

This document and process conversion measures necessary to comply with this revision shall be completed by 1 May 1999

INCH-POUND

MIL-DTL-6000C
10 December 1998
SUPERSEDING
MIL-H-6000B
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DETAIL SPECIFICATION

HOSE, RUBBER (FUEL, OIL, COOLANT, WATER, AND ALCOHOL)

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

1. SCOPE

1.1 Scope. This specification covers one type of hose for use in fuel, oil, coolant, water, and alcohol lines in engine installations.

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 cited 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 supplement thereto, cited in the solicitation (see 6.2).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Defense Supply Center, Columbus, DSCC-VAI, 3990 East Broad Street, Columbus, OH 43216-5000, 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.

SPECIFICATIONS

DEPARTMENT OF DEFENSE

MIL-M-6002 - Marking; Standard Hose, Aircraft

(Unless otherwise indicated, copies of the above specification are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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

OTHER GOVERNMENT DOCUMENTS

DEFENSE LOGISTICS AGENCY

Cataloging Handbook H4/H8 - Commercial and Government Entity Code

(Copies of this document are available from the Defense Logistics Services Center, 74 North Washington Avenue, Battle Creek, MI 49017-3094.)

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).

AEROSPACE INDUSTRIES ASSOCIATION (AIA)

NAS 1925 - Clamp, Hose (DoD adopted)

(Application for copies should be addressed to the Aerospace Industries Association of America, Inc., 1250 Eye Street, N.W., Washington, D.C. 20005.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D380 - Rubber Hose, Standard Test Methods for (DoD adopted)
ASTM D412 - Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension, Standard Test Methods for (DoD adopted)
ASTM D413 - Rubber Property - Adhesion to Flexible Substrate, Standard Test Methods for (DoD adopted)
ASTM D471 - Rubber Property - Effect of Liquids, Standard Test Method for (DoD adopted)
ASTM E1119 - Industrial Grade Ethylene Glycol, Standard Specification for (DoD adopted)

(Application for copies should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE AMS 3002	-	Alcohol, Denatured Ethyl
SAE AS1933	-	Age Controls for Hose Containing Age-Sensitive Elastomeric Material (DoD adopted)
SAE AS5131	-	Tube End - Beaded, Design Standard
SAE AS5132	-	Fitting End - Hose Connection, Design Standard

(Application for copies should be addressed to the Society of Automotive Engineers International, 400 Commonwealth Drive, Warrendale, PA 15096-0001.)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/NCSL Z540-1	-	Calibration Laboratories and Measuring and Test Equipment, General Requirements.
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(Application for copies should be addressed to the American National Standard Institute, 1430 Broadway New York 10018-3308.)

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 Qualification. The rubber hose furnished under this specification shall be a product that is authorized by the qualifying activity for listing on the applicable qualified products list before contract award (see 4.4 and 6.3).

3.2 Materials. The hose shall be uniform in quality and free from material defects. Materials shall be as specified herein and shall conform to all applicable specifications. Materials not specified herein shall be of the best quality and be capable of meeting all of the requirements of this specification.

3.2.1 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.2.2 Hazardous substances. The use of hazardous substances, toxic chemicals, or ozone depleting chemicals (ODCs) shall be avoided, whenever feasible.

3.3 Design and construction. The hose shall consist of a seamless compounded inner tube, ply or plies or reinforcement, and a protective outer coating. The hose shall be compatible with standard hose connection fitting ends conforming to SAE AS5132, tubing ends conforming to SAE AS5131, and hose clamps conforming to NAS 1925. The design shall facilitate servicing, adjustment, or replacement under field conditions.

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3.3.1 Inner tube. The inner tube of the hose shall be manufactured from synthetic rubber compounded with the necessary ingredients to meet the requirements of this specification. It shall be seamless and have a minimum thickness of 0.040 inch. The bore shall be clean and free from pitting.

3.3.2 Reinforcement. The reinforcement shall consist of one or more plies with frictioning.

3.3.3 Outer coating. The outer coating shall consist of polychloroprene rubber and reinforcement compounded to meet the requirements of this specification.

3.3.4 Age. The hose shall meet the age requirements of SAE AS1933 (see 6.5).

3.4 Size.

3.4.1 Diameters. The inside and outside diameters of the hose shall be as specified in table I.

TABLE I. Hose diameters.

Size code	Nominal hose size inches	Nominal hose size inches, (decimal)	Inside diameter, inches		Outside diameter, inches	
			minimum	maximum	minimum	maximum
A	1/4	.250	.234	.266	.563	.625
B	5/16	.313	.297	.328	.625	.688
C	3/8	.375	.359	.391	.688	.750
D	1/2	.500	.484	.516	.813	.875
E	5/8	.625	.609	.641	.938	1
F	3/4	.750	.734	.766	1.063	1.125
G	7/8	.875	.844	.906	1.188	1.250
H	1	1	.969	1.031	1.313	1.375
J	1-1/4	1.250	1.219	1.281	1.625	1.750
K	1-1/2	1.500	1.469	1.531	1.875	2
L	1-3/4	1.750	1.734	1.766	2.125	2.250
M	2	2	1.969	2.031	2.375	2.500
N	2-1/2	2.500	2.469	2.531	2.875	3
P	3	3	2.969	3.031	3.375	3.500
Q	3-1/2	3.500	3.469	3.531	3.938	4.063
R	4	4	3.969	4.031	4.438	4.563

3.4.2 Length. Unless otherwise specified by the acquiring activity (see 6.2), the hose shall be furnished in any lengths 10 feet or greater, except that not more than 10 percent of the order may be furnished in random lengths greater than 3 feet and less than 10 feet. A tolerance of ± 1 inch shall be allowed for a specified length of from 3 to 10 feet. All ends shall be squarely cut.

3.5 Performance characteristics.

3.5.1 Examination of product. When visually examined and dimensionally checked as specified in 4.6.1, the hose shall meet the requirements specified herein.

3.5.2 Hydrostatic pressures.

3.5.2.1 Burst pressure. When tested as specified in 4.6.2.1, the burst pressure of the hose shall be as specified in table II.

TABLE II. Hose pressure requirements.

Hose size, inches (based on inside diameter)	Burst pressure, psi minimum	Proof pressure, psi minimum
1/4 to 1, inclusive	1,000	500
1-1/4 to 1-1/2, inclusive	800	400
1-3/4 to 2, inclusive	600	300
2-1/2 to 3, inclusive	400	200
3-1/2	350	175
4	300	150

3.5.2.2 Proof pressure. When tested as specified in 4.6.2.2, the proof pressure shall be as specified in table II. The hose shall show no signs of leaking through the hose wall.

3.5.2.3 Length change. When tested as specified in 4.6.2.3, the length of the hose shall not change by more than 10 percent.

3.5.3 Installation. When tested as specified in 4.6.3, the force necessary to install a fitting end conforming to SAE AS5132 into a 1-inch size hose shall be not greater than 50 pounds.

3.5.4 Circulation.

3.5.4.1 High temperature - 200 hours. When tested as specified in 4.6.4.1, the burst pressure of the hose shall be not less than 50 percent of the burst pressure specified in table II.

3.5.4.2 High temperature - 50 hours. When tested as specified in 4.6.4.2, the burst pressure of the hose shall be not less than 50 percent of the burst pressure specified in table II.

3.5.5 Low-temperature flexibility. When tested as specified in 4.6.5, the hose shall not break or show cracks in the tube or coating.

3.5.6 Bend radii. When tested as specified in 4.6.6, the minimum outside diameter of the hose shall be not less than 75 percent of the original outside diameter of the hose.

3.5.7 Adhesion. When tested as specified in 4.6.7, the minimum tension required to cause separation between the tube and adjacent parts at the specified rate shall be not less than 15 pounds per inch of width (piw).

3.5.7.1 Iso-octane. When tested as specified in 4.6.7.1, the minimum tension required to cause separation between the tube and adjacent parts at the specified rate shall be not less than 6 piw.

3.5.8 Volume change.

3.5.8.1 Ethylene glycol immersion. When tested as specified in 4.6.8.1, the decrease in tube volume shall be not greater than 10 percent.

3.5.8.2 Oil immersion. When tested as specified in 4.6.8.2, the tube shall show no decrease in volume.

3.5.8.3 Fuel immersion. When tested as specified in 4.6.8.3, the increase in tube volume shall be not greater than 85 percent.

3.5.9 Tensile strength. When tested as specified in 4.6.9, the original tensile strength of the tube shall be not less than 1,000 pounds per square inch (psi).

3.5.9.1 Fuel immersion. When tested as specified in 4.6.9.1, the tensile strength of the tube shall be not less than 45 percent of the original tensile strength.

3.5.10 Elongation. When tested as specified in 4.6.10, the original ultimate elongation of the tube shall be not less than 250 percent.

3.5.10.1 Ethylene glycol immersion. When tested as specified in 4.6.10.1, the elongation of the tube shall be not less than 40 percent of the original elongation and in no case be less than 140 percent.

3.5.10.2 Oil immersion. When tested as specified in 4.6.10.2, the elongation of the tube shall be not less than 40 percent of the original elongation and in no case be less than 140 percent.

3.5.10.3 Fuel immersion. When tested as specified in 4.6.10.3, the elongation of the tube shall be not less than 50 percent of the original elongation.

3.5.11 Crush resistance. When tested as specified in 4.6.11, the crush resistance of the hose shall be not greater than 35 pounds per lineal inch to produce a 50 percent decrease of the inside diameter.

3.5.12 Water and alcohol resistance. When tested as specified in 4.6.12, the tensile loss of the tube shall be not greater than 35 percent.

3.6 Identification of product. The hose shall be marked for identification in accordance with MIL-M-6002. In addition, each hose shall be legibly marked along the longitudinal axis with a red stripe consisting of the Commercial and Government Entity (CAGE) code in accordance with Cataloging Handbook H4/H8, and a white stripe consisting of the size, cure date in quarter and year, and specification (for example; Size 5/8 1Q98 6000) which shall be repeated at least every 6 inches. The hose shall be rejected when any marking is not legible.

3.7 Workmanship. The hose shall be free from all defects or irregularities which would adversely affect its service performance.

TABLE III. Qualification and Group B extended acceptance.

Test Nominal ID size (inches) ^{1/}	Extended to Nominal ID size (inches)
1 inch	1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8,
2 inch	1-1/4, 1-1/2, 1-3/4
4 inch	2-1/2, 3, 3-1/2

^{1/} Manufacturers qualifying hose of a different ID size than listed below shall be independently qualified. See the qualifying activity for guidelines.

4. VERIFICATION

4.1 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities of sufficient accuracy, quality, and quantity to permit performance of the required inspection shall be established and maintained by the contractor. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment (i.e. Industry Standard, Military Standard, etc.) shall be in accordance with ANSI/NCSS Z540-1 or equivalent.

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

- a. Qualification inspection (see 4.4).
- b. Conformance inspection (see 4.5.1).
 1. Group A lot acceptance inspection (see 4.5.1.1)
 2. Group B periodic inspection (see 4.5.1.2)

4.3 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with the ASTM methods referenced in the test procedures. Where adhesion after immersion is specified, a section of hose approximately 4 inches long shall be immersed and test specimens shall be prepared from the center portion of this section after immersion.

TABLE IV. Qualification inspection.

Inspection	Requirement Paragraph	Test Paragraph
Examination of product	3.5.1	4.6.1
Burst pressure	3.5.2.1	4.6.2.1
Proof pressure	3.5.2.2	4.6.2.2
Length change	3.5.2.3	4.6.2.3
Installation	3.5.3	4.6.3
Circulation		
High temperature - 200 hours	3.5.4.1	4.6.4.1
High temperature - 50 hours	3.5.4.2	4.6.4.2
Low temperature flexibility	3.5.5	4.6.5
Bend radii	3.5.6	4.6.6
Adhesion	3.5.7	4.6.7
Iso-octane	3.5.7.1	4.6.7.1
Volume change		
Ethylene glycol immersion	3.5.8.1	4.6.8.1
Oil immersion	3.5.8.2	4.6.8.2
Fuel immersion	3.5.8.3	4.6.8.3
Tensile strength	3.5.9	4.6.9
Fuel immersion	3.5.9.1	4.6.9.1
Elongation	3.5.10	4.6.10
Ethylene glycol immersion	3.5.10.1	4.6.10.1
Oil immersion	3.5.10.2	4.6.10.2
Fuel immersion	3.5.10.3	4.6.10.3
Crush resistance	3.5.11	4.6.11
Water and alcohol resistance	3.5.12	4.6.12

TABLE V. Conformance inspection.

Inspection	Test Paragraph
Group A (lot acceptance)	
Examination of product	4.6.1
Proof pressure	4.6.2.2
Group B (periodic)	
Low temperature flexibility	4.6.5
Fuel immersion	4.6.8.3
Length change	4.6.2.3
Burst pressure	4.6.2.1

4.4 Qualification inspection. Qualification inspection shall be performed at a laboratory acceptable to the Government on sample units produced with equipment and procedures used in production. Qualification may be extended to include an ID range of product in accordance with table III produced with the same materials and processes.

4.4.1 Samples for qualification. Samples for qualification shall be representative of the products proposed to be furnished to the Government. The test sample shall be the nominal size of hose as specified in table III and shall consist of not less than 30 feet of hose.

4.4.2 Failures. One or more failures shall be cause for refusal to grant qualification approval.

4.4.3 Retention of qualification. To retain qualification, the contractor shall verify in coordination with the qualifying activity the capability of manufacturing products which meet the performance requirements of this specification. Refer to the qualifying activity for the guidelines necessary to retain qualification to this specification. The contractor shall immediately notify the qualifying activity at any time the inspection data indicates failure of the qualified product to meet the performance requirements of this specification.

4.5 Inspection of product for delivery. Inspection of product for delivery shall consist of group A.

4.5.1 Conformance inspection.

4.5.1.1 Group A inspection. Group A inspection shall consist of the inspections specified in table V in the order shown. Each hose manufacturer is responsible for developing a Group A sample plan based on production methods, in-line monitors and inspection capabilities that have documented approval by the qualifying activity.

4.5.1.1.1 Group A sampling plan. Group A tests specified in table V shall be performed on a production lot basis. Random samples shall be selected to form an inspection lot. If one or more defects are found in the inspection lot, then the production lot shall be screened for that particular defect and defects removed. An inspection lot shall be selected from the production lot and all group A tests again performed. If one or more defects are found in the second inspection lot, the production lot shall be rejected and shall not be supplied to this specification.

4.5.1.1.2 Production lot. A production lot shall consist of bulk hose manufactured on the same production line(s) by means of the same production technique, materials, controls, and design during the same continuous production run.

4.5.1.2 Group B inspection (periodic). Group B tests specified in table V shall be made on 3 test samples of the length specified in the applicable test which have been subjected to and passed the group A inspection. Group B inspection shall be performed once every 12 calendar weeks. Acceptance may be extended to include an ID range of product in accordance with table III but the ID size of product that the extended acceptance applies to shall have been produced during the same production period with the same materials and processes.

4.5.1.2.1 Group B sampling plan. A sample of 3 parts shall be randomly selected in accordance with 4.6.2.1, 4.6.2.3, 4.6.5, and 4.6.8.3. Parts shall be as representative as possible of the production lots for the time period that they represent (for example, parts shall be from different lots, different production dates, different ID's etc.). Parts tested must be from actual production lots and are not to be built just for testing. Manufacturers are not required to do Group B testing for a range if there has been no production for that range during the period covered by the testing. If there has been no production for a specific range for a period of two years, the qualifying activity has the option of requiring the manufacturer to build parts to perform Group B tests.

4.5.1.2.2 Nonconformance. If a sample fails to pass any group B inspection, the manufacturer shall immediately notify the qualifying activity and cognizant inspection activity of such failure and take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured under essentially the same conditions, with essentially the same materials and processes, and which are considered subject to the same failure. Acceptance and shipment of the product shall be discontinued until corrective action, acceptable to the qualifying activity has been taken. After the corrective action has been taken, group B inspection shall be repeated on additional samples (all inspections, or the inspection which the original sample failed, at the option of the qualifying activity). Group A (and group B if applicable) inspection may be reinstated; however, final acceptance shall be withheld until the group B inspection has shown that the corrective action was successful. In the event of failure after inspection, information concerning the failure and corrective action taken shall be furnished to the cognizant inspection activity and the qualifying activity.

4.5.1.2.3 Disposition of test specimens. Test specimens which have been tested to group B inspection shall not be delivered on the contract or purchase order.

4.6 Methods of inspection. The following identified tests and test methods assure hose integrity within typical operating conditions and applications. Alternate commercial industry standard test methods are allowed; however when an alternate method is used, documented approval must be obtained from the qualifying activity prior to the performance of the test. The test methods described herein are proven methods and shall be the referee method in case of dispute.

4.6.1 Examination of product. The hose shall be visually examined for identification markings and workmanship. Spot checks shall be made to determine dimensions and tolerances. With approval from the qualifying activity, statistical quality control may be used for marking, workmanship, and dimensional examination. Requirements shall be as specified in 3.5.1.

4.6.2 Hydrostatic pressures.

4.6.2.1 Burst pressure. Burst pressure testing shall be conducted in accordance with ASTM D380 except that fluid conforming to ASTM D471 Oil No. 1 shall be used as the test liquid instead of water. The burst pressure of the hose shall meet the requirements specified in 3.5.2.1.

4.6.2.2 Proof pressure. Proof pressure testing shall be conducted in accordance with ASTM D380 except that fluid conforming to ASTM D471 Oil No. 1 shall be used as the test liquid instead of water. The hose shall be subjected to a hydrostatic pressure of 50 percent of the minimum burst pressure specified in table II for not less than 30 seconds and not more than 3 minutes. The hose shall meet the requirements specified in 3.5.2.2.

4.6.2.3 Length change. A 10-inch length of hose (original) shall be subjected to a hydrostatic pressure of 50 percent of the burst pressure specified in table II. The change in length of the hose shall meet the requirements specified in 3.5.2.3.

4.6.3 Installation. The tube of a 4-inch length of hose shall be lubricated with fluid conforming to ASTM D471 Oil No. 1. A hose connection fitting end, conforming to the nominal "B" and "C" dimensions, ± 0.001 inch, of SAE AS5132, shall be inserted 0.375 inch into the tube. The hose and fitting shall be placed upright in a compression jig mounted in a standard testing machine having a jaw speed of 1 inch per minute. The force necessary to install the fitting into the hose shall be determined and recorded and shall meet the requirements specified in 3.5.3.

4.6.4 Circulation.

4.6.4.1 High temperature - 200 hours. A 9-inch or longer length of hose shall be used for this test. Fitting ends shall conform to AS5132 and hose clamps shall conform to NAS 1925. The hose clamp shall be tightened to 25 inch-pounds torque initially.

- a. Ethylene glycol conforming to ASTM E1119 and fluid conforming to ASTM D471 Oil No. 1 shall be circulated through the hose for 16 hours followed by 8 hours of no circulation. This shall be continued until 200 hours of circulation time is accumulated. An ambient temperature of 140 ± 10 °F (60 ± 5.5 °C) shall be maintained during the circulation periods. The hose clamp shall not be torqued more than three times during this test.
- b. Ethylene glycol conforming to ASTM E1119 shall be circulated through one hose while maintaining a hose inlet pressure of 75 psi gage and a temperature of 286 to 300 °F (141 to 149 °C).
- c. Fluid conforming to ASTM D471 Oil No. 1 shall be circulated through the second hose while maintaining a hose inlet pressure of 50 psi gage and a temperature of 244 to 261 °F (118 to 127 °C).

Upon completion of the circulation test, the burst pressure (4.6.2.1) of the hose shall be determined and shall meet the requirements specified in 3.5.4.1.

4.6.4.2 High temperature - 50 hours. A 9-inch or longer length of hose shall be used for this test. Fitting ends, hose clamps, and torque shall be the same as specified in 4.6.4.1 except that the hose clamp shall not be torqued more than four times during this test. Ethylene glycol conforming to ASTM E1119 shall be circulated through the hose for 50 continuous hours while maintaining a temperature of 286 to 300 °F (141 to 149 °C). Upon completion of the circulation test, the burst pressure (4.6.2.1) of the hose shall be determined and shall meet the requirements specified in 3.5.4.2. If the hose fails, two more samples shall be selected from the same length and tested.

4.6.5 Low-temperature flexibility. Hose of 1 inch and less (inside diameter) shall be tested by conditioning a straight piece of hose at least 12 inches long in a cold chamber at -40 ± 4 °F (-40 ± 2 °C) for 5 hours. Within 2 seconds of removal from the cold chamber, the hose shall be bent around a cooled mandrel having a diameter of 10 times the outside diameter of the hose. Bending shall be completed within 1 second. Hose over 1 inch (inside diameter) shall be tested in accordance with ASTM D380 at -40 ± 4 °F (-40 ± 2 °C). Requirements for hose of any inside diameter shall be as specified in 3.5.5.

4.6.6 Bend radii. A length of hose shall be bent so that the inside radius of the hose is equal to 12 times the inside diameter of the hose. Requirements shall be as specified in 3.5.6.

4.6.7 Adhesion. The adhesion shall be determined in accordance with the Static-Mass Method (for ring specimens) of ASTM D413 and shall meet the requirements specified in 3.5.7.

4.6.7.1 Iso-octane. A 4-inch length of hose shall be boiled for 1 hour in fluid conforming to ASTM D471 Reference Fuel A. The container in which the test is run shall be fitted with a reflux condenser. The fuel and hose shall be allowed to cool for at least 24 hours. For ring specimens, three 1-inch widths shall be cut from the center portion of the 4-inch length. The adhesion shall be determined as specified in 4.6.7 within 30 minutes after removal from the fuel. Requirements shall be as specified in 3.5.7.1.

4.6.8 Volume change.

4.6.8.1 Ethylene glycol immersion. Test specimens shall be immersed in a solution of 97 percent ethylene glycol, conforming to ASTM E1119, at a temperature of 286 to 300 °F (141 to 149 °C) for 70 hours. At the end of the immersion period, the specimens shall be removed from the solution and cooled in fresh ethylene glycol at room temperature for 30 minutes. The specimens shall then be wiped to remove any ethylene glycol from the surface and the change in volume shall be immediately determined in accordance with ASTM D380. Requirements shall be as specified in 3.5.8.1.

4.6.8.2 Oil immersion. Test specimens shall be immersed in fluid conforming to ASTM D471 Oil No. 1 at a temperature of 244 to 261 °F (118 to 127 °C) for 70 hours. The container in which the test is run shall be fitted with a reflux condenser. At the end of the immersion period, the specimens shall be removed from the oil and cooled in fresh oil at room temperature for 30 minutes. The specimens shall then be wiped to remove any oil from the surface and the change in volume shall be immediately determined in accordance with ASTM D380. Requirements shall be as specified in 3.5.8.2.

4.6.8.3 Fuel immersion. Test specimens from the tube shall be immersed in fluid conforming to ASTM D471 Reference Fuel B at a temperature of 70 to 81 °F (21 to 27 °C) for 24 hours. At the end of the immersion period, the specimens shall be removed from the fuel and wiped to remove any fuel from the surface. The change in volume shall be determined within 5 minutes in accordance with ASTM D380. Requirements shall be as specified in 3.5.8.3.

4.6.9 Tensile strength. The tensile strength shall be determined in accordance with ASTM D412 and shall meet the requirements specified in 3.5.9.

4.6.9.1 Fuel immersion. Dumbbell test specimens from the tube shall be suspended in fluid conforming to ASTM D471 Reference Fuel B at a temperature of 70 to 81 °F (21 to 27 °C) for 48 hours. The specimens shall then be removed from the fluid and the tensile strength shall be determined within 5 minutes in accordance with ASTM D412. Tensile strength calculations shall be based on the original cross-sectional area of the test specimens. Requirements shall be as specified in 3.5.9.1.

4.6.10 Elongation. The ultimate elongation shall be determined on dumbbell specimens in accordance with ASTM D412 and shall meet the requirements specified in 3.5.10.

4.6.10.1 Ethylene glycol immersion. Dumbbell test specimens shall be immersed in a solution of 97 percent ethylene glycol, conforming to ASTM E1119, at a temperature of 286 to 300 °F (141 to 149 °C) for 70 hours. At the end of the immersion period, the specimens shall be removed from the solution and cooled in fresh ethylene glycol at room temperature for 30 minutes. The specimens shall then be wiped to remove any ethylene glycol from the surface and allowed to stand in air at room temperature for 4 hours ±15 minutes before the elongation of the tube is determined in accordance with ASTM D412. Requirements shall be as specified in 3.5.10.1.

4.6.10.2 Oil immersion. Dumbbell test specimens shall be immersed in fluid conforming to ASTM D471 Oil No. 1 at a temperature of 244 to 261 °F (118 to 127 °C) for 70 hours. The container in which the test is run shall be fitted with a reflux condenser. At the end of the immersion period, the specimens shall be removed from the oil and cooled in fresh oil at room temperature for 30 minutes. The specimens shall then be wiped to remove any oil from the surface and allowed to stand in air at room temperature for 4 hours ±15 minutes before the elongation of the tube is determined in accordance with ASTM D412. Requirements shall be as specified in 3.5.10.2.

4.6.10.3 Fuel immersion. Dumbbell test specimens from the tube shall be immersed in fluid conforming to ASTM D471 Reference Fuel B at a temperature of 70 to 81 °F (21 to 27 °C) for 24 hours. At the end of the immersion period, the specimens shall be removed from the fuel and wiped to remove any fuel from the surface. The elongation shall be determined within 5 minutes in accordance with ASTM D412. Requirements shall be as specified in 3.5.10.3.

4.6.11 Crush resistance. A 3-inch length of hose shall be subjected to the 200-hour high temperature ethylene glycol circulation test. The hose shall be allowed to cool at room temperature for at least 4 hours before crush tests are performed. A force shall be applied at a rate of speed of 1 inch per minute. The inside diameter of the hose shall be measured with a "go or no-go" rod during the time the force is being applied and shall decrease at least 50 percent of the original inside diameter when a maximum load of 105 pounds has been applied. Requirements shall be as specified in 3.5.11.

4.6.12 Water and alcohol resistance. Test specimens from the tube shall be immersed in a solution of 50 percent water and 50 percent alcohol, conforming to AMS 3002, at a temperature of 158 °F (70 °C) for 24 hours under reflux. The samples shall be tested in accordance with ASTM D412 except that the tensile strength shall be determined within 15 minutes after they are removed from the solution. Tensile strength calculations shall be based on the original cross-sectional area of the test specimens. Requirements shall be as specified in 3.5.12.

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 or 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 which may be helpful, but is not mandatory.)

6.1 Intended use. The rubber hose covered by this specification is a military-unique item that is used in military weapons systems including fighter, surveillance, and cargo aircraft, and carrier-based anti-submarine warfare and search and rescue helicopters requiring interoperability and compatibility with associated components and equipment. The intended use of the hose is for use in fuel, oil, coolant, water, and alcohol lines in engine installations. If used in lengths greater than 18 inches, however, the hose has a tendency to collapse. The qualification process ensures the hose will meet the hydrostatic pressure requirements. Manufacturers and users of this hose place great reliance on the detailed technical requirements to ensure that it meets the interoperability and compatibility requirements.

MIL-DTL-6000C

6.2 Acquisition requirements. Acquisition documents must specify the following:

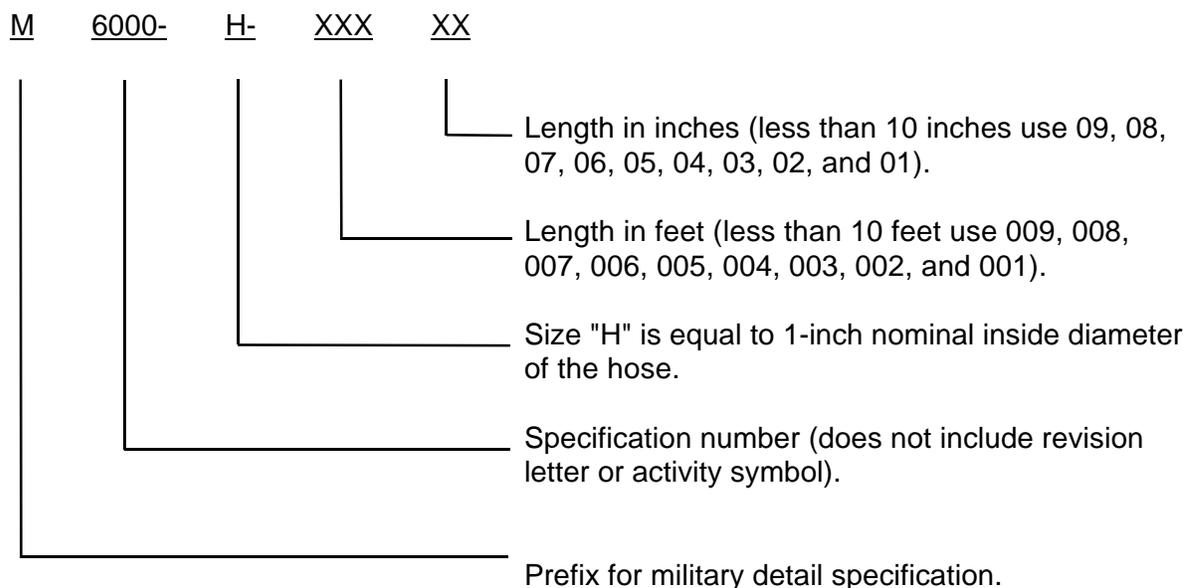
- a. Title, number, and date of this specification.
- b. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2 and 2.3).
- c. Size and quantity of hose required.
- d. Length of hose when lengths greater than 10 feet are acquired.
- e. Packaging requirements (see 5.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion on Qualified Products List QPL-6000 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from the Commander, Defense Supply Center, Columbus, DSCC-VQP, 3990 East Broad Street, Columbus, OH 43216-5000.

6.4 References to superseded specifications. All the requirements of MIL-DTL-6000C are interchangeable with those of MIL-H-6000B, therefore, previously existing documents (OEM drawings, etc.) referencing MIL-H-6000 need not be changed.

6.5 Age definition. Since hose is dated by the quarters of the year, it is necessary to judge hose age in terms of time after the quarter and year of manufacture. Hose manufactured during the first quarter of any year will not become one quarter old until the second quarter of that year.

6.6 Part or Identifying Number (PIN). The PIN to be used for rubber hose acquired under this specification is constructed as follows:



Example of PIN: a 1-inch inside diameter hose that is 6 feet 10 inches long is described as M6000-H-00610.

6.7 Subject term (key word) listing.

- Inner tube
- Outer coating
- Reinforcement

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

Custodians:

- Army - AT
- Navy - AS
- Air Force - 99

Preparing activity:

DLA - CC

(Project No. 4720-0196)

Review activities:

- Army - MI
- Navy - SH
- Air Force - 82

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.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-DTL-6000C	2. DOCUMENT DATE (YYMMDD) 10 DECEMBER 1998
3. DOCUMENT TITLE HOSE, RUBBER (FUEL, OIL, COOLANT, WATER, AND ALCOHOL)		
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) DSN (If applicable)	7. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY		
a. NAME Defense Supply Center Columbus	b. TELEPHONE (Include Area Code) (1) Commercial 614-692-1568 (2) DSN 850-1568 (3) Fax 614-692-6939	
c. ADDRESS (Include Zip Code) DSCC-VAI 3990 East Broad Street Columbus, Ohio 43216-5000	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Standardization Program Office, Attn: DLSC-LM 8725 John J. Kingman Road, Suite 1655, Fort Belvoir, VA. 22060-6221 Telephone (703) 767-6888 DSN 427-6888	