

INCH-POUND

MIL-DTL-83296A
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SUPERSEDING
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DETAIL SPECIFICATION

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

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 general requirements for corrosion resistant steel fittings used with high-pressure, high-temperature, hydraulic and pneumatic polytetrafluoroethylene (PTFE) hose.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

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

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Defense Supply Center, Columbus, DSCC-VAI, 3990 East Broad Street, Columbus, OH 43216-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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FSC 4730

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SPECIFICATIONS

FEDERAL

TT-I-735 - Isopropyl Alcohol

DEPARTMENT OF DEFENSE

MIL-DTL-83298 - Hose, Polytetrafluoroethylene, High Temperature, High Pressure
 MIL-H-5606 - Hydraulic Fluid, Petroleum Base, Aircraft, Missile and Ordnance
 MIL-PRF-680 - Degreasing Solvent
 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

(See supplement 1 for list of specification sheets.)

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-130 - Identification Marking of U. S. Military Property
 MIL-STD-1655 - Fittings, Flareless, Classification of Defects of

BULLETINS

ANA BUL 431 - Air Force-Navy Aeronautical Bulletin Fittings, Flared,
 Classification of Defects

HANDBOOKS

DEPARTMENT OF DEFENSE

MIL-HDBK-831 - Test Reports, Preparation of

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

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AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

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

(Applications for copies should be addressed to the American Society of Mechanical Engineers, Three Park Avenue, New York, NY 10016-5990.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- ASTM E1742 - Standard Practice for Radiographic Examination (DoD adopted)

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

AMERICAN WELDING SOCIETY INC. (AWS)

- AWS C3.4 - Specification for Torch Brazing (DoD adopted)
- AWS C3.6 - Specification for Furnace Brazing (DoD adopted)

(Application for copies should be addressed to the American Welding Society Inc., 550 N.W. Le Jeune Road, Miami, FL 33126.)

NATIONAL CONFERENCE OF STANDARDS LABORATORIES (NCSL)

- ANSI/NCSL Z540-1 - Calibration Laboratories and Measuring and Test Equipment, General Requirements. (DoD adopted)

(Application for copies should be addressed to the National Conference of Standards Laboratories, 1800 30th Street, Suite 305B, Boulder, CO 80301.)

SAE INTERNATIONAL

- AMS-QQ-P-35 - Passivation Treatments for Corrosion-Resistant Steel
(DoD adopted)
- AMS-STD-2219 - Fusion Welding for Aerospace Applications (DoD adopted)
- ARP603 - Impulse Testing of Hydraulic Hose, Tubing and Fitting
Assemblies (DoD adopted)
- AS2078 - Test Methods, Hose Assemblies, Polytetrafluoroethylene
(PTFE)
- AS4395 - Fitting End-Flared Tube Connection, Design Standard
(DoD adopted)
- AS8879 - Screw Threads - UNJ Profile, Inch
- AS33514 - Fitting End, Standard Dimensions For, Flareless Tube Connection
and Gasket Seal (DoD adopted)

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

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2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated specifications or 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. The fittings furnished under this specification shall be products that are authorized by the qualifying activity for listing on the applicable qualified products list (QPL) before contract award (see 4.2 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 costs.

3.3.2 Hazardous substances. The use of hazardous substances, toxic chemicals, or Ozone Depleting Chemicals (ODCs) shall be avoided, whenever feasible.

3.4 Design and construction. The fitting 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 conforming to MIL-DTL-83298.

3.4.1 Fitting end mating. The fittings shall mate with fitting ends designed in accordance with AS33514 or 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. The fittings, when attached to hose per MIL-DTL-83298, shall meet the following performance requirements.

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.

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TABLE I. Torque

Size dash no.	Socket torque (lb-ft)
-4	45
-6	65
-8	90
-10	120

TABLE II. Physical requirements of high pressure, high temperature fittings

Size dash no.	Temperature ^{1/} range (°F)	Max. operating pressure (psi)	Proof pressure (psi)	Min. burst pressure at room temp (psi)	Min. burst pressure at high temp (psi)	Minimum bend radius (inside of bend) (inch)
-4	-65 to +400	3000	6000	16,000	12,000	3.00
-6	-65 to +400	3000	6000	14,000	10,500	5.00
-8	-65 to +400	3000	6000	14,000	10,500	5.75
-10	-65 to +400	3000	6000	12,000	9,000	6.50

^{1/} Pneumatic temperature range shall be -65 °F to +160 °F

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 or blow off the hose when subjected to the minimum room temperature burst pressure specified in table II, when tested in accordance with 4.8.4.

3.5.4 Room temperature burst pressure. The fittings shall not leak, rupture, or blow off the hose at any pressure below the minimum room temperature (60 °F to 90 °F) burst pressure specified in table II, when tested in accordance with 4.8.5.

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 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 4.8.10.

3.5.10 Over-tightening torque. The fittings shall withstand over-tightening torque 15 times, when tested in accordance with 4.8.11.

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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 AS8879.

3.8 Finish. Corrosion resisting steel parts shall be passivated per AMS-QQ-P-35, type II. Parts shall then be thoroughly rinsed in water and dried.

3.9 Brazing or welding. Fittings requiring welding operations shall be welded in accordance with MIL-STD-2219, 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: MS part number 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 (i.e. Industry Standard, Military Standard, etc.) shall be in accordance with ANSI/NC SL Z540-1 or equivalent.

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

- a. Qualification inspection (see 4.4).
- b. Quality conformance inspection (see 4.5).
 - 1. Sampling tests (see 4.5.2).
 - 2. Periodic control tests (see 4.5.3)

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, a temperature between 60 °F and 100 °F, and a relative humidity of not more than 90%. Tolerances of the test conditions shall be as follows:

<u>Test conditions</u>	<u>Tolerances</u>
Temperature	+10 °F, -5 °F
Pressure gage	±5%

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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 pressure test fluid shall be hydraulic oil conforming to MIL-H-5606, MIL-PRF-83282, or water (leakage test only). When a high temperature test fluid is specified, the test fluid shall be MIL-PRF-7808 lubricating oil.

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 for 7 days. All air shall be excluded 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 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.

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

TABLE III. Lengths of hose assemblies for test.

Hose assembly size	Six assemblies for impulse test of the lengths specified (inch) ^{1/}	Ten assemblies for other tests of the lengths specified (inch) ^{1/}
-4	16	18
-6	21	18
-8	24	18
-10	30	18

^{1/} An example of the number of each length of hose assembly tested: For the -4 hose assembly size, six 16 inch and ten 18 inch hose assemblies are tested.

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

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TABLE IV. Inspection requirements.

Inspection or test	Requirement paragraph	Test method paragraph	Qualification inspection	Conformance inspection		
				Sampling tests (Lot acceptance)	Periodic control tests	
					1	2
Dimensional/Visual inspection	3.4, 3.10, and 3.11	4.8.1	X	X		
Lubricant wear	3.5.1	4.8.2	X			
Proof Pressure	3.5.2	4.8.3	X		X	
Leakage <u>1/</u>	3.5.3	4.8.4	X		X	
Room temperature burst pressure <u>1/</u>	3.5.4	4.8.5	X		X	
Stress degradation <u>1/</u>	3.5.5	4.8.6	X			
Pneumatic effusion	3.5.6	4.8.7	X			
Pneumatic surge	3.5.7	4.8.8	X			
Impulse <u>1/</u>	3.5.8	4.8.9	X			
High temperature burst pressure <u>1/</u>	3.5.9	4.8.10	X			
Over-tightening torque <u>1/</u>	3.5.10	4.8.11	X			X

1/ These are destructive tests.

TABLE V. Qualification inspection.

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

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

2/ Two samples (9 and 10) shall have a 90° elbow fitting on one end of the assembly.

3/ These samples are with flareless fittings.

4.4.2.1 Fitting ends. Qualification inspections shall be performed on straight-type swivel ends (MS27616), except that samples 3, 4, 5, 6, 9, and 10 shall have a 90° elbow-swivel nut (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. Two additional hose assemblies having flareless style fitting ends (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. 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, shall be submitted to the acquiring activity for approval.

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4.4.3 Acceptance of qualification data. For identical requirements and test procedures, using an identical fitting, qualification test data from MIL-DTL-83298 may be accepted as qualification test data for 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 contractor 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 but 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 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 Quality conformance inspection.

4.5.1 Inspection of product for delivery. Inspection of product for delivery shall consist of sampling tests.

4.5.2 Sampling tests. Fittings randomly selected from a production lot (see 4.5.2.1) to form an inspection sample (see 4.5.2.2), shall be subjected to the sampling tests specified in table IV.

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 VI.

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TABLE VI. 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 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. Required periodic control tests 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.

4.5.3.1 Periodic tests (1). Periodic tests (1) as specified in table IV shall be performed on three assemblies (six fittings) for each size at least once per year regardless of the total number of fittings produced. 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 (1) is not required for that size.

4.5.3.2 Periodic tests (2). Periodic tests (2) as specified in table IV shall be performed on two fittings at least once per year regardless of the total number of fittings produced. 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, in terms of metals used for the threaded parts. 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 (2) is not required.

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4.5.3.3 Tests. The following tests, as described under 4.8, shall be performed on samples from the periodic control test lot:

<u>Test</u>	<u>Sample</u>
Proof (see 4.8.3)	6-inch, minimum, hose assembly (2 fittings)
Leakage (see 4.8.4)	6-inch, minimum, hose assembly (2 fittings)
Room temperature burst pressure (see 4.8.5)	18-inch, minimum, hose assembly (2 fittings)
Over-tightening torque (see 4.8.11)	2 fittings

4.5.3.4 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 have 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 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-83298 may be accepted as conformance inspection data for MIL-DTL-83296 providing that documented approval has been obtained from the qualifying activity.

4.6 Assembly procedure. The hose and fitting assembly procedure shall be as follows:

a. The hose shall be wrapped two full turns with a gummed fabric tape where the hose will be cut. Then the hose shall be cut squarely through the tape with a power driven, circular "knife-edge" blade. For ease of cutting, the hose may be bent slightly. The knife-edge blade shall be kept sharp to avoid excessive welding of the reinforcement wire ends which could result in poor flaring.

b. The gummed fabric tape shall be unwrapped one full turn and shall be rewrapped so the tape can be rolled over the exposed end of the hose. The above step shall be repeated for each hose cut length.

c. Sockets shall be installed on hose. The hose shall be inserted into the skirt-end of the socket by applying a twisting, pushing motion. After assembling both sockets, the tape shall be removed.

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d. There shall be approximately .065 inch clearance at the end of the hose between the tube and the reinforcement to permit installation of the sleeve. If it is necessary to flare the reinforcement, the sleeve may be used by placing the edge of the sleeve between the tube and reinforcement and oscillating it around the circumference of the hose. The reinforcement wires shall not be over-flared.

e. The sleeve shall be squarely inserted between the reinforcement and tube. If the reinforcement is properly flared as specified in d, the sleeve shall start easily. The sleeve shall be started by hand and positioned by pushing firmly against a flat surface until the tube bottoms against the shoulder inside the sleeve. Care should be exercised to insure that no reinforcement wires are trapped between the sleeve and the tube. The tube OD shall not be scratched or cut.

f. The tube shall be expanded into the sleeve by inserting the hose on the preassembly tool per MS27638. A steady force and a slight rotation of the hose shall be executed until the sleeve bottoms on the shoulder of the tool. The hose shall be removed from the preassembly tool and a check made to insure that the tube is still bottomed against the shoulder inside the sleeve.

g. The socket shall be held firmly in a vise and the preassembly tool inserted into the end of the hose (The hose shall be pulled into the socket by hand as far as possibly). Using a nonferrous hammer, the preassembly tool shall be tapped to force the sleeve into the socket. The threaded end of the socket shall bottom against the shoulder on the preassembly tool. Then the preassembly tool shall be removed. Reinforcement wires shall not extend into the threaded portion of the socket.

h. The nipple shall be installed onto the hose. A steady force and a slight rotation of the nipple shall be executed until the threads of the nipple and socket engage. Then the nipple shall be turned by hand to assure no cross threading.

i. With the proper size wrench, the fitting shall be tightened until a $.031 + .015$ to $-.008$ inch gap is obtained (see figure 1).

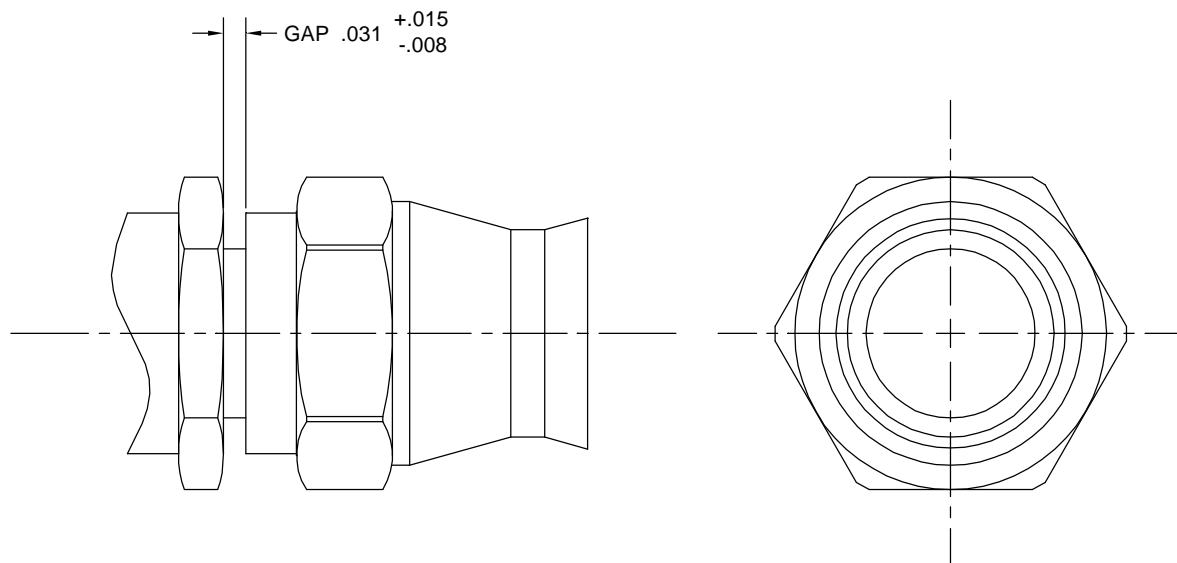


FIGURE 1. Gap measurement.

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4.7 Disassembly procedure. The hose and fitting disassembly procedure shall be as follows:

- a. With the proper size wrench, the nipple shall be loosened and removed from the socket and hose.
- b. The hose shall be cut approximately 1 inch from the socket skirt (if a new hose assembly is to be made from the salvaged length of hose the instructions shall be followed as specified in 4.6).
- c. The socket shall be held firmly in a vise. Needle nose pliers shall be used to remove the tube from the sleeve and hose reinforcement. The tube shall be removed by folding longitudinally and pulling it out of the skirt end of the socket.
- d. With the socket still in a vise, the disassembly tool (MS27639) shall be inserted so that the shoulder on the tool engages the shoulder in the sleeve. A nonferrous hammer shall be used to tap the tool until the sleeve separates from the socket and hose reinforcement. The reinforcement shall then be pulled out of the socket.
- e. The fitting components shall be cleaned with air pressure to remove dirt and other foreign matter before reuse.

4.8 Inspection 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. Test fittings, or parts thereof, shall be inspected for defective units, in accordance with MIL-STD-1655 and ANA-BUL-431 (see 6.4).

4.8.2 Functional test. The fittings shall be assembled to hose conforming to MIL-DTL-83298, 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. The fittings shall be assembled to the hose as specified in 4.6 and disassembled as specified in 4.7. New ends of hose shall be used for each assembly. During the last assembly, the torque reading shall be recorded.

4.8.3 Proof pressure test. The assembly shall be tested as specified in SAE AS2078 when subjected to the rated proof pressure specified in table II.

4.8.4 Leakage test. The assembly shall be tested as specified in SAE AS2078. Test fluid shall be water or fluid conforming to MIL-H-5606 or MIL-PRF-83282.

4.8.5 Room temperature burst pressure test. The assembly shall be tested as specified in SAE AS2078 when subjected to a room temperature burst as specified in table II. Test fluid shall be water of fluid conforming to MIL-H-5606 or MIL-PRF-83282. The assembly shall be observed throughout the test and the type of failure and the pressure at which failure occurred shall be recorded.

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4.8.6 Stress degradation test. The assembly shall be tested as specified in SAE AS2078. When necessary, the assembly shall be drained and flushed with fluid conforming to MIL-PRF-680.

4.8.7 Pneumatic effusion test. The 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. The assembly shall be tested as specified in 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. Prior to impulsing, two assemblies shall be oil-aged, two shall be air-aged, and two shall be unaged. The assemblies shall then be subjected at room temperature to the rated proof pressure specified in table II for a minimum of 5 minutes. The assemblies shall be tested as specified in SAE AS2078. Electronic measuring devices shall be used to determine and control the impulse pressures in the inlet manifold to the magnitude as specified in SAE ARP603. The impulse shall occur at 70 ± 10 cpm. The test fluid shall be one of the high temperature test fluids specified in 4.3.2. The rate of pressure rise shall not be less than 100,000 psi/sec or more than 200,000 psi/sec.

4.8.10 High temperature burst pressure test. The assembly shall be filled with one of the high temperature test fluids specified in 4.3.2 and tested as specified in SAE AS2078.

4.8.11 Over-tightening torque test. 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 AS4395 or AS33514, as applicable. The threads of the AS4395 or AS33514 fittings shall be lubricated with oil conforming to MIL-H-5606 or MIL-PRF-83282 prior to this test. All fittings shall be tightened to the appropriate over-tightening torque specified in table VII and then loosened. This sequence shall be repeated 15 times. On the 15th over-tightening torque application, the hose shall be subjected to the proof pressure test specified in 4.8.3. 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 VII. Over-tightening torque values.

Fitting size dash no.	Fittings (lb-in)
-4	160
-6	300
-8	560
-10	700

4.8.12 Preparation for delivery. Packaging shall be examined for conformance to section 5.

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5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature which may be helpful, but is not mandatory.)

6.1 Intended use. These military unique fittings covered by this specification are intended for use in military aircraft and missile high pressure (3,000 psi) and high temperature (-65 °F to +160 °F) pneumatic and (-65 °F to 400 °F) hydraulic systems. High 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. Issue of DoDISS to be cited in the solicitation, and if required, the specified issue of individual documents referenced (see 2.2 and 2.3).
- 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 QPL-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 Commander, Defense Supply Center, Columbus, DSCC-VQP, 3990 East Broad Street, Columbus, OH 43216-5000.

6.3.1 Prequalification. An assessment of each manufacturer intending to qualify product to this specification shall be 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.

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6.4 Subject term (key words) listings.

Field attachable
Hose

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

6.5.1 Stabilization temperature. Temperature which, within 6 inches of an object, does not change more than +10 °F, -5 °F per hour.

6.6 Reference to superseded specifications. All requirements of MIL-DTL-83296A are interchangeable with those of MIL-F-83296, therefore, previously existing documents (OEM drawings, etc.) referencing MIL-F-83296 need not be changed.

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.

Custodians:

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

Preparing activity:

DLA - CC

(Project 4730-1040)

Review activities:

Air Force - 82
Navy - MC, SA

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER

MIL-DTL-83296A

2. DOCUMENT DATE (YYYYMMDD)

2000/09/29

3. DOCUMENT TITLE

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

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)

b. ORGANIZATION

c. ADDRESS (Include Zip Code)

d. TELEPHONE
(Include Area Code)
(1) Commercial:

(2) DSN:
(If Applicable)

7. DATE SUBMITTED
(YYYYMMDD)

8. PREPARING ACTIVITY DLA-CC

a. NAME
COMMANDER
DEFENSE SUPPLY CENTER
COLUMBUS

b. TELEPHONE NUMBER (Include Area Code)

(1) Commercial
(614) 692-0538

(2) DSN
850-0538

Fax: (614) 692-6939

c. ADDRESS (Include Zip Code)
CODE DSCC-VAI
3990 EAST BROAD STREET
COLUMBUS, OH 43216-5000

IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:

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