



AEROSPACE STANDARD

AS1975™**REV. G**

Issued 1998-11
Reaffirmed 2007-01
Revised 2016-05

Superseding AS1975F

(R) Hose Assembly, Polytetrafluoroethylene, Para-Aramid Reinforced,
3000/4000 psi, 275 °F, Standard Duty, Hydraulic, Aircraft Systems

RATIONALE

Changed lay line requirement to two lay lines 180 degrees apart and incorporated hose assembly specifications (removed reference to AS1975SUP1).

1. SCOPE

This SAE Aerospace Standard (AS) defines the requirements for a polytetrafluoroethylene (PTFE) lined, para-aramid fiber reinforced, hose assembly suitable for use up to 4000 psi, and up to 275 °F, aircraft and missile hydraulic and pneumatic systems.

1.1 Product Classification

CLASS 3000 - For use in pressure systems of 3000 psig, or lower, at the reduced bend radius per Table 2.

CLASS 4000 - For use in pressure systems of 4000 psig, or lower, at the bend radius per Table 1.

1.2 Field of Application

1.2.1 For use with phosphate ester or silicate ester hydraulic fluids. The oil immersion samples in 3.5.2.7 shall be preconditioned per 4.5.2.2 using both types of system fluids as specified. Due precaution must be taken in handling any toxic hydraulic fluid.

1.2.2 This is not recommended for gaseous service where minor effusion is detrimental.

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Documents

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2. REFERENCES

2.1 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.

2.1.1 SAE Publications

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

AS150	Hose Assembly, Type Classifications of, Basic Performance and Fire Resistance
AS603	Impulse Testing of Hydraulic Hose, Tubing, and Fittings Assemblies
AS611	Hose Assembly and Tubing, Polytetrafluoroethylene, Cleaning Methods for
ARP908	Torque Requirements, Installation and Qualification Test, Hose and Tube Fitting
AS1055	Fire Testing of Flexible Hose, Tube Assemblies, Coils, Fittings, and Similar System Components
AS1072	Sleeve, Hose Assembly, Fire Protection
AS1073	Sleeve Hose Assembly, Heat Shrinkable
AIR1228	Standard Impulse Machine Equipment and Operation
AS1241	Fire Resistant Phosphate Ester Hydraulic Fluid for Aircraft
ARP1835	Preparation for Delivery, General Requirements for Hose Assemblies
AS2078	Test Methods, Hose Assemblies, Polytetrafluoroethylene (PTFE)
AS4375	Fitting End, Flareless, Design Standard
AS4395	Fitting End, Flared, Tube Connection, Design Standard
AS4488	Tubular Assemblies, Fusion Welded, Inspection Processes and Acceptance Standards For
AS4658	Fitting End, External Thread, Short Flareless, Design Standard
AS4659	Fitting End, External Thread, Short Flareless, Design Standard
AS4660	Nut, Short Flareless
AS4700	Short Flareless Fittings, Installation Procedures and Torque For
AS4702	Nut, Retained, Short Flareless
AS4703	Fitting End, Acorn, Short Flareless, Design Standard

AS5272	Lubricant, Solid Film, Heat Cured, Corrosion Inhibiting, Procurement Specification
AS7003	Nadcap Program Requirements
AS7112	National Aerospace and Defense Contractors Accreditation Program Requirements for Fluid System Components
AS8879	Screw Threads - UNJ Profile, Inch Controlled Radius Root with Increased Minor Diameter
AS33514	Fitting End, Standard Dimensions for Flareless Tube Connection and Gasket Seal
AS85421	Fittings, Tube, Fluid Systems, Separable, Beam Seal, 3000/4000 psi, General Specification For
AS85421/1	Fitting End, Standard Dimensions for Dynamic Beam Seal, Male
AMS2486	Conversion Coating of Titanium Alloys Flouride-Phosphate Type
AMS2700	Passivation of Corrosion Resistant Steels
AMS4921	Titanium Bars, Wire, Forgings, and Rings, Commercially Pure, 70 ksi (483 MPa) Yield Strength
AMS4928	Titanium Alloy Bars, Wire, Forgings, Rings, and Drawn Shapes, 6Al - 4V, Annealed
AMS4945	Titanium Alloy Tubing, Seamless, Hydraulic, 3Al - 2.5V, Controlled Contractile Strain Ratio, Cold Worked, Stress Relieved
AMS4965	Titanium Alloy, Bars, Wire, Forgings, and Rings, 6.0Al - 4.0V, Solution Heat Treated and Aged
AMS5556	Steel, Corrosion and Heat-Resistant, Seamless or Welded Hydraulic Tubing, 18Cr - 11Ni - 0.70Cb (SAE 30347), Solution Heat Treated
AMS5557	Steel, Corrosion and Heat-Resistant, Seamless or Welded Hydraulic Tubing, 18.5Cr - 10.5Ni - 0.40Ti (SAE 30321), Solution Heat Treated
AMS5561	Steel, Corrosion and Heat-Resistant, Welded and Drawn or Seamless and Drawn Tubing, 9.0Mn - 20Cr - 6.5Ni - 0.28N, High-Pressure Hydraulic
AMS5567	Steel, Corrosion Resistant, Seamless or Welded Hydraulic Tubing, 19Cr - 10Ni (SAE 30304), Solution Heat Treated
AMS5570	Steel, Corrosion and Heat-Resistant, Seamless Tubing, 18Cr - 11Ni - 0.40Ti (321), Solution Heat Treated
AMS5571	Steel, Corrosion and Heat-Resistant, Seamless Tubing, 18Cr - 10.5Ni - 0.70Cb (Nb) (347), Solution Heat Treated
AMS5575	Steel, Corrosion and Heat-Resistant, Welded Tubing, 18Cr - 10.5Ni - 0.70Cb (Nb) (347), Solution Heat Treated
AMS5576	Steel, Corrosion and Heat-Resistant, Welded Tubing, 18Cr - 10.5Ni - 0.40Ti (SAE 30321), Solution Heat Treated

AMS5636	Steel, Corrosion-Resistant, Bars and Wire, 18Cr - 9.0Ni (SAE 30302), Solution Heat Treated and Cold Drawn, 100 ksi (689 MPa) Tensile Strength
AMS5637	Steel, Corrosion Resistant, Bars and Wire, 18Cr - 9.0Ni (SAE 30302), Solution Heat Treated, Cold Drawn and Stress Relieved, 125 ksi (862 MPa) Tensile Strength
AMS5639	Steel, Corrosion-Resistant, Bars, Wire, Forgings, Tubing, and Rings, 19Cr - 10Ni, Solution Heat Treated
AMS5643	Steel, Corrosion-Resistant, Bars, Wire, Forgings, Tubing, and Rings, 16Cr - 4.0Ni - 0.30Cb (Nb) - 4.0Cu, Solution Heat Treated, Precipitation Hardenable
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
AMS5647	Steel, Corrosion-Resistant, Bars, Wire, Forgings, Tubing, and Rings, 19Cr - 9.5Ni, Solution Heat Treated
AMS5659	Steel, Corrosion-Resistant, Bars, Wire, Forgings, Rings, and Extrusions, 15Cr - 4.5Ni - 0.30Cb (Nb) - 3.5Cu,
AMS5743	Steel, Corrosion and Heat-Resistant, Bars and Forgings, 15.5Cr - 4.5Ni - 2.9Mo - 0.10N, Solution Heat Treated, Sub-Zero Cooled, Equalized, and Over-Tempered
AMS-QQ-S-763	Steel, Corrosion Resistant, Bars, Wire, Shapes, and Forgings

2.1.2 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 A262	Standard Recommended Practices for Detecting Susceptibility to Intergranular Attack in Stainless Steel
ASTM B348	Titanium Alloy
ASTM D638	Precipitation Hardening Iron Base Superalloy Bars, Forgings, and Forging Stock for High Temperature Service, Standard Specification for

2.1.3 NAS Standards

Available from Aerospace Industries Association, 1000 Wilson Boulevard, Suite 1700, Arlington, VA 22209-3928, Tel: 703-358-1000, www.aia-aerospace.org.

NAS 847	Caps and Plugs, Protective, Dust and Moisture Seal
NAS 1760	Fitting End, Flareless Acorn, Standard Dimensions for

2.1.4 U.S. Government Publications

Copies of these documents are available online at <http://quicksearch.dla.mil>.

MIL-PRF-680 Degreasing Solvent

MIL-F-8815 Filter and Filter Elements, Fluid Pressure, Hydraulic Lines, 15 Micron Absolute and 5 Micron Absolute, Type II Systems

MIL-PRF-83282 Hydraulic Fluid, Fire Resistant Synthetic Hydrocarbon Base, Metric, NATO Code Number H-537

MIL-PRF-87257 Hydraulic Fluid, Fire Resistant; Low Temperature, Synthetic Hydrocarbon Base, Aircraft and Missile

2.1.5 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

ASME Y14-100 Engineering Drawing Practices

ASME Y14.5M 1982 Dimensioning and Tolerancing

2.1.6 AWS Publications

Available from American Welding Society, 8669 NW 36 Street, #130, Miami, FL 33166-6672, Tel: 1-800-443-9353 or 305-443-9353, www.aws.org.

AWS D17.1 Specification for Fusion Welding for Aerospace Applications – Incorporating Errata 07/2001

2.1.7 PRI Publications

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

PD2001 Qualified Product Management Council Procedures for Qualified Products Group

PD2101 Aerospace Quality Assurance, Product Standard, Qualification Procedures, Fluid Systems

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Aerospace Technical Report.

2.2.1 Hose Assembly Parts Standards

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org. The hose assembly standards applicable to this procurement standard include:

AS4568 Hose Assembly, PTFE, Para-Aramid Reinforced Standard Duty, 3000 Psi, 275°F, Titanium Fittings, Flareless, Straight to Straight

AS4569 Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 3000 Psi, 275°F, Titanium Fittings, Flareless, Straight to 45°

AS4570	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty 3000 Psi, 275°F, Titanium Fittings, Flareless, Straight to 90°
AS4571	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 3000 Psi, 275°F, Titanium Fittings, Flareless, 45° to 90°
AS4572	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 3000 Psi, 275°F, Titanium Fittings, Flareless, 45° to 45°
AS4573	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 3000 Psi, 275°F, Titanium Fittings, Flareless, 90° to 90°
AS4574	Hose Assembly, PTFE, Para-Aramid Reinforced Standard Duty, 3000 Psi, 275°F, Titanium Fittings, Beam Seal, Straight to Straight
AS4575	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 3000 Psi 275°F, Titanium Fittings, Beam Seal, Straight to 45°
AS4576	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 3000 Psi, 275°F, Titanium Fittings, Beam Seal, Straight to 90°
AS4577	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 3000 Psi, 275°F, Titanium Fittings Beam Seal, 45° to 45°
AS4578	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 3000 Psi, 275°F, Titanium Fittings, Beam Seal, 45° to 90°
AS4579	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 3000 Psi, 275°F, Titanium Fittings, Beam Seal, 90° to 90°
AS4580	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 4000 psi, 275°F, Titanium Fittings, Flareless, Straight to Straight
AS4581	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 4000 psi, 275°F, Titanium Fittings, Flareless, Straight to 45°
AS4582	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 4000 psi, 275°F, Titanium Fittings, Flareless, Straight to 90°
AS4583	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 4000 psi, 275°F, Titanium Fittings, Flareless, 45° to 90°
AS4584	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 4000 psi, 275°F, Titanium Fittings, Flareless, 45° to 45°
AS4585	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 4000 psi, 275°F, Titanium Fittings, Flareless, 90° to 90°
AS4586	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 4000 psi, 275°F, Titanium Fittings, Beam Seal, Straight to Straight
AS4587	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 4000 psi, 275°F, Titanium Fittings, Beam Seal, Straight to 45°

AS4588	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 4000 psi, 275°F, Titanium Fittings, Beam Seal, Straight to 90°
AS4589	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 4000 psi, 275°F, Titanium Fittings, Beam Seal, 45° to 45°
AS4590	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 4000 psi, 275°F, Titanium Fittings, Beam Seal, 45° to 90°
AS4591	Hose Assembly, PTFE, Para-Aramid Reinforced, Standard Duty, 4000 psi, 275°F, Titanium Fittings, Beam Seal, 90° to 90°

3. TECHNICAL REQUIREMENTS

3.1 Qualification

Hose assemblies supplied in accordance with this document shall be representative of products which have been subjected to and which have successfully passed the qualification tests specified in this standard.

3.1.1 Manufacturer Qualification

A manufacturer producing a product in conformance to this procurement specification shall be accredited in accordance with the requirements of PD2101, AS7003, and AS7112, and shall be listed in a Performance Review Institute (PRI) Qualified Manufacturers List (QML) for this type product.

3.1.2 Product Qualification

All hose assemblies shall conform to the requirements of this procurement specification and shall be approved in accordance with the requirements of PD2001 and PD2101 for listing in a Performance Review Institute (PRI) Qualified Parts List (QPL).

3.2 Materials

The hose assembly materials shall be uniform in quality, free from defects, consistent with good manufacturing practice, shall conform to applicable specifications and the requirements specified herein, and suitable for the purpose intended.

3.2.1 Metals

Metals used in the hose and fittings shall be corrosion-resistant and shall conform to the following specifications:

a. Bars and Forgings:

1. AMS-QQ-S-763 Class 302 - Cond. A or Cond. B (AMS5636 or AMS5637)
2. AMS-QQ-S-763 Class 304 - Cond. A or Cond. B (AMS5639)
3. AMS-QQ-S-763 Class 304L - Cond. A (AMS5647)
4. AMS-QQ-S-763 Class 321 - Cond. A (AMS5645)
5. AMS-QQ-S-763 Class 347 - Cond. A (AMS5646)
6. AMS5643 17-4PH
7. AMS5644 17-7PH

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|-----|-----------|------------------------------------|
| 8. | AMS5659 | 15-5PH |
| 9. | AMS5743 | AM-355 |
| 10. | AMS4921 | Titanium Alloy - Commercially pure |
| 11. | AMS4928 | Titanium 6Al-4V Annealed |
| 12. | AMS4965 | Titanium 6Al-4V Heat Treated |
| 13. | ASTM B348 | Titanium Alloy - Grade 2 |

b. Tubing:

- | | | |
|----|---------|--|
| 1. | AMS5556 | Type 1 or Type 2 Stainless Steel Tubing, 347 |
| 2. | AMS5557 | Type 1 or Type 2 Stainless Steel Tubing, 321 |
| 3. | AMS5561 | Welded Stainless Steel Tubing, 21-6-9 |
| 4. | AMS5567 | Type 1 or Type 2 Stainless Steel Tubing, 304 |
| 5. | AMS5570 | Seamless Stainless Steel Tubing, 321 |
| 6. | AMS5571 | Seamless Stainless Steel Tubing, 347 |
| 7. | AMS5575 | Welded Stainless Steel Tubing, 347 |
| 8. | AMS5576 | Welded Stainless Steel Tubing, 321 |
| 9. | AMS4945 | Titanium 3Al-2.5V Texture Controlled |

3.2.2 Reinforcement

Para-aramid textile treated and applied to the hose with an outer polyester braid, polybenzimidazol/para-aramid blend or air textured nylon braid cover to meet all the requirements herein.

3.3 Design and Construction

The hose assembly shall consist of a seamless polytetrafluoroethylene (PTFE) inner tube, treated para-aramid reinforcement, polyester, polybenzimidazol/para-aramid blend or air textured nylon outer braid cover with optional PTFE tape interlayer, and corrosion-resistant steel and/or titanium alloy end fittings as required to meet the construction and performance requirements of this specification.

3.3.1 Inner Tube

The inner tube shall be of a seamless construction of virgin PTFE resin of uniform gage. It shall have a smooth bore and shall be free from pitting or projections on the inner surface. Additives may be included in the compound from which the tube is extruded.