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Superseding AS683C

Installation Procedures and Torques for Fluid Connections**RATIONALE**

Complete revision of all figures and updating of specifications.

FOREWORD

Changes in this Revision are format /editorial only.

1. SCOPE

These procedures cover the following:

Paragraph 3 - Cone end connections for flared tube and brazed ferrule, with and without gasket.

Paragraph 4 - Boss end connections, positioned type, with back-up ring.

Paragraph 5 - Boss end connections, positioned type, without back-up ring

Paragraph 6 - Boss end connections, non-positioned type.

Paragraph 7 - Bulkhead connections.

1.1 Purpose

To establish standard installation procedures for fluid connection parts listed in this standard.

1.2 All parts with lockwire holes shall be lockwired per AS567.

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 the 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 SAE Publications

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

AS567	Safety Cable, Safety Wire, Key Washers, and Cotter Pins for Propulsion Systems, General Practices for Use of
AS930	Fitting End, Straight Thread, Boss Connection, Design Standard
AS1038	Fitting, Elbow, 90 Degrees, Standard and Reducer, Bulkhead, Flared
AS1078	Fitting End - Flared Tube Connection, Extended Thread
AS1039	Fitting, Tee, Standard and Reducer, Bulkhead on Side, Flared
AS1171	Boss - Fluid Connection, Internal Straight Thread, Shallow Tap
AS3074	Gasket - 37° Flared Tube Fitting, Nickel, AMS5553
AS3075	Gasket - 37° Flared Tube Fitting, Nickel, AMS5553
AS3208	Packing, Preformed - Ams 7276 - Seal
AS3282	Gasket - 37° Flared Tube Fitting, Nickel, AMS5553
AS3551	Packing, Preformed - O-Ring Seal, AMS 7272
AS3578	Packing, Preformed - O-Ring Seal, AMS 7271
AS4330	Tubing, Flared Standard Dimensions For, Design Standard
AS4395	Fitting End, Flared, Tube Connection, Design Standard
AS4396	Fitting End, Bulkhead, Flared Tube Connection, Design Standard
AS5160	Fitting, Bolt, Flared
AS5161	Fitting, Bolt, Fluid Passage
AS5174	Fitting, Union and Reducer, Flared
AS5175	Nut, Coupling, Flared
AS5176	Fitting, Sleeve, Flared
AS5202	Port Or Fitting End, Internal Straight Thread, Design Standard
AS5406	Fitting, Union, Tube, .375 Bulkhead
AS8879	Screw Threads - UNJ Profile, Inch Controlled Radius Root With Increased Minor Diameter
AS9058	Back-Up, Boss Connection, AMS 3652, AMS 3656, AMS 3660, AMS 3667
AS9201	Nut, Plain, Hexagon, Boss Connection, Silver Plated, 347 Cres UNS S34700

AS9385	Packing, Performed, Ams 7267, O-Ring
AS9902	Plug, Machine Thread Drilled, Preformed Packing, AS8879 Thread (UNS S34700)
AS9966	Packing, Preformed - AMS 7273, Seal
AS33583	Tubing End Double Flare, Standard Dimensions For
AS90991	Nut, Hexagon, Drilled, Boss Connection, Aluminum - UNS A92024
AS91001	Nut, Hexagon, Drilled, Boss Connection, Cres - UNS S30400
AS92001	Nut, Hexagon, Drilled, Boss Connection, Aluminum - UNS A92014
ARP573	Silver, Copper and Nickel Alloy Brazed Joints for Aerospace Propulsion Systems
AMS7276	Rubber: Fluorocarbon (FKM) High-Temperature-Fluid Resistant Low Compression Set for Seals in Fuel systems and Specific Engine Oil Systems

AMS-G-4343 Grease, Pneumatic System

2.2 U. S. Government Publications

Available from the Document Automation and Production Service (DAPS), Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-9495, <https://assist.daps.dla.mil/quicksearch/>.

MS9015	Plug, Machine Thread- "O" Ring Seal
MS9095	Nipple, Tube - Aluminum, Boss
MS9096	Elbow, Tube - AMS 4135, Boss, 90 Deg
MS9097	Elbow, Tube - AMS 4135, Boss, 45 Deg.
MS9193	Nipple, Tube - SAE-AMS5639, Boss
MS9194	Elbow, Tube - SAE-AMS5646, Boss, 90 Degrees
MS9195	Elbow, Tube - SAE-AMS5639, Boss, 45 Degrees
MS9196	Tee, Tube - SAE-AMS5646, Boss
MS9197	Nut, Tube Coupling-CRES SAE-AMS5646, Silver Plate
MS9198	Nut, Tube Coupling-CRES SAE-AMS5646
MS9483	Ferrule, Brazing, Tube Fitting-Cres SAE-AMS5646, Straight
MS9901	Plug, Machine Thread - AMS 5646
MS9953	Plug, Machine Thread - AMS 4121
MS9954	Plug, Machine Thread-Drilled, AMS 4121
MIL-PRF- 5606	Hydraulic Fluid, Petroleum Base; Aircraft, Missile, and Ordnance

MIL-PRF-7808	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base
MIL-PRF-87257	Hydraulic Fluid, Fire Resistant; Low Temperature, Synthetic Hydrocarbon Base, Aircraft And Missile
MIL-PRF-83282	Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Metric, NATO Code Number H-537
VV-P-236	Petrolatum, Technical

2.3 NAS Publications

Available from Aerospace Industries Association, 1000 Wilson Boulevard, Suite 1700, Arlington, VA 22209-3928, Tel: 7303-358-1000, www.aia-aerospace.org

NAS 1149 WASHER, FLAT

3. CONE END CONNECTIONS FOR FLARED TUBE AND BRAZED FERRULE

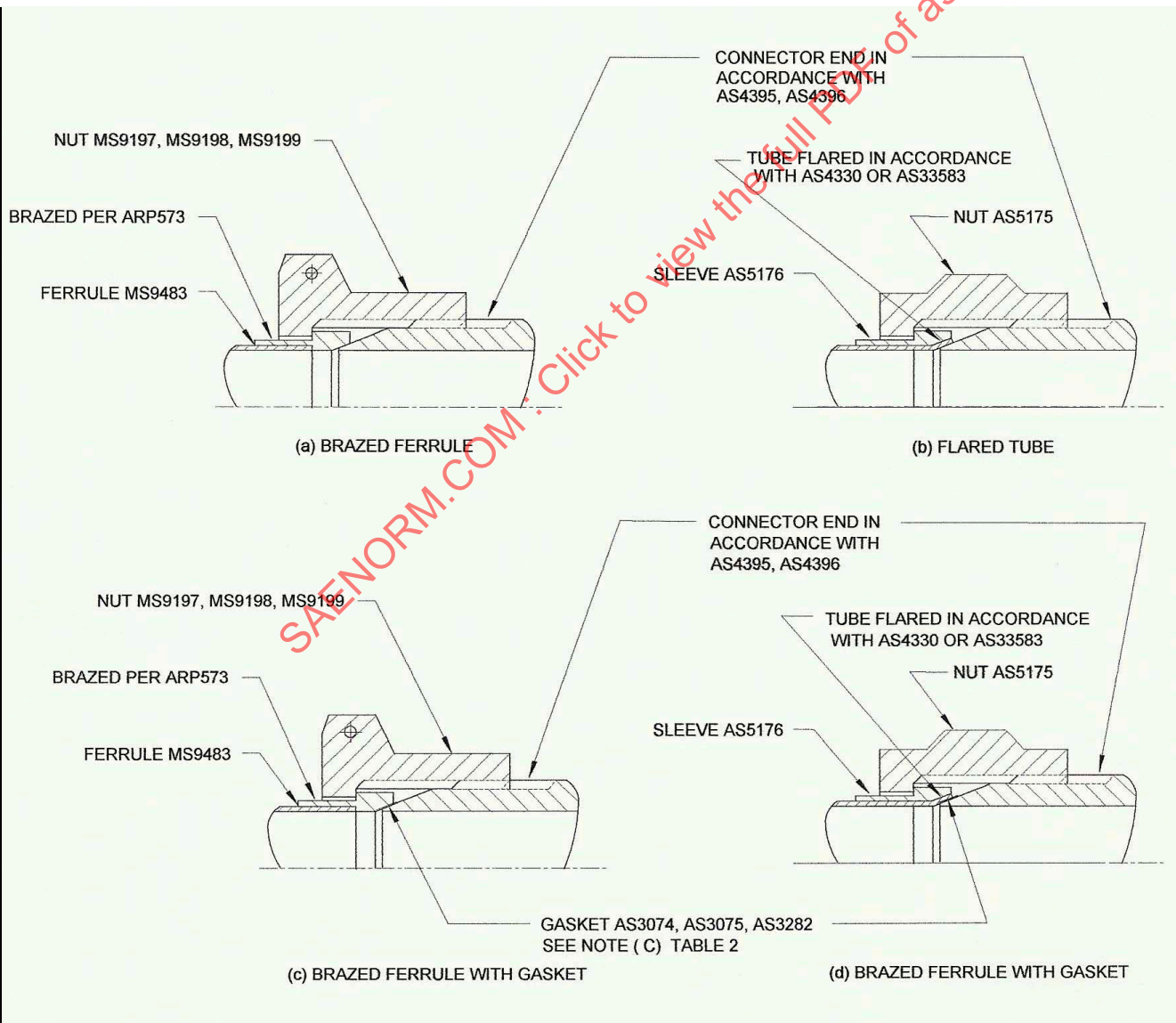


FIGURE 1 - CONE END CONNECTORS FOR FLARED TUBE AND BRAZED FERRULE

3.1 Installation Procedures

- 3.1.1 Step One: Coat threads at cone end of connector sparingly with lubricant as listed in Table 1.
- 3.1.2 Step Two: Assemble gasket when specified, See Figure 1C and 1D.
- 3.1.3 Step Three: Assemble the flared tube or brazed ferrule to the connector cone and/or gasket and tighten the nut in accordance with Table 2.
- 3.1.4 Leaking joints: Do not attempt to correct any leakage or misalignment of the joint by overtorquing. Instead, disassemble and check for nicks, burrs, dirt, etc. Reassemble, using new parts if necessary. Gaskets AS3074, AS3075 and AS3282 must be replaced if the joint is disassembled.

4. BOSS END CONNECTIONS, POSITIONED TYPE, WITH BACK-UP RING

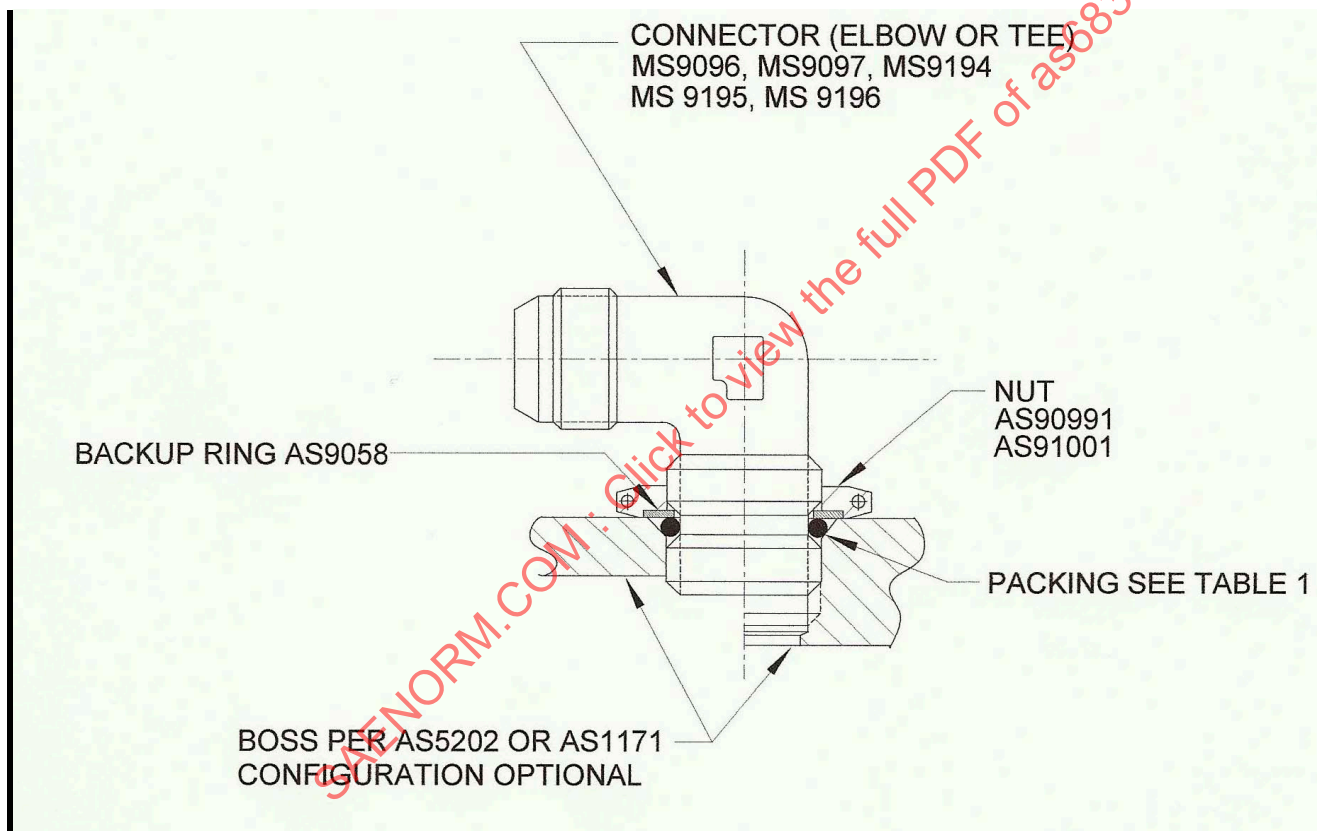


FIGURE 2 – BOSS END CONNECTION, POSITIONED TYPE, WITH BACK-UP RING

4.1 Installation Procedures

- 4.1.1 Step One: Coat male threads of connector, back-up ring and packing sparingly with lubricant as listed in Table 1. Work back-up ring into counterbore of the nut, and assemble packing in groove. Turn the nut down until the packing is firmly seated against the lower threaded portion of the connector.
- 4.1.2 Step Two: Install the connector into the boss. At the same time keep the nut turning with the connector until the packing contacts the boss. A sudden increase in torque will determine the contact. Apply wrench to the nut to prevent its turning and then turn the connector 1.5 turns into the boss. Complete the assembly and positioning by turning into the boss not more than one additional turn.
- 4.1.3 Step Three: Hold the connector in the required position and tighten the nut in accordance with Table 3.

5. BOSS END CONNECTIONS, POSITIONED TYPE, WITHOUT BACK-UP RING

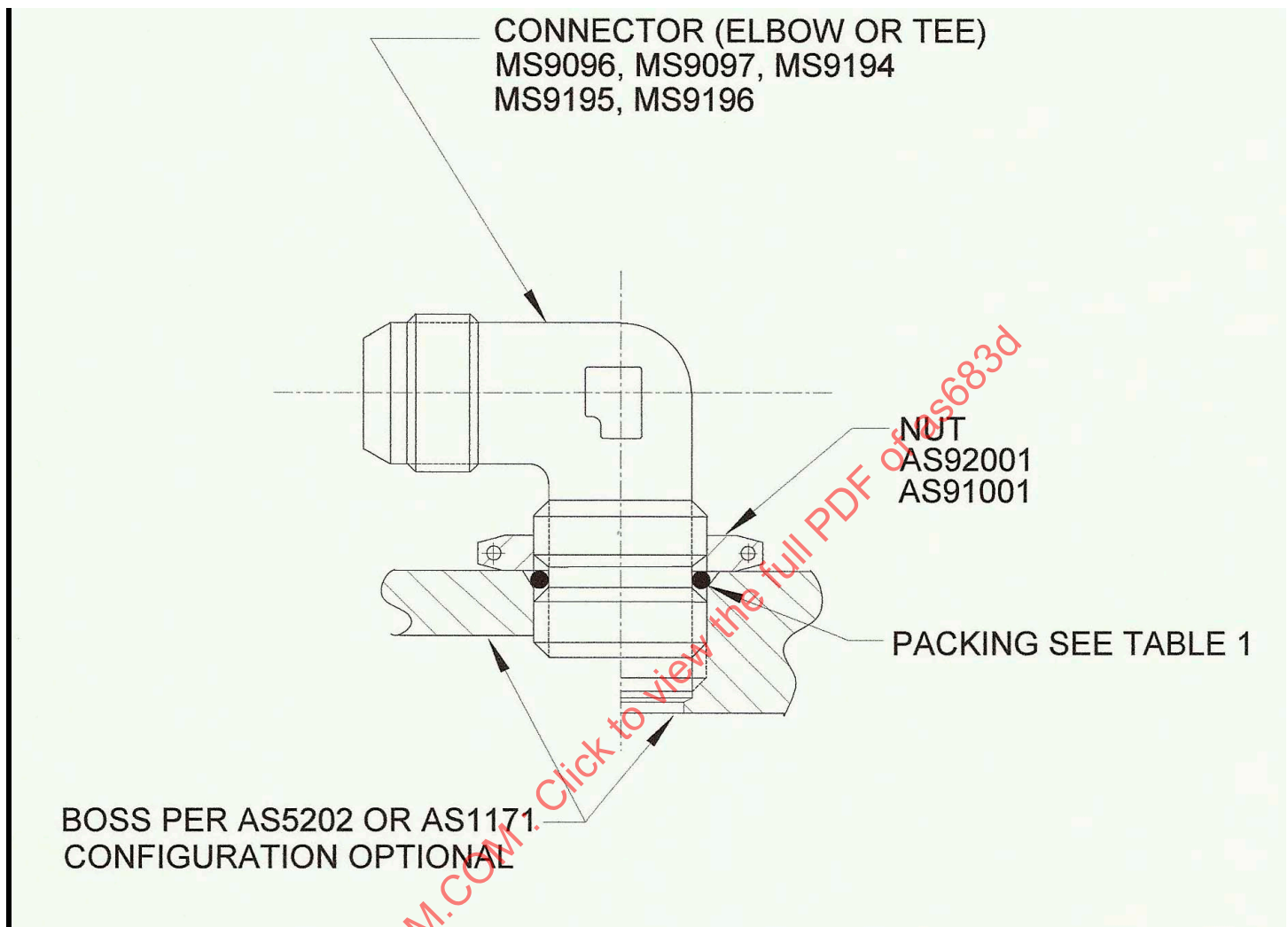


FIGURE 3 – BOSS END CONNECTION, POSITIONED TYPE, WITHOUT BACK UP RING

5.1 Installation Procedures

- 5.1.1 Step One: Coat male threads of connector and packing sparingly with lubricant as listed in Table 1 and assemble packing in groove. Turn the nut down until packing is firmly seated against lower threaded portion of the connector.
- 5.1.2 Step Two: Install the connector into the boss. At the same time keep the nut turning with the connector until the packing contacts the boss. A sudden increase in torque will determine the contact. Apply wrench to the nut to prevent its turning, and then turn the connector 1.5 turns into the boss. Complete the assembly and positioning by turning into the boss not more than one additional turn.
- 5.1.3 Step Three: Hold the connector in the required position and tighten the nut in accordance with Table 3.

6. BOSS END CONNECTIONS, NON-POSITIONED TYPE

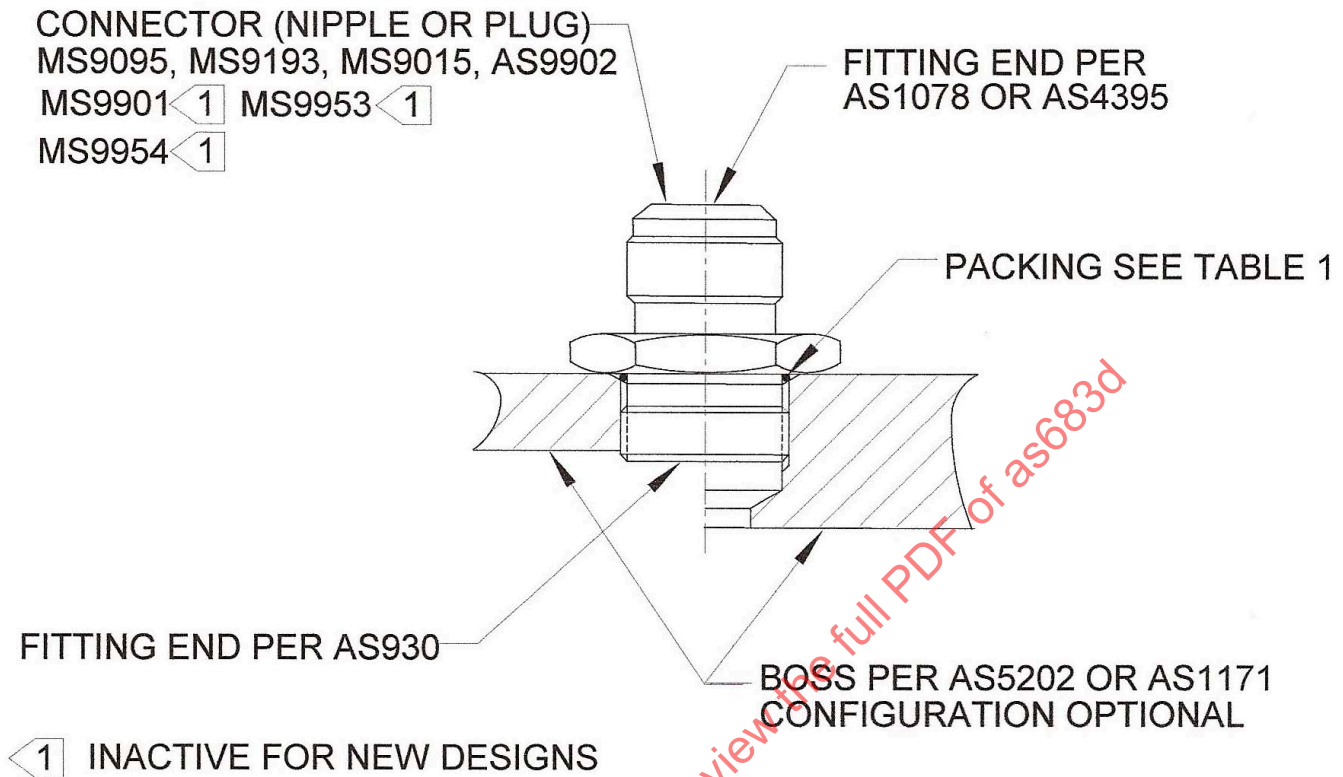


FIGURE 4 – BOSS END CONNECTION, NON POSITIONED TYPE

6.1 Installation Procedure

- 6.1.1 Step One: Coat male thread of connector and packing sparingly with lubricant as listed in Table 1, and assemble packing in groove.
- 6.1.2 Step Two: Install the connector into the boss and tighten the connector in accordance with Table 3.

7. BULKHEAD CONNECTIONS

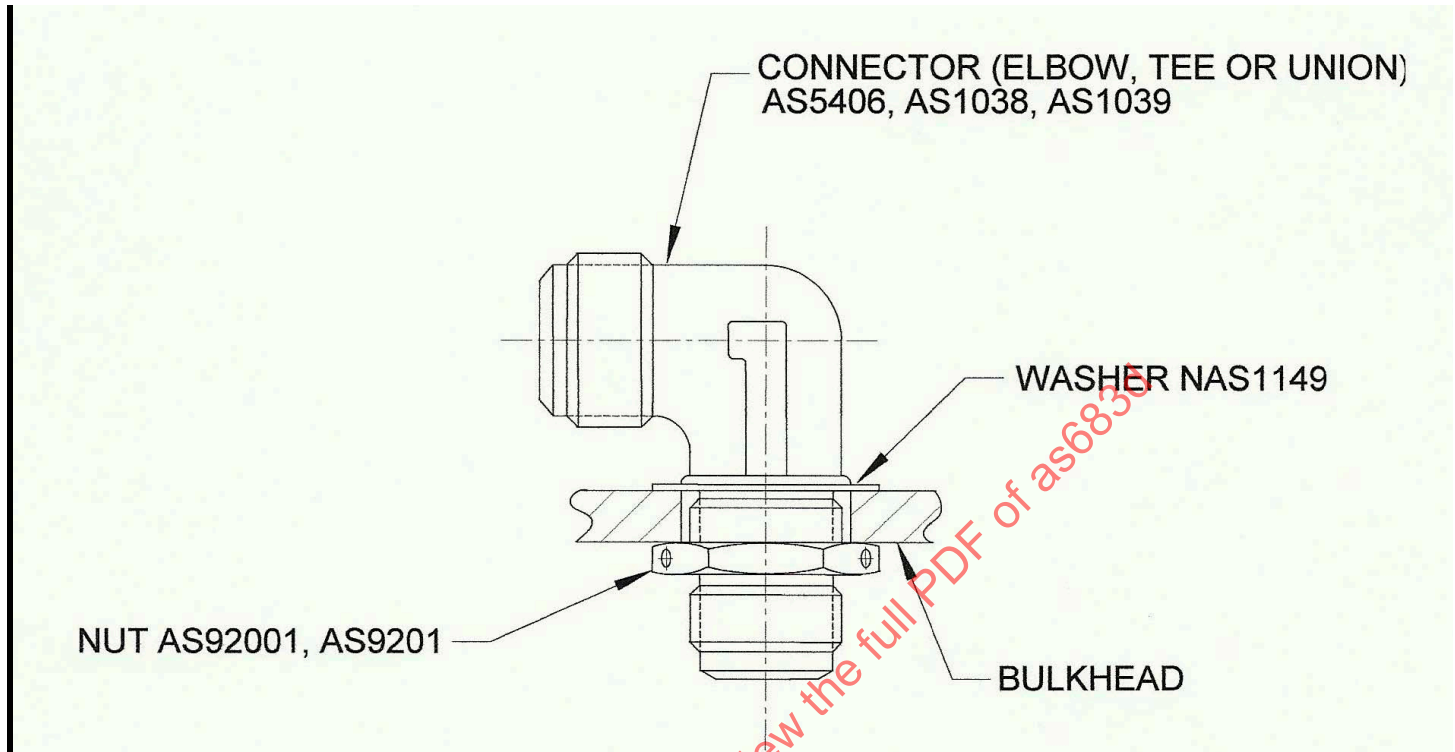


FIGURE 5 – BULKHEAD CONNECTION

7.1 Fittings

7.1.1 Style S (Shouldered)

- Size -6 and smaller may be used through bulkheads up to .250 maximum thickness.
- Size -8 and larger may be used through bulkheads up to .375 maximum thickness.

7.1.2 Style E (Hex)

- Unions (AS5406) may be used through bulkheads up to .375 maximum thickness.

7.2 Washer (NAS1149)

7.2.1 Style S Connectors (Shouldered)

- Connector size -6 and smaller may be used when bulkhead is .188 thick or less, provided that a .062 thick washer is also used.
- Connector size -8 and larger may be used when bulkhead is .188 thick or less, provided that a .094 thick washer is also used.
- Washer is not required when bulkhead is thicker than .188, provided hole in bulkhead is equal to the hole in applicable washer.

7.2.2 Style E Connectors (Hex)

- a. Washer is not required provided hole in bulkhead is equal to the hole in applicable washer.

7.3 Installation Procedures

- 7.3.1 Step One: Coat threads on bulkhead end of connector sparingly with lubricant as listed in Table 1.

- 7.3.2 Step Two: Hold the connector in the required position and tighten the nut in accordance with Table 4.

8. REFERENCE RING SEAL DATA

- 8.1 Table 1 lists typical ring seal data applicable to the boss type connection installation.

TABLE 1 – REFERENCE PACKING APPLICATION

Application	Packing, Preformed	Typical Installation Lubricant
Hydraulic	AS3551 AMS7276 AS3208	Hydraulic Oil MIL-PRF-5606 MIL-PRF-87257, MIL-PRF-83282 or Petrolatum (VV-P-236)*
Engine Oil	AS3551 AMS7276 AS9966 AS3208	Applicable Engine Oil or MIL-PRF-7808
Fuel	AS3578 AS9966 AS3208	Applicable Fuel or Petrolatum (VV-P-236)*
Pneumatic	AS9385	Lubricating Grease AMS-G-4343 or Petrolatum (VV-P-236)*
Water	AS9385	Petrolatum (VV-P-236)
*Use in proximity to control valve not recommended. Petrolatum not compatible with. MIL-PRF-7808		

9. TORQUE VALUES

9.1 The following tables list torque data applicable to the aforementioned connections. Reduced fluid fitting torques shall be in accordance with the applicable threaded end.

TABLE 2 – TORQUE VALUES FOR TUBE FITTINGS

Nom Tube OD	Thread T AS8879	Torque (A)	Torque (B) and (C)
Inch		lbf-in	lbf-in
.125	.3125-24UNJF-3B	22-30	35-50
.188	.3750-24UNJF-3B	30-45	75-100
.250	.4375-20UNJF-3B	40-60	115-150
.312	.5000-20UNJF-3B	55-75	150-200
.375	.5625-18UNJF-3B	75-115	250-300
.438	.6250-18UNJF-3B	95-140	300-350
.500	.7500-16UNJF-3B	150-225	450-500
.562	.8125-16UNJF-3B	175-270	550-600
.625	.8750-14UNJF-3B	200-315	650-700
.688	1.0000-12UNJF-3B	260-405	800-900
.750	1.0625-12UNJ-3B	300-450	900-1000
.875	1.1875-12UNJ-3B	360-540	1050-1200
1.000	1.3125-12UNJ-3B	500-630	1200-1400
1.125	1.5000-12UNJF-3B	540-745	1400-1700
1.250	1.6250-12UNJ-3B	600-810	1500-1800
1.500	1.8750-12UNJ-3B	700-1000	1900-2200
1.750	2.2500-12UNJ-3B	800-1150	2200-2700
2.000	2.5000-12UNJ-3B	850-1300	2500-3000

(A) These values apply when flared tube, connector or nut are aluminum.

(B) These values apply when flared tube or brazed ferrule and connector are steel.

(C) Torque values are for nickel gasket seals used with steel fittings, see Figure 1.