MIL-H-27267B
30 May 1984
SUPERSEDING
MIL-H-27267A
13 July 1965

# MILITARY SPECIFICATION

## HOSE, TETRAFLUOROETHYLENE, HIGH TEMPERATURE, MEDIUM PRESSURE

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

## 1. SCOPE

1.1 This specification covers the requirements for high-temperature, medium pressure, tetrafluoroethylene hose.

## 2. APPLICABLE DOCUMENTS

### 2.1 Government documents

2.1.1 Specifications and standards. Unless otherwise specified, the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS), and supplement thereto, in effect on the date the qualifying activity authorizes the conduct of the qualification tests, form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

| | |
|---|---|
| P-D-680 | Dry Cleaning Solvent |
| TT-I-735 | Isopropyl Alcohol |
| TT-S-735 | Standard Test Fluids, Hydrocarbon |

MILITARY

| | |
|---|---|
| MIL-P-775 | Hose, Rubber or Fabric (Including Tubing), and Fittings, Nozzles and Strainers, Packaging of |
| MIL-H-5606 | Hydraulic Fluid, Petroleum Base, Aircraft and Ordinance |
| MIL-T-5624 | Turbine Fuel, Aviation Grades JP-4 and JP-5 |
| MIL-L-7808 | Lubricating Oil, Aircraft Turbine Engine, Synthetic Base |
| MIL-F-8815 | Filter and Filter Elements, Fluid Pressure, Hydraulic, Line, 15 Micron Absolute and 5 Micron Absolute, Type II Systems, General Specification for |

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: ASD/ENES, Wright-Patterson AFB, OH 45433 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 4720

Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

| | |
|---|---|
| MIL-F-27272 | Fitting, Hose, Tetrafluoroethylene, High Temperature, Medium Pressure, General Requirements for |
| MIL-T-27602 | Trichloroethylene, Oxygen Propellant Compatible |
| MIL-H-83282 | Hydraulic Fluid, Fire Resistant Synthetic Hydrocarbon Base, Aircraft |

STANDARDS

MILITARY

| | |
|---|---|
| MIL-STD-105 | Sampling Procedures and Tables for Inspection by Attributes |
| MIL-STD-130 | Identification Marking of US Military Property |
| MIL-STD-143 | Specifications and Standards, Order of Precedence for the Selection of |
| MIL-STD-831 | Test Reports, Preparation of |

(Copies of specifications, standards, and publications required by manufacturer's in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. The issues of documents which are indicated as DOD adopted shall be the issue listed in the current DoDISS and the supplement thereto if applicable.

AMERICAN SOCIETY FOR TESTING AND MATERIALS

| | |
|---|---|
| ASTM D412 | Rubber Properties in Tension, Test Method For |
| ASTM D792 | Specific Gravity and Density of Plastics by Displacement |
| ASTM D1457 | PTFE-Fluorocarbon and Extrusion Materials, Spec-for |

(Application for copies may be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.)

SOCIETY OF AUTOMOTIVE ENGINEERS

| | |
|---|---|
| ARP 603 | Impulse Testing of Hydraulic Hose Assemblies, Tubing and Fittings |
| AIR 1228 | Standard Impulse Machine Equipment and Operation |
| AMS 3380 | Hose, Polytetrafluoroetylene TFE Fluorocarbon Resin Wire Braid Reinforced |

(Application for copies may be addressed to the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, Pa 15096.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.



Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

3. REQUIREMENTS

3.1 Qualification. The hose furnished under this specification shall be a product which has been tested, and passed the qualification tests specified herein, and has been listed on or approval for listing on the applicable Qualified Products List.

3.2 Components. The hose shall consist of a tetrafluoroethylene tube and a corrosion-resistant steel wire braid reinforcement.

3.3 Selection of specifications and standards. Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with MIL-STD-143.

3.4 Materials. Materials shall conform to applicable specification and to the requirements specified herein. All materials that are not specifically described shall be of the highest quality and suitable for the purpose intended.

3.5 Design and construction. The hose shall be so designed and constructed that, when assembled with approved end fittings conforming to MIL-F-27272, the resulting assemblies will meet the requirements of this specification.

3.5.1 Tube design. The tube shall be a seamless extrusion of virgin tetrafluoroethylene resin and uniform gage. Base resin shall conform to ASTM D1457, type III, except for specific gravity (SG) requirements. Additives may be included in the compound from which the tube is extruded.

3.5.1.1 Reinforcement. The reinforcement shall consist of corrosion-resistant steel wires. Hose under size -16Z shall have a single layer of braid, and hose -16Z and above shall have two layers of braid. The letter Z following a dash size signifies that a double layer of wire braid is mandatory. The wires shall be so arranged over the inner tube as to provide sufficient strength to ensure conformance with the requirements specified herein. Broken or missing reinforcing wires shall be cause for rejection. Crossed-over reinforcing wires shall not be cause for rejection.

3.5.2 Dimensions. The hose dimensions shall be as specified in table I.

3.5.2.1 Lengths. Unless otherwise specified, hose shall be furnished in lengths as indicated in table I-A.

3.5.3 Hose end fittings. Hose end fittings required to test hose to the requirements of this specification shall conform to MIL-F-27272 and the applicable MS.

3.6 Performance. The hose shall meet the following performance requirements.

3.6.1 Tube

3.6.1.1 Tube roll and proof pressure. The tube shall not leak, split, burst, nor show any other evidence of malfunction when rolled through the sequence of rollers as specified in AMS 3380.



Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

3.6.1.2 Tube proof pressure. The tube, without reinforcing braid, shall not leak, burst, nor show any evidence of malfunctions when held at the specified pressure for one minute.

3.6.1.3 Tensile strength. The longitudinal tensile strength for all sizes of tubes shall be 3,000 psi minimum at 77°F ±2°F. The transverse tensile strength for sizes -10 and larger shall be 2,500 psi minimum at the same temperature. For sizes under -10, the transverse tensile strength need not be tested.

3.6.1.4 Elongation. Elongation at 77°F ±2°F shall be a minimum of 200 percent.

3.6.1.5 Specific gravity. The hose inner tube shall conform to those values required herein, when tested as specified in 4.6.3.3.

TABLE I. Hose dimensions

| Tubing | | | |
|---|---|---|---|
| Size | Inside diameter (inches) | Wall thickness (inch) +.007 -.005 | Over braid outside diameter (inches) |
| -4 | 0.188 ±.015 | 0.040 | 0.312 +.031 -.008 |
| -5 | 0.250 ±.015 | 0.040 | 0.375 +.031 -.008 |
| -6 | 0.313 ±.015 | 0.040 | 0.446 +.023 -.016 |
| -8 | 0.406 ±.015 | 0.043 | 0.562 +.023 -.016 |
| -10 | 0.500 ±.015 | 0.047 | 0.656 +.031 -.015 |
| -12 | 0.625 +.020 -.010 | 0.047 | 0.789 ±.023 |
| -16Z | 0.875 +.031 -.024 | 0.047 | 1.109 ±.031 |
| -20Z | 1.125 +.031 -.024 | 0.050 | 1.359 ±.031 |
| -24Z | 1.375 ±.031 | 0.070 | 1.672 ±.035 |



Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

TABLE I-A. Hose lengths.

| Dash size | Length (percent) 1/ 3 to 14 ft (max %) | Above 14 ft (min%) |
|---|---|---|
| -4 through -8 | 35 | 65 |
| -10 through -16Z | 45 | 55 |
| -20Z through -24Z | 60 | 40 |

1/ Not more than 5 percent of the full order can be of 3-foot lengths.

3.6.1.6 Conductivity of tube. Tube sizes -4 through -8 shall be capable of conducting a direct current equal to or greater than 10 microamperes, and sizes -10 through -24 a current equal to or greater than 20 microamperes with a test potential of 1,000 volts dc, when tested as specified in 4.6.3.4.

3.6.2 Hose assembly. The hose, complete with reinforcing braid and assembled with end fittings, shall meet the following performance requirements.

3.6.2.1 Proof pressure. The hose shall be subjected to the proof pressure specified in table II when tested in accordance with 4.6.5. There shall be no leakage or failure of the hose.

3.6.2.2 Elongation and contraction. The hose shall not change in length by more than +0.20 inch or -0.30 inch in 10 inches of length when subjected to the operating pressure shown in table II for a minimum of five minutes.

3.6.2.3 Hydraulic fluid impulse. The hose shall not burst, loosen, leak, nor show evidence of malfunctioning when subjected to a minimum of 100,000 cycles at 400°F.

3.6.2.4 Stress degradation. The hose shall not leak when filled with oil and subjected to the pressures and temperatures, for the time periods specified in 4.6.9.

3.6.2.5 Room temperature burst pressure. The hose shall not leak nor burst at any pressure below the burst pressure specified in table II.

3.6.2.6 High temperature burst pressure. The hose, when filled with the applicable test fluid and soaked for one hour at 450°F ±10°F, shall not leak nor burst at any pressure below the burst pressure specified in table II.

3.6.2.7 Cold temperature flexing. The hose assembly shall not be damaged when filled with the applicable test fluid, placed in a cold chamber for 24 hours at -67°F ±2°F, and subjected to flexing as specified in 4.6.12.

3.6.2.8 Vacuum. The hose assembly shall not collapse nor show any other defects when subjected to a temperature of 450°F ± 10°F with the assembly in the minimum bend radius condition for 4 hours while a negative pressure as specified in 4.6.13 is maintained.

3.6.2.9 Cubical expansion. The volumetric expansion, when determined at a pressure of 1,000 psi, shall not exceed 0.028 cc per inch of full length for size-4 and 0.040 cc per inch of free length for size -5.

Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

TABLE II. Test samples, proof and burst pressure, and bend radius.

| Size | Length of 6 samples for impulse test (inches) | Length of 10 samples for all other tests (inches) | Operating pressure (psi max.) | Proof pressure (psi min.) | Burst pressure room temp. (psi min.) | Burst pressure high temp. (psi min.) | Minimum bend radius (inside of bend) (inches) |
|---|---|---|---|---|---|---|---|
| -4 | 14 | 18 | 1,500 | 3,000 | 12,000 | 7,000 | 2 |
| -5 | 16 | 18 | 1,500 | 3,000 | 10,000 | 6,500 | 2 |
| -6 | 18 | 18 | 1,500 | 3,000 | 9,000 | 6,500 | 4 |
| -8 | 21 | 18 | 1,500 | 3,000 | 8,000 | 6,000 | 4-5/8 |
| -10 | 23-1/2 | 18 | 1,500 | 3,000 | 7,000 | 5,500 | 5-1/2 |
| -12 | 27-1/2 | 18 | 1,000 | 2,000 | 5,000 | 3,500 | 6-1/2 |
| -16Z | 18 | 1/ 18 | 1,250 | 2,500 | 5,000 | 3,500 | 7-3/8 |
| -20Z | 18 | 1/ 18 | 1,000 | 2,000 | 4,000 | 3,000 | 11 |
| -24Z | 18 | 1/ 18 | 1,000 | 2,000 | 4,000 | 3,000 | 14 |

1/ Three of the 10 samples in these sizes shall be 30 inches in length for tests specified in 4.6.12 and 4.6.13.



Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

3.6.2.10 Leakage. The hose shall not leak when subject to two cycles in which the presure is increased to 70 percent of burst pressure, held for five minutes, then released.

3.6.2.11 Fuel resistance. The hose assembly shall not leak when filled with fuel conforming to MIL-T-5624 at 260°F ±10°F for 48 hours with operating pressure applied, then drained, cooled, and refilled with fluid conforming to TT-S-735, type III, at room temperature and the operating pressure maintained for two hours.

3.6.2.12 Corrosion. The hose assembly shall function satisfactorily at the specified operating pressure after 172 hours of cycling under the following conditions: a five minute soak in a 2-1/2 percent salt solution, by weight, and a 25-minute dryout period in air at 140°F.

3.6.2.13 Pneumatic effusion. The hose assemblies shall not exceed the effusion rates specified in table III, when tested in accordance with 4.6.17.

3.6.3 Braid flare. The maximum braid flare shall not exceed the maximum flare diameter specified in table IV.

TABLE III. Effusion rate (cc/30 min/ft of hose).

| Size | Effusion at room temperature |
|---|---|
| -4 | 4.0 |
| -5 | 5.0 |
| -6 | 5.0 |
| -8 | 5.0 |
| -10 | 5.0 |
| -12 | 6.0 |
| -16Z | 8.0 |
| -20Z | 8.0 |
| -24Z | 8.0 |

TABLE IV. Braid flare dimensions.

| Size | Hose nominal inside diameter (inches) | Maximum sample length (inches) | Expansion diameter A (inches) | Maximum flare diameter B-ring inside diameter (inches) |
|---|---|---|---|---|
| -4 | 0.188 | 12 | 0.230 | 0.500 |
| -5 | 0.250 | 12 | 0.300 | 0.560 |
| -6 | 0.313 | 12 | 0.370 | 0.625 |
| -8 | 0.406 | 12 | 0.475 | 0.750 |
| -10 | 0.500 | 12 | 0.585 | 0.875 |
| -12 | 0.625 | 12 | 0.720 | 1.000 |
| -16Z | 0.875 | 12 | 0.995 | 1.400 |
| -20Z | 1.125 | 12 | 1.270 | 1.700 |
| -24Z | 1.375 | 12 | 1.545 | 1.950 |



Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

3.6.4 Pneumatic leakage. The test assembly shall withstand pneumatic pressure for five minutes at room temperature without any visible air bubbles after one minute at pressure when tested in accordance with 4.6.19.

3.7 Identification of products. The hose shall be marked for identification in accordance with MIL-STD-130. Metal bands or pliable plastic bands shall be placed on each end of the hose and at ten foot intervals and shall contain the following additional information: Operating pressure in psi and the manufacturer's Federal Supply Code for Manufacturer's (FSCM) number.

3.8 Workmanship. The hose shall be uniform in quality, free from foreign inclusions and defects in materials, shall not be over- or under-sintered, and shall be finished in accordance with good commercial practices.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contactor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the contractor may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Classification of inspections. The examining and testing of tetrafluoroethylene hose shall be classified as follows:

a. Qualification inspections (4.4)

b. Quality conformance inspections (4.5)

4.3 Test conditions. The test conditions shall be as specified for each particular test.

4.4 Qualification inspections

4.4.1 Test samples. The test samples shall consist of 16 assemblies of each size and of the lengths specified in table II, made up as required from braided tetrafluoroethylene hose as specified herein and end fittings conforming to MIL-F-27272.

4.4.1.1 In addition to the samples specified in 4.4.1, two 14-inch lengths of tubings and one 12-inch length of braided hose (without end fittings) shall also be used for tests as applicable herein.

4.4.2 Test report. When tests are conducted at a location other than the laboratory of the procuring activity, the following shall be furnished to that activity:

a. Test report: Three copies of a test report in accordance with MIL-STD-831.

b. Test samples: The samples that were tested and three untested samples of each size for which qualification is desired, if requested by the activity responsible for qualification.

Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

4.4.3 Qualification tests. The qualification tests shall consist of all tests described under 4.6. The test schedule shown in table V shall be followed during qualification testing.

4.5 Quality conformance tests. Quality conformance tests shall be conducted in accordance with MIL-STD-105. The tests shall consist of:

a. Individual tests (4.5.1)

b. Sampling tests (4.5.2)

c. Periodic control tests (4.5.3)

4.5.1 Individual tests. Each length of tube shall be subject to:

a. Examination of products (4.6.1)

b. Tube roll and proof test (4.6.2)

4.5.1.1 Braided hose. Each length of braided hose shall be subjected to:

a. Examination of products (see 4.6.1.1)

b. Proof pressure (see 4.6.5)

4.5.2 Sampling tests

4.5.2.1 Lot. A sampling test lot shall consist of approximately, but not more than 3,500 feet of hose, of one dash size, manufactured under essentially the same conditions but not necessarily during one continuous manufacturing run.

4.5.2.2 Tests. Two samples, one consisting of 4 lengths of hose and the second consisting of 4 hose assemblies, shall be individually selected at random over the complete sampling lot. One sample (4 hose lengths) shall be subjected to test a., then b.

a. Braid flare test (4.6.4)

b. Specific gravity (ASG and RSG) test (4.6.3.3)

The second sample (4 hose assemblies) shall be subjected to test c., then d.

c. Elongation and contraction test (4.6.8)

d. Room temperature burst pressure test (4.6.7)

4.5.2.2.1 Rejection and retest. When one or more items selected from a lot fails to meet the specification, all items in the lot shall be rejected. Once a lot or a part of a lot has been rejected by the procuring activity (Government or commercial), and before it can be resubmitted for tests, full particulars shall be furnished by the contractors concerning the cause of previous rejection and the action taken to correct the defects in the lot.



Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

TABLE V. Qualification inspection schedule.

| Sample No. | Tube | | Hose | Assemblies (16) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 1/4 | 5 | 6 | 7 | 1/8 | 9 | 1/10 | 11 | 12 | 13 | 14 thru 19 |
| Para. | 4.6.1 | 4.6.1 | 4.6.1 | 4.6.1 | 4.6.1 | 4.6.1 | 4.6.1 | 4.6.1 | 4.6.1 | 4.6.1 | 4.6.1 | 4.6.1 | 4.6.1 | 4.6.1 |
| | 4.6.2 | 4.6.2 | 4.6.2 | 4.6.2 | 4.6.2 | 4.6.2 | 4.6.2 | 4.6.2 | 4.6.2 | 4.6.2 | 4.6.2 | 4.6.2 | 4.6.2 | 4.6.2 |
| | 4.6.3 | 4.6.3 | 4.6.4 | 4.6.5 | 4.6.5 | 4.6.5 | 4.6.5 | 4.6.5 | 4.6.5 | 4.6.5 | 4.6.5 | 4.6.5 | 4.6.5 | 4.6.5 |
| | | | | 4.6.12 | 4.6.8 | 4.6.8 | 4.6.14 | 4.6.14 | 4.6.6 | 4.6.15 | 4.6.6 | 4.6.17 | 4.6.17 | 4.6.10 |
| | | | | 4.6.13 | 4.6.16 | 4.6.16 | 4.6.9 | 4.6.9 | 4.6.15 | 4.6.12 | 4.6.11 | 4.6.18 | 4.6.18 | |
| | | | | | 4.6.11 | 4.6.7 | 4.6.7 | 4.6.12 | | 4.6.13 | | | | |
| | | | | | | | | 4.6.13 | | | | | | |

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



Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

4.5.3 Periodic control tests

4.5.3.1 Lot. A periodic control test lot shall consist of approximately, but not more than, 20,000 feet of hose, of one dash size, manufactured under essentially the same conditions, but not necessarily during one continuous manufacturing run.

4.5.3.2 Tests. Two samples, one consisting of 4 lengths of hose and the second consisting of 4 hose assemblies, shall be individually selected at random over the completed periodic control lot. One sample (4 hose assemblies) shall be subjected to test a., then b.

a. Elongation and contraction test (4.6.8)

b. Impulse test (4.6.10) (unaged sample only)

The second sample (4 hose assemblies) shall be subjected to test c., then d.

c. Stress degradation test (4.6.9, 4.6.9.11 may be omitted)

d. Conductivity test (4.6.3.4)

4.5.3.2.1 Rejection and retest for periodic control tests. When one or more items in the lot fails to meet the specification, the same procedures described in 4.5.2.2.1 shall be followed.

4.6 Inspection methods

4.6.1 Examination of product. Each length of tubing shall be examined to determine compliance with this specification with respect to materials, size, and workmanship.

4.6.1.1 Inspection of braided hose. The braided hose shall be visually inspected for broken or missing reinforcing wires which shall be cause for rejection. Cross-over reinforcing wires shall not be cause for rejection.

4.6.2 Tube roll and proof test. Each length of tubing shall be subjected to a tube roll and proof test in accordance with AMS 3380. The proof pressure shall be as specified in table VI. The test fluid shall be water.

TABLE VI. Tube proof pressure.

| Size | Proof pressure (psi) |
|---|---|
| -4 | 360 |
| -5 | 290 |
| -6 | 230 |
| -8 | 180 |
| -10 | 170 |
| -12 | 140 |
| -16Z | 90 |
| -20Z | 65 |
| -24Z | 45 |



Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

4.6.3 Tube tests

4.6.3.1 Tensile strength. Size -10 tubes and under shall be subjected to tensile strength tests in accordance with ASTM D412, except that the separation speed shall be two inches per minute. Tubes larger than -10 shall be tested in accordance with ASTM D1457. The longitudinal tensile strength for all sizes shall be a minimum of 3,000 psi at 77°F ±2°F. Transverse tensile strength for sizes -10 and larger shall be a minimum of 2,500 psi at 77°F ±2°F. Sizes under -10 will not be tested for transverse tensile strength.

4.6.3.2 Elongation. The tube shall be subjected to elongation tests in accordance with the ASTM methods specified in 4.6.3.1. Elongation at a temperature of 77°F ±2°F shall be a minimum of 200 percent.

4.6.3.3 Specific gravity of tube

4.6.3.3.1 Apparent specific gravity. Apparent specific gravity shall be determined in accordance with ASTM D792 and shall not exceed 2.155 at 77°F ±2°F. Two drops of wetting agent shall be added to the water. When test samples are made from braided hose, the braid impressions must be removed before testing.

4.6.3.3.2 Relative specific gravity. Relative specific gravity shall not exceed a value of 2.210 (for all sizes of tubes).

4.6.3.4 Conductivity test of tube

4.6.3.4.1 The test specimen shall be a 14-inch length of tube (braid removed). The inner surface of the tube shall be washed first with solvent conforming to P-D-680 and then with isopropyl alcohol conforming to TT-I-735, to remove surface contamination, and thoroughly dried at room temperature.

4.6.3.4.2 The test specimen shall then be arranged vertically as shown on figure 1. The relative humidity shall be kept below 70 percent and room temperature between 60°F and 90°F. One thousand volts maximum dc shall be applied between the upper mercury or salt water solution electrode, and the lower (MS21900) fitting electrode. Salt water solution shall be 450 grams NaCL in 1 liter of chemically pure water.

4.6.3.4.3 The current shall be measured with an instrument with a sensitivity of at least one microampere ($1 \times 10^{-6}$ ampere). The current measured shall be equal to or greater than 10 microamperes for sizes -4 through -8 and equal to or greater than 20 microamperes for sizes -10 through -24.

4.6.4 Braid flare. A sample of hose of the maximum length shown in table IV shall be sized by expanding the flared-out end over a plug having a diameter as shown in the "Expansion diameter A" column of table IV. The plug shall be inserted into the flared-out end of the hose to a depth of 3/16 inch and then removed. After this sizing operation, the sample shall be inserted through a ring with the bottom of the flare extending six inches above the top of the ring. From this position, the sample shall pass by its own weight through the ring which shall have an inside diameter shown in the "Maximum flare diameter B-ring inside diameter" column of table IV.



Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

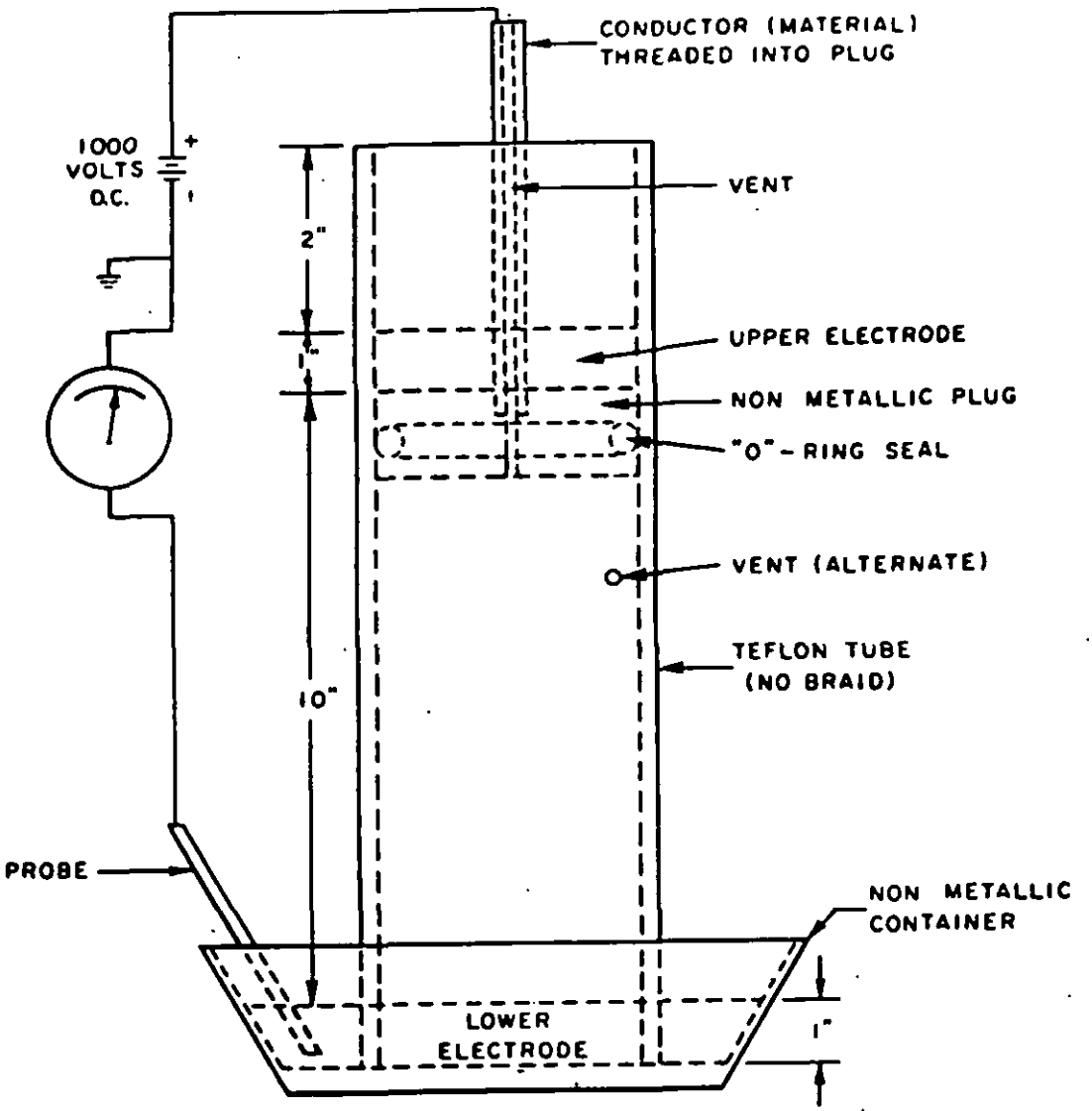


FIGURE 1. Electrostatic conductivity test diagram.



Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

4.6.5 Proof pressure test. Prior to this test, the hose assembly shall be examined to assure that it is properly assembled. The hose assembly shall be subjected to the applicable proof pressure specified in table II for a minimum period of 30 seconds and maximum of five minutes. The test fluid shall be water only. During qualification testing, hydraulic fluid conforming to MIL-H-5606 or MIL-H-83282 may be used. There shall be no evidence of permanent deformation, damage, or leakage from the hose assembly during or at the completion of this test.

4.6.6 Leakage. Two samples of each size shall be subjected to a leakage test using test fluid conforming to MIL-H-5606 or MIL-H-83282. While at room temperature, the samples shall be pressurized to 25 psi for a minimum of five minutes. The pressure shall be increased to a value equal to 70 percent of the rated room temperature burst pressure specified in table II and again held for a minimum of five minutes, and then released. Leakage shall be checked by wrapping a white paper towel tightly around the sample so that the towel is in contact with the braid. The pressure shall then be completely released and again increased to 70 percent of the rated room temperature burst pressure and held for a minimum of 5 minutes. Any spot of test fluid on the towel shall be cause for rejection.

4.6.7 Room temperature burst pressure test. Two test samples of each size shall be subjected to a pressure sufficient to burst the assemblies, with a rate of pressure rise equal to 20,000 ±5,000 psi per minute. The assemblies shall be observed throughout the test and the type of failure and the pressure at which failure occurred shall be recorded. The assemblies shall not leak nor show any evidence of malfunction at any pressure below the specified room temperature burst pressure listed in table II. The test fluid shall be water or oil. If oil is used, it shall conform to MIL-H-5606 or MIL-H-83282.

4.6.8 Elongation and contraction. Two samples of each size shall be subjected to the elongation and contraction test. The hose shall not change in length by more than +0.20 or -0.30 inch in 10 inches of length, when subjected to the operating pressure shown in table II for not less than 5 minutes. With the hose held in a straight, unpressurized condition, a 10-inch gage length shall be marked off on the hose and the hose then pressurized. After five minutes, and while still pressurized, the gage length shall be remeasured and the change in length calculated. The test fluid shall conform to MIL-H-5606 or MIL-H-83282.

4.6.9 Stress degradation test

4.6.9.1 Two hose assemblies of each size shall be subjected to this test. The hose assemblies shall be filled with oil conforming to MIL-L-7808.

4.6.9.2 The hose assemblies shall then be placed in an oven which shall be maintained at a temperature of 450°F ±10°F. Precautions shall be taken to assure that the hose assemblies do not come in contact with parts 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.

4.6.9.3 After a minimum of 20 hours at 450°F, 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 TT-S-735 type III fluid, equivalent in volume to at least twice the test sample volume and drained.

Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

4.6.9.4 The hose assemblies shall then be filled with new TT-S-735 type III fluid. A pressure equal to the rated operating pressure specified in table II shall be applied and held for a minimum of two hours at room temperature.

4.6.9.5 The hose assemblies shall then be emptied and filled with oil as specified in 4.6.9.1. The procedure specified in 4.6.9.2, 4.6.9.3, and 4.6.9.4 shall be repeated.

4.6.9.6 The hose assemblies shall then be filled with TT-S-735 type III fluid 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 fittings while the bending is being performed. The procedures specified in 4.6.9.1, 4.6.9.2, 4.6.9.3 and 4.6.9.4 shall be conducted for a total of three times.

4.6.9.7 Within four hours after the final two-hour pressurization period with TT-S-735 type III fluid, the assemblies shall be drained and flushed with trichloroethylene (MIL-T-27602) and placed in an oven for one hour. The temperature of the oven shall be maintained at 160°F ±10°F.

4.6.9.8 Within eight hours after completion of the drying process, the assemblies shall be subjected to an air-under-water test. To conduct this test, the hose assemblies shall be installed in an apparatus similar to figure 2.

4.6.9.9 This apparatus with the hose assembly installed shall be immersed in water containing no wetting agent. A pressure equivalent to the rated operating pressure specified in table II shall be applied for 15 minutes to allow any entrapped air in the hose to escape. During this period, the shield of the test apparatus shall be closed.

4.6.9.10 The shield of the test apparatus shall then be opened and the pressure held for an additional five minute period (figure 2). During this time effused gas shall be collected in one inch increments over the entire length of the assembly (cone seat to cone seat). If, after the five minute period of pressurization, the rate of effusion in any of the one inch increments exceeds the values listed in table VII, it shall be cause for rejection.

TABLE VII. Effusion leakage rates (maximum).

| Tube size | -4 | -5 | -6 | -8 | -10 | -12 | -16Z | -20Z | -24Z |
|---|---|---|---|---|---|---|---|---|---|
| Effusion rate cc/in/min | 8 | 8 | 8 | 4 | 2 | 2 | 2 | 2 | 2 |

4.6.9.11 At the completion of tests specified in 4.6.9.2 through 4.6.9.10, the hose assemblies shall be filled with oil and placed in a cold chamber for eight hours while the temperature is maintained at -67°F ±2°F cold chamber. At the end of this time, oil at a temperature of 450°F ±10°F shall be circulated through the samples. 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 a minimum of two minutes. Any evidence of leakage during the testing specified in 4.6.9.1 through 4.6.9.11 shall be cause for rejection.



Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

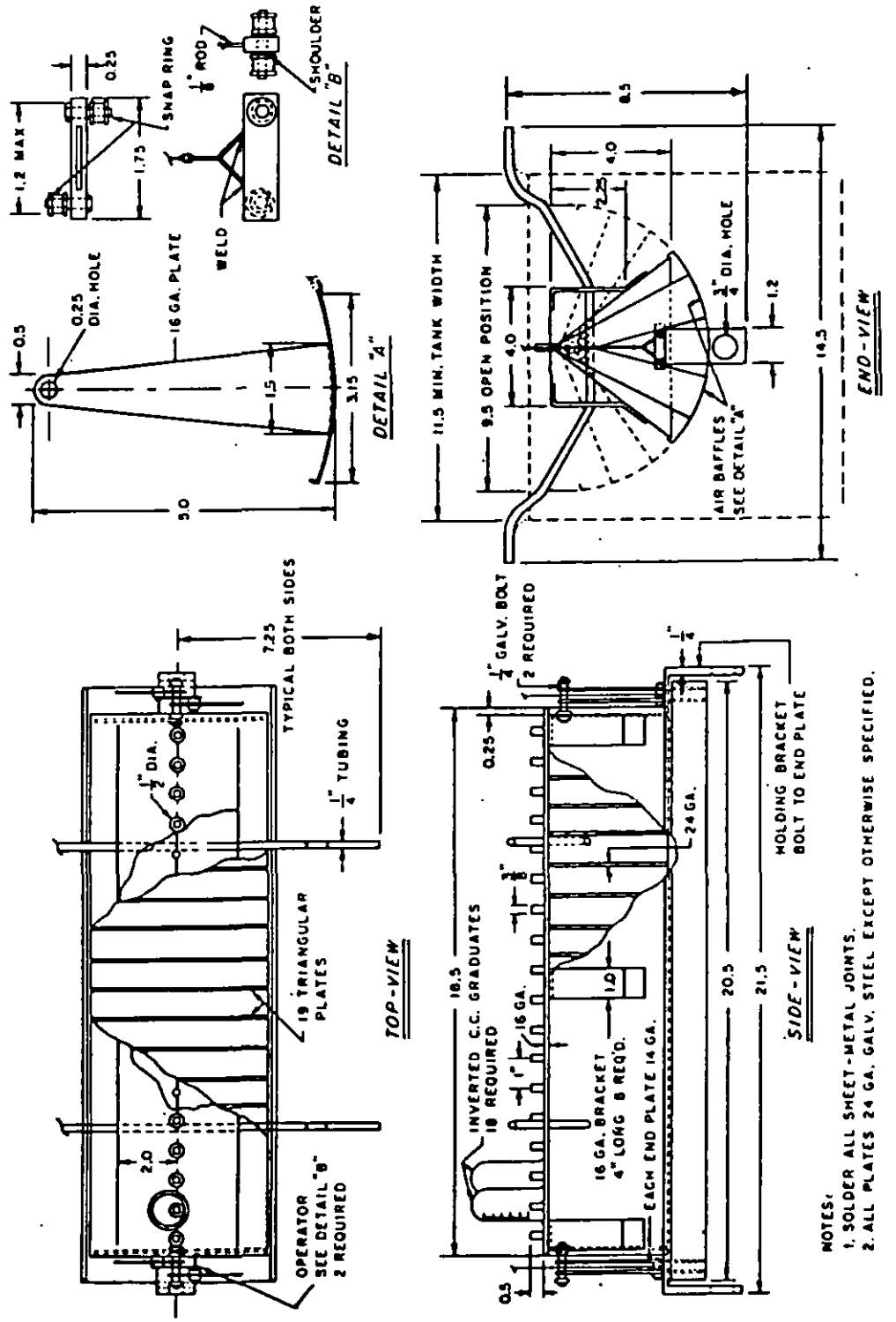


FIGURE 2. Apparatus for stress degradation and effusion tests.



Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

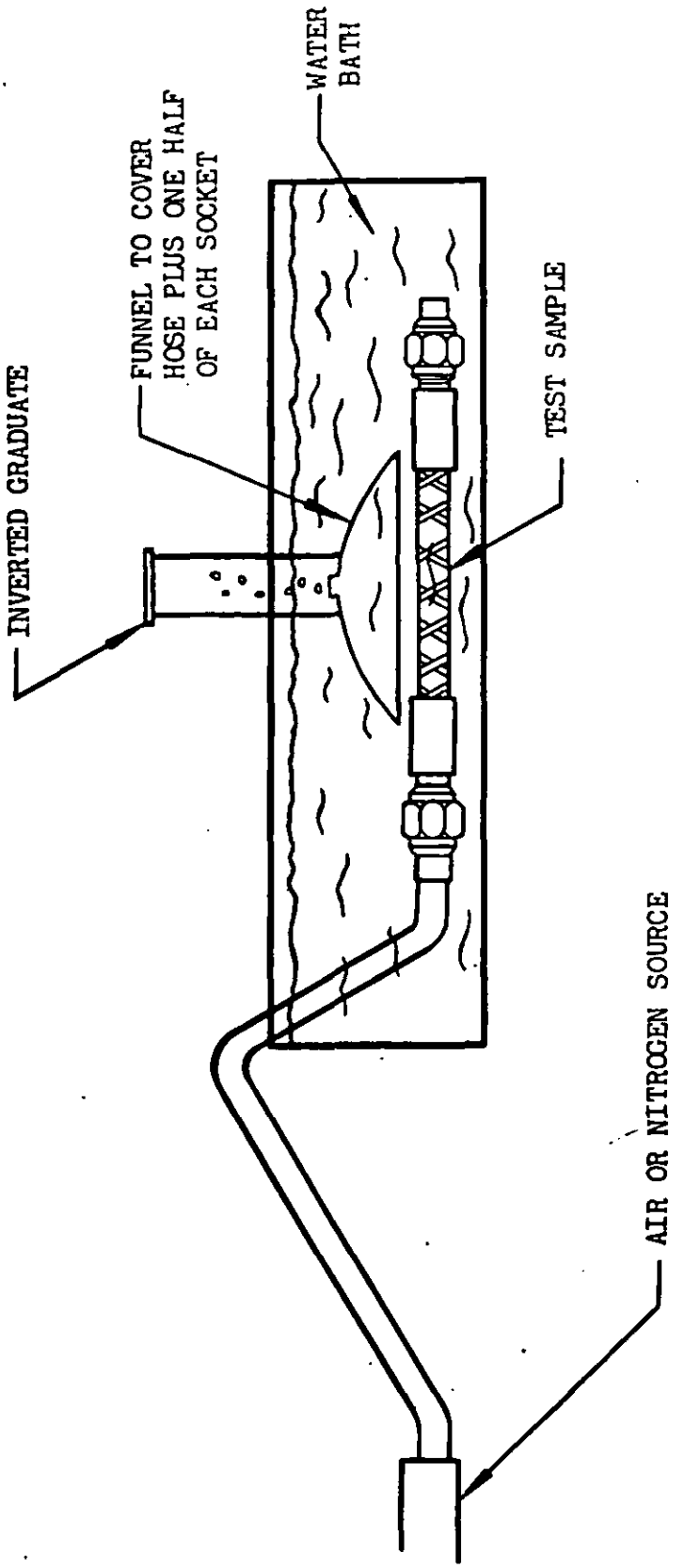


FIGURE 3. Effusion test diagram.



Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

4.6.10 Impulse test

4.6.10.1 Six hose assemblies of each size of the lengths specified in table II shall be subjected to this test. Three samples shall be immersed in lubricating oil conforming to MIL-L-7808 (or one of the following (1) General Electric F-50, or equal; (2) Dow Chemical Company F-60, or equal; (3) Oronite Chemical Company 8200 or equal), at 400°F ±10°F for 168 hours. The other three samples shall be aged in air at 400°F ±10°F for 168 hours. All samples shall then be subject to the proof pressure test specified in 4.6.5.

4.6.10.2 All sizes through -12 shall be installed in the impulse tester with a bend radius equal to the minimum specified in table II. Both ends of the samples shall be connected to a rigid support. Sizes -16Z and larger shall be installed straight, one end of which may be left free.

4.6.10.3 The pressure impulse test and equipment shall conform to ARP 603 and AIR 1228. Electronic measuring devices shall be used to determine and control the impulse pressures according to the operating pressures specified in table II with peak pressures of 125 percent for hose sizes -4 through 16Z. Sizes -20Z and -24Z shall be tested similarly, except that peak pressure need not exceed the operating pressures specified in table II. All sizes shall be subjected to 100,000 pressure impulse cycles applied at a frequency of 60 to 70 cpm. The temperature of the test fluid and ambient air shall be maintained at 400°F ±10°F. Any signs of leakage, blowoff of fittings, or other malfunction of the assemblies prior to completion of the 100,000 cycles shall be cause for rejection.

4.6.11 High temperature burst pressure. Two hose assemblies of each size shall be filled with a suitable test fluid and soaked for one hour with the ambient and fluid temperature at 450°F ±10°F. After one hour, the pressure shall be raised to the operating pressure and held for five minutes. The pressure shall be increased at a rate of 20,000 ±5,000 psi per minute until bursting or leakage occurs. Any leakage at pressures below the high temperature burst pressure listed in table II shall be evidence of failure.

4.6.12 Low temperature flexing. One test sample from the fuel resistance test, one from the stress degradation test, and one unaged sample shall be used for this test. The samples shall be filled with test fluid in accordance with TT-S-735, type III, and placed in a cold chamber maintained at a temperature of -67°F ±2°F for 24 hours. At the end of this time and while still at this temperature, the samples shall be bent to the extreme around a mandrel with a radius equal to the minimum bend radius specified in table II. The bend shall then be reversed and returned to the straight position. This cycle shall be repeated for a total of five times allowing four seconds per cycle. Damage to the hose as a result of this test shall be cause for rejection.

Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

4.6.13 Vacuum test. The same samples used in 4.6.12 shall be emptied and placed in an oven, maintained at 450°F ±10°F, with the assemblies in a minimum bend radius condition. A negative pressure as specified in table VIII shall then be applied to the assemblies and maintained. At the end of four hours, the assemblies shall be removed from the oven with the negative pressure maintained. When the samples have cooled to room temperature, the pressure shall be released and the hose inspected for collapse or defects. One end of each sample shall then be cut off within one inch of the fitting and a ball of the diameter specified in table VIII rolled the length of the hose. Reduction of the inside diameter to a value less than that of the ball specified, or damage to the hose as a result or bending or vacuum shall be cause for rejection.

4.6.14 Cubical expansion. The cubical expansion test shall be conducted on two samples each of sizes -4, and -5 only. Cubical expansion values shall not be greater than those listed in table IX.

4.6.15 Fuel resistance test. Two test samples of each size shall be subject to a fuel resistance test as follows. Fuel leakage during or at the conclusion of this test shall be cause for rejection.

TABLE VIII. Vacuum test.

| Size | Nominal inside diameter (inches) | Ball diameter (inches) | Vacuum (inches Hg) |
|---|---|---|---|
| -4 | 0.188 | 0.125 - 0.132 | 28 |
| -5 | 0.250 | 0.187 - 0.193 | 28 |
| -6 | 0.313 | 0.250 - 0.255 | 28 |
| -8 | 0.406 | 0.332 - 0.337 | 28 |
| -10 | 0.500 | 0.421 - 0.426 | 28 |
| -12 | 0.625 | 0.531 - 0.538 | 20 |
| -16Z | 0.875 | 0.770 - 0.778 | 14 |
| -20Z | 1.125 | 0.996 - 1.004 | 10 |
| -24Z | 1.375 | 1.246 - 1.252 | 8 |

TABLE IX. Cubical expansion (maximum).

| Size | Nominal inside diameter (inch) | Volumetric expansion (cc per inch of free length) |
|---|---|---|
| -4 | 0.188 | 0.028 |
| -5 | 0.250 | 0.040 |

4.6.15.1 The samples shall be filled with solvent conforming to P-D-680 or fuel conforming to MIL-T-5624 and placed in an oven maintained at a temperature of 260°F ±10°F for 48 hours. Precautions shall be taken to assure that the hose assemblies do not come in contact with parts of the oven that are at a higher temperature. Oven-wall temperatures high enough to ignite the fuel shall be avoided. Pressure equal to the operating pressure specified in table II shall be applied to the test samples.



Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

4.6.15.2 At the end of the 48-hour period, the test samples shall be drained and allowed to cool for 20 minutes at room temperature. The samples shall then be filled with test fluid conforming to TT-S-735, type III and a pressure equal to the rated operating pressure applied and maintained for a minimum of two hours at room temperature. Any evidence of leakage during or at the completion of this test shall be cause for rejection.

4.6.16 Corrosion test. Two test samples of each size shall be mounted in a vertical position and immersed in a 2-1/2 percent solution, by weight, of sodium chloride for five minutes. They shall then be air dried at 140°F for 25 minutes. This cycling shall be continued for 172 hours with the hose pressurized to normal operating pressure. Following the cycling, one sample shall be subjected to the room temperature burst pressure test (4.6.7) and the other sample shall be subjected to the high temperature burst pressure test (4.6.11). Any evidence of malfunction or leakage below the respective burst pressure specified in table II, or any pitting corrosion, or stress corrosion that might adversely affect the life of the hose shall be cause for rejection.

4.6.17 Pneumatic effusion test. Two hose assemblies of each size shall be used for this test. The assemblies shall be subjected to the operating pressure specified in table II for one hour at room temperature. The total amount of effusion through the hose and two fittings shall be collected over the last 30 minutes of testing and shall not exceed the value specified in table III. The collecting device should be similar to that shown on figure 3.

4.6.18 Pneumatic surge test. Two hose assemblies of each size that were subjected to the effusion test shall be used for this test. The assemblies shall be installed in test apparatus in accordance with figure 4. They shall then be subject with compressed gas to the rated operating pressure specified in table II for 25 minutes at room temperature. After this period of pressurization, the exhaust valve shall be opened within 50 milliseconds to permit the rapid discharge of the compressed gas. After five minutes, the valve shall be closed and the pressure recycled. This sequence of 25 minutes at operating pressure and five minutes at zero pressure shall be repeated a total of 16 times. The hose assemblies shall then be subjected to the rated proof pressure specified in table II for a minimum of two minutes. Any evidence of leakage at the end fittings shall constitute failure. The filter downstream of the hose shall be examined for evidence of inner tube degradation. Any evidence of degradation shall constitute failure.

4.6.19 Pneumatic leakage test. The test assembly shall be tested at room temperature at a value equal to the nominal operating pressure for a minimum period of five minutes while submerged under water. The test fluid shall be dry compressed air or nitrogen. The test assemblies shall be prepared without use of oil during assembly and shall be solvent cleaned and air dried prior to testing. Any visible air bubbles after one minute at pressure shall constitute failure.

## 5. PACKAGING

5.1 Preservation, packaging, packing, and marking. The hose shall be preserved, packaged, packed, and marked in accordance with MIL-P-775. Preservation and packaging shall be level A or C, and packing shall be level A, B, or C, as specified (see 6.2).

Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

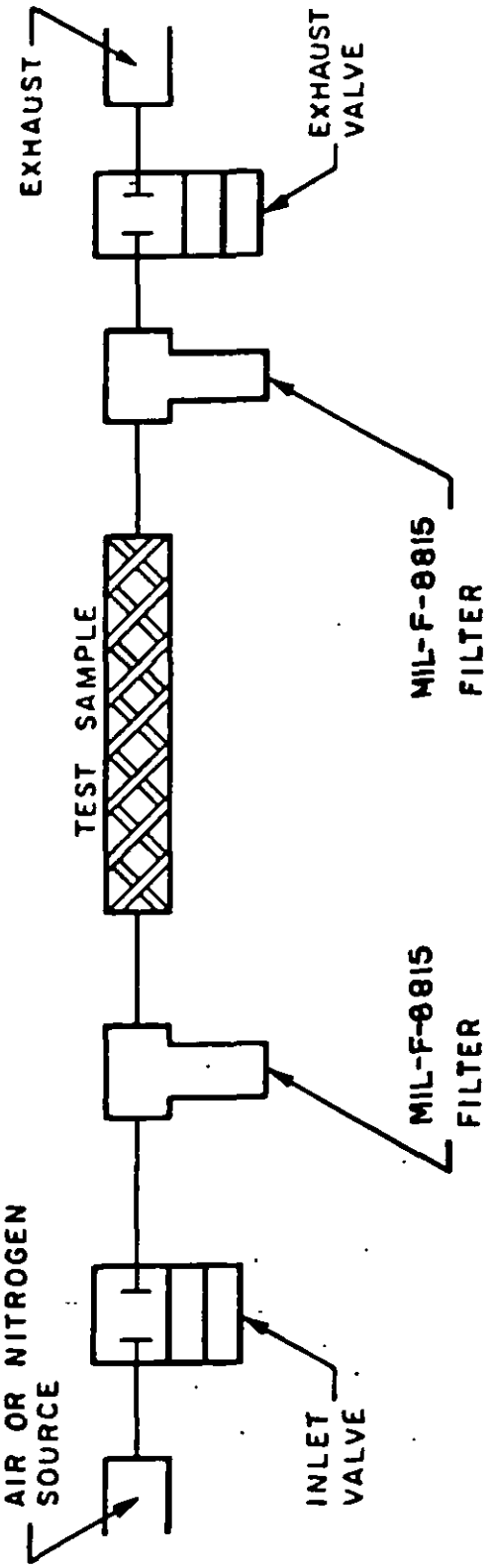


FIGURE 4. Pneumatic surge test diagram.



Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

## 6. NOTES

6.1 Intended use. The hose is intended for use in high-temperature fuel, lubricating oil, water-alcohol, chemical-fluid, and hydraulic and pneumatic systems. The temperature range is -65°F to 450°F. The operating presures are specified in table II. The -20 and -24 sizes shall not be used in systems where peak pressures exceed 1,000 psi.

6.1.1 Pneumatic storage system applications will not be approved. 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 approval by the procuring activity.

6.2 Ordering data. Procurement documents should specify:

a. Title, number, and date of this specification

b. Size, length, and part number of hose to be furnished

c. Level of preservation and packaging, and level of packing required (see 5.1)

d. Samples subjected to destructive tests (4.5.2 and 4.5.3, respectively) are not to be considered or shipped as part of the contract or order.

6.3 Qualification. With respect to products requiring qualification, awards will be made only for such products that, prior to the time set for opening of bids, have been tested and approved for inclusion in the applicable qualified products list, whether or not such products have actually been so listed by that date. The attention of the contractors is called to this requirement, 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. The activity responsible for the qualified products list is the Aeronautical Systems Division, ATTN: ENES, Wright-Patterson AFB, Ohio 45433, and information pertaining to qualification of products may be obtained from that activity.

6.4 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:
Army - AV
Navy - AS
Air Force - 11

Review activities:
Army - GL
Air Force - 99
DLA - CS

User activities:
Army - MI
Navy - SH

Preparing activity:
Air Force - 11

Project No. 4720-0576

Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

**INSTRUCTIONS:** In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge *(DO NOT STAPLE)*, and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

*NOTE:* This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification 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.

*(Fold along this line)*

*(Fold along this line)*

DEPARTMENT OF THE AIR FORCE
ASD/ENES:
Wright-Patterson AFB OH 45433

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

**BUSINESS REPLY MAIL**
FIRST CLASS PERMIT NO. 73236 WASHINGTON D. C.
POSTAGE WILL BE PAID BY THE DEPARTMENT OF THE AIR FORCE

ASD/ENES
Wright-Patterson AFB OH 45433

Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.

# STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

*(See Instructions – Reverse Side)*

1. DOCUMENT NUMBER: MIL-H-27267B.

2. DOCUMENT TITLE:

3a. NAME OF SUBMITTING ORGANIZATION:

b. ADDRESS *(Street, City, State, ZIP Code)*:

4. TYPE OF ORGANIZATION *(Mark one)*

- ☐ VENDOR
- ☐ USER
- ☐ MANUFACTURER
- ☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional:

b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional:

c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional:

8. DATE OF SUBMISSION *(YYMMDD)*:

DD FORM 82 MAR 1426

PREVIOUS EDITION IS OBSOLETE.

Source: https://assist.dla.mil -- Downloaded: 2016-11-16T07:28Z
Check the source to verify that this is the current version before use.