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INCH-POUND

MIL-PRF-26385F
16 March 1998
SUPERSEDING
MIL-H-26385E
20 July 1994

PERFORMANCE SPECIFICATION

HOSE, OXYGEN AND PRESSURIZATION, OZONE RESISTANT

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

1. SCOPE

1.1 Scope. This specification covers ozone resistant hoses for use with pressurizing and oxygen breathing systems.

1.2 Size. This specification covers hoses conforming to the internal diameters and lengths identified in the table on figure 1 (see 6.2 and 6.12).

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are cited in sections 3 and 4 of this specification. These lists do 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 these lists, document users are cautioned that they must meet the requirements specified in the documents cited in sections 3 and 4 of this specification, whether or not they are listed.

Beneficial comments (recommendations, additions, deletions) and any pertinent data that may be of use in improving this document should be addressed to: Oklahoma City Air Logistics Center/TICLA, 3001 Staff Drive, Suite 1AE1-101A, Tinker AFB, OK 73145-3036, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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2.2 Government documents.

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

SPECIFICATIONS

FEDERAL

BB-A-1034	-	Compressed Air, Breathing
BB-N-411	-	Nitrogen, Technical
CCC-C-419	-	Cloth, Duck, Unbleached, Plied-Yarns, Army and Numbered

STANDARDS

FEDERAL

FED-STD-191	-	Textile Test Methods
FED-STD-595	-	Colors Used In Government Procurement

DEPARTMENT OF DEFENSE

AN807	-	Adapter, Straight, Tube To Hose
MS22064	-	Clamp-Hose
MS33658	-	Fitting End, Hose Connection, Standard Dimensions For

(Unless otherwise indicated, copies of the above specifications and standards are available from the Defense Automated Printing Service, 700 Robbins Avenue, Building 4D, 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 applicable issues of the documents which have been adopted by the DoD are those listed in the specific issue of the DoDISS cited in the solicitation. Unless otherwise specified, the documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE AS 8010	-	Aviator’s Breathing Oxygen Purity Standard
SAE AS 1065	-	Quality & Serviceability Requirements for Aircraft Cylinder Assemblies Charged With Aviator’s Breathing Oxygen

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SAE AS 1933 - Age Controls for Hose Containing Age-Sensitive Elastomeric Material (DoD-adopted)

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D1149 - Standard Test Method for Rubber Deterioration-Surface Ozone Cracking in a Chamber (DoD-adopted)

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

AMERICAN NATIONAL STANDARDS INSTITUTE/AMERICAN SOCIETY FOR QUALITY CONTROL (ANSI/ASQC)

ANSI/ASQC Z1.4 - Sampling Procedures and Tables for Inspection by Attributes (DoD-adopted)

(Application for copies should be addressed to American Society for Quality Control, P.O. Box 3066, Milwaukee, WI 53201-3066, or to the American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036.)

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), the hose shall be subjected to first article inspection in accordance with 4.2.

3.2 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 cost.

3.3 Materials. All materials shall be suitably treated to resist corrosion due to electrolytic decomposition and any other atmospheric condition that may be encountered during operational use or storage. The use of toxic chemicals, hazardous substances, or ozone depleting chemicals shall be avoided, whenever feasible (see 6.3).

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3.3.1 Ozone resistance. End cover material, inner liner material, and elastomers shall be ozone resistant.

3.4 Interface.

3.4.1 Color. The exterior of the hose shall be lusterless green, color 34079 of FED-STD-595.

3.4.2 Fittings. The hose shall be compatible with fittings conforming to AN807 and MS33658, and with hose clamps conforming to MS22064.

3.4.3 Dimensions. The hose shall conform to the dimensions shown in figure 1.

3.5 Performance.

3.5.1 Components.

3.5.1.1 Hose reinforcement. The hose shall be reinforced (see 6.4 and figure 1).

3.5.1.2 Inner liner. The hose shall be provided with an inner liner (see figures 1 and 2).

3.5.1.3 End cover. The hose shall be provided with an end cover 0.750 inches in length on each end (see figures 1 and 2).

3.5.1.4 Outer covering. The hose shall be provided with an outer covering (see 6.5 and figures 1 and 2).

3.5.2 Leakage. With an internal pressure of 25 psi, the hose shall not leak.

3.5.3 Delamination. Under a vacuum of 16 inches of mercury, the inner liner shall not delaminate.

3.5.4 Cleanliness. The hose shall be free of contaminants such as rust, scale, dirt, paints, oils, hydrocarbons, and cleaning compounds.

3.5.5 Flexibility. The hose shall be free from any permanent set after being coiled around a 1.5 inch diameter rod and rotated 90° about its longitudinal axis four times (see 6.6).

3.5.6 Elongation. The hose, when suspended vertically with a 60 pound weight suspended from the lower end, shall not elongate more than 2 inches per foot of hose length. Any permanent set shall not exceed 2% of the hose length.

3.5.7 Static load. Under a static load of 225 pounds normal to the diameter of a 4-inch length of the hose, the outside diameter shall not be decreased more than 10% of the original value. After removal of the static load, the outside diameter of the hose shall be within 5% of the original diameter.

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3.5.8 Flexibility endurance. The hose shall withstand being coiled and uncoiled around a 1.5 inch diameter rod 500 times. The hose shall then withstand being twisted 180° in both directions 500 times.

3.5.9 Abrasion. The hose shall withstand abrasion occurring during normal usage.

3.5.10 Odor. The hose shall be odorless.

3.5.11 Low temperature. The hose shall withstand exposure to -65° ± 5°F for 48 hours.

3.5.12 High temperature. The hose shall withstand exposure to 160° ± 5°F for 48 hours.

3.5.13 Age. Hose shall be no more than 12 months old from the cure date to the acceptance date as defined in SAE AS 1933 (see 6.3).

3.5.14 Weight. The hose shall not exceed 3.0 ounces per foot of length.

3.5.15 Identification. The hose shall be permanently and legibly marked with the following data (see 6.2):

a. Nomenclature.
b. Cure date.
c. PIN.
d. National stock number.
e. Manufacturer’s CAGE code.
f. Manufacturer’s part number.

3.6 Interchangeability. All parts having the same manufacturer’s part number shall be functionally and dimensionally interchangeable.

4. VERIFICATION

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

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

4.2 First article inspection. First article inspection shall be performed on two 12-inch length hoses and shall consist of all tests in section 4.6.

4.3 Conformance inspection. Conformance inspection shall consist of the individual tests in 4.3.1 and the sampling tests in 4.3.2.

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4.3.1 Individual tests. Each hose shall be subjected to the following tests:

a. Examination (see 4.6.1).
b. Leakage (see 4.6.2).
c. Delamination (see 4.6.3).

4.3.2 Sampling tests. Sampling tests shall be performed in accordance with the guidance in ANSI/ASQC Z1.4. Sampling shall begin at the normal inspection level (see 6.7). The sampling tests are:

a. Cleanliness (see 4.6.4).
b. Flexibility (see 4.6.5).
c. Elongation (see 4.6.6).
d. Static load (see 4.6.7).
e. Odor (see 4.6.10).

4.4 Test conditions. Unless otherwise specified herein, all tests shall be performed under the following test conditions:

a. Ambient atmospheric conditions.
b. Oxygen conforming to Type I of SAE AS 8010.

4.5 Requirements cross-reference matrix. Table I provides a cross-reference matrix of the section 3 requirements tested or verified in the paragraphs below.

TABLE I. Requirements cross-reference matrix

Requirement	Verification	Requirement	Verification
3.1	4.2	3.5.5	4.6.5, 4.6.8
3.3	4.6.1	3.5.6	4.6.6
3.3.1	4.6.13	3.5.7	4.6.7
3.4.1	4.6.1	3.5.8	4.6.8
3.4.2	4.6.1, 4.6.2	3.5.9	4.6.9
3.4.3	4.6.1	3.5.10	4.6.10
3.5.1.1	4.6.5, 4.6.6, 4.6.7	3.5.11	4.6.11
3.5.1.2	4.6.1, 4.6.3	3.5.12	4.6.12
3.5.1.3	4.6.1	3.5.13	4.6.14
3.5.1.4	4.6.1	3.5.14	4.6.1
3.5.2	4.6.2	3.5.15	4.6.1
3.5.3	4.6.3	3.6	4.6.1
3.5.4	4.6.4		

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4.6 Tests.

4.6.1 Examination. The hose shall be examined to determine that the materials, interface, inner liner, end cover, outer covering, weight, identification, and interchangeability conform to this specification.

4.6.2 Leakage. With fittings conforming to AN807 or MS33658, and secured by a clamp conforming to MS22064, the hose shall be subjected to a static pressure of 25 psi for 2 minutes. The hose shall not leak (see 6.8).

4.6.3 Delamination. With one end of the hose capped, a vacuum equivalent to 16 inches of mercury shall be applied to the hose for 10 minutes. While the vacuum is maintained, the inner liner shall show no evidence of delamination (see 6.9).

4.6.4 Cleanliness. The hose shall be free of contaminants such as paints, oils, hydrocarbons, and cleaning compounds. Cleanliness of the surfaces shall be demonstrated by industrially accepted methods and these methods shall be identified (see 6.2 and 6.10).

4.6.5 Flexibility. The hose shall be coiled and uncoiled around a 1.5 inch diameter rod four times; after each coiling and uncoiling the hose shall be turned 90° clockwise about its longitudinal axis. The hose shall have no permanent set.

4.6.6 Elongation. The hose shall be suspended by one end, vertically, and a 60 pound pull shall be applied for 10 minutes. The length shall increase no more than 16% of the hose length. Two minutes after removal of the force, the hose shall have no permanent set in excess of 2% of the hose length.

4.6.7 Static load. A static load of 225 pounds shall be applied to a 4 inch section of the reinforced portion of the hose, and this force shall be normal to the longitudinal axis. With the load applied, the outside diameter shall not reduce more than 10 percent. Two minutes after the load is removed, the reduction of the outside diameter shall be no more than 5 percent.

4.6.8 Flexibility endurance. The hose shall be coiled and uncoiled around a 1.5 inch diameter rod 500 times. The hose shall then be twisted 180° in both directions about its longitudinal axis 500 times in each direction. The hose shall then be subjected to the leakage and delamination tests.

4.6.9 Abrasion. Two samples of the hose shall be subjected to the test in FED-STD-191, Method 5308, dry conditions. The abradant shall conform to CCC-C-419, Type I, hard texture duck No. 10. A minimum force of 1 pound shall be maintained between the abradant and hose throughout the test. The reinforced sections of the hose shall withstand 10,000 cycles of abrasion without exposing the reinforced wire (see 6.11).

4.6.10 Odor. Oxygen conforming to SAE AS 8010 shall be flowed through the hose at 10 liters per minute for 2 minutes and then tested for odor in accordance with SAE AS 1065.

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4.6.11 Low temperature. The hose shall be subjected to -65° ± 5°F for 48 hours. After this period and while still at this temperature, the hose shall be subjected to the flexibility test. After returning to room temperature, the hose shall be subjected to the leakage, delamination, and odor tests.

4.6.12 High temperature. The hose shall be subjected to 160° ± 5°F for 48 hours. While still at 160°F, the hose shall be subjected to the flexibility test. After returning to room temperature, the hose shall be subjected to the leakage, delamination, and odor tests.

4.6.13 Ozone resistance. Samples of the end cover, inner liner, and elastomer materials shall be tested in accordance with ASTM D1149 (see 6.3). The test samples shall be elongated 20%, placed in an ozone free atmosphere for 24 hours, and then subjected to an ozone environment. The temperature shall be 100° ± 5°F, the ozone concentration shall be 120 ± 10 parts per million by volume, and the air velocity across the sample shall be at least 2 feet per second. The material shall be exposed to these conditions for 60 minutes. The test slabs shall be examined under 10X magnification for evidence of damage such as blooming, checking, or cracking.

4.6.14 Age. The age of the hose shall be verified to be no more than 12 months from cure date to the acceptance date in accordance with SAE AS 1933.

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 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 or Defense Agency 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 hoses covered by this specification are intended for use with aircraft oxygen and pressurizing systems. The hoses supply air or oxygen for breathing or pressurizing purposes when used with altitude suits, anti-G suits, and ejection seat or escape capsule equipment.

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6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification.
b. Issue of the 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 (see 1.2).
d. When first article is required (see 3.1).
e. Item identification (see 3.5.15 items a, c, and d).
f. The requirement for the vendor to identify proposed test methods (see 4.6.4).
g. Packaging requirements (see 5.1).
h. Data required.

6.3 Materials. Previously, material certification sheets were used to validate contractor's material selection.

6.4 Hose reinforcement. Previous hoses used an integral corrosion resistant wire conforming to ASTM A313/A313M.

6.5 Outer covering. Previous hoses used outer coverings made from tubular polyamide or polyester material of knitted or braided construction.

6.6 Permanent set. A permanent set is defined as a permanent change in the physical shape of the hose after all forces have been removed.

6.7 Sampling inspection. In previous acquisitions, hoses offered for delivery at one time were considered a lot, and random samples where selected from each lot in accordance with inspection level S-2, MIL-STD-105.

6.8 Leakage. Previously, hoses were tested by horizontally submerging them in water while internally pressurized.

6.9 Delamination testing. Previously, the delamination test used an end cap with a viewing window at one end and a vacuum source with a light at the other end. While under a vacuum, the interior of the hose was examined for evidence of delamination

6.10 Cleanliness. Guidance for cleaning methods can be found in MIL-STD-1359.

6.11 Abrasion test. Previous procurements used a Schiefer machine modified to retain a 2-inch section of hose.

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6.12 Part or identifying number (PIN). The PINs to be used for the hose acquired to this specification are created as follows (see figure 1). M26385 dash numbers supersede MS27797 dash numbers.

M	26385	-XX	-XXX
Prefix for military specification	Specification number	Dash number, diameter (D)	Dash number, length (L)

6.13 Superseding data. Superseded MS27797 dash numbers are listed in the table on figure 1.

6.14 Subject term (key word) listing.

altitude suit
anti-G suit
ejection seat
escape capsule
liquid oxygen

6.15 Changes from 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.

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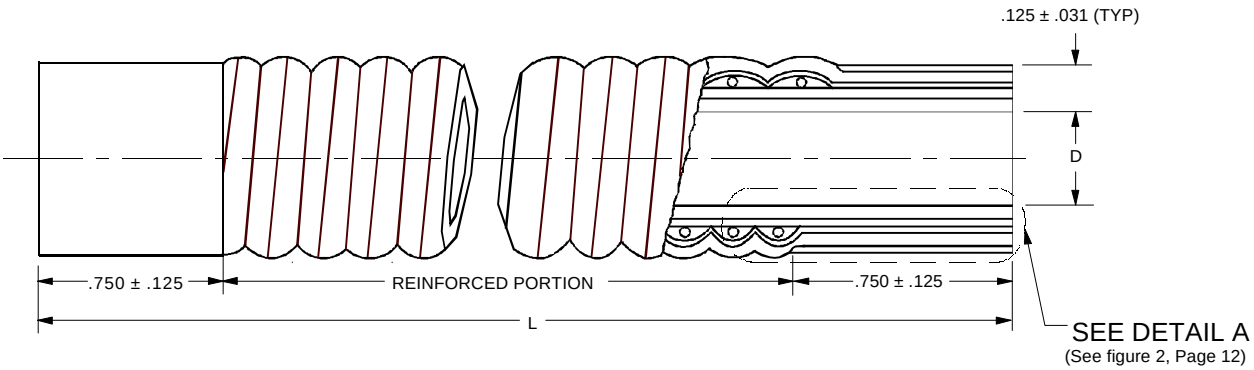

M26385 dash number (Note 3)	D ± .031 (Inches)	L + 5%, - 0% (Inches)	Superseding MS27797 dash number
-2	0.125	-	-
-4	0.250	-	-
-6	0.375	-	-
-6-052	0.375	5.2	-6-052
-6-060	0.375	6.0	-6-060
-6-140	0.375	14.0	-6-140
-6-214	0.375	21.4	-6-214
-8	0.500	-	-
-10	0.625	-	-
-10-080	0.625	8.0	-10-080
-10-085	0.625	8.5	-10-085
-10-115	0.625	11.5	-10-115
-10-120	0.625	12.0	-10-120
-10-180	0.625	18.0	-10-180
-10-200	0.625	20.0	-10-200
-10-240	0.625	24.0	-10-240
-12	0.750	-	-

Notes:

1. Dimensions are in inches.
2. Tolerances are as specified.
3. First dash number is inside diameter and the second dash number is length. If second dash number is not listed, length can be specified in other than standard lengths.
4. Drawing is not to scale.
5. End notes and dimensions apply to both ends.

FIGURE 1. Hose

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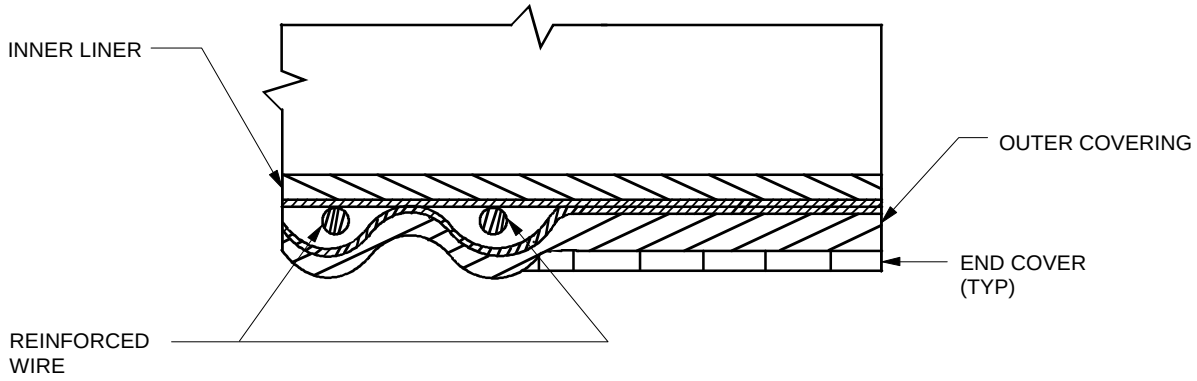

DETAIL A

Notes:

1. Hose size determined by the table on figure 1.
2. Drawing is not to scale.

FIGURE 2. Hose end - detail A

Custodians:
Army - AT
Air Force - 99

Review activities:
DLA - CC

Preparing Activity:
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I RECOMMEND A CHANGE:	**1. DOCUMENT NUMBER**	**2. DOCUMENT DATE (YYMMDD)**
	MIL-PRF-26385F	980316

3. DOCUMENT TITLE

HOSE, OXYGEN AND PRESSURIZATION, OZONE RESISTANT

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)*	**7. DATE SUBMITTED (YYMMDD)**

8. PREPARING ACTIVITY

a. NAME	**b. TELEPHONE** *(Include Area Code)*	
Nick Stone	(1) Commercial (405) 736-5080	(2) DSN 336-5080
c. ADDRESS ***(Include Zip Code)*** OC-ALC/LIIRC 3001 Staff Drive, Suite 1AC496 Tinker AFB, OK 73145-3029	**IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:** **Defense Quality and Standardization Office** **5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3446** **Telephone (703) 756-2340 Autovon 289-2340**	

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