AEROSPACE STANDARD

AS4842™	REV. B

Issued 1995-05
Reaffirmed 2015-06
Revised 2021-03

Superseding AS4842A

Fittings and Bosses, Pipe Threaded, Fluid Connection, Procurement Specification

RATIONALE

Revise AS4842 by including individual tables showing recommended operating pressure ratings for fittings when used on CRES and Al Alloy tubing. Document title revised. Note 2.1 updated to include specifications mentioned herein. Flagnotes /7/ through /10/ added to Table 1. Note 3.1.1 revised to align with current QML statement. Note 3.1.2 added. Notes /7/, /8/, /9/, and /10/ added to Table 1. Upper range of hardness requirement in note 3.3.3 revised. Note 3.4.4 reworded to include color requirement. Note 4.5.1.2 revised to remove the statement that destructive testing is required to retain QML status. This requirement is regulated by AC7112. Historical information added to note 6.2. Tables 5A and 5B added. Note 6.2.2 revised and supersession Table 7 added. Lessons learned note 6.2.4 added. General updates included.

1. SCOPE

This SAE Aerospace Standard (AS) establishes the requirements for pipe threaded fluid connection fittings (see Section 6) for use in all types of fluid systems.

1.1 Classification

Fittings shall be furnished in the types and styles designated by the applicable AN, AS, MS, NAS, or other engineering standard drawings. This specification is similar to MIL-F-5509 as applicable to pipe threaded fittings and bosses including updated materials, process specifications and industry coordinated general improvements. It is intended to serve as a procurement specification for the fittings described herein and in Section 6.

2. APPLICABLE DOCUMENTS

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

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For more information on this standard, visit
https://www.sae.org/standards/content/AS4842B

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Telephone: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2472	Anodic Treatment of Aluminum Alloys Sulfuric Acid Process, Dyed Coatings
AMS2658	Hardness and Conductivity Inspection of Wrought Aluminum Alloy Parts
AMS2700	Passivation of Corrosion Resistant Steels
AMS2759	Heat Treatment of Steel Parts General Requirements
AMS2770	Heat Treatment of Wrought Aluminum Alloy Parts
AMS2772	Heat Treatment of Aluminum Alloy Raw Materials
AMS4124	Aluminum Alloy, Rolled or Cold Finished Bars, Rods, and Wire 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (7075-T73, T7351) Solution Heat Treated, Stress Relieved by Stretching, and Overaged
AMS4133	Aluminum Alloy Forgings and Rolled Rings 4.4Cu - 0.85Si - 0.80Mn - 0.50Mg (2014-T6) Solution and Precipitation Heat Treated
AMS4134	Aluminum Alloy, Die Forgings 4.4Cu - 0.85Si - 0.80Mn - 0.50Mg (2014-T4) Solution Heat and Naturally Aged
AMS4141	Aluminum Alloy Die Forgings 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (7075-T73) Solution and Precipitation Heat Treated
AMS4339	Aluminum Alloy, Rolled or Cold Finished Bars and Rods 4.4Cu - 1.5Mg - 0.60Mn (2024-T851) Solution Heat Treated, Cold Worked, and Artificially Aged
AMS4610	Brass, Free-Cutting Bars and Rods 61.5Cu - 35Zn - 3.1Pb Half Hard (H02)
AMS4614	Brass Forgings, Free Cutting 60Cu - 2.0Pb - 37.5Zn As Forged (M10)
AMS5639	Steel, Corrosion-Resistant, Bars, Wire, Forgings, Mechanical Tubing, and Rings 19Cr - 10Ni Solution Heat Treated
AMS5645	Steel, Corrosion and Heat Resistant, Bars, Wire, Forgings, Tubing, and Rings 18Cr - 10Ni - 0.40Ti (321) Solution Heat Treated
AMS5646	Steel, Corrosion and Heat-Resistant, Bars, Wire, Forgings, Tubing, and Rings 18Cr - 11Ni - 0.60Cb(Nb) (347) Solution Heat Treated
AMS5648	Steel, Corrosion and Heat-Resistant, Bars, Wire, Forgings, Tubing, and Rings, 17Cr - 12Ni - 2.5Mo (316) Solution Heat Treated
AMS6370	Steel, Bars, Forgings, and Rings, 0.95Cr - 0.20Mo (0.28-0.33C) (SAE 4130)
AMS6382	Steel, Bars, Forgings, and Rings, 0.95Cr - 0.20Mo (0.38-0.43C) (SAE 4140) Annealed
AMS-H-6875	Heat Treatment of Steel Raw Materials
AMS-QQ-A-225/6	Aluminum Alloy, 2024, Bar, Rod, and Wire; Rolled, Drawn, or Cold Finished

AMS-QQ-A-225/9	Aluminum Alloy 7075, Bar, Rod, Wire, and Special Shapes; Rolled, Drawn, or Cold Finished
AMS-QQ-A-367	Aluminum Alloy Forgings
AMS-QQ-P-416	Plating, Cadmium (Electrodeposited)
AMS-QQ-S-763	Steel, Corrosion Resistant, Bars, Wire, Shapes, and Forgings
AMS-S-6758	Steel, Chrome-Molybdenum (4130), Bars and Reforging Stock (Aircraft Quality)
AMS-STD-595	Colors Used in Government Procurement
ARP4784	Definitions and Limits, Metal Material Defects and Surface and Edge Features, Fluid Couplings, Fittings and Hose Ends
ARP9013	Statistical Product Acceptance Requirements
AS478	Identification Marking Methods
AS1376	Alternate Dimensions, Center Body Section, Shape Fluid Fitting, Design Standard
AS5200	Port or Fitting End, Internal Taper Pipe Thread, Design Standard
AS5201	Fitting End, External Taper Pipe Thread, Design Standard
AS71051	Pipe Threads, Taper, Aeronautical National Form, Symbol ANPT - Design and Inspection Standard

2.2 U.S. Government Publications

Copies of these documents are available online at https://quicksearch.dla.mil.

A-A-59133	Cleaning Compound, High Pressure (Steam) Cleaner
MIL-PRF-6083	Hydraulic Fluid, Petroleum Base, For Preservation and Operation
MIL-A-8625	Anodic Coatings, for Aluminum and Aluminum Alloys
MIL-PRF-83282	Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Metric, NATO Code Number H-537
MIL-DTL-83488	Coating, Aluminum, High Purity

2.3 ASME Publications

Available from ASME, P.O. Box 2900, 22 Law Drive, Fairfield, NJ 07007-2900, Tel: 800-843-2763 (U.S./Canada), 001-800-843-2763 (Mexico), 973-882-1170 (outside North America), www.asme.org.

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

2.4 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM A108 Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished

ASTM A370 Standard Test Methods and Definitions for Mechanical Testing of Steel Products

ASTM B16/B16M Standard Specification for Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines

ASTM B124/B124M Standard Specification for Copper and Copper Alloy Forging Rod, Bar, and Shapes

ASTM B138/B138M Standard Specification for Manganese Bronze Rod, Bar, and Shapes

ASTM B154 Standard Test Method for Mercurous Nitrate Test for Copper and Copper Alloys

2.5 PRI Publications

Available from Performance Review Institute, 161 Thorn Hill Road, Warrendale, PA 15086-7527, Tel: 724-772-1616, www.pri-network.org.

AC7112 Nadcap Audit Criteria for Fluid Systems Component Manufacturers

AC7112/2 Nadcap Audit Criteria for Fittings and other Machined Components

PD1100 Nadcap Program Requirements

3. TECHNICAL REQUIREMENTS

3.1 Qualification

3.1.1 Manufacturer Accreditation

A manufacturer producing a product in conformance to this procurement specification shall be accredited in accordance with the requirements of AC7112 and shall be listed in a NADCAP Qualified Manufacturers List (QML). The QML is available at www.eAuditNet.com.

3.1.2 Accreditation of Special Processes

Manufacturers of threaded items are to be accredited to PRI NADCAP AC7112/2 (see 3.2.3).

3.2 Material

Fittings shall be fabricated of materials listed in Table 1 and in compliance with requirements in this specification, or as specified on the applicable part standard drawing (see 6.2.2).

Table 1 - Materials

Material	Type of Part	Form /1/	Specification	Alloy and Temper	Material Code
Aluminum Alloy /7/	Straight Fittings	Bars, Rods	AMS-QQ-A-225/6	2024-T6 or T851 /8/	D /10/
			AMS4339	2024-T851 /8/	D /10/
			AMS-QQ-A-225/9	7075-T73	W
			AMS4124	7075-T7351	W
	Shape Fittings	Forgings	AMS-QQ-A-367	2014-T6 /8/	D /10/
			AMS4134	2014-T6 /8/	D /10/
			AMS-QQ-A-367	7075-T73	W
			AMS4141	7075-T73	W
	Shape Fittings	Bars	AMS-QQ-A-225/6	2024-T6 or T851 /8/	D /10/
			AMS4339	2024-T851 /8/	D /10/
			AMS-QQ-A-225/9	7075-T73	W
			AMS4124	7075-T7351	W
Carbon and Low Alloy Steel /2/	Fittings	Bars, Rods	ASTM A108 /3/	1137 /9/	None
			AMS-S-6758	4130	None
			AMS6370	4130	F or None
			AMS6382	4140	F or None
	Shape Fittings	Forgings	ASTM A108 /3/	1137 /9/	None
			AMS6370	4130 Cold Finished	F or None
			AMS6382	4140 Cold Finished	F or None
Copper-Based Alloy /5/	Straight Fittings	Bars, Rods	ASTM B16/B16M	Alloy 360, half hard	B (None, C) /6/
			AMS4610	Alloy 360, half hard	B (None, C) /6/
			ASTM B138/B138M	Alloy 675, half hard	B (None, C) /6/
	Shape Fittings	Bars, Rods	ASTM B138/B138M	Alloy 675, half hard	B (None) /6/
		Forgings	ASTM B124/B124M	Alloy 377	B (None) /6/
			AMS4614	Alloy 377	B (None) /6/
Corrosion Resistant Steel	Fittings	Bars	AMS5639	Class 304, Cond A	J
			AMS5648	Class 316, Cond A	K
			AMS5645	Class 321, Cond A	R
			AMS5646 /4/	Class 347, Cond A	S
	Shape Fittings	Forgings	AMS5639	Class 304, Cond A	J
			AMS5648	Class 316, Cond A	K
			AMS5645	Class 321, Cond A	R
			AMS5646 /4/	Class 347, Cond A	S

/1/ The center body section of shape fittings machined from bar or oversized forgings shall conform to AS1376 (see 3.5).

/2/ The hardness of finished carbon steel parts shall be per 3.3.3. If the materials are procured with this requirement as a supplement to the specification, the purchase order shall specify that any heat treatment applied shall be in accordance with AMS-H-6875 or AMS2759 (see 3.3.2).

/3/ This document is for bar from which forgings shall be made and only the chemical composition applies.

/4/ Type 347 Corrosion Resistant Steel, type code “S” shall not be used for new manufacture but may be used until existing stocks are depleted.

/5/ ASTM B138/B138M is manganese bronze. ASTM B16/B16M, AMS4610, and AMS4614 are brass.

/6/ Code letter B is preferred. Codes in parentheses are on some older standards.

/7/ The electrical conductivity and hardness of aluminum alloy shall be per 3.3.2. This requirement shall be added to the applicable document when materials are procured, or the material is heat treated before or after fabrication in order to meet the requirement.

/8/ Aluminum Alloy, Type 2014 and 2024 are not recommended for new design.

/9/ Alloy steel, Type 1137 is not recommended for new design.

/10/ Material Code letter W, 7075 aluminum alloy, is a preferred replacement for material code letter D, 2014 and 2024 aluminum, because of superior corrosion and stress corrosion resistance.

3.3 Heat Treatment

3.3.1 Aluminum Alloy

Aluminum alloy fittings shall be supplied in the final temper as shown in Table 1. When fitting material is purchased in other than the final temper, the heat treatment of the raw material and of semi-finished or finished parts shall be in accordance with AMS2770 or AMS2772, as applicable.

3.3.1.1 Electrical Conductivity and Hardness

Aluminum alloy fittings shall meet the electrical conductivity and hardness requirements of AMS2658. The material may have to be heat treated before or after fabrication of parts in order to meet the requirement (see 4.7.2).

3.3.2 Steel

When additional processing is required to comply with hardness requirements of 3.3.3, heat treatment shall be in accordance with AMS-H-6875 or AMS2759, as applicable.

3.3.3 Hardness Properties for Finished Carbon and Low Alloy Steel

Unless otherwise specified on the applicable drawings, the hardness of the finished carbon and low alloy steel parts with plating removed shall be 92 HRB to 40 HRC. For carbon and low alloy steel parts below a hardness of 20 HRC, hardness tests shall be made using the Rockwell B scale, in which case the hardness shall be within the range of 92 to 99 HRB (see 4.7.3).

3.4 Finish

3.4.1 Aluminum Alloy

3.4.1.1 Anodic Coating

Aluminum alloy fittings shall be anodized in accordance with MIL-A-8625, Type II, Class 2, or AMS2472, dyed blue for material code D; or brown for material code W, as applicable (see 3.7.4), and shall be duplex sealed. Contact area from anodizing electrode may show discoloration and impressions. Such discoloration and impression due to anodizing electrode shall not be cause for rejection if they occur in internal passages. Burn marks are not permissible. Bare areas occurring on bearing or threaded surfaces shall be cause for rejection. Bare areas shall not exceed 30% of the remaining surface area.

3.4.1.2 High Purity Aluminum Coating

When specified, high purity aluminum coating shall be in accordance with MIL-DTL-83488, Class 3, Type II, with 0.0005 inch maximum thickness. Chromate treatment shall be applied after glass bead peening at a pressure of 25 psig maximum. Barrel processing is not permitted. Surface texture after glass bead peening and chromate treatment shall not exceed drawing tolerances. Coating thickness requirements for holes, recesses, and internal threads do not apply. Visual evidence of coating in holes and openings shall be to a minimum depth of two diameters or two times opening.

3.4.2 Carbon and Low Alloy Steel

Carbon and low alloy steel fittings shall be cadmium plated in accordance with AMS-QQ-P-416, Type II, Class 2, dyed black (see 3.7.4). All such carbon or low alloy steel fittings shall be dipped in oil conforming to MIL-PRF-6083 or MIL-PRF-83282. Fluid passage holes, other openings, and internal threads shall not be subject to a plating thickness requirement and may exhibit bare areas provided that they are protected with a light film of oil.

3.4.3 Corrosion-Resistant Steel

Corrosion-resistant steel fittings shall be passivated in accordance with AMS2700, Type 6 or 7.

3.4.4 Copper-Base Alloy

When specified, copper-based alloy fittings shall be cadmium plated in accordance with AMS-QQ-P-416, Type II, Class 3. Color natural.

3.5 Design and Fabrication

The design and fabrication of the fittings shall be in accordance with the applicable drawings. The fitting ends shall be in accordance with AS5200 or AS5201, as applicable. Dimensional requirements are applicable after heat treatment and protective finishing. The center body section of shape fittings machined from bar or oversized forgings shall conform to AS1376.

3.5.1 Shape and Form Restrictions

Abrupt reductions of section shall be avoided. Small external sections adjoining relatively heavy body sections shall transition into the heavier sections by means of ample fillet radii.

3.5.2 Passages

3.5.2.1 Drill Offset

On straight fittings where the fluid passage is drilled from each end, the offset between the drilled holes at the meeting point of the drills shall not exceed 0.015 inch. It shall be possible to pass through the fluid passage a ball whose diameter is 0.020 inch less than the minimum diameter specified for the passage. Passages shall meet the minimum diameter requirement as specified on the detail part standard drawings.

3.5.2.2 Cross Section at Fluid Path Junction

On shape fittings, the cross-sectional area at the junction of fluid passages shall be such that it shall be possible to pass through the fitting from end to end, a ball whose diameter is not less than 0.7 times the minimum diameter specified for the smaller passage.

3.5.3 Threads

Pipe threads shall conform to AS71051, unless otherwise specified. Steel, corrosion resistant steel, and aluminum alloy threads may be cut, ground, or rolled (see 3.5.3.1). Copper alloy threads shall be cut or ground only.

3.5.3.1 Rolled External Threads

Laps and seams, whose depths are within the limits of Table 2, are acceptable on the crest, and the non-pressure thread flank above the pitch diameter. Laps and seams are not acceptable on any part of the pressure thread flank, in the thread root, or on the non-pressure thread flank extending from above to below the pitch diameter (see Figure 1). Stress cracks are unacceptable.

Table 2 - Depth of laps, seams, surface irregularities, and discontinuities in rolled threads

Nominal Pipe Size Inches	Depth Inch Max
0.125	0.006
0.250	0.007
0.375	0.008
0.500	0.009
0.750 through 2.00	0.010

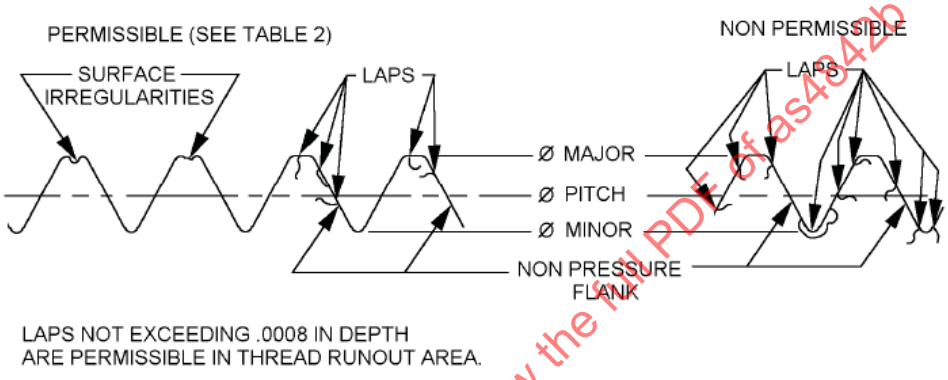

Figure 1 - Laps and surface irregularities in threads

3.6 Performance

3.6.1 Internal Strain of Copper-Base Alloys

Fittings fabricated from copper-base alloys shall have no internal strain as revealed by the test specified in 4.7.4. After testing, the parts shall be examined. Any evidence of cracks indicates internal strain and is not acceptable.

3.7 Identification of Product

All fittings shall be marked in accordance with the following instructions. The marking shall be applied in accordance with AS478 as specified on the applicable drawing in a location not detrimental to the performance of the fitting and not detrimental to the corrosion protection of the fitting. When items cannot be physically marked because of lack of space or because marking would have a deleterious effect, the package shall provide the identification per 5.4.

3.7.1 Manufacturer's Identification

Unless otherwise specified, all fittings shall be marked with the manufacturer's name, CAGE code or trademark, and with the letters AN, MS, AS, or NAS, as applicable.

3.7.2 Material Identification

Fittings shall be marked with the material code letter as shown in Table 1.

3.7.3 Marking for Part Number and Size

A numerical size code equivalent to the nominal pipe size in 0.062 inch increments is optional. All fittings larger than 0.375 inch nominal pipe or 06 size code for flared fittings shall be marked with the part number, exclusive of size. Fittings previously manufactured to AN, AS, MS, or NAS standards that meet all other requirements of this document and the applicable part standards may retain their identification in addition to the previous requirements.

3.7.4 Color Identification

In addition to the markings specified, the fittings shall be identified by the following colors:

a. Aluminum alloys 2014 and 2024: Blue (see 3.4.1.1)

b. Aluminum alloy 7075: Brown (see 3.4.1.1)

c. Steel: Black (see 3.4.2)

d. Copper-base alloys: Natural cadmium plate, if applicable (see 3.4.4)

e. Corrosion-resistant steel: Natural silvery color (see 3.4.3)

3.8 Workmanship

Machined surfaces of fittings shall be as specified on the applicable drawings. Unmachined surfaces, such as forged surfaces and bar stock flats, shall be free from blisters, fins, folds, seams, laps, cracks, segregations, spongy areas, or other defects as specified in ARP4784. Surface defects may be explored by suitable etching and if they can be removed so that they do not appear on re-etching and the required section thickness can be maintained, they shall not be cause for rejection. The surface texture of unmachined surfaces, except forging parting lines, shall be 250 µin Ra per ASME B46.1. The surface texture of forging parting planes shall be 500 µin Ra per ASME B46.1. ARP4784 also gives inspection methods.

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 and test requirements as specified herein. Except as otherwise specified, the supplier may utilize their own facilities or any commercial laboratory acceptable to the procuring activity for the performance of the inspection and test requirement. The procuring activity reserves the right to perform any of the inspections and tests set forth in this document whenever such inspections and tests are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Inspection Lot

A lot shall consist of finished parts that are identified by one unique part number fabricated from one mill heat of material produced by the same machining operation at approximately the same time in one continuous production run. Splits of one production run into two parallel runs that may be machined at different times constitutes splitting the lot into two distinct lots. Processes such as heat treating, plating, baking, and dry lubricant application shall be performed at essentially the same time under the same conditions; processes not meeting the condition shall require the assigning of a distinguishing lot number.

4.3 Material Certification

Records of the chemical composition analysis and mechanical property tests showing conformance to the material requirements of this document shall be available to the procuring activity upon request for each lot of fittings except that for aluminum alloys a certificate of conformance to the chemical analysis requirement may be furnished in lieu of an actual chemical analysis test report.

4.4 Heat Treating Certification

Records of heat treating performed on the materials after purchasing showing conformance to the applicable heat treating specification shall be available to the procuring activity upon request for each lot of fittings.

4.5 Quality Conformance Inspection

4.5.1 Sampling

4.5.1.1 Sampling for Nondestructive Inspections

Samples for non-destructive inspection shall be in accordance with ARP9013 and the IRR specified in Appendix A, and inspected per Table 3. The acceptance number is equal to zero rejections. A statistical method for product acceptance which provides equivalent or greater quality assurance than this sampling procedure may be used if approved by the procuring activity.

Table 3 - Quality conformance inspection for nondestructive tests

Examination and Inspection Methods Requirement	Requirement Paragraph	Examination or Inspection Paragraph
Material requirements	3.2	4.3, 4.6
Design and fabrication	3.5	4.6
Identification of product	3.7	5.4
Workmanship	3.8	4.6

4.5.1.2 Sampling for Destructive Tests

Sampling for destructive tests shall be six samples taken at random from the lot being procured, or per Appendix A, and inspected per Table 4. The acceptance number is equal to zero rejections. A statistical method for product acceptance which provides equivalent or greater quality assurance than this sampling procedure may be used if approved by the procuring activity.

Table 4 - Quality conformance inspection for destructive tests

Tests and Inspection Methods Requirement	Requirement Paragraph	Examination or InspectionParagraph
Durability of aluminum finish	3.4.1.1	4.7.1
Electrical conductivity and hardness	3.3.1.1	4.4, 4.7.2
Hardness of carbon and low alloy steel fittings	3.3.3	4.4, 4.7.3
Internal strain of copper-based alloys	3.6.1	4.7.4

4.6 Examination of Product

Using the sampling of 4.5.1.1, for nondestructive inspection, each lot of fittings shall be examined per Table 3. Design and dimensions shall be examined in accordance with ARP9013 as specified in Appendix A.

4.7 Tests

Using the sampling of 4.5.1.2 for destructive testing, each lot of fittings shall be examined per Table 4.

4.7.1 Durability of Finish

Dyed aluminum anodized fittings shall withstand immersion in a cleaning solution containing 5 to 6 ounces of a cleaner conforming to A-A-59133 per gallon of solution at a temperature of 160 to 170 °F for 5 minutes. The color shall not rub off when wiped lightly with a clean cloth.

4.7.2 Electrical Conductivity and Hardness

Aluminum alloy fittings shall be tested in accordance with AMS2658.

4.7.3 Hardness of Low Alloy Steel Fittings

The hardness of steel fittings shall be determined by hardness tests of the fittings. Rockwell hardness readings shall be taken on a smooth flat surface of any unthreaded portion of the fitting from which the plating has been removed. Hardness tensile strength relationships are specified in ASTM A370. For this document, the hardness scale to scale conversions and hardness to tensile strength conversions of Tables 2A, 2B, 2C, and 2D of ASTM A370 may be considered as equivalent.

4.7.4 Internal Strain of Copper-Base Alloys

Fittings fabricated from copper-base alloys shall be tested for residual internal stresses from manufacturing in accordance with ASTM B154. Any visual evidence of cracks indicates internal strain and is not acceptable.

4.8 Rejection and Retest

Rejected lots shall be resubmitted for retest one time with one or more failure to reject the entire lot. Those fittings subjected to destructive testing shall be discarded, whether they pass the test or not.

5. PREPARATION FOR DELIVERY

5.1 Cleaning

Surfaces of fittings shall be free of oil, grease, dirt, and other foreign material except as noted in 5.2.

5.2 Preservation Application

No preservative compound shall be applied except that cadmium plated steel parts shall be dipped in oil as specified in 3.4.2.

5.3 Packaging

All fittings shall be packaged as necessary to prevent damage, corrosion, or deterioration during storage or shipment.

5.4 Package Identification

Each package shall be identified with the following minimum information:

a. Manufacturer’s identification (name, CAGE code)

b. Manufacturer’s part number

c. Customer’s part number if different from b

d. Item description (noun)

e. Quantity and unit of issue (each, piece, etc.)

f. Contract number (for government contracts only)

5.5 Packing for Shipment

Containers of parts shall be prepared for shipment in accordance with commercial practice to ensure carrier acceptance and safe transportation to the point of delivery.

6. NOTES

NOTICE

This document references a part which contains cadmium as a plating material. Consult local officials if you have questions concerning cadmium's use.

6.1 Purpose

This section contains information of a general nature, which may be helpful, but is not mandatory. It does not contain any requirements.

6.2 Intended Use

Fittings covered by this document when assembled per 6.2.1 are intended for use in oxygen systems and for ground service equipment and with all types of fluids, such as hydraulic fluids, oil, fuels, air, and water. Recommended operating pressures for ANPT fittings, based on tube sizes for fittings with at least one flared or flareless port, are shown in Table 5A and 5B. Use Table 5A and 5B as a guideline for fittings having only ANPT ports.

Historically, the pressures previously specified in the above paragraph (prior to revision B) were intended only for ANPT type fittings and followed the guidelines as specified in legacy strandard MIL-F-5509. Procurement specification AS4842/1 defines requirements for fittings having at least one flared port and at least one ANPT port. Procurement specification AS4842/2 defines requirements for fittings having at least one flareless port and at least one ANPT port. Tables 5A and 5B are being intorduced to show recommended operating pressures based on fittings/tubing material combinations.

User shall verify pressures based on tubing wall thickness considered. When used on pressure lines higher than shown in Table 5A or 5B, the user shall perform tests defined herein.

Table 5A - Fitting material and operating pressures for use on 304 1/8 hard cres tubing

Nominal Tubing OD	Tube Size in 0.062 Increments	Nominal Wall Thickness Corrosion Resistant Steel Tubing per AMS-T-6845	Maximum Operating Pressure (psi) Steel, CRES, Fittings	Maximum Operating Pressure (psi) Al Alloy /6.2.3/ Cu Alloy Fittings
0.125	02	0.012	3000	3000
0.188	03	0.016	3000	3000
0.250	04	0.020	3000	3000
0.312	05	0.020	3000	3000
0.375	06	0.028	3000	3000
0.500	08	0.035	3000	3000
0.625	10	0.042	3000	3000
0.750	12	0.058	3000	3000
1.000	16	0.065	3000	1500
1.250	20	0.049	1500	1500
1.500	24	0.065	1500	1000
2.000	32	0.065	1500	600
2.500	40	/1/	/1/	600
3.000	48	/1/	/1/	600

/1/ End user shall perform tests to determine acceptable pressure ratings, no test data is available at the time of this publication.

Table 5B - Operating pressures for al alloy or cu alloy fittings for use on aluminum alloy tubing

Nominal Tubing OD	Tube Size in 0.062 Increments	Nominal Wall Thickness 6061-T6 Aluminum Alloy Tubing per AMS4083	Maximum Operating Pressure (psi) Al Alloy Cu Alloy Fittings
0.125	02	/1/	1500
0.188	03	/1/	1500
0.250	04	0.035	1500
0.312	05	0.035	1500
0.375	06	0.035	1500
0.500	08	0.035	1500
0.625	10	0.035	1000
0.750	12	0.035	900
1.000	16	0.035, 0.049 /2/	900 /3/
1.250	20	0.049	600
1.500	24	0.049	600
2.000	32	0.065	600
2.500	40	/1/	600
3.000	48	/1/	600

/1/ End user shall perform tests to determine acceptable pressure ratings, no test data is available at the time of this publication.

/2/ If testing is completed with the 0.035 inch wall tubing at 900 psi operating pressure, then fittings tested with 0.049 inch tube wall are considered qualified by similarity.

/3/ When tested, the minimum burst pressure of 3600 psi cannot be consistently achieved with 0.035 inch tube wall for size 16 fittings. Therefore, 0.049 inch tube wall is recommended when 900 maximum operating pressure is required.

6.2.1 Assembly

A suitable thread sealant or polytetrafluoroethylene tape is be applied to the external threads. The external threads are to be assembled into the internal threads at least two turns by hand and then torque applied to the applicable values of Table 6.

Table 6 - Installation torque, pipe threaded fittings

Pipe Thread Size Inches	Minimum Torque, lb-in	Maximum Torque, lb-in
0.125	40	300
0.250	60	600
0.375	75	700
0.500	100	900
0.750	200	1600
1.000	300	2200
1.250	400	2500

6.2.2 Superseding Information

This document is intended to be an improved suitable designation as a procurement specification for pipe threaded fittings that mate to threaded pipe or to other pipe threaded fittings. This document is intended to be a replacement as a primary procurement specification for the following known active fitting that has MIL-F-5509 designated as a procurement specification. See Table 7 for those standards that have been cancelled and superseded by current SAE standards.

MS27769 Plug, Pipe, Countersink Hex Head

Table 7 - Supersession table

Standard Part No.	Status	Description	Replacement	Description
AN910	/1/	Coupling, Pipe	AS4859	Fitting, Coupling Pipe, Internal Thread
AN911	/1/	Nipple, Pipe	AS4860	Fitting, Bushing, Pipe, Internal and External Thread
AN912	/1/	Bushing, Pipe	AS4861	Fitting, Elbow, 90 Degrees, Pipe, Internal and External Thread
AN914	/1/	Elbow, Pipe, Internal and External Thread, 90 Degrees	AS4854	Fitting, Elbow, 90 Degrees, Pipe, Internal and External Thread
AN915	/1/	Elbow, Pipe, 45 Degrees	AS4855	Fitting, Elbow, 45 Degrees, Pipe, Internal and External Thread
AN916	/1/	Elbow, Pipe, Internal Thread, 90 Degrees	AS4856	Fitting, Elbow, 90 Degrees, Pipe, Internal Thread
AN917	/1/	Tee, Pipe	AS4857	Fitting, Tee, Pipe, Internal Thread
AN918	/1/	Cross, Pipe	AS4858	Fitting, Cross, Pipe, Internal Thread
AN933	/2/	Plug, Pipe, Hex Head	AS4862	Fitting, Plug, Pipe, External Thread, Hex Head
MS20913	/2/	Plug, Pipe	AS4863	Plug, Pipe, External Thread

/1/ Inactive for new design
/2/ Cancelled