

18 June 1965

MILITARY SPECIFICATION

ADAPTER ASSEMBLY, REUSABLE, FLEXIBLE HOSE, LOW PRESSURE

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

1. SCOPE AND CLASSIFICATION

1.1 This specification establishes the requirements for adapter assembly, swivel nut type, for use with low pressure hose assemblies.

1.2 Classification. The adapter assembly shall be of one type, one style and shall be of the sizes specified on the applicable Aeronautical (AN), Military Standard (MS) or other engineering drawings approved by the procuring activity.

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on the date of invitation for bids or request for proposals, form a part of this specification to the extent specified herein.

SPECIFICATIONS

Federal

QQ-A-225/5	Aluminum Alloy Bars, Rods, Wire and Special Shapes; Rolled, Drawn or Cold-Finished - 2017
QQ-A-225/6	Aluminum Alloy, Bars, Rods and Wire, Rolled Drawn or Cold-Finished - 2024
QQ-A-367	Aluminum Alloy Forgings, Heat Treated
QQ-P-416	Plating Cadmium (Electrodeposited)
QQ-S-633	Steel Bars, Carbon, Cold Finished and Hot Rolled, General Purpose

Military

MIL-H-775	Hose, Rubber or Fabric (Including Tubing and Fittings) Nozzles and Strainers, Packaging of
MIL-H-5593	Hose, Aircraft, Low Pressure, Flexible
MIL-H-5606	Hydraulic Fluid, Petroleum Base, Aircraft and Ordnance
MIL-O-6082	Lubricating Oil, Aircraft Reciprocating Engine (Piston)
MIL-H-6083	Hydraulic Fluid, Petroleum Base, Preservative

FSC 4730

MIL-H-6088	Heat Treatment of Aluminum Alloys; Process for Aircraft Application
MIL-S-7742	Screw Threads, Standard Optimum Selected Series; General Specifica- tion For
MIL-A-8625	Anodic Coatings, For Aluminum and Aluminum Alloys
MIL-D-70327	Drawings, Engineering and Associated Lists

STANDARDS

Federal

Fed Test Method Std No. 601	Rubber; Sampling and Testing
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Military

MIL-STD-105	Sampling Procedure and Tables for Inspection by Attributes
MIL-STD-130	Identification Marking of U.S. Military Property
MIL-STD-143	Specifications and Standards Order of Precedence for the Selection of Test Reports, Preparation of
MIL-STD-831 MS27404	Adapter, Straight, Reusable, Tube to Hose, Low Pressure
MS33656	Fitting End, Standard Dimensions for Flared Tube Connection and Gasket Seal

(Copies of specifications, standards, drawings and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids, or request for proposal, shall apply.

ASA B46.1 - Surface Texture, Surface Roughness,
Waviness and Lay.

Application for copies should be addressed to the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York 17, NY.

3. REQUIREMENTS

3.1 Qualification. The fitting assemblies furnished under this specification shall be products which have passed the qualification tests specified herein, and have been listed on or approved for listing on the applicable qualified products list.

3.2 General

3.2.1 Fittings shall be suitable for use with hose conforming to MIL-H-5593 to form flexible hose assemblies for use in low pressure systems.

3.3 Materials. Component parts of the fitting assembly shall be fabricated from material listed in Table 1, as specified on the applicable MS Standard.

Table 1. Material

TYPE	MATERIAL	FORM	SPECIFICATION
Straight	Aluminum Alloy	Bars, Shapes, Rods	QQ-A-225/5-2017 Temper T4
			QQ-A-225/6-T351 Temper T4
Shapes		Forgings	QQ-A-367-2014 Temper T4
Straight & Shapes	Steel	Bars, Rods & Forgings	QQ-S-633 (C-1020)

3.3.1 Material certification. Records of chemical composition, analysis and mechanical property tests showing conformance to the material requirements of this specification shall be available to the Government when such information is necessary to assure that materials conform to the prescribed requirements.

3.3.2 Heat treatment. Aluminum alloy parts shall be heat treated to the tempers specified in Table 1, in accordance with MIL-H-6088.

3.4 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.

3.5 Design and construction.

3.5.1 Design. The design and dimensions shall fall within the envelope limits shown on the applicable MS Standard.

3.5.2 Construction. Abrupt reductions of sections shall be avoided. Small external sections adjoining relatively heavy body sections shall be shaped into the heavier sections by means of ample fillets. Sharp corners, inadequate fillets, excessive undercuts or grooves at the junction of small sections with large sections of the fitting shall be cause for rejection.

3.6 Screw threads. All threads shall be in accordance with MIL-S-7742.

3.7 Part numbering of interchangeable parts. All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable. The item identification and part number requirements of MIL-D-70327 shall govern the manufacturer's part number and changes thereto.

3.8 Finish.

3.8.1 Aluminum parts. Aluminum parts shall be anodized in accordance with MIL-A-8625, Type II, for a period of 30 ± 5 minutes.

3.8.1.1 Current density. Anodic current density shall be within 12 to 16 amperes per square foot, measured on a flat sheet.

3.8.2 Carbon steel parts. Carbon steel parts shall be cadmium plated in accordance with QQ-P-416, Type 1, Class 2. After plating, all parts shall be dipped in preservative oil conforming to MIL-H-6083.

3.9 Surface roughness. Surface roughness shall be in accordance with ASA B46.1.

3.10 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. The sealing surface shall be smooth except that annular tool marks of 100 RMS roughness as defined in ASA B46.1 will be acceptable. All other machined surfaces shall not exceed 125 RMS roughness.

3.11 Identification of product. All fittings shall be marked for identification in accordance with MIL-STD-130, with the applicable MS number and the manufacturer's name or trademark.

3.11.1 Location and method of marking. Marking shall be embossed or impression stamped on the fitting and shall be in a location which will not be detrimental to the part or the corrosion preventative finish.

3.11.2 Color identification. In addition to the marking specified in 3.11, the fittings shall be further identified by the following colors:

Aluminum - Blue
Steel - Black

3.12 Performance. When assembled with hose conforming to MIL-H-5593, the fittings shall meet the following performance requirements.

3.12.1 Proof pressure. When tested in accordance with 4.5.2, the fittings shall not leak when subjected to the proof pressure specified in Table II for not less than 30 seconds and not more than 5 minutes.

3.12.2 Leakage. When tested in accordance with 4.5.3, the fittings shall not leak when subjected to the proof pressure specified in Table II for not less than 1 hour.

3.12.3 Burst pressure. When tested in accordance with 4.5.4, the fittings shall not leak or blow off the hose at any pressure below the burst pressure specified in Table II.

3.12.4 Low temperature test. When tested in accordance with 4.5.5, the fittings shall not leak when subjected to the proof pressure specified in Table II for not less than 30 seconds and not more than 5 minutes.

3.12.5 Overtightening torque test. When tested in accordance with 4.5.6, there shall be no evidence of failure or deformation of the fitting assembly.

4. QUALITY ASSURANCE PROVISIONS

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

Table II. Test pressures.

Size	Operating Pressure (PSI Max.)	Proof Pressure (PSI Min.)	Burst Pressure (PSI Min.)	Minimum Bend Radius (Inside of Bend - Inches)
-2	300	600	2000	2
-3	250	500	1700	2
-4	200	400	1250	4
-6	150	300	1000	4
-8	150	250	750	6
-10	150	250	700	6

4.1.1 Components and material inspection. In accordance with 4.1 the supplier is responsible for insuring that components and materials used are manufactured, tested and inspected in accordance with the requirements of referenced subsidiary specifications and standards to the extent specified herein, or if none, in accordance with this specification.

4.2 Classification of tests. The inspection and testing of fittings shall be classified as follows:

- a. Qualification tests . . . (4.3).
- b. Acceptance tests (4.4).

4.3 Qualification test.

4.3.1 Test samples.

4.3.1.1 Hose assemblies. The test samples shall consist of 8 fittings conforming to MS27404 of each size to be qualified made up into 4 assemblies using hose which has been qualified to MIL-H-5593. The length of the assemblies shall be 18 inches long. All samples shall be identified with the manufacturer's name, part number and the specification number.

4.3.1.2 Fittings. Two fittings conforming to MS27404 of each size shall be qualified for overtightening torque tests.

4.3.2 Test report and test samples for the qualifying activity. When the 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. Two copies of a test report in accordance with MIL-STD-831.

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

4.3.3 Qualification tests. The qualification tests shall consist of all the tests described under 4.5. The qualification test schedule shall be in accordance with Table III.

Table III. Qualification test schedule

Sample No.	Fittings	Hoae Assemblies			
	1 & 2	3	4	5	6
Paragraph	4.5.1	4.5.1	4.5.1	4.5.1	4.5.1
	4.5.6	4.5.2	4.5.2	4.5.2	4.5.2
		4.5.3	4.5.3	4.5.5	4.5.5
		4.5.4	4.5.4	4.5.2	4.5.2

4.4 Acceptance tests. Acceptance tests shall consist of:

a. Sampling tests (4.4.2).

b. Periodic sampling tests . . (4.4.3).

4.4.1 Lot. A lot shall consist of all fittings of one size not to exceed 2,000, made from the same material and processed at one time.

4.4.2 Sampling tests. Fittings shall be selected at random, in accordance with MIL-STD-105, inspection level S-4, not to exceed 2,000 of any one size. Fittings shall be subjected to the examination of product test specified in 4.5.1. The AQL shall be 4.0 percent defective.

4.4.2.1 Resubmitted lots. Inspection of resubmitted lots shall be in accordance with MIL-STD-105.

4.4.3 Periodic sampling tests. Six fittings taken at random from each 5,000 fittings of one size, not necessarily manufactured during one continuous production run, shall be made up into three hose assemblies and subjected to the following tests.

- a. Proof pressure test (4.5.2).
- b. Leakage test (4.5.3).
- c. Burst pressure test (4.5.4).

4.4.3.1 Rejection and retest. When one or more fittings from a lot fails to meet the test requirement, no fittings still on hand or later produced shall be accepted until the extent and cause of failure are determined and appropriately corrected. The contractor shall explain to the procuring activity the cause of failure and action taken to preclude recurrence. After correction of the defects, all tests shall be repeated.

4.5 Test Methods.

4.5.1 Examination of product. The fittings shall be examined to determine compliance with the requirements specified herein with respect to materials, dimensions, workmanship and marking.

4.5.2 Proof pressure. All test samples of each size shall be subjected to the proof pressure specified in Table II for not less than 30 seconds and not more than 5 minutes. The test fluid shall be hydraulic oil conforming to MIL-H-5606 or water. Any evidence of leakage at the end fittings shall be cause for rejection.

4.5.3 Leakage. Two unaged test samples shall be used for this test. The test procedure shall be in accordance with FED-STD-601, Test Method 10111, except that the proof pressure specified in Table II shall be maintained for not less than 1 hour. Test samples shall have the outer cover of the hose stripped off next to each end fitting for a distance of approximately 1/2 inch, so that the braid is exposed, care being taken not to injure the braid in removing the cover. Leakage through the end fittings, as evidenced by air bubbles, will be cause for rejection.

4.5.4 Burst pressure. The test samples that were subjected to the leakage test (4.5.3) shall be used for this test. The test procedure shall be in accordance with FED-STD-601, Test Method 10011. The end fittings shall not leak, or blow off the hose at any pressure less than the burst pressure specified in Table II.

4.5.5 Low temperature test. Two sample hose of each size shall be used for this test. One sample shall be filled with oil or immersed in oil conforming to MIL-H-5606. The other sample shall be open to the oven atmosphere. The samples shall be placed in an oven with a maintained temperature of $158^{\circ} \pm 2^{\circ}\text{F}$ for a period of seven days. The test samples shall then be placed in a cold chamber having a temperature of $-67^{\circ} \pm 2^{\circ}\text{F}$ and allowed to remain for 24 hours. After this time and while still at the specified temperature the test samples shall be flexed through 180 degrees to the minimum bend radius specified in Table II at each extreme of travel, for one cycle, the rate of cycling being one cycle in 4 seconds. The test samples shall then be subjected to the proof pressure test as described in 4.5.2. Any leakage at the end fittings shall be cause for rejection.

4.5.6 Overtightening torque test. Two end fittings of each size shall be subjected to this test. The end fittings shall be assembled on a fitting of steel construction in accordance with MS33656. The threads of the MS33656 fitting shall be lubricated with oil conforming to MIL-L-6082 or MIL-H-5606 prior to this test. Each fitting shall be tightened to the appropriate overtightening torque values listed in Table IV for each size and loosened. This sequence shall be repeated 15 times. After this sequence, there shall be no evidence of failure or deformation of the fitting assembly, and the swivel nut shall be free enough to permit turning on the nipple by hand.

Table IV. Overtightening Torque (Pound Inches)

Size	Torque	
	Steel	Aluminum
-2	100	80
-3	130	100
-4	160	120
-6	300	200
-8	560	300
-10	700	400

5. PREPARATION FOR DELIVERY

5.1 Preparation. Preservation packaging, packing and marking shall be in accordance with MIL-H-775.

5.1.1 Level packaging. The level of preservation packaging shall be A or C as specified. (See 6.2)

5.1.2 Level packing. Packing shall be level A, B or C as specified. (See 6.2)

6. NOTES

6.1 Intended use. The adapter assembly covered by this specification is intended for use on low pressure hose assemblies used on air and vacuum systems for instruments, pages and automatic pilots.

6.2 Ordering data. Procurement documents shall specify the following:

- a. Title, number and date of this specification.
- b. Size and/or part number of adapter.
- c. Level of packaging and packing required.

6.3 Qualification. With respect to products requiring qualification, awards will be made only for such products as have, prior to the time set for opening of bids, 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 suppliers 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 MOAMA (MONEBM) Brookley AFB, Ala 36615, and information pertaining to qualification of products may be obtained from that activity.

Custodian:
Air Force - 69
Navy - WP
Army - MO

Preparing Activity:
Air Force - 69
Project No. 4730-0174

Review Activity:
DSA - CS
Air Force - 69

User Activity

SPECIFICATION ANALYSIS SHEET

Form Approved Budget Bureau No. 119-R004

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity.

SPECIFICATION

ORGANIZATION

CITY AND STATE

CONTRACT NO.

QUANTITY OF ITEMS PROCURED

DOLLAR AMOUNT

\$

MATERIAL PROCURED UNDER A

DIRECT GOVERNMENT CONTRACT

SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING

D. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

YES

NO

IF "YES", IN WHAT WAY?

4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)

SUBMITTED BY (Printed or typed name and activity)

DATE

DD FORM 1426
1 APR 63

REPLACES NAVSHIPS FORM 0033, WHICH IS OBSOLETE