AEROSPACE RECOMMEND PRACTICE

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Superseding ARP4968

Installation Standard for Couplings

RATIONALE

This technical report is being stabilized because it covers technology, products, or processes which are mature and not likely to change in the foreseeable future.

STABILIZED NOTICE

This document has been declared “STABILIZED” by SAE G-3, Aerospace Couplings, Fittings, Hose, Tubing Assemblies Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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1. SCOPE:

   a. This document describes the engineering requirements for the assembly and installation of tube couplings used on aircraft fuel and pneumatic systems.

   b. In case of conflict between this document and an engineering drawing, the provisions of the engineering drawing shall prevail.

2. REFERENCES:

2.1 Applicable Documents:

The following publications form a part of this specification 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, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AS567	General Practices for Use of Safety Wire, Key Washers, and Cotter Pins for Propulsion Systems
AS1712	Coupling Subassembly, Flexible, Variable Cavity, Threaded, Ferrule Type Tube Ends
AS1713	Half Coupling Subassembly, Flexible, Variable Cavity, Threaded, Ferrule Type Tube Ends
AS1714	Nut Assembly, Coupling, Flexible, Variable Cavity, Threaded, Ferrule Type Tube Ends
AS1715	Washer, Coupling, Flexible, Variable Cavity, Threaded, Ferrule Type Tube Ends
AS1716	Ferrule, Coupling, Flexible, Variable Cavity, Threaded, Ferrule Type Tube Ends
AS1717	Retainer, Coupling, Flexible, Variable Cavity, Threaded, Ferrule Type Tube Ends

2.1.1 (Continued):

AS1718	Coupling Body, Flexible, Variable Cavity, Threaded, Ferrule Type Tube Ends
AS1730	Coupling, Fuel, Rigid, Threaded Type
AS1731	Coupling, Rigid, Fixed Cavity, Threaded, Ferrule Type Tube Ends, Envelope Dimensions Design Standard
AS1732	Body, Coupling, Rigid, Fixed Cavity, Threaded, Ferrule Type Tube Ends, Type I
AS1733	Body, Coupling, Rigid, Fixed Cavity, Threaded, Ferrule Type Tube Ends, Type II
AS1734	Nut, Coupling, Rigid, Fixed Cavity, Threaded, Ferrule Type Tube Ends, Type I
AS1735	Nut, Coupling, Rigid, Fixed Cavity, Threaded, Ferrule Type Tube Ends, Type II
AS1736	Washer, Coupling, Rigid, Fixed Cavity, Threaded, Ferrule Type Tube Ends
AS1737	Ferrule, Coupling, Rigid, Fixed Cavity, Threaded, Ferrule Type Tube Ends
AS4536	Safety Cable Kit Procurement Specification and Requirements for Use

2.2 Definitions:

FIXED CAVITY: A seal cavity that is fixed or defined at the time of installation.

RIGID COUPLING: A coupling assembly that does not provide for any relative movement after assembly.

HALF COUPLING: A simple joint using only one seal with selected components of a full coupling to join a tube end with a special machined fitting.

FULL COUPLING: A flexible coupling joint with comparable end fittings on each mating tube end. Two seals are required.

FLEXIBLE COUPLING: A fluid coupling assembly designed to accommodate relative movement between the mating tube end components.

3. ASSEMBLY AND INSTALLATION OF AS1700 SERIES TYPE COUPLINGS:

3.1 Personnel:

All personnel assigned to the installation and assembly of tube couplings should be a qualified installer and certified by the installation organization or subcontractor.

3.2 Preinstallation Tube Assembly Inspection:

Visually inspect all tube assembly components prior to installation. Reject those assemblies that exhibit the following defect characteristics:

a. Damage to end fittings, seal areas, and threads, etc., or imperfections prohibited by the applicable detail and specification control drawing.

b. Scratches, pits, cuts, creases, foreign material, etc. on gaskets and O-rings.

c. Scratches, pits, and similar flaws having a depth in excess of .002 in nonseal areas of tubing.

3.3 Lubrication:

Use only the approved O-ring lubricants compatible with the system fluid.

3.4 Hand Tightening Procedure:

Use the following procedure for hand tightening couplings:

a. Engage the coupling nut and body threads and tighten by hand until the O-rings and backup rings have bottomed against the retainer. This bottoming is evidenced by heavy resistance to turning by hand.

b. Loosen the nut until the load is removed and then retighten until contact with the seal components (O-ring, backup rings, and retainer) provides light resistance.

c. Using two hands (one on nut, one on body), tighten an additional 90 to 180° (the safety wire holes in the nut and coupling body are spaced 90° apart and can be used as a turning reference).

d. Do not retighten the coupling after completing the sequence above. If further tightening is required to prevent leakage or other problems, disassemble, inspect, and reassemble with new O-rings.

3.5 Assembly and Installation of the AS1700 Series Type Couplings:

3.5.1 Rigid Couplings (AS1730): The rigid coupling is illustrated in Figure 1.

a. Prior to installing connectors, hold the tube in place to verify that the ferrules are parallel to the body surfaces and located within .03 of each other.

b. Place the connector nut over the end of the ferrule.

c. Install the retaining ring over the ferrule.

d. Lightly coat the O-ring with approved lubricant and install into the groove of the body.

e. Engage the connector nut with the body threads and hand tighten in accordance with 3.4.

f. Install the lockwire or safety cable in accordance with AS567 or AS4536.

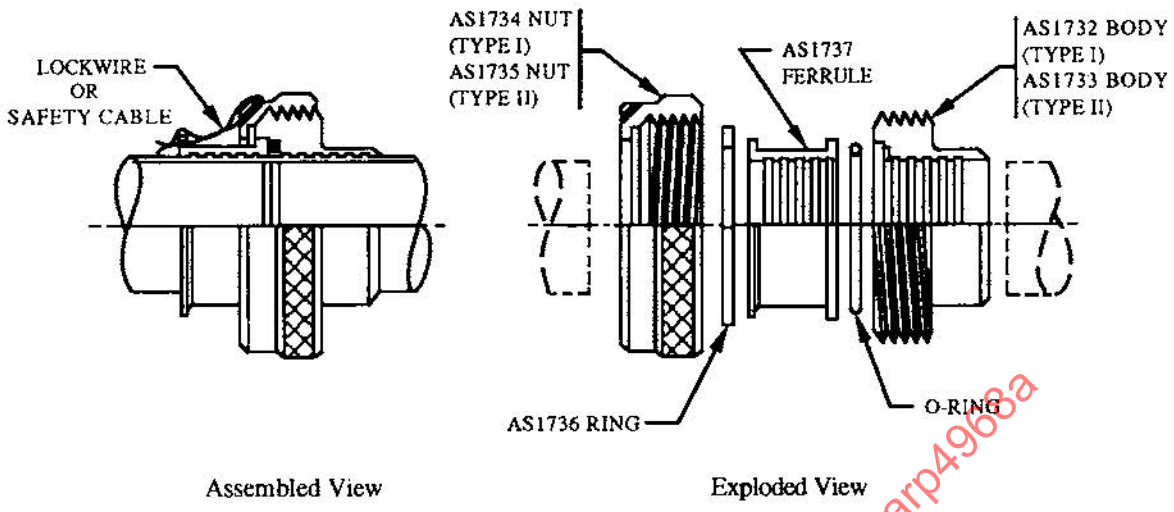

FIGURE 1 - Assembly of Rigid Type Coupling (AS1731)

3.5.2 Half-Coupling - Flexible (AS1713): The flexible type half-coupling is illustrated in Figure 2.

a. Prior to assembly of coupling components, verify that axial alignment of the duct ends is within 1° 30 min, as illustrated in Figure 3.

b. Slide the coupling nut over the ferrule on the tube end.

c. Install one retaining ring on the ferrule.

d. Lightly coat the O-ring with approved lubricant and install over the end of the ferrule.

e. Install the second retaining ring on the ferrule so that the O-ring is sandwiched between the two retaining rings.

f. Engage the coupling nut and hand tighten in accordance with 3.4.

g. Install lockwire or safety cable in accordance with AS567 or AS4536.

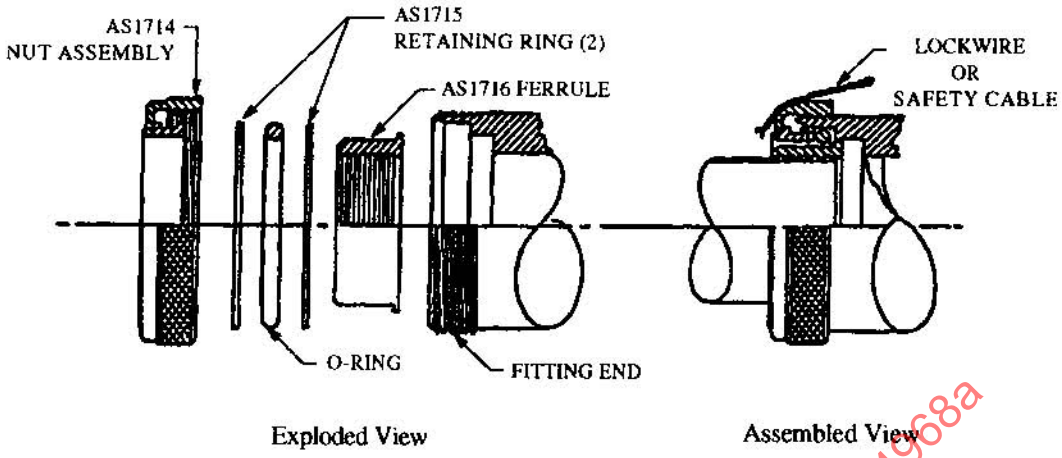

FIGURE 2 - Assembly of Flexible Type Half-Coupling

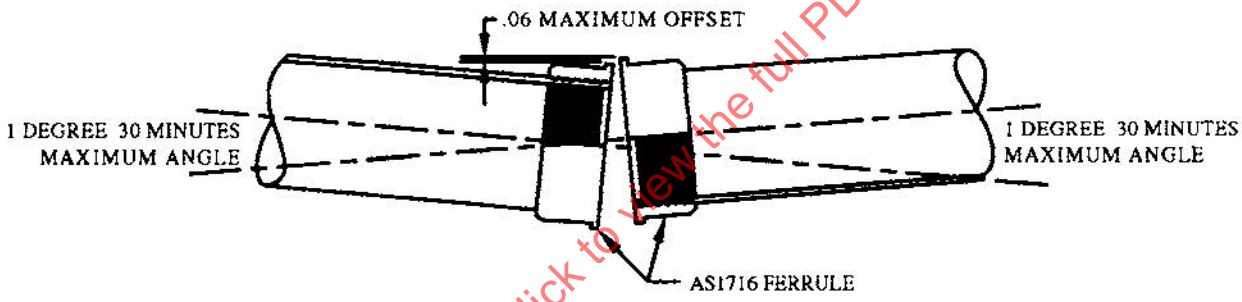

FIGURE 3 - Alignment of Tube Ends

3.5.3 Full Coupling - Flexible (AS1712): The AS1712 type flexible full coupling is illustrated in Figure 4.

a. Prior to assembly of coupling components, verify that axial alignment of the tube ends is within 1° 30 min, and .06 maximum offset as illustrated in Figure 3.

b. Slide the coupling nut over the ferrule on the end of one tube.

c. Slide the coupling body over the ferrule on the end of the adjoining tube.

d. Install one retaining ring over the body ferrule and another retaining ring over the nut ferrule.

e. Locate the two tube ends, with a gap of .150 ± .050 between ferrules, so that the O-rings are sandwiched between the retainer rings and the retainer halves. Lubricate the O-rings with a light coating of approved lubricant and install.

3.5.3 (Continued):

f. Install O-ring seals per Figure 4.

g. Install retainer halves over the ferrule ends. Snap halves together.

h. Pull the body over the seals and retainer halves.

i. Engage the AS1714 nut assembly to the AS1718 body and hand tighten in accordance with 3.4.

j. Install lockwire or safety cable in accordance with AS567 or AS4536.

k. Ensure that hand tightened full couplings meet the dimensional requirements illustrated in Figure 5 and listed in Table 1. If requirements are not met, disassemble and inspect for fit up problems. Reassemble per instructions.

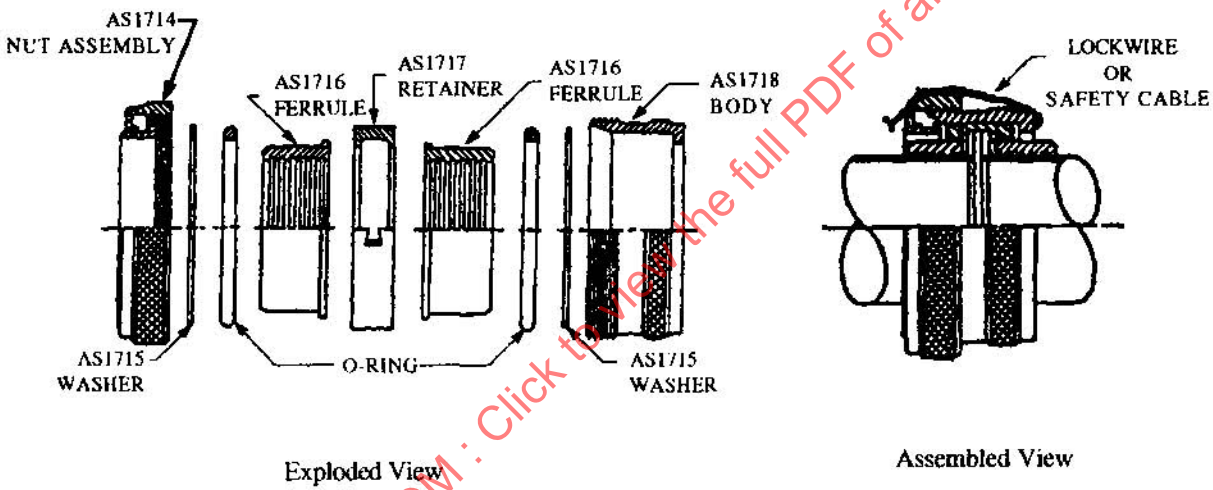

FIGURE 4 - Assembly of Flexible Type Full Coupling