

INCH-POUND

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SUPERSEDING
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DETAIL SPECIFICATION

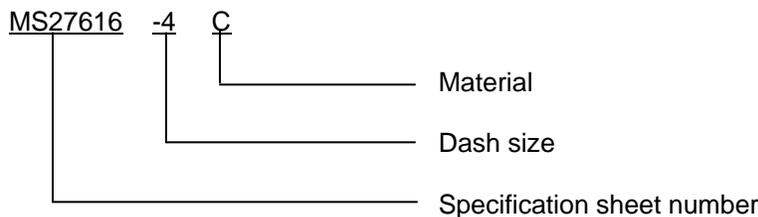
FITTINGS, CORROSION RESISTANT STEEL, HIGH TEMPERATURE, HIGH PRESSURE (3000 PSI), HYDRAULIC AND PNEUMATIC, GENERAL SPECIFICATION FOR

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 fittings, corrosion resistant steel, high temperature, high pressure (3000 psi), hydraulic and pneumatic. These fittings are for use with MIL-DTL-83798 hose, conductive polytetrafluoroethylene (PTFE) smooth bore tube (see 6.1).

1.2 Part or Identifying Number (PIN). The PIN consists of the MS number, a dash number for fitting size, and material code as specified in the MS sheet.



PIN example: MS27616-4C indicates an adapter assembly, tube to hose with swivel nut, .250 inch, corrosion resistant steel.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 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, 4, or 5 of this specification, whether or not they are listed.

Comments, suggestions, or questions on this document should be addressed to: Defense Supply Center, Columbus, Attn: DSCC-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 <http://assist.daps.dla.mil>.

AMSC N/A

FSC 4730

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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-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 Hydraulic Fluid, Non-Petroleum Base, Aircraft
- MIL-PRF-83282 - Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Metric, NATO Code Number H-537
- MIL-DTL-83298 - Hose, Polytetrafluoroethylene, High Temperature, High Pressure
- MIL-PRF-87257 - Hydraulic Fluid, Fire Resistant; Low Temperature, Synthetic Hydrocarbon Base, Aircraft and Missile
- MIL-DTL-32330 - Hose Assembly, Conductive Polytetrafluoroethylene Tube, Smooth Bore, Flared and Flareless, Tube to Hose, with Swivel Nut

(See supplement 1 for list of specification sheets.)

DEPARTMENT OF DEFENSE STANDARD

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

(Copies of these documents are available online at <http://assist.daps.dla.mil> or from the Standardization Document Order Desk, 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 issues of these documents are those cited in the solicitation or contract.

ASME INTERNATIONAL

- ASME B46.1 - Surface Texture (Surface Roughness, Waviness and Lay)

(Copies of these documents are available online at <http://www.asme.org> or from the ASME International, Three Park Avenue, New York, NY 10016-5990.)

ASTM INTERNATIONAL

- ASTM E1742 - Standard Practice for Radiographic Examination

(Copies of these documents are available online at <http://www.astm.org> or from the ASTM International, P.O. Box C700, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

AMERICAN WELDING SOCIETY INC. (AWS)

- AWS C3.4 - Specification for Torch Brazing
- AWS C3.6 - Specification for Furnace Brazing
- AWS D17.1 - Specification for Fusion Welding for Aerospace Applications-Incorporating Errata

(Copies of these documents are available online at <http://www.aws.org/> or from the American Welding Society Inc., 550 N.W. LeJeune Road, Miami, FL 33126-5649.)

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> or from NCSL International 2995 Wilderness Place, Suite 107 Boulder, Colorado 80301-5404)

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.iso.ch> or from the International Organization for Standardization American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036.)

SAE INTERNATIONAL

SAE-AMS2700 - Passivation of Corrosion Resistant Steels
SAE-AS603 - Impulse Testing of Hydraulic Hose, Tubing and Fitting Assemblies
SAE-AS2078 - Test Methods, Hose Assemblies, Polytetrafluoroethylene (PTFE)
SAE-AS4395 - Fitting End-Flared Tube Connection, Design Standard
SAE-AS8879 - Screw Threads - UNJ Profile, Inch Controlled Radius Root with Increased Minor Diameter
SAE-AS33514 - Fitting End, Standard Dimensions for, Flareless Tube Connection and Gasket Seal

(Copies of these documents are available from <http://www.sae.org/> or from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), 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 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet. In the event of any conflict between the requirements of this specification and the specification sheet, the latter shall govern.

3.2 Qualification. Fittings 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).

3.3 Materials. Materials shall be limited to those specified on the applicable specification sheets.

3.3.1 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 cost.

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3.4 Design and construction. The fittings shall be designed to meet the requirements specified herein and in the applicable specification sheet. Special features shall not be used on the portion of the fitting that attaches to the hose. The fittings shall be suitable for use with hose in accordance with MIL-DTL-83298 to make hose assemblies in accordance with MIL-DTL-32330.

3.4.1 Fitting end mating. The fittings shall mate with fitting ends designed in accordance with SAE-AS33514 or SAE-AS4395 as applicable.

3.4.2 Dimensions. Dimensions of the fittings shall be as specified on the applicable specification sheets.

3.4.3 Surface roughness. Surface roughness shall be in accordance with ASME B46.1 as specified in the applicable specification sheet.

3.5 Performance.

3.5.1 Lubricant wear. The fittings shall be assembled four times and disassembled three times, not exceeding the torque listed in table I, when tested in accordance with 4.8.2. The final torque readings shall not exceed the values specified in table I.

TABLE I. Torque. 1/

Size dash no.	Socket torque lb-ft (Nm)
-4	45 (61.9)
-6	65 (88.1)
-8	90 (122.0)
-10	120 (162.7)

1/ Metric equivalents are given for information only.

3.5.2 Proof pressure. The fittings shall withstand the proof pressure specified in table II without malfunction or leakage, when tested in accordance with 4.8.3.

3.5.3 Leakage. The fittings shall not leak, when tested in accordance with 4.8.4.

3.5.4 Room temperature burst. The fittings shall not leak, rupture, or blow off the hose at any pressure below the minimum room temperature burst pressure specified in table II, when tested in accordance with 4.8.5.

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TABLE II. Performance requirements of high pressure, high temperature fittings. 1/ 2/

Fitting dash size	Fitting ID	Max. operating pressure psi (MPa)	Proof pressure psi (MPa)	Min. burst pressure at room temp psi (MPa)	Min. burst pressure at high temp psi (MPa)	Minimum bend radius (inside of bend) inch (mm)
-4	.025	3000 (21)	6000 (41)	16,000 (110)	12,000 (83)	3.00 (76.2)
-6	.375	3000 (21)	6000 (41)	14,000 (97)	10,500 (72)	5.00 (127.0)
-8	.500	3000 (21)	6000 (41)	14,000 (97)	10,500 (72)	5.75 (146.1)
-10	.625	3000 (21)	6000 (41)	12,000 (83)	9,000 (62)	6.50 (165.1)

Fitting dash size	Temperature range
-4	Hydraulic -65°F to +400°F (-53.9°C to 204.4°C)
-6	
-8	
-10	Pneumatic -65°F to +160°F (-53.9°C to 204.4°C)

1/ Dimensions are in inches.

2/ Metric equivalents are given for information only.

3.5.5 Stress degradation. The average air leakage at the fittings shall not exceed 2.0 cc/in/min, when tested in accordance with 4.8.6.

3.5.6 Pneumatic effusion. The effusion at the fittings shall not exceed 8.0cc/ft/30 min., when tested in accordance with 4.8.7.

3.5.7 Pneumatic surge. The fittings shall not leak, when tested in accordance with 4.8.8.

3.5.8 Impulse. The fittings shall not loosen, leak, or blow off the hose when subjected to a minimum of 250,000 impulse cycles, when tested in accordance with 4.8.9.

3.5.9 Over-tightening torque. The fittings shall withstand over-tightening torque 15 times, when tested in accordance with 4.8.10.

3.5.10 High temperature burst pressure. The fittings shall not leak, rupture, or blow off the hose at any pressure below the minimum high temperature burst pressure specified in table II, when tested in accordance with 4.8.11.

3.6 Interchangeability. Parts having the same MS number shall be functionally and dimensionally interchangeable. All parts manufactured to the same military part number shall be functionally interchangeable.

3.7 Screw threads. Threads shall be in accordance with SAE-AS8879.

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3.8 Finish. Corrosion resisting steel parts shall be passivated in accordance with SAE-AMS2700, method 1.

3.9 Brazing or welding. Fittings requiring welding operations shall be welded in accordance with AWS D17.1, or brazed in accordance with AWS C3.4 or AWS C3.6. Welding of socket is not permitted. Inspection shall be in accordance with ASTM E1742, except that the requirements concerning detailed data and retention of radiographs shall not apply to the brazed parts.

3.10 Identification of product. The fittings shall be permanently and legibly marked in accordance with MIL-STD-130 with the following information: PIN (see 1.2) and manufacturer's CAGE code.

3.11 Workmanship. Fittings shall be free from cracks, laps, seams, burrs, longitudinal and spiral tool marks, or any other defects which may detrimentally affect their suitability for the service use intended.

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 or identified 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.

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

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

4.3 Inspection conditions. Unless otherwise specified, all testing shall be conducted at atmospheric pressure within the range of 28 to 31 inches of mercury (71.1 to 78.4 centimeters of mercury), a temperature between 60°F and 100°F (15.6°C to 37.8°C), and a relative humidity of not more than 90%. Tolerances of the test conditions shall be as follows:

- a. Temperature: +10°F, -5°F (+5.55°C, -2.8°C)
- b. Pressure (gauge): ±5%

4.3.1 Stabilization of test temperatures. Unless otherwise specified, the test temperature in the chamber shall be stabilized before conducting the test (see 6.5.1).

4.3.2 Test fluids. Unless otherwise specified, the test fluid shall be hydraulic oil in accordance with MIL-PRF-5606, MIL-PRF-83282, or MIL-PRF-87257, or water (proof test, burst test, and leakage test only). When a high temperature test fluid is specified, the test fluid shall be lubricating oil in accordance with MIL-PRF-7808.

4.3.3 Oil aging. In all of the tests using oil-aged samples, the hose assemblies shall be filled with a high temperature test fluid and soaked in an air oven at a temperature of 400°F (204.4°C) for 7 days. All air shall be removed from the bore of the assembly during the test.

4.3.4 Air aging. In all of the tests using air-aged samples, the hose assemblies shall be kept in air at a temperature of 400°F (204.4°C) for 7 days.

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

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4.4.1 Samples for qualification inspection. Samples for qualification inspection shall be representative of the products proposed to be furnished to this specification. Test samples, consisting of 16 assemblies (32 fittings), and hose in accordance with MIL-DTL-83298, for each dash size and length specified in table III, shall be examined and tested by the qualifying activity in accordance with this specification. Fittings shall be assembled and tested with qualified hose supplied by qualified manufacturers. Test results shall be submitted to the acquiring activity. All assemblies shall be identified with the manufacturer's name and the MS sheet PIN.

TABLE III. Lengths of hose assemblies for test. 1/2/

Hose assembly size	Six assemblies for impulse test of the lengths specified inch (mm) 3/	Ten assemblies for other tests of the lengths specified inch (mm) 3/
-4	16 (406.4)	18 (457.2)
-6	21 (533.4)	18 (457.2)
-8	24 (609.6.)	18 (457.2)
-10	30 (762.0)	18 (457.2)

1/ Dimensions are in inches.

2/ Metric equivalents are given for information only.

3/ An example of the number of each length of hose assembly tested: For the -4 hose assembly size, six 16 inch (406.4 mm) and ten 18 inch (457.2 mm) hose assemblies are tested.

4.4.2 Qualification inspection routine. All fitting samples shall be subjected to qualification testing in table IV and in the sequence specified in table V.

TABLE IV. Qualification inspection requirements.

Inspection	Requirement paragraph	Test method paragraph
Dimensional and visual inspection	3.3, 3.4.1, 3.4.2, 3.7, 3.8, 3.10, and 3.11	4.8.1
Lubricant wear	3.5.1	4.8.2
Proof Pressure	3.5.2	4.8.3
Leakage 1/	3.5.3	4.8.4
Room temperature burst pressure 1/	3.5.4	4.8.5
Stress degradation 1/	3.5.5	4.8.6
Pneumatic effusion	3.5.6	4.8.7
Pneumatic surge	3.5.7	4.8.8
Impulse 1/	3.5.8	4.8.9
Over-tightening torque 1/	3.5.9	4.8.10
High temp burst test	3.5.10	4.8.11

1/ These are destructive tests.

TABLE V. Qualification test sequence.

Hose assembly number (14)	Connector type	Test sequence - paragraph numbers					
		4.8.1	4.8.10	—	—	—	—
1 and 2	Flared	4.8.1	4.8.10	—	—	—	—
3 and 4 <u>1/</u>	Flared	4.8.1	4.8.2	4.8.3	4.8.7	4.8.4	4.8.5
5 and 6	Flared	4.8.1	4.8.2	4.8.3	4.8.4	4.8.11	—
7 and 8 <u>2/</u>	Flared	4.8.1	4.8.2	4.8.3	4.8.6	4.8.8	—
9 through 14	Flared	4.8.1	4.8.2	4.8.3	4.8.9	—	—
15 and 16	Flareless	4.8.1	4.8.10	4.8.4	4.8.5	—	—

1/ These samples shall have a 90° elbow fitting on one end of the assembly.

2/ Two samples (7 and 8) shall have a 90° elbow fitting on one end of the assembly.

4.4.2.1 Qualification of fitting ends.

4.4.2.1.1 Qualification of swivel end fittings. Qualification inspections in table IV shall be performed on straight-type swivel ends in accordance with MS27616, except that samples for hose dash sizes -4, -6, -8, and -10 shall have a 90° elbow-swivel nut in accordance with MS27618 on one end. Satisfactory qualification inspections on these fitting ends shall constitute qualification approval on fitting ends MS27616 through MS27618 made up of parts in accordance with MS27619 through MS27628 in the sizes inspected.

4.4.2.1.2 Qualification of flareless fittings. In addition to the qualification testing in 4.4.2.1.1 two additional hose assemblies having flareless style fitting ends in accordance with MS27629 shall be subjected to the examination of product (see 4.8.1), over-tightening torque (see 4.8.11), leakage (see 4.8.4), and room temperature burst pressure (see 4.8.5) tests. Satisfactory test results on these fitting ends (flareless style) shall constitute qualification approval on fitting ends (MS27629 through MS27631 made up of parts in accordance with MS27632 through MS27637 and MS27622 through MS27625) in the sizes inspected.

4.4.2.1.3 Qualification of other type fittings. In addition to the qualification testing in 4.4.2.1.1 and 4.4.2.1 all other fittings that use an identical attachment method, as in the standard fittings (MS27616 through MS27618 and MS27629 through MS27631), but have special end configurations, the test plan shall be submitted to the acquiring activity for approval prior to testing.

4.4.3 Acceptance of qualification data. For identical requirements and test procedures, using an identical hose or hose assembly, qualification test data specified in MIL-DTL-83298 and MIL-DTL-32330 may be accepted as qualification test data specified in MIL-DTL-83296 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.

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 supplier 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 quantities of fitting that have passed and failed shall be included. All reworked sampling lots shall 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 and the corrective measures acceptable to the qualifying activity has not been taken, action may be taken to remove the failing product from the QPL.

4.4.5.2 Periodic qualification test 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 period. 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 requirements specified herein. If there has been no production during the reporting period, a report shall be submitted certifying that the manufacturer still has the capabilities and the facilities necessary to produce the qualified product. If there has been no production during two consecutive report periods, the manufacturer may be required, at the discretion of the qualifying activity, to submit his qualified product for testing in accordance with the qualification inspection requirements.

4.5 Conformance inspection.

4.5.1 Inspection of product for delivery. Inspection of product for delivery shall consist of individual inspections in table VI.

TABLE VI. Individual inspections.

Inspection	Requirement paragraph	Test method paragraph
Dimensional and visual inspection	3.3, 3.4.1, 3.4.2, 3.7, 3.8, 3.10, and 3.11	4.8.1

4.5.2 Sampling for individual inspections. Fittings for sampling shall be selected from a production lot (see 4.5.2.1) and shall be subjected to the individual inspections. The sampling size shall be as specified in 4.5.2.2.

4.5.2.1 Production lot. A production lot shall consist of all fittings of the same part number which have been manufactured under the same conditions and on the same continuous run.

4.5.2.2 Inspection sample. The inspection sample shall be product selected at random from the production lot without regard to quality and shall be the size specified in table VII.

TABLE VII. Inspection sample.

Production lot size	Sample size
1 to 8	All
9 to 90	8
91 to 150	12
151 to 280	19
281 to 500	21
501 to 1,200	27
1,201 to 3,200	35
3,201 to 10,000	38
10,001 to 35,000	46

4.5.2.3 Nonconformance of sampling tests. If one or more defects are identified, then the entire production lot shall be screened for that defect and all defects shall be removed. A second inspection sample shall then be selected and the sampling tests shall be performed again. If one or more defects are identified from the second inspection lot, then the entire production lot shall be rejected and not supplied to this specification.

4.5.3 Periodic tests P1 and P2.

4.5.3.1 Periodic tests P1. Periodic tests P1 as specified in table VIII shall be performed on three assemblies (six fittings) for each size at least once per year regardless of the total number of fittings produced, see 4.5.3.3. At least three of the six fittings, used for testing, shall be flared fittings with the greatest bend angle. If no flared fittings were produced, flareless fittings shall be used. The six fittings selected shall be as representative as possible of those produced during the period in terms of fitting material and joint configuration. If there has been no production for a particular size, during the past year, periodic testing P1 is not required for that size.

TABLE VIII. Periodic control tests. 1/

Inspection	Requirement paragraph	Test method paragraph	Periodic control tests		Sample
			P1	P2	
Proof Pressure	3.5.2	4.8.3	X		6-inch (152.4 mm), minimum, hose assembly (2 fittings)
Leakage 2/	3.5.3	4.8.4	X		6-inch (152.4 mm), minimum, hose assembly (2 fittings)
Room temperature burst pressure 2/	3.5.4	4.8.5	X		18-inch (457.2 mm), minimum, hose assembly (2 fittings)
Over-tightening torque 2/	3.5.9	4.8.10		X	2 fittings

1/ If there are no reported failures after two consecutive intervals then periodic testing can be done at 24 months intervals. If there are no reported failures after the next 24 month interval, then periodic testing can be done at 36 months intervals.

2/ These are destructive tests.

4.5.3.2 Periodic tests P2. Periodic tests P2 as specified in table VIII shall be performed on two fittings at least once per year regardless of the total number of fittings produced, see 4.5.3.3. The fittings shall be of any bend angle and joint configuration. The two fittings selected shall be as representative as possible of those produced during the period. The size of the two fittings shall be determined based on the fitting size that is most likely to fail if there was a defect. If there has been no production during the past year, periodic testing P2 is not required.

4.5.3.3 Reduced test frequencies P1 and P2. If there have been no reported failures after two consecutive intervals, than periodic testing, with the written approval of the Qualifying Activity, can be done at 24 months intervals. If there are no reported failures after the next 24 month interval, than periodic testing, with the written approval of the Qualifying Activity, can be done at 36 months intervals. If the design, material, construction, or processing of the part is changed, or if there are any quality problems or failures, the Qualifying Activity may require resumption of the original test frequency.

4.5.3.4 Testing performed at bulk hose level. Required periodic control tests (P1 and P2) at fitting level that were already performed at the bulk hose level may be eliminated if documented approval has been obtained from the qualifying activity. For identical requirements and test procedures, using an identical fitting, conformance inspection data from MIL-DTL-83298 or MIL-DTL-32330 may be accepted as conformance inspection data for MIL-DTL-83296 providing that documented approval has been obtained from the qualifying activity.

4.5.3.5 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 reinstated 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 sample units. Samples units, which have been subjected to periodic tests P1 and P2, shall not be delivered on the contract or purchase order.

4.6 Additional qualification test and reporting requirements.

4.6.1 Retention of qualification. To retain qualification, the contractor shall submit a test report to the qualifying activity at 12 month intervals. The qualifying activity shall establish the initial reporting date. Each report shall consist of a summary of test and inspection results required by this specification that were performed during the 12 month reporting interval. As a minimum, the report shall include the following:

- a. Number of lots produced and tested, including lot and sample sizes for each lot.
- b. Identify which tests were performed.
- c. Quantities passed.
- d. Quantities failed.
- e. All reworked sampling lots shall be accounted for and identified. A summary of corrective action taken shall be included.

4.7 Loss of product qualification.

4.7.1 Failure to meet test requirements. The manufacturer shall immediately notify the qualifying activity at any time during the 12-month reporting period when the qualified product fails to meet the test and inspection requirements of this specification. The manufacturer shall identify and indicate what corrective action will be taken to correct the problem. Failure to take corrective action acceptable to the qualifying activity may result in removal of the product from the QPL.

4.7.2 Failure to submit summary test data report. Failure to submit a report within 30 days after the end of the 12 month reporting period may result in loss of qualification for the product.

4.7.3 Change to manufacturing process, materials or equipment. The manufacturer shall notify the qualifying activity, in writing, of any changes in the manufacturing process, materials, or equipment used to manufacture a qualified product list (QPL) product. Subsequently, the qualifying activity shall notify the manufacturer, in writing, if a full re-qualification, partial re-qualification, or no additional testing is required as a result of these changes.

4.7.4 No production during reporting period (12 months). When no production occurs during the reporting period, a report shall be submitted to the qualifying activity certifying that the manufacturer still has the capability and facilities necessary to produce the QPL product.

4.8 Test methods.

4.8.1 Examination of product. The fittings shall be examined to determine compliance with the material, workmanship, and marking requirements specified herein, and to the dimensions specified in the specification sheets.

4.8.1.1 Visual and dimensional inspection. Fittings and their related parts shall be examined to determine conformance to this specification and the applicable specification sheet with respect to materials, interfaces, dimensions and tolerances, threads, finish, identification marking, and workmanship. See [3.3](#), [3.4.1](#), [3.4.2](#), [3.7](#), [3.8](#), [3.10](#), and [3.11](#).

4.8.2 Functional test. The fittings shall be assembled to hose in accordance with MIL-DTL-32330, and subjected to the lubricant wear test as specified in [4.8.2.1](#). Any fitting failing to pass this test is counted as a defective unit and is cause for rejection of a lot. Fittings, or parts thereof, subjected to the lubricant wear test shall not be delivered to the acquiring activity.

4.8.2.1 Lubricant wear test (see [3.5.1](#)). Fittings when subjected to the lubricant wear test shall meet the requirements of [3.5.1](#). The fittings shall be lubricated with hydraulic oil in accordance with MIL-PRF-5606, MIL-PRF-83282, or MIL-PRF-87257 prior to this test. The fittings shall be assembled to the hose in accordance with MIL-DTL-32330 and disassembled in accordance with MIL-DTL-32330. New ends of hose shall be used for each assembly. This sequence shall be repeated 15 times. During the last assembly, the torque reading shall be recorded.

4.8.3 Proof pressure test (see [3.5.2](#)). The hose assembly shall be tested as specified in SAE-AS2078. When subjected to the rated proof pressure specified in [table II](#) the hose assembly shall meet the requirements of [3.5.2](#).

4.8.4 Leakage (see [3.5.3](#)). Prior to testing, the exterior of the samples shall be cleaned free of oil and of any residues. Samples shall be subjected to testing in accordance with SAE-AS2078. Test fluid shall be water or fluid in accordance with MIL-PRF-5606, MIL-PRF-83282, or MIL-PRF-87257. A white paper towel, wrapped tightly around the entire length of the sample, shall be used to check for leakage. Conformance shall be as specified in [3.5.3](#)

4.8.5 Room temperature burst pressure test (see [3.5.4](#)). Hose assemblies when subjected to room temperature burst pressure testing shall meet the requirements of [3.5.4](#). The following details shall apply:

- a. The hose assembly shall be tested as specified in SAE-AS2078 when subjected to a room temperature burst as specified in [table II](#).
- b. Test fluid shall be water or hydraulic fluid in accordance with MIL-PRF-5606, MIL-PRF-83282, or MIL-PRF-87257.
- c. The assembly shall be observed throughout the test and the type of failure and the pressure at which failure occurred shall be recorded.

4.8.6 Stress degradation test (see 3.5.5). Hose assemblies when subjected to stress degradation testing shall meet the requirements of 3.5.5. The hose assembly shall be tested as specified in SAE-AS2078. When necessary, the assembly shall be drained and flushed with fluid in accordance with MIL-PRF-680.

4.8.7 Pneumatic effusion test (see 3.5.6). Hose assemblies when subjected to pneumatic effusion testing shall meet the requirements of 3.5.6. The hose assembly shall be tested as specified in SAE-AS2078 when subjected to the rated operating pressure specified in table II.

4.8.8 Pneumatic surge test (3.5.7). Hose assemblies when subjected to pneumatic surge test shall meet the requirements of 3.5.7. The hose assembly shall be tested as specified in SAE-AS2078 when subjected to the rated operating pressure specified in table II. The assembly shall then be subjected to the rated proof pressure specified in table II for a minimum of 2 minutes.

4.8.9 Impulse test (see 3.5.8). Hose assemblies when subjected to impulse testing shall meet the requirements of 3.5.8. The following details shall apply:

- a. Prior to impulsing, two assemblies shall be oil-aged, two shall be air-aged, and two shall be unaged.
- b. The assemblies shall then be subjected at room temperature to the rated proof pressure specified in table II for a minimum of 5 minutes.
- c. The assemblies shall be impulse tested in accordance with SAE-AS2078.
- d. Electronic measuring devices shall be used to determine and control the impulse pressures in the inlet manifold to the magnitude as specified in SAE-AS603.
- e. The impulse shall occur at 70 ± 10 cycles per minute.
- f. The test fluid shall be one of the high temperature test fluids specified in 4.3.2.
- g. The rate of pressure rise shall not be less than 100,000 psi/sec or more than 200,000 psi/sec.

4.8.10 Over-tightening torque test (see 3.5.9). Hose assemblies when subjected to over-tightening torque testing shall meet the requirements of 3.5.9. The following details shall apply:

- a. Two hose assemblies with flared type end fittings and two hose assemblies with flareless type end fittings of each size shall be subjected to the following test by assembling on a fitting end of steel construction in accordance with SAE-AS4395 or SAE-AS33514, as applicable.
- b. The threads of the SAE-AS4395 or SAE-AS33514 fittings shall be lubricated with oil in accordance with MIL-PRF-5606, MIL-PRF-87257 or MIL-PRF-83282 prior to this test.
- c. All fittings shall be tightened to the appropriate over-tightening torque specified in table IX and then loosened. This sequence shall be repeated 15 times.
- d. On the 15th over-tightening torque application, the hose shall be subjected to the proof pressure test specified in 4.8.3.
- e. After this sequence, there shall be no evidence of failure, leakage, or deformation of the fitting assemblies, and the swivel nuts shall be free enough to permit turning on the nipple by hand.

TABLE IX. Over-tightening torque values. 1/

Fitting size dash no.	Torque	
	lb-in	Nm
-4	160	18.1
-6	300	22.6
-8	560	63.3
-10	700	79.1

1/ Metric equivalents are given for information only.

4.8.11 High temperature burst pressure test (see 3.5.10). Hose assemblies when subjected to high temperature burst pressure testing shall meet the requirements of 3.5.9. The following details shall apply:

- a. The assembly shall be filled with one of the high temperature test fluid specified in 4.3.2 and soaked for 1 hour with an ambient temperature at the maximum temperature specified in table II.
- b. After 1 hour, the pressure shall be raised to the rated operating pressure as specified in table II and held for 5 minutes.
- c. The pressure shall then be increased at a rate of pressure rise equal to 20,000 \pm 5,000 psi (138 \pm 34 MPa) per minute until failure is obtained.

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 packaging activities within the Military Service or Defense Agency, or within the military service's system command. Packaging data retrieval is available from the managing Military Service 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. These fittings are military unique because they are intended for use in military aircraft and missile systems that use high pressure (3,000 psi) and high temperature (-65°F to +160°F) pneumatic and (-65°F to +400°F) hydraulic systems. Medium pressure pneumatic storage system applications are not recommended. These fittings are capable of withstanding the severe environment encountered in military applications. Installations in which the limits specified herein are exceeded, or in which the application is not covered specifically by this specification will be subject to the approval of the acquiring activity.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and data of this specification.
- b. PIN (see 1.2)
- c. Type and size of fittings required (see applicable specification sheets).
- d. 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 in Qualified Products List No. 83296, 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 qualifying activity Defense Logistics Agency, Defense Supply Center, Columbus (DSCC-VQP), P.O. Box 3990, Columbus, OH 43218-3990. An online listing of products qualified to this specification may be found in the Qualified Products Database (QPD) at <http://assist.daps.dla.mil>.

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

6.3.2 Prequalification. An assessment of each manufacturer intending to qualify product to this specification is conducted by the qualifying activity prior to initial qualification and periodically thereafter to assure compliance with specification requirements. This assessment will review the manufacturer's quality system, including production and testing, to ensure that adequate controls are in place to provide compliant product on a recurring basis. This assessment may include a facility survey as determined necessary by the qualifying activity.

6.4 Subject term (key words) listings.

Conductive
Field attachable
Hose
Smooth bore

6.5 Definitions. For the purpose of this specification, the following definition applies.

6.5.1 Stabilization temperature. Temperature which, within 6 inches (152.4 mm) of an object, does not change more than +10°F, -5°F (5.55°C, -2.77°C) per hour.

6.6 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).

6.7 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.

MIL-DTL-83296B

CONCLUDING MATERIAL

Custodians:

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

Preparing activity:
DLA - CC

(Project 4730-2008-033)

Review activities:

Navy - MC, SA
Air Force - 71

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 <http://assist.daps.dla.mil>.