



AEROSPACE STANDARD

AS1896™**REV. B**

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Superseding AS1896A

Coupling Assembly, Self-Sealing, One Side Only, Hydraulic

RATIONALE

Corrected vacuum (3.4.5), added note (Figure 4), and updated 4.4.11 for clarification.

1. SCOPE

This document establishes the requirements for aircraft, hydraulic couplings, self-sealing one side only, for use in Type II hydraulic systems (-65 to +275 °F temperature range) as defined by MIL-H-5440. The purpose being to connect a hose or tube to a standard MS33656, MS33514, or MIL-F-85421, or MIL-F-85720 fitting, and to provide the self-sealing feature on the hose or tube side of the connection.

1.1 Product Classification

Hydraulic self-sealing couplings shall be of the following classes:

- a. Class 1000: 1000 lbf/in² (gage)
- b. Class 3000: 3000 lbf/in² (gage)
- c. Class 4000: 4000 lbf/in² (gage)
- d. Class 5000: 5000 lbf/in² (gage)

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.

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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.

AIR1047	A Guide for the Selection of Quick Disconnect Couplings for Fluid Systems
ARP24	Determination of Hydraulic Pressure Drop
ARP603	Impulse Testing of Hydraulic Hose, Tubing, and Fitting Assemblies
ARP868	Method-Pressure Drop Tests for Fuel System Components
ARP908	Ø Torque Requirements, Installation and Qualification Test, Hose and Tube Fitting
AS604	Hose Assembly, Polytetrafluoroethylene, Metallic Reinforced, 3000 psi, 400 °F, Heavyweight, Hydraulic
AS614	Hose Assembly, Polytetrafluoroethylene, Metallic Reinforced, 4000 psi, 400 °F, Heavy Duty, Hydraulic and Pneumatic

2.1.2 U.S. Government Publications

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

MIL-F-85421	Fitting, Tube, Fluid Systems, Separable, Dynamic Beam Seal, General Requirements For
MIL-F-85720	Fitting, Tube, Fluid Systems, Separable, High Pressure, Dynamic Beam Seal, General Requirements For
MIL-H-25579	Hose Assembly, Tetrafluoroethylene, High Temperature, Medium Pressure, General Requirements For
MIL-H-5440	Hydraulic Systems: Design, Installation and Test of Aircraft (General Specification For)
MIL-H-5606	Hydraulic Fluid, Petroleum Base, Aircraft and Ordnance
MIL-H-83282	Hydraulic Fluid, Fire Resistant Synthetic Hydrocarbon Base, Aircraft
MIL-H-85800	Hose Assemblies, Polytetrafluoroethylene, Aramid Fiber Reinforced, 5000 and 8000 psi, General Specification For
MIL-H-8775	Hydraulic System Components, Aircraft and Missile, General Specifications For
MIL-P-83461	Packing, Preformed, Petroleum Hydraulic Fluid Resistant, Improved Performance at 275 °F
MIL-R-8791	Retainer, Packing, Hydraulic and Pneumatic, Tetrafluoroethylene Resin
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-130	Identification Markings of U.S. Military Property
MIL-STD-810	Environmental Test Methods
MS33656	Fitting End, Standard Dimensions for Flared Tube Connection and Gasket Seal
MS33514	Fitting End, Standard Dimensions for Flareless Tube Connection and Gasket Seal

3. TECHNICAL REQUIREMENTS

3.1 Qualification

The couplings furnished under this document shall be a product which has been tested, and has passed the qualification tests specified herein, and has been approved by the Procuring Agency or Prime Contractor.

3.1.1 General Specification

The requirements of MIL-H-8775 apply to this document except as specified herein.

3.2 Materials

The coupling shall be constructed of materials that will not change the composition of or be adversely affected by hydraulic fluid conforming to MIL-H-5606 or MIL-H-83282. Other materials and fluids can be utilized for similar applications based on Procuring Agency requirements.

3.3 Design and Construction

The configuration, dimensions, and other details of design of the couplings shall conform to applicable Specification Control Drawings. This shall include mating with MS33656, MS33514, MIL-F-85421, or MIL-H-85720 end fittings as may be specified. The design objective shall be to obtain the smallest size and lightest weight commensurate with meeting performance requirements herein.

3.3.1 Temperature Range

The couplings shall be designed to operate throughout the temperature range of -65 to +275 °F (see 4.4.3).

3.3.2 Sealing, Fluid Loss, and Air Inclusion

The couplings shall, when uncoupled, seal the end of the disconnected line at the point of disconnection. Fluid loss (spillage) as specified in Table 1 and as determined by 4.4.11 is not considered to be external leakage. The coupling containing the valving shall seal under both low and high pressures (see 4.4.4).

Table 1 - Air inclusion and fluid loss (see 4.4.11)

Dash No.	Equivalent Tube Size Inches	Air Inclusion ¹ cm ³	Air Inclusion ¹ in ³	Fluid Loss cm ³	Fluid Loss in ³
-04	0.250	1.64	0.10	1.64	0.10
-06	0.375	2.46	0.15	2.46	0.15
-08	0.500	4.10	0.25	4.10	0.25
-10	0.625	4.92	0.30	4.92	0.30
-12	0.750	11.47	0.70	11.47	0.70
-16	1.000	16.39	1.00	16.39	1.00
-20	1.250	36.88	2.25	36.88	2.25
-24	1.500	49.17	3.00	49.17	3.00
-32	2.000	98.34	6.00	98.34	6.00

¹This value may be exceeded when the dynamic beam seal, separable fittings are used.

3.3.3 Seals

Only MIL-P-83461 packing material and MIL-R-8791 retainer material shall be used with MIL-H-5606 hydraulic fluid. Packing and retainer material for other fluids shall be specified by the Procuring Agency.

3.3.4 Operation

The coupling shall be so designed that it can be uncoupled without special tools (but using standard wrenches), while the fitting is held in a fixed mounting. It shall be possible to couple and uncouple with a static pressure, as shown in Table 2, applied to the coupling assembly. The installation torque shall not exceed the values shown in Table 2, when completely coupled.

3.3.5 Interchangeability

Couplings of the same part number shall be interchangeable. It shall be impossible to interconnect different tube size fitting ends.

Table 2 - Coupling torque with the indicated pressure and fitting ends shown

Dash No.	With Human Engineering Factor All specified Fitting Ends Static Pressure lbf/in ² (gage)	With Human Engineering Factor All Specified Fitting Ends Hand Tightening Torque lbf/in (Approximate)	MS33656 or MS33514 Fitting End Maximum Installation Torque in lbf/in Par ARP908 CRES Material	MS33656 or MS33514 Fitting End Maximum Installation Torque in lbf/in Per ARP908 Aluminum Material	MIL-F-58421 or MIL-F-85720 Fitting End Maximum Installation Torque lbf/in - CRES Material lbf/in ² (gage) 3000	MIL-F-58421 or MIL-F-85720 Fitting End Maximum Installation Torque lbf/in - CRES Material lbf/in ² (gage) 4000/5000
-04	100	15		85	168	168
-06	100	20	145	130	300	300
-08	100	25	245 470	280	480	480
-10	100	30		360	660	680
-12	100	40	680	500	840	840
-16	100	50	945 1280	700	1128	1380
-20	60	60	1680	900	1680	1680
-24	60	70	2100	800	1980	--
-32	30	80	2940	2000	--	--

3.4 Performance

The self-sealing couplings furnished under this document shall perform satisfactorily when conforming to the following performance requirements.

3.4.1 Envelope, Weight, Materials

Each coupling half shall conform to the applicable purchaser and supplier envelope dimensions, weight control, materials, and finishes.

3.4.2 Proof Pressure

Each coupling half must meet operational and leakage requirements after being subjected to proof pressure of 150% operating pressure for a period of 1 minute (see 4.4.2).

3.4.3 Extreme Temperature Functioning

Each coupling half shall show no malfunction during or after being subjected to extreme temperature testing from -65 to +275 °F (see 4.4.3).

3.4.4 Leakage

Coupling halves shall meet specified leakage requirements at 30-inch static head of hydraulic fluid and at operating pressure (see 4.4.4).

3.4.5 Vacuum

The coupled coupling shall be subjected to a vacuum equivalent of 10 in Hg internally. The vacuum line shall be closed for 5 minutes. The coupling assembly shall not exhibit a decrease in vacuum level exceeding 0.5 in Hg within a period of 5 minutes (see 4.4.5).

3.4.6 Surge Flow

Coupling shall meet leakage, operational, and pressure drop requirements after being subjected to five times (three times for -16, two times for -20, -24, and -32) the rated flow in each direction (see 4.4.6). The surge flow pattern shall be repeated 100 times.

3.4.7 Vibration

Each coupling shall be capable of withstanding the vibration environment specified without experiencing any malfunction or degradation. Couplings shall be pressurized with 15 lbf/in² (gage) pressure (see 4.4.7).

3.4.8 Impulse

Coupling halves shall be capable of withstanding the impulse testing specified per ARP603 without any indication of malfunction. Pressures, rate of rise, and impulse form shall be per Table 3 and Figure 3 (see 4.4.8).

3.4.9 Endurance

Coupling shall be capable of withstanding 200 endurance cycles without any evidence of malfunction or serious degradation with 15 lbf/in² (gage) pressure applied to the self-sealing half. Size -32 shall have 10 lbf/in² (gage) pressure (see 4.4.9).

3.4.10 Manual Operation

The couplings shall be coupled and uncoupled five times for this test. Couplings shall be installed in systems capable of accommodating some fluid displacement without pressure rise. The coupling force/torque and applied pressures shall be per Table 2 (see 4.4.10).

3.4.11 Air Inclusion/Fluid Loss

The air inclusion and fluid loss for the coupling shall be within specified limits per Table 1 (see 4.4.11).