INCH-POUND

MIL-DTL-27267D
w/AMENDMENT 1
17 April 2015
SUPERSEDING
MIL-DTL-27267D
9 January 2012

DETAIL SPECIFICATION

HOSE, CRES WIRE REINFORCED, POLYTETRAFLUOROETHYLENE, 450°F, MEDIUM PRESSURE

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

1. SCOPE

1.1 Scope. This specification covers the requirements for a hose, CRES reinforced, polytetrafluoroethylene, 450°F, medium pressure (see 3.5.1).

1.2 Part or Identifying Number (PIN). The hose PIN consists of the letter M, the basic specification number and hose dash size.

M 27267 -16Z

- -16Z — Hose dash size (see table I and 3.4.2)
- 27267 — Specification number
- M — M prefix

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.

Comments, suggestions, or questions on this document should be addressed to: DLA Land and Maritime, Columbus, Attn: VAI, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to FluidFlow@dla.mil. Since contact information can change you may want to verify the currency of this address information using the ASSIST Online database at https://assist.dla.mil.

AMSC N/A FSC 4720

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 cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-DTL-25579	-	Hose Assembly, Tetrafluoroethylene, High Temperature Medium Pressure
MIL-DTL-27272	-	Fittings, Polytetrafluoroethylene, High Temperature, Medium Pressure, General Specification for
MIL-PRF-680	-	Degreasing, Solvent
MIL-PRF-5606	-	Hydraulic Fluid, Petroleum Base; Aircraft, Missile and Ordnance
MIL-PRF-7808	-	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base
MIL-PRF-83282	-	Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Aircraft, Metric, NATO Code Number H-537
MIL-PRF-87257	-	Hydraulic Fluid, Fire Resistant; Low Temperature, Synthetic Hydrocarbon Base, Aircraft and Missile.

DEPARTMENT OF DEFENSE STANDARD

MIL-STD-130	-	Identification Markings of U.S. Military Property

(Copies of these documents are available online at http://quicksearch.dla.mil/).

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 these documents are those cited in the solicitation or contract.

ASTM INTERNATIONAL

ASTM D471	-	Rubber Property - Effect of Liquids
ASTM D792	-	Density and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM D4895	-	Polytetrafluoroethylene (PTFE) Resin Produced from Dispersion

(Copies of these documents are available online at http://www.astm.org/).

NCSL INTERNATIONAL

NCSL Z540.3	-	Requirements for the Calibration of Measuring and Test Equipment

(Copies of these documents are available online at http://www.ncsli.org).

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 17025	-	General requirements for the competence of testing and calibration laboratories

(Copies of these documents are available online at http://www.ansi.org).

SAE INTERNATIONAL

SAE-ARP1153	-	Determining Relative Specific Gravity Polytetrafluoroethylene Tubing, Method for
SAE-AS2078	-	Hose Assemblies, Polytetrafluoroethylene (PTFE), Test Methods
SAE-AS1946	-	Hose Assembly, Polytetrafluoroethylene, Metallic Reinforced, Up to 1500 psi and 450 Degrees F, Hydraulic and Pneumatic

(Copies of these documents are available online at http://www.sae.org).

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in 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 hoses furnished under this specification shall be products that are authorized by the qualifying activity for listing on the applicable qualified products list before contract award (see 4.4 and 6.3).

3.2 Components. The hose shall consist of a PTFE tube reinforced with a CRES steel wire braid.

3.3 Materials. Materials shall conform to the requirements specified herein. Materials which are not covered by this specification, or which are not specifically described herein, shall be of the quality appropriate for the purpose intended. (see 6.1).

3.3.1 Recycled, recovered, environmentally preferable, or biobased materials. Recycled, recovered, environmentally preferable, or biobased 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.

3.4 Design and construction.

3.4.1 Tube. The tube shall be a seamless, uniformly gauged extrusion of virgin PTFE resin. The base resin shall conform to ASTM D4895 except for the specific gravity requirement (see 3.5.2.4). Additives may be included in the compound from which the tube is extruded.

3.4.2 Reinforcement. The reinforcement for the hose shall be braided CRES wires. Hoses under size -16Z shall have a single layer of braid while size -16Z and above shall have two layers of braid. The letter “Z” is used to indicate that two layers of wire braiding are required. The arrangement of the wires over the tube shall provide sufficient strength to ensure conformance to the requirements specified herein. Hoses with broken or missing reinforcing wires shall be cause for rejection; however, hoses with crossed-over reinforcing wires shall not be cause for rejection.

3.4.3 Hose end fittings. Hose shall be designed to connect with reusable fittings in accordance with MIL-DTL-27272 and with permanent fittings in accordance with MIL-DTL-25579 and its applicable specification sheets.

3.4.4 Dimensions. The cross section of the hose shall meet the requirements specified in table I.

TABLE I. Hose dimensional requirements. 1/ 2/

Dash size	ID inch (mm)		Tube wall thickness inch (mm)		Over braid OD inch (mm)	
-4	.188 (4.78)	± .015 (0.38)	.040 (1.02)	+ .007 (0.18) - .005 (0.13)	.312 (7.92)	+ .031 (0.79) - .008 (0.20)
-5	.250 (6.35)		.040 (1.02)		.375 (9.53)	+ .031 (0.79) - .008 (0.20)
-6	.313 (7.95)		.040 (1.02)		.446 (11.33)	+ .023 (0.58) - .016 (0.41)
-8	.406 (10.31)		.043 (1.09)		.562 (14.27)	+ .023 (0.58) - .016 (0.41)
-10	.500 (12.70)		.047 (1.19)		.656 (16.66)	+ .031 (0.79) - .015 (0.38)
-12	.625 (15.88)	+ .020 (0.51) - .010 (0.25)	.047 (1.19)		.789 (20.04)	± .023 (0.58)
-16Z	.875 (22.23)	+ .031 (0.79) - .024 (0.61)	.047 (1.19)		1.109 (28.17)	± .031 (0.79)
-20Z	1.125 (28.58)		.050 (1.27)		1.359 (34.52)	± .031 (0.79)
-24Z	1.375 (34.93)	±.031 (0.79)	.070 (1.78)		1.672 (42.47)	± .035 (0.79)

1/ Dimensions are in inches.
2/ Metric equivalents are given for information only.

3.4.5 Length of hose. When the order is for a specific length in feet, a tolerance of ±1% of the required length shall be used.

3.5 Performance.

3.5.1 Operating temperature and pressure. The hose shall operate in the temperature range of -65°F to 450°F (-54°C to 221°C) when assembled in class 1 hose assemblies in accordance with MIL-DTL-25579. The maximum operating pressure shall be as specified in table II.

TABLE II. Hose sample sizes and test conditions. 1/

Hose Size	Length of 6 samples for impulse test inches (mm)	Length of 10 samples for all other tests inches (mm) 2/	Operating pressure psi (MPa)	Proof pressure psi (MPa)	Room temperature burst pressure psi (MPa)	High temperature burst pressure psi (MPa)	Bend radius inches (mm)
-4	14.0 (355.6)	18.0 (457.2)	1500 (10.3)	3000 (20.7)	12000 (82.7)	7000 (48.3)	2.00 (50.8)
-5	16.0 (406.4)	18.0 (457.2)	1500 (10.3)	3000 (20.7)	10000 (68.9)	6500 (44.8)	2.00 (50.8)
-6	18.0 (457.2)	18.0 (457.2)	1500 (10.3)	3000 (20.7)	9000 (62.1)	6500 (44.8)	4.00 (101.6)
-8	21.0 (533.4)	18.0 (457.2)	1500 (10.3)	3000 (20.7)	8000 (55.2)	6000 (41.4)	4.63 (117.6)
-10	23.5 (596.9)	18.0 (457.2)	1500 (10.3)	3000 (20.7)	7000 (48.3)	5500 (37.9)	5.50 (139.7)
-12	27.5 (698.5)	18.0 (457.2)	1000 (6.9)	2000 (13.8)	5000 (34.5)	3500 (24.1)	6.50 (165.1)
-16Z	18.0 (457.2)	18.0 (457.2) 3/	1250 (8.6)	2500 (17.2)	5000 (34.5)	3500 (24.1)	7.38 (187.5)
-20Z	18.0 (457.2)	18.0 (457.2) 3/	1000 (6.9)	2000 (13.8)	4000 (27.6)	3000 (20.7)	11.00 (279.4)
-24Z	18.0 (457.2)	18.0 (457.2) 3/	1000 (6.9)	2000 (13.8)	4000 (27.6)	3000 (20.7)	14.00 (255.6)

1/ Metric equivalents are given for information only.
2/ The number of samples required for qualification is specified in 4.4.1 and table II.
3/ Samples for the low temperature flexibility and the vacuum tests shall be 30 inches (762 mm) long for these sizes.

3.5.2 Tube. The extruded PTFE tube shall meet the following requirements.

3.5.2.1 Tube roll and tube proof pressure. The tube shall not leak, split, burst, or show any evidence of malfunctioning when tested in accordance with 4.6.2.1.

3.5.2.2 Tensile strength. When tested in accordance with 4.6.2.2, the longitudinal tensile strength for all sizes of tubes shall be not less than 3000 psi (21 MPa). The transverse tensile strength for sizes 10 and larger shall be not less than 2500 psi (17 MPa). For sizes under -10, the transverse tensile strength need not be tested.

3.5.2.3 Elongation. Elongation of the tube shall be not less than 200% when tested in accordance with 4.6.2.2.

3.5.2.4 Specific gravity. When tested in accordance with 4.6.2.3, the apparent specific gravity of the tube shall be not greater than 2.155 and its relative specific gravity shall be not greater than 2.210 for all sizes of tubes.

3.5.2.5 Tube conductivity. When tested in accordance with 4.6.2.4, tube sizes -4 through -8 shall conduct a direct current of not less than 10 μA. Tube sizes -10 through -24Z shall conduct a direct current of not less than 20 μA.

3.5.3 Hose and hose assembly. The hose (braid reinforced PTFE tube) or the hose assembly, consisting of the hose assembled with end fittings (see 3.4.3), shall meet the following requirements.

3.5.3.1 Braid flare. When tested in accordance with 4.6.3.1, the length of hose shall pass, by its own weight, through a ring of applicable inside diameter specified in table III.

TABLE III. Braid flare dimensional requirement. 1/ 2/

Hose dash size	Hose Nominal ID inches (mm)	Expansion diameter inches (mm)	Maximum flare diameter - ring ID inches (mm)
-4	.188 (4.80)	.230 (5.84)	.500 (12.70)
-5	.250 (6.35)	.300 (7.62)	.560 (14.22)
-6	.313 (7.95)	.370 (9.40)	.625 (15.88)
-8	.406 (10.31)	.475 (12.07)	.750 (19.05)
-10	.500 (12.70)	.585 (14.86)	.875 (22.23)
-12	.625 (15.88)	.720 (18.29)	1.000 (25.40)
-16Z	.875 (22.23)	.995 (25.27)	1.400 (35.56)
-20Z	1.125 (28.58)	1.270 (32.26)	1.700 (43.18)
-24Z	1.375 (34.93)	1.545 (39.24)	1.950 (49.53)

1/ Dimensions are in inches.
2/ Metric equivalents are given for information only.

3.5.3.2 Proof pressure. When subjected to the applicable proof pressure specified in table II and tested in accordance with 4.6.3.2, the hose shall not leak or fail during or at the completion of testing. There shall not be any visual evidence of permanent deformation or damage. Furthermore, there shall be no visual evidence of permanent deformation or damage.

3.5.3.3 Elongation and contraction. When subjected to the applicable operating pressure specified in table II and tested in accordance with 4.6.3.3, the hose shall not change length by more than +0.20 or –0.30 inch in 10 inches (+5.1 mm or -7.6 mm in 254 mm) of length.

3.5.3.4 Impulse. The hose assembly shall not leak, burst, or loosen from the test apparatus and there shall be no evidence of malfunctioning when subjected to 100,000 cycles in accordance with 4.6.3.4.

3.5.3.5 Stress degradation. The effusion rate of the hose assemblies shall not be greater than the values specified in table IV when tested in accordance with 4.6.3.5. Following the introduction of hot oil, the hose assembly shall not leak when subjected to the applicable proof pressure test specified in 4.6.3.2.

TABLE IV. Effusion requirement after stress degradation test.

Hose size	-4	-5	-6	-8	-10	-12	-16Z	-20Z	-24Z
Effusion rate (cc/in/min)	8.0	8.0	8.0	4.0	2.0	2.0	2.0	2.0	2.0

3.5.3.6 Room temperature burst pressure. When subjected to testing in accordance with 4.6.3.6, the hose assembly shall not leak or burst below the applicable room temperature burst pressure specified in table II. There shall be no leakage around the end fittings. The end fittings shall not loosen or separate from the hose.

3.5.3.7 High temperature burst pressure. When subjected to testing in accordance with 4.6.3.7, the hose assembly shall not leak or burst below the applicable high temperature burst pressure specified in table II. There shall be no leakage around the end fittings. The end fittings shall not loosen or separate from the hose.

3.5.3.8 Low temperature flexibility. When tested in accordance with 4.6.3.8 and subjected to the applicable inside bend radius specified in table II, the hose assembly shall not leak or exhibit any visual evidence of permanent deformation or damage.

3.5.3.9 Vacuum. The hose shall not collapse or show any evidence of defects when subjected to testing in accordance with 4.6.3.9. The ball shall roll freely through the entire length of the hose, unaided, to indicate that the inside diameter of the hose has not been distorted or reduced.

3.5.3.10 Volumetric expansion. The volumetric expansion, measured in cc/in of free length, shall not be greater than .028 inch (0.71 mm) for size 4 and .040 inch (1.02 mm) for size 5 when tested in accordance with 4.6.3.10.

3.5.3.11 Leakage. There shall be no leakage through the wall of the hose and around the fittings when the hose assembly is tested in accordance with 4.6.3.11.

3.5.3.12 Fuel resistance. When subjected to testing in accordance with 4.6.3.12, the hose assembly shall not leak or show any evidence of deterioration during and at the completion of the test.

3.5.3.13 Corrosion. When subjected to testing in accordance with 4.6.3.13, the hose assembly shall not leak or malfunction when subjected to the applicable room and high temperature burst pressures specified in table II.

3.5.3.14 Pneumatic leakage. When subjected to testing in accordance with 4.6.3.14, a steady stream of bubbles shall not be seen from any area on the hose assembly.

3.5.3.15 Pneumatic effusion. When subjected to testing in accordance with 4.6.3.15, the measured effusion rate of the hose assembly shall not be greater than the values listed in table V.

TABLE V. Pneumatic effusion requirement.

Size	-4	-5	-6	-8	-10	-12	-16Z	-20Z	-24Z
Effusion rate 1/ (cc/ft of hose)	4.0	5.0	5.0	5.0	5.0	6.0	8.0	8.0	8.0

1/ Collected during the last 30 minutes of the test.

3.5.3.16 Pneumatic surge. When subjected to testing in accordance with 4.6.3.16, the hose assembly shall not leak through the hose wall and around the end fittings. The inner tube of the hose shall not exhibit any evidence of degradation when the filter is examined at the completion of the test.

3.5.3.17 Cleanliness. Prior to shipping, the ends of each hose length shall be capped or plugged to prevent entrance of moisture and foreign matter. The caps or plugs shall be securely attached and shall withstand normal strains, jarring and vibrations encountered during shipping, storage and handling. The interior surface of the hose assembly shall be free from oil, grease, dirt, moisture, cleaning solvents and foreign materials. During individual conformance inspection, hose lengths with uncovered ends shall be rejected and considered as failure. The interior of the hose shall not contain any debris or foreign materials when examined in accordance with 4.6.3.17.

3.6 Product identification. The hose shall be marked in accordance with MIL-STD-130. The hose shall have metal or pliable plastic bands placed on each end of the hose and at five-foot intervals and shall contain the following information:

a. PIN as specified in 6.3.
b. Operating pressure in psi.
c. Commercial and Government Entity (CAGE) code.

3.7 Workmanship. The hose shall be uniform in quality, free from foreign inclusions and defects in materials and shall be finished in accordance with good commercial practices.

4. VERIFICATION

4.1 Classification of inspection. The inspection requirements specified herein shall be classified as follows:

a. Qualification inspection (see 4.4).
b. Conformance inspection (see 4.5).

4.2 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 shall be in accordance with ISO 17025 and NCSL Z540.3 as applicable.

4.3 Inspection conditions. Unless otherwise specified, all required inspections shall be performed in accordance with the test conditions specified in 4.6.

4.4 Qualification inspection. Qualification inspection shall be performed at a laboratory acceptable to the Government qualifying activity (see 6.3) on sample units produced with equipment and procedures used in production.

4.4.1 Samples for qualification. Samples for qualification shall be representative of the products proposed to be furnished to this specification. Samples, consisting of 16 hose assemblies of each size and of the lengths specified in table II, shall be subjected to qualification testing. Each sample shall be a PTFE hose reinforced with braided CRES wires, as specified herein, and assembled with end fittings. In addition, one 12-inch (305 mm) length of braided hose without end fittings and two 14-inch (356 mm) lengths of tubing shall also be subjected to qualification testing.

4.4.2 Fittings used in qualification samples. For each size, manufacturers shall test 16 hose assemblies, with reusable class 1 fittings, qualified to MIL-DTL-27272.

4.4.3 Qualification inspection routine. All samples shall be subjected to the qualification testing in accordance with table VI and in the sequence specified in table VII.

4.4.3.1 Acceptance of qualification data. For identical requirements and test procedures, using an identical fitting, qualification test data from the manufacturer of MIL-DTL-27267 hose shall be accepted as qualification test data for MIL-DTL-27272 and for MIL-DTL-25579 providing that documented approval has been obtained from the qualifying activity. Unless otherwise approved by the qualifying activity, qualification test data from one manufacturer shall not be accepted for another manufacturer of the same product.

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

4.4.5 Retention of qualification. To retain qualification, the manufacturer shall submit a report at 12-month intervals to the qualifying activity. The qualifying activity shall establish the initial reporting date. Each report shall contain a summary of the results obtained from both the sampling tests and the periodic control tests performed during the 12-month interval. The number of lots and the quantities of assemblies that have passed and failed shall be included. All reworked lots shall also be accounted for and identified.

4.4.5.1 Nonconformance of qualification. If the summary of test results indicates nonconformance with the requirements specified herein but corrective measures acceptable to the qualifying activity have not been taken, action may be taken to remove the failing product from the QPL.

4.4.5.2 Periodic qualification report. Failure to submit the report within 30 days after the end of each 12-month period may result in loss of qualification for the product. In addition to the periodic submission of inspection data, the manufacturer shall immediately notify the qualifying activity at any time during the 12-month period that the inspection data indicates failure of the qualified product to meet the requirement specified herein. Testing shall be in accordance with the procurement standard. No sampling or periodic testing is required for a specific size if there has been no production for that size in the reporting period. If there has been no production for a period of three years or longer at any location, sampling tests (two items for each sampling test) shall be completed with items from the first production lot when production is resumed for the applicable size at the applicable location.

4.4.5.3 Sampling and periodic tests- limited production. In the case where there has been limited production, and the specification limit for the applicable sampling or periodic control tests has not been reached within a three year period since the last sampling or periodic test, the required sampling or periodic control tests shall be performed using the small lot test sample quantities as specified in the procurement specification within 30 calendar days of the end of the three year period.

TABLE VI. Inspection requirements.

Requirement	Requirement paragraph	Test method paragraph
Examination of product	---	4.6.1
Tube roll & tube proof pressure	3.5.2.1	4.6.2.1
Tensile strength	3.5.2.2	4.6.2.2
Elongation	3.5.2.3	4.6.2.2
Specific gravity	3.5.2.4	4.6.2.3
Tube conductivity	3.5.2.5	4.6.2.4
Braid flare	3.5.3.1	4.6.3.1
Proof pressure	3.5.3.2	4.6.3.2
Elongation & contraction	3.5.3.3	4.6.3.3
Impulse	3.5.3.4	4.6.3.4
Stress degradation	3.5.3.5	4.6.3.5
Room temperature burst pressure	3.5.3.6	4.6.3.6
High temperature burst pressure	3.5.3.7	4.6.3.7
Low temperature flexibility	3.5.3.8	4.6.3.8
Vacuum	3.5.3.9	4.6.3.9
Volumetric expansion	3.5.3.10	4.6.3.10
Leakage	3.5.3.11	4.6.3.11
Fuel resistance	3.5.3.12	4.6.3.12
Corrosion	3.5.3.13	4.6.3.13
Pneumatic leakage	3.5.3.14	4.6.3.14
Pneumatic effusion	3.5.3.15	4.6.3.15
Pneumatic surge	3.5.3.16	4.6.3.16

TABLE VII. Qualification inspection sequence.

Required qualification test	Required test paragraph	Sample number											
		Tubes	Hose	Assemblies									
		1-2	3	4 1/	5	6	7	8 1/	9	10 1/	11	12-13	14-19
Examination of product	4.6.1	X	X	X	X	X	X	X	X	X	X	X	X
Tube roll & proof pressure	4.6.2.1	X											
Tensile strength	4.6.2.2	X											
Elongation	4.6.2.2	X											
Specific gravity	4.6.2.3	X											
Tube conductivity	4.6.2.4	X											
Braid flair	4.6.3.1		X										
Proof pressure	4.6.3.2			X	X	X	X	X	X	X	X	X	X
Elongation & contraction	4.6.3.3				X	X							
Impulse	4.6.3.4												X
Volumetric expansion	4.6.3.10						X	X					
Leakage	4.6.3.11								X		X		
Fuel resistance	4.6.3.12								X	X			
Stress degradation	4.6.3.5						X	X					
Corrosion	4.6.3.13				X	X							
Room temp burst pressure	4.6.3.6					X	X						
High temp burst pressure	4.6.3.7				X						X		
Low temp flexibility	4.6.3.8			X				X		X			
Vacuum	4.6.3.9			X				X		X			
Pneumatic leakage	4.6.3.14											X	
Pneumatic effusion	4.6.3.15											X	
Pneumatic surge	4.6.3.16											X	

1/ These samples shall be 30 inches in length for sizes 16Z, 20Z and 24Z.

4.5 Conformance inspection.

4.5.1 Individual tests. Inspection of the product for delivery shall consist of subjecting each hose length to the individual tests specified in table VIII. Any item failing to meet the requirements of the individual tests shall be immediately removed from the lot.

TABLE VIII. Individual inspection.

Requirement	Requirement paragraph	Test method Paragraph
Examination of product	---	4.6.1
Proof pressure	3.5.3.2	4.6.3.2

4.5.2 Sampling tests. The following inspections and tests shall be performed in the order indicated on two samples, one consisting of eight hose assemblies with straight fittings at each end and the second consisting of 4 lengths of hose, selected at random from each inspection lot. The inspection lot shall consist of approximately, but not more than, 3000 hose assemblies, all of one size manufactured under essentially the same conditions, but not necessarily during one continuous run. One hose assembly tested from each lot of 375 hose assemblies is also permitted. The first sample (8 hose assemblies) shall be subjected to tests in the following sequence.

a. Internal cleanliness (see 3.5.3.17 and 4.6.3.17).
b. Leakage tests (see 3.5.3.11 and 4.6.3.11).
c. Room temperature burst pressure test (see 3.5.3.6 and 4.6.3.6).

The second sample (4 hose lengths) shall be subjected to tests in the following sequence:

d. Braid flare-Type B only (see 3.5.3.1 and 4.6.3.1)
e. Specific gravity tests (apparent and relative) (see 3.5.2.4 and 4.6.2.3)

NOTE: Production lot records may be used to verify conformance to specific gravity tests if the PTFE tube being used is an established production item.

4.5.2.1 Nonconformance of sampling tests. If one or more defects are found in the inspection sample, both the qualifying and inspection activities shall be immediately notified and the production lot shall be rejected and not be supplied to this specification. Acceptance and shipment of the product shall be discontinued until corrective action, acceptable to the qualifying activity, has been taken. The corrective measures shall be performed on the materials or processes, or both, as warranted, and on all products considered subjected to the same failure. Once the corrective action has been completed, either the specific sampling test in which the original sample failed or all sampling tests may be required to be repeated on additional samples, at the option of the qualifying activity. However, final acceptance shall be withheld until testing has shown that the corrective action was successful. In the event of a failure after re-inspection, information concerning the failure and the corrective action taken shall be furnished to both the qualifying and inspection activities.

4.5.3 Periodic Control Tests. The following inspections and tests shall be performed as indicated on eight hose assemblies manufactured from bulk hose lengths selected at random from each inspection lot. The inspection lot shall consist of not more than 20,000 feet of hose, all of one size, manufactured under essentially the same conditions but not necessarily during one continuous run. Two hose assemblies manufactured and tested from each lot of 5000 feet of hose is also permitted.

4.5.3.1 Assembly. Four hose assemblies, or one hose assembly from a lot of 5000 feet, shall be subjected to the following tests in the order indicated:

a. Elongation and contraction test (see 3.5.2.3 and 4.6.2.2).
b. Impulse test (see 3.5.3.4 and 4.6.3.4) (unaged samples only, and may have straight fittings on both ends).

4.5.3.2 Assembly and Inner Tube: Four hose assemblies, or one hose assembly from a lot of 5000 feet, shall be subjected to the following tests in the order indicated:

a. Stress degradation test (see 3.5.3.5 and 4.6.3.5)
b. Tube Conductivity test (see 3.5.2.5 and 4.6.2.4)

4.5.3.3 Nonconformance of periodic control tests. If a sample fails a periodic control test, both the qualifying and inspection activities shall be immediately notified of such failure. Acceptance and shipment of the product shall be discontinued until corrective action, acceptable to the qualifying activity, has been taken. The corrective measures shall be performed on the materials or processes, or both, as warranted, and on all products considered subjected to the same failure. Once the corrective action has been completed, either the specific periodic control test in which the original sample failed or all periodic control tests may be required to be repeated on additional samples, at the option of the qualifying activity. Furthermore, the sampling tests may be reinstituted in addition to the periodic control tests if deemed applicable by the qualifying activity. However, final acceptance shall be withheld until testing has shown that the corrective action was successful. In the event of a failure after re-inspection, information concerning the failure and the corrective action taken shall be furnished to both the qualifying and inspection activities.

4.5.4 Disposition of test specimens. Samples that have been subjected to any sampling or periodic control tests are considered damaged and shall not be delivered as part of a contract or purchase order.

4.5.5 Acceptance of conformance inspection data. For identical requirements and test procedures, using an identical fitting, conformance inspection data from MIL-DTL-25579 or MIL-DTL-27272 may be accepted as conformance inspection data for MIL-DTL-27267, providing that documented approval has been obtained from the qualifying activity. When conformance inspection data from MIL-DTL-25579 or MIL-DTL-27272 is to be accepted as conformance inspection data for MIL-DTL-27267, one hose assembly shall be considered to be the equivalent of two feet of bulk hose.

4.6 Test methods. Test methods used shall be as specified in table VI. No alternative methods shall be used unless documented approval has been obtained from the preparing activity. For qualification testing, the sequence of tests performed shall be in accordance with table VII. For all inspections required herein, only class 1 fittings conforming to either MIL-DTL-27272 or as defined in MIL-DTL-25579 shall be used. Unless otherwise specified room temperature shall be defined as 60°F to 90°F (16°C to 32°C).

4.6.1 Examination of product. Each hose or each hose assembly shall be visually and physically examined for conformance to the following requirements:

a. Components (see 3.2).
b. Reinforcement (see 3.4.2).
c. Dimensions (see 3.4.4).
d. Cleanliness (see 3.5.3.17).
e. Product identification (see 3.6).
f. Workmanship (see 3.7).

4.6.2 Tube tests.

4.6.2.1 Tube roll and tube proof pressure. Each length of tubing shall be subjected to a tube roll and a tube proof pressure test in accordance with SAE-AS2078, using a proof pressure specified for a 1500 psi hose. Conformance shall be as specified in 3.5.2.1.

4.6.2.2 Tensile strength and elongation. The tube shall be subjected to both the tensile strength and the elongation tests in accordance with SAE-AS2078. Conformance for tensile strength shall be as specified in 3.5.2.2. Conformance for elongation shall be as specified in 3.5.2.3.

4.6.2.3 Specific gravity. The apparent specific gravity of the tube shall be determined in accordance with ASTM D792 while the relative specific gravity of the tube shall be determined in accordance with SAE-ARP1153. If test samples are obtained from a braided hose, the braid impressions shall be removed prior to testing. Conformance shall be as specified in 3.5.2.4.

4.6.2.4 Tube conductivity. A 14-inch (356 mm) length of tube shall be subjected to testing in accordance with SAE-AS2078, Electrical Conductivity test procedure under “Tests on PTFE Inner Tubes”. When test samples are obtained from a braided hose, the braiding shall be removed prior to testing. Conformance shall be as specified in 3.5.2.5.

4.6.3 Hose and assembly tests.

4.6.3.1 Braid flare. A hose when tested for braid flare shall meet the requirements of 3.5.3.1, the following details shall apply:

a. A length of hose, no longer than 12 inches (305 mm), shall be sized by expanding the flared-out end over a plug.
b. The diameter of the plug shall be as specified in the “expansion diameter” column of table III.
c. The plug shall be inserted into the flared-out end of the hose to a depth of .187 inch (4.75 mm) and then removed.
d. After this sizing operation, the sample shall then be inserted through a ring with the bottom of the flare extending 6 inches (152 mm) above the top of the ring.
e. The inside diameter of the ring shall be as specified in the “maximum flare diameter - ring inside diameter” column of table II. From this position, the sample shall be allowed to pass, by its own weight, through the ring.

4.6.3.2 Proof pressure. A hose assembly when proof pressure tested shall meet the requirements of 3.5.3.2, the following details shall apply:

a. Prior to testing, the hose assembly shall be examined to ensure that it is properly assembled.
b. The test sample shall then be subjected to testing in accordance with SAE-AS2078 using the applicable proof pressure specified in table II.
c Test fluid shall be water; however, fluid conforming to MIL-PRF-5606, MIL-PRF-83282, or MIL-PRF-87257 may be used during qualification testing.

4.6.3.3 Elongation and contraction. Samples shall be subjected to elongation and contraction testing in accordance with SAE-AS2078, shall meet the requirements of 3.5.3.3. The test fluid shall be water or fluid conforming to MIL-PRF-5606, MIL-PRF-83282, or MIL-PRF-87257.

4.6.3.4 Impulse. Hose assemblies when subjected to impulse testing shall meet the requirements of 3.5.2.4, the following details shall apply:

a. All test specimens, of length as specified in table II, shall be subjected to the proof pressure test (see 4.6.3.2) prior to impulse testing in accordance with SAE-AS2078.
b. For qualification testing, 2 of the 6 samples shall be unaged while 2 samples shall be aged in air at 400°F ±10°F (204°C ±5.5°C) for 168 hours. The remaining 2 samples shall be aged by

immersion in fluid in accordance with MIL-PRF-7808 at 400°F ±10°F (204°C ±5.5°C) for 168 hours.

(1) The assemblies shall then be subjected at room temperature to the proof pressure specified in table II for a minimum of 5 minutes.

(2) The hose assemblies shall then be pressurized to operating pressure and while maintaining this pressure at room temperature, the hose assemblies shall be immersed in a 3.5% +0.1% U.S.P. Grade NaCl solution by weight for 8 to 10 minutes, then allow to air dry for the remainder of 1 hour. This sequence of immersion and air drying shall be repeated no less than 50 times.

c. Samples sizes 12 and smaller shall be connected to the rigid supports of the test apparatus and bent to the applicable radius specified in table II. Samples sizes -16Z and larger shall be installed straight; one end may be left free.

d. The peak pressure used for samples shall be 100% of operating pressure specified in table II.

4.6.3.5 Stress degradation. Hose assemblies when stress degradation tested shall meet the requirements of 3.5.3.5, the following details shall apply:

a. Two hose assemblies of each size shall be subjected to this test. The hose assemblies shall be filled with high temperature test fluid in accordance with MIL-PRF-7808 or MIL-PRF-83282.

b. The hose assemblies shall then be placed in an oven which shall be maintained at a temperature of 450°F ±10°F (232°C ±5.5°C). Precautions shall be taken to assure that the hose assemblies do not come in contact with part of the oven that are at a higher temperature. A pressure equal to the rated operating pressure specified in table II shall be applied to the hose assemblies.

c. After a minimum of 20 hours at 450°F ±10°F (232°C ±5.5°C), the pressure shall be gradually released and the assemblies shall be removed from the oven, drained and cooled to room temperature. The assemblies shall then be flushed with a quantity of new test fluid, equivalent in volume to at least twice the sample volume and drained.

d. The hose assemblies shall then be filled with MIL-PRF-87257 fluid. A pressure equal to the rated operating pressure specified in table II shall be applied and held for a minimum of 2 hours at room temperature.

e. The assemblies shall then be emptied and filled with oil or hydraulic fluid as specified in 4.6.3.5(a). The tests specified in 4.6.3.5 (b), (c), and (d) shall be repeated.

f. The hose assemblies shall then be filled with ASTM reference fluid B (isooctane, 70%; toluene, 30%) in accordance with ASTM D471 and individually capped. While at room temperature, the assemblies shall be bent around a mandrel having a radius equal to the minimum bend radius as specified in table II. The assemblies shall be bent around the mandrel and straightened for 20 cycles. The assemblies shall be held by the fitting while the bending is being performed. The tests specified in 4.6.3.5 (a), (b), (c), and (d) shall be conducted for the third time.

g. Within 4 hours after the final 2 hours pressurization period with ASTM reference fluid B, the assemblies shall be drained and flushed with fluid in accordance with MIL-PRF-680 and placed in an oven for 1 hour. The temperature of the oven shall be maintained at 160°F ±10°F (71°C ±5.5°C).

h. Within 8 hours after completion of the drying process, the hose assemblies shall be removed from the oven, cooled to room temperature, and then subjected to an air-under-water test. To conduct this test, the hose assemblies shall be installed in an apparatus similar to that shown on figure 1.

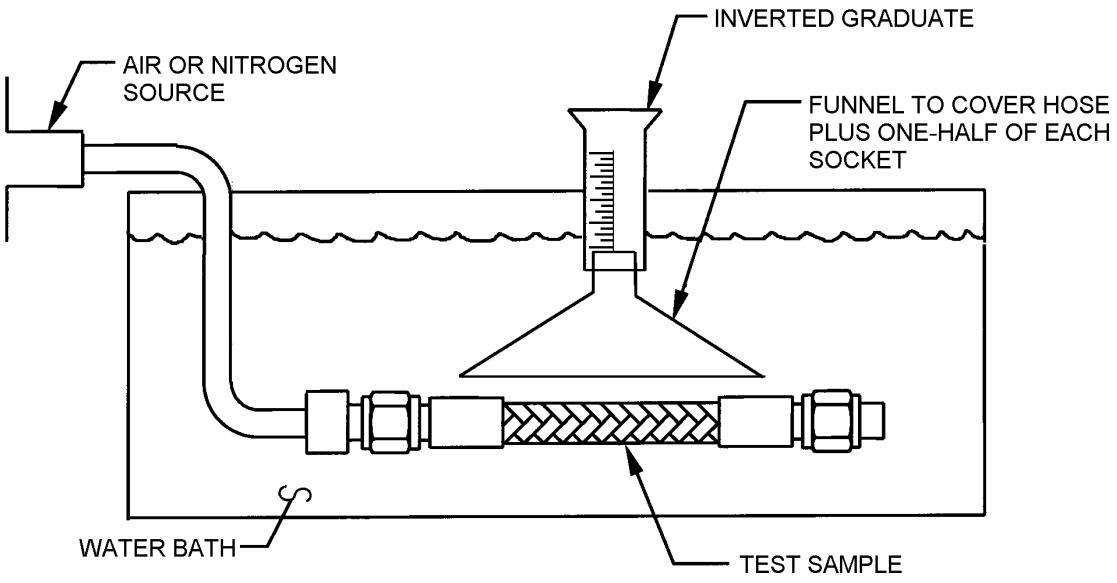

FIGURE 1. Test setup for pneumatic effusion tests.

i. This test setup with the hose assembly installed shall be immersed in water containing no wetting agent. A pressure equivalent to the rated operating pressure, as specified in table II, shall be applied and the pressure shall be held for a minimum of 15 minutes to allow any entrapped air in the hose assembly to escape.

j. A pressure equivalent to the rated operating pressure specified in table II shall be applied and the pressure shall be held for a minimum of 5 minutes and then released. This shall be repeated for a total of 10 times between each pressure application and with the samples still in the -67º±2ºF (-55°C ±1.1°C) cold chamber.

k. The pressure shall be held for an additional 5 minute period. During this time effused gas shall be collected from the test sample which includes the juncture of the hose to the fitting, but not including the fitting nut. If after the 5 minute period of pressurization, the average rate of effusion through the hose assembly exceeds the values listed in table III, it shall be cause for rejection.

l. At the completion of the tests specified in 4.6.3.5 (b) through (j), the hose assemblies shall be filled with oil and placed in a cold chamber for 8 hours while maintained at -67°F ± 2°F (-55°C ±1.1°C).

m. After the 8 hour cold soak, the assemblies shall be subjected to a pressure equal to the operating pressure specified in table II. The pressure shall be held for a minimum of 5 minutes between each pressure application and with the samples still in the -67°F ±2°F (-55°C ±1.1°C) cold chamber.

n. At the end of this time oil at a temperature of 450°F ±10°F (232°F ±5.5°C) shall be circulated through the hose assemblies.

o. Within 15 seconds after introduction of the hot oil, the pressure shall be increased to the rated proof pressure specified in table II and held for 2 minutes. There shall be no evidence of leakage from the hose.

4.6.3.6 Room temperature burst pressure. Samples shall be tested in accordance with SAE-AS2078. The test fluid shall be water or fluid conforming to MIL-PRF-5606, MIL-PRF-83282, or MIL-PRF-87257. The samples shall be observed throughout the test. The type of failure and the pressure at which failure occurred shall be recorded. Conformance shall be as specified in 3.5.3.6.

4.6.3.7 High temperature burst pressure. Samples shall be tested in accordance with SAE-AS2078. The test fluid shall conform to MIL-PRF-7808, MIL-PRF-83282, or MIL-PRF-87257. The samples shall be observed throughout the test. The type of failure and the pressure at which failure occurred shall be recorded. Conformance shall be as specified in 3.5.3.7.

4.6.3.8 Low temperature flexing. The following samples shall be tested in accordance with SAE-AS2078: one unaged sample, one sample that was subjected to the stress degradation test (see 4.6.3.5), and one sample that was subjected to the fuel resistance test (see 4.6.3.12). Conformance shall be as specified in 3.5.3.8.

4.6.3.9 Vacuum. Hose assembles when subjected to vacuum testing in accordance with SAE-AS2078 shall meet the requirements of 3.5.3.9. The following details shall apply:

a. Samples that were tested for low temperature flexibility (see 4.6.3.8) shall then be subjected to vacuum testing in accordance with SAE-AS2078.
b. The applicable negative pressure used shall be as specified in table IX and ball diameters shall be as specified in SAE-AS1946.

TABLE IX. Vacuum test conditions. 1/ 2/

Hose size	Nominal ID inches (mm)	Ball diameter		Negative pressure (in Hg)
		inches	mm	
-4	.188 (4.78)	.125 - .132	3.18 - 3.35	28
-5	.250 (6.35)	.187 - .193	4.75 - 4.90	28
-6	.313 (7.95)	.250 - .255	6.35 - 6.48	28
-8	.406 (10.31)	.332 - .337	8.43 - 8.56	28
-10	.500 (12.70)	.421 - .426	10.69 - 10.82	28
-12	.625 (15.88)	.531 - .538	13.49 - 13.67	20
-16Z	.875 (22.23)	.770 - .778	19.56 - 19.76	14
-20Z	1.125 (28.58)	.996 - 1.004	25.30 - 25.50	10
-24Z	1.375 (34.93)	1.246 - 1.252	31.65 - 31.80	8

1/ Dimensions are in inches.
2/ Metric equivalents are given for information only.

4.6.3.10 Volumetric expansion. Hose assemblies when subjected to volumetric expansion in accordance with SAE-AS2078 shall meet the requirements of 3.5.3.10. Only two samples, one of size -4 and one of size -5, shall be tested in accordance with SAE-AS2078 except that the operating pressure used shall be 1000 psi (7 MPa).

4.6.3.11 Leakage. Hose assemblies when subjected to leakage tests in accordance with SAE-AS2078 shall meet the requirements of 3.5.3.11, the following details shall apply:

a. Test fluid shall be water or fluid conforming to MIL-PRF-5606 MIL-PRF-83282 or MIL-PRF-87257.
b. Leakage shall be determined by wrapping a white paper towel tightly around the sample so that the towel is in contact with the braid.

4.6.3.12 Fuel resistance. Samples shall be subjected to testing in accordance with SAE-AS2078. Conformance shall be as specified in 3.5.3.12.

4.6.3.13 Corrosion. Hose assemblies when subjected to corrosion testing shall meet the requirements of 3.5.3.13, the following details shall apply:

a. Two samples shall be pressurized to the applicable operating pressure specified in table II.
b. The samples shall then be mounted in a vertical position and immersed for at least 5 minutes in a 2.5 percent NaCl solution, by weight.
c. They shall then be air-dried at 140°F ±10°F (60°C ±5.5°C) for 25 minutes.
d. This cycling shall continue for at least 172 hours while maintaining the specified pressure on the hose.
e Following the cycling, one of the samples shall be subjected to room temperature burst pressure test (see 4.6.3.6) and the other sample shall be subjected to high temperature burst pressure test (see 4.6.3.7).

4.6.3.14 Pneumatic leakage. Samples shall be subjected to testing in accordance with SAE-AS2078. Conformance shall be as specified in 3.5.3.14.

4.6.3.15 Pneumatic effusion. The samples that were subjected to the pneumatic leakage test shall be tested for pneumatic effusion in accordance with SAE-AS2078. Conformance shall be as specified in 3.5.3.15.

4.6.3.16 Pneumatic surge. The samples that were subjected to the pneumatic effusion test shall then be tested for pneumatic surge in accordance with SAE-AS2078. Conformance shall be as specified in 3.5.3.16.

4.6.3.17 Cleanliness. Both ends of the hose length shall be visually inspected to determine if caps or plugs are installed. Conformance shall be as specified in 3.5.3.17.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the Military Service's system commands. 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. The hose covered by this specification is military unique due to its ability to maintain the operating pressure, specified in table II, even under extreme temperature conditions ranging from -67°F to 450°F (-55°C to 232°C). This hose is intended for use in high-temperature fuel, lubricating oil, water-alcohol, chemical-fluid, hydraulic and pneumatic systems that allow some gaseous effusion through the hose wall. This hose should not be used outside the specified operating temperature range and pressure. Sizes 20Z and -24Z should not be used in systems where the peak pressures are greater than 1000 psi (7 MPa).

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. The PIN (see 1.2) and length of hose required.
c. Packaging requirements (see 5).

6.2.1 Supplier's responsibility. This specification does not preclude the supplier's responsibility for providing a product that meets the system performance requirements and acceptability for oxygen use. It is considered to be an integral part of the purchase agreement between the vendor and the procuring agency

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 in Qualified Products List QPL No.27267 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 orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Defense Supply Center Columbus, P.O. Box 3990, ATTN: DSCC-VQ, Columbus, Ohio 43218-3990 or emailed to vqp.chief@dla.mil. An online listing of products qualified to this specification may be found in the Qualified Products Database (QPD) at https://assist.dla.mil.

6.3.1 Provisions governing qualification (SD-6). Copies of "Provisions Governing Qualification" are available online at https://assist.dla.mil or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.

6.4 Environmentally preferable material. Environmentally preferable materials should be used to the maximum extent possible to meet the requirements of this specification. As of the dating of this document, the U.S. Environmental Protection Agency (EPA) is focusing efforts on reducing 31 priority chemicals. The list of chemicals and additional information is available on their website http://www.epa.gov/osw/hazard/wastemin/priority.htm. Included in the EPA list of 31 priority chemicals are cadmium, lead, and mercury. Use of these materials should be minimized or eliminated unless needed to meet the requirements specified herein (see section 3).

6.5 Subject item (key word) listing.

Conductive
Fuel resistance
High Temperature
Hydraulic systems
Low temperature
Pneumatic systems
PTFE

6.6 Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes 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 previous issue.

CONCLUDING MATERIAL

Custodians:
Army - AV
Navy - AS
Air Force - 99
DLA - CC

Review activities:
Army - AR, AT, MI
Navy - MC, SA, SH
Air Force - 71

Preparing activity:
DLA - CC

(Project 4720-2015-001)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at https://assist.dla.mil.