SAE Aerospace
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AEROSPACE STANDARD

SAE AS683 | REV. C

Issued 1964-04
Revised 2001-10
Reaffirmed 2006-05

Installation Procedures and Torques for Fluid Connections

RATIONALE

This document has been reaffirmed to comply with the SAE 5-year Review policy.

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:

AS567
AS3074
AS3075
AS3282
AN832
AN960

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3. CONE END CONNECTIONS FOR FLARED TUBE AND BRAZED FERRULE:

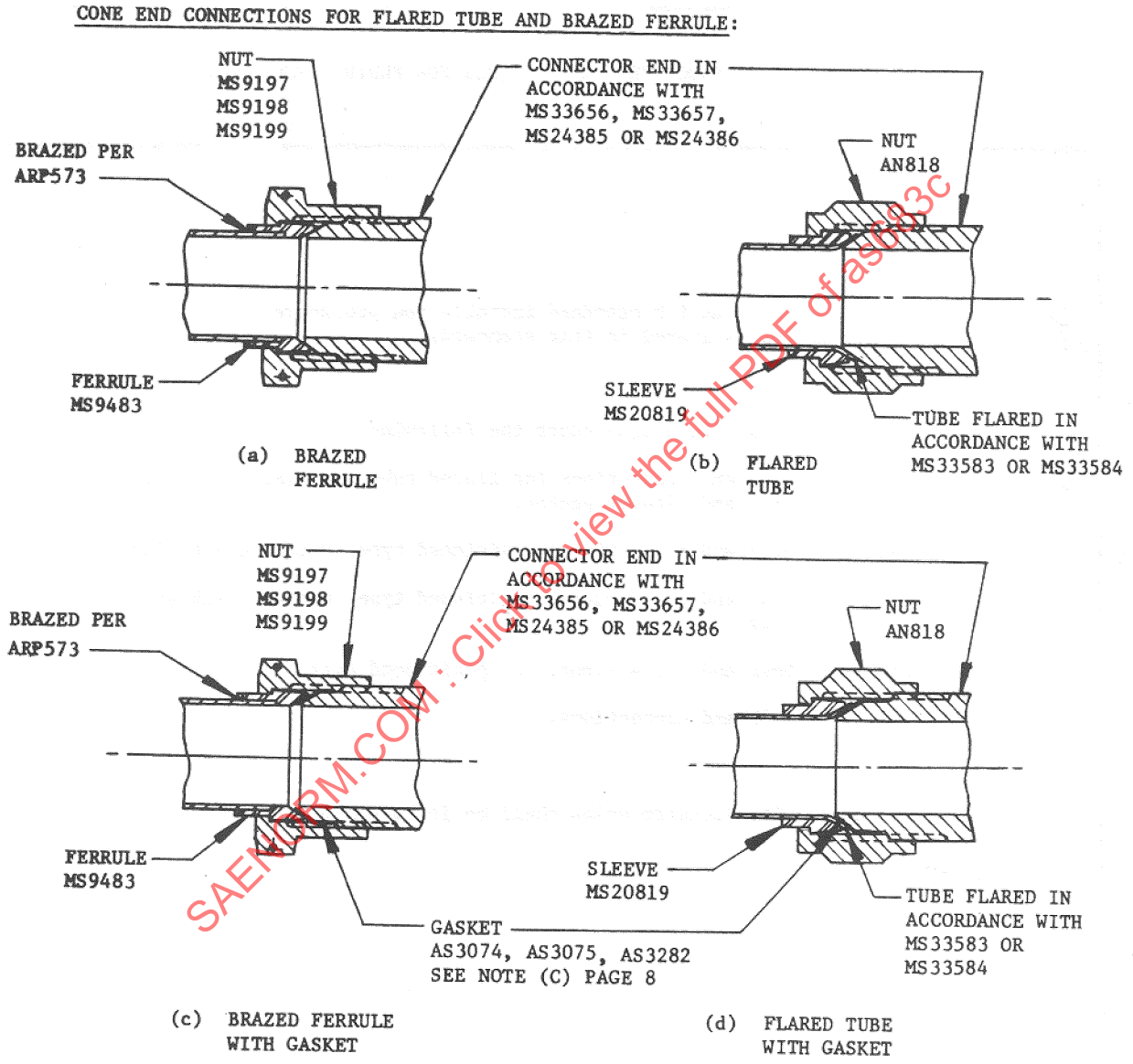

FIGURE 1

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:

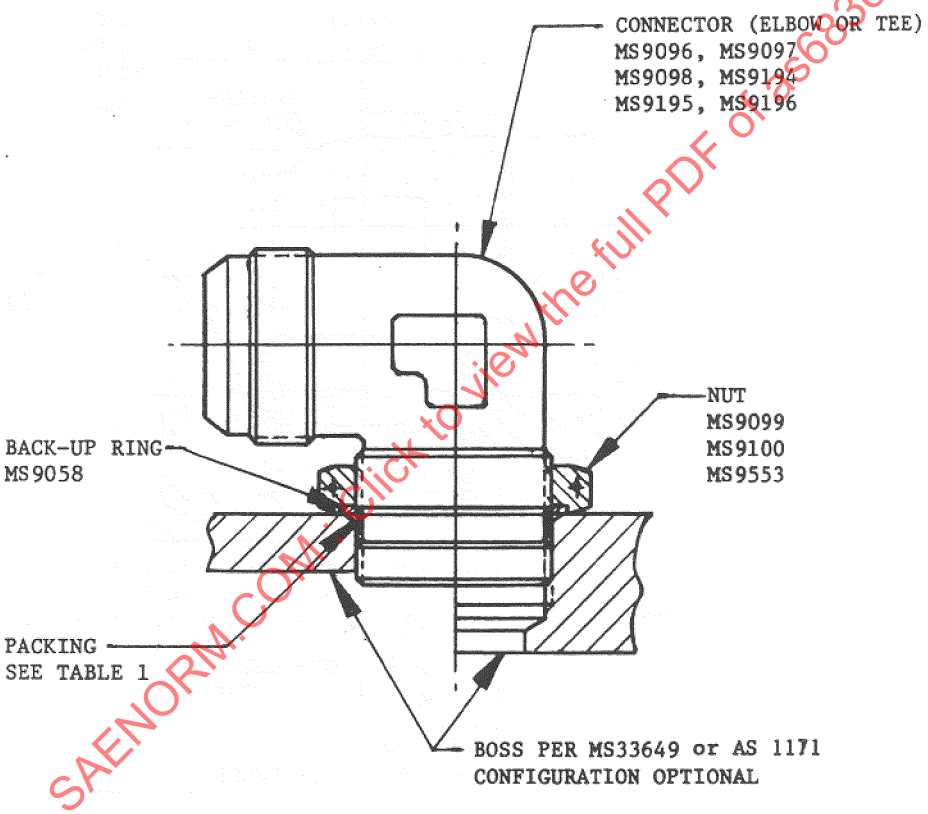

FIGURE 2

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:

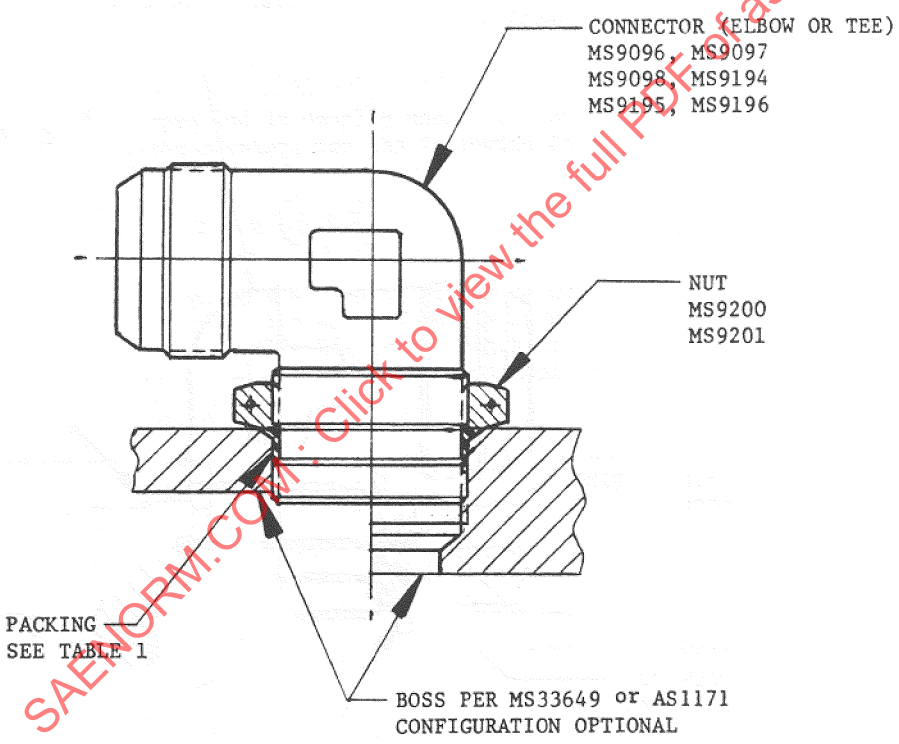

FIGURE 3

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:

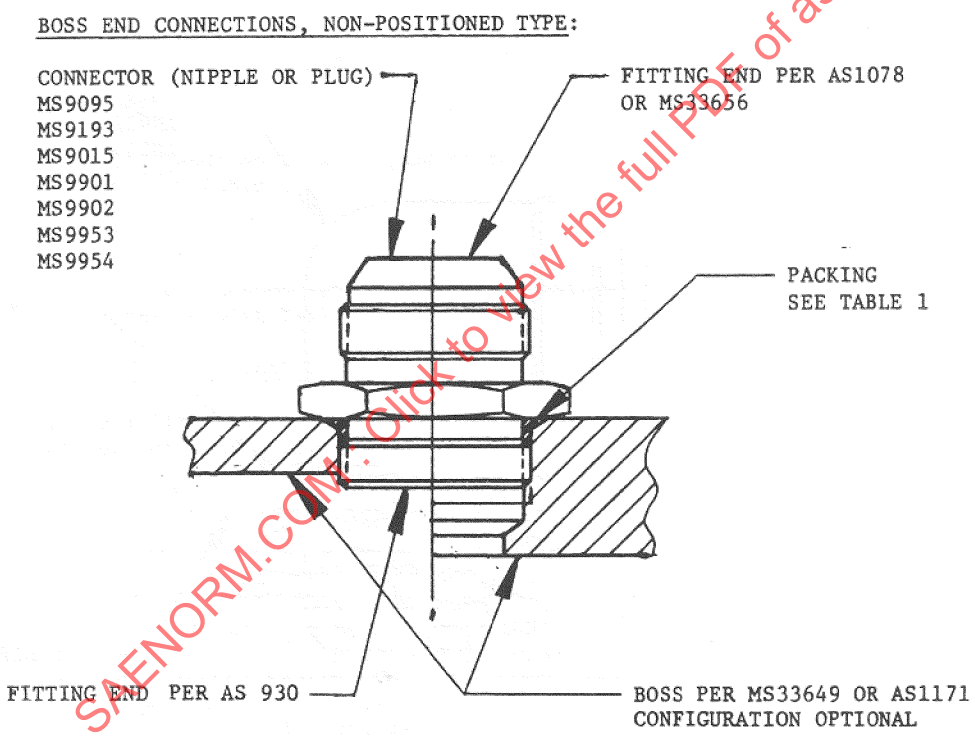

FIGURE 4

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:

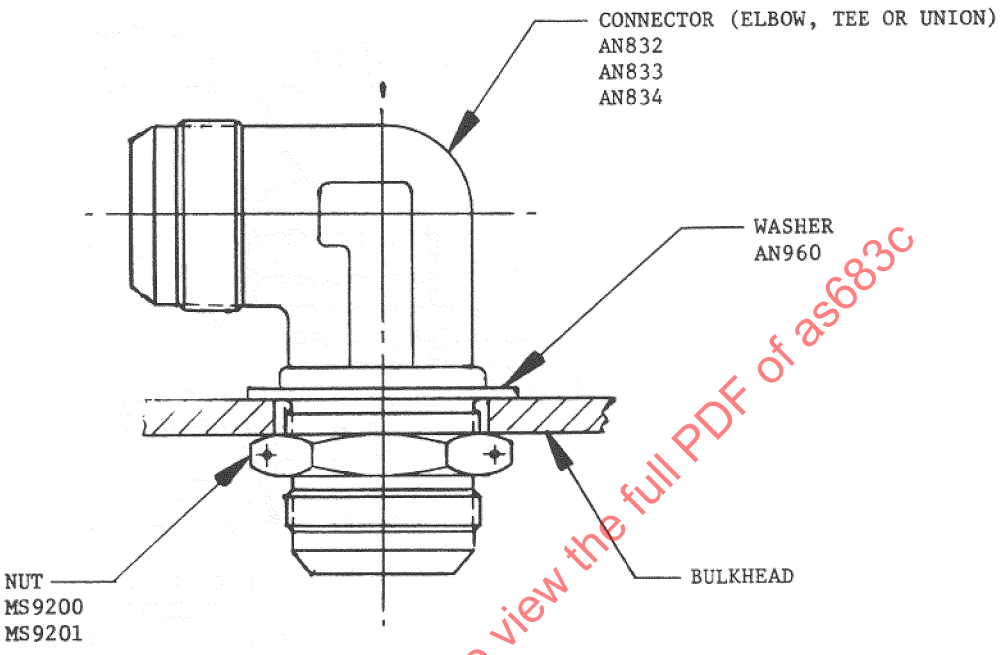

FIGURE 5

7.1 Fittings:

7.1.1 Style S (Shouldered):

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

7.1.2 Style E (Hex):

a. Unions (AN832) may be used through bulkheads up to .375 maximum thickness.

7.2 Washer (AN960):

7.2.1 Style S Connectors (Shouldered):

a. Connector size -6 and smaller may be used when bulkhead is .188 thick or less, provided that a .062 thick washer is also used.
b. Connector size -8 and larger may be used when bulkhead is .188 thick or less, provided that a .094 thick washer is also used.
c. 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	MS9355 MS9387 AS3084	Hydraulic Oil MIL-H-5606 or Petrolatum (VV-P-236)*
ENGINE OIL	MS9355 MS9387 MS9966 AS3084	Applicable Engine Oil
FUEL	MS9020 MS9387 MS9966 AS3084	Applicable Fuel or Petrolatum (VV-P-236)*
PNEUMATIC	MS9385	Lubricating Grease MIL-L-4343 or Petrolatum (VV-P-236)*
WATER	MS9385	Petrolatum (VV-P-236)
*Use in proximity to control valve not recommended. Petrolatum not compatible with MIL-L-7808.		

9. TORQUE VALUES:

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

TABLE 2

TORQUE VALUES FOR TUBE FITTINGS

NOM TUBE OD inch	NOM TUBE OD (mm)	THREAD T MIL-S-8879	TORQUE (A) LBF-IN	TORQUE (A) N.m	TORQUE (B) (C) LBF-IN	TORQUE (B) (C) N.m
.125	3.18	.3125-24UNJF-3B	22-30	2.48-3.39	35-50	3.95-5.65
.188	4.78	.375-24UNJF-3B	30-45	3.39-5.08	75-100	8.47-12.98
.250	6.35	.4375-20UNJF-3B	40-60	4.52-6.78	115-150	12.99-16.95
.312	7.92	.500-20UNJF-3B	55-75	6.21-8.47	150-200	16.95-22.60
.375	9.52	.5625-18UNJF-3B	75-115	8.47-12.99	250-300	28.25-33.90
.438	11.13	.625-18UNJF-3B	95-140	10.73-15.82	300-350	33.90-39.54
.500	12.70	.750-16UNJF-3B	150-225	16.95-25.42	450-500	50.84-56.49
.562	14.27	.8125-16UNJF-3B	175-270	19.77-30.51	550-600	62.14-67.79
.625	15.88	.875-14UNJF-3B	200-315	22.60-35.59	650-700	73.44-79.09
.688	17.48	1.000-12UNJF-3B	260-405	29.38-45.76	800-900	90.39-101.7
.750	19.05	1.0625-12UNJ-3B	300-450	33.90-50.84	900-1000	101.7-113.0
.875	22.22	1.1875-12UNJ-3B	360-540	40.67-61.01	1050-1200	118.6-135.6
1.000	25.40	1.3125-12UNJ-3B	500-630	56.49-71.18	1200-1400	135.6-158.2
1.125	28.58	1.500-12UNJF-3B	540-745	61.01-86.17	1400-1700	158.2-192.1
1.250	31.75	1.625-12UNJ-3B	600-810	67.79-91.52	1500-1800	169.5-203.4
1.500	38.10	1.875-12UNJ-3B	700-1000	79.09-113.0	1900-2200	214.7-248.6
1.750	44.45	2.250-12UNJ-3B	800-1150	90.39-129.9	2200-2700	248.6-305.1
2.000	50.80	2.500-12UNJ-3B	850-1300	96.04-146.9	2500-3000	282.5-338.9

(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.