SAE Aerospace
An SAE International Group

AEROSPACE STANDARD

SAE AS18280/1A

Issued 2000-09
Reaffirmed 2004-07
Revised 2008-12

Superseding AS18280/1

(R) Sleeve, Bite Type, 24° Cone Flareless Fitting, 3000 psi

RATIONALE

Revision A - Changes have been implemented under:

2. References and text: Update of specification numbers

3.5.2: Repeated Assembly Test of “Bite-Type Sleeves” was moved from AS18280 to here

Table 3: Make-up of test specimens has been clarified

4.1.4: Measuring minimum opening was transferred from AS18280 to here

4.1.5: Repeated Assembly Test procedure was transferred from AS18280 to here

1. SCOPE

1.1 Scope

This SAE Aerospace Standard (AS) establishes the requirements for bite type sleeves for use with 24° cone flareless fluid connection fittings per AS18280.

1.2 Classification

Sleeves shall be furnished in the types and styles designated by the applicable AS, MS and other engineering standard drawings. It is intended to serve as a procurement specification for the fittings described herein and in Section 6.

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 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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http://www.sae.org/technical/standards/AS18280/1A

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.

AS2094	Test Methods for Tube-Fitting Assemblies
AS5148	Assembly, Installation and Torque for Flareless and Straight Thread Fluid Fittings and Tube Assemblies
AS18280	Fittings, 24° Cone Flareless, Fluid Connection, 3000 psi
AS21922	Sleeve, Coupling, Flareless
AMS2700	Passivation of Corrosion Resistant Steels
AMS5643	Steel, Corrosion-Resistant, Bars, Wire, Forgings, Tubing, and Rings 16Cr - 4.0Ni - 0.30Cb - 4.0Cu Solution Heat Treated, Precipitation Hardenable
AMS-QQ-P-416	Plating, Cadmium (Electrodeposited)

2.1.1 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 A 108	Steel Bars, Carbon, Cold-finished, Standard Quality
ASTM A 576	Steel Bars, Carbon, Hot-wrought, Special Quality

2.1.2 ASQ Publications

Available from American Society for Quality, 600 North Plankinton Avenue, Milwaukee, WI 53203, Tel: 800-248-1946 (United States or Canada) or +1-414-272-8575 (International), www.asq.org.

ASQ Z1.4	Sampling Procedures and Tables for Inspection by Attributes

3. TECHNICAL REQUIREMENTS

3.1 Material

Fittings shall be fabricated of materials listed in Table 1 and in compliance with requirements in this specification or as specified on the applicable part standard drawing.

3.1.1 Heat Treatment

Bite type sleeves shall be heat treated by case hardening or nitriding to metallurgical properties capable of meeting the performance requirements of 3.5. The acceptability of the heat treatment shall be by functional test only in accordance with 3.6. See 6.3 for historical detail metallurgical requirements.

TABLE 1 - MATERIALS

Material	Form	Specification	Alloy & Temper	Material Code
Carbon Steel	Bars, rods	ASTM A 108	1213, 12L14, or 1215	None
		ASTM A 576	1213	None
Corrosion Resistant Steel	Bars, rods	AMS5643	17-4PH	C

3.2 Design and Fabrication

The design and fabrication of the fittings shall be in accordance with the applicable drawings. The bite type sleeves when assembled to tubing are intended to mate with the 24° cone flareless fitting end of AS18280.

3.3 Finish

3.3.1 Carbon Steel Bite Type Sleeves

Carbon steel bite type sleeves shall be cadmium plated 0.0003 in minimum to 0.0005 in maximum in accordance with AMS-QQ-P-416, Type II. Sleeves shall not be dipped in oil. The ID shall not be subject to a plating thickness requirement and may exhibit bare areas.

NOTICE: This document references a part which contains cadmium as plating material. Consult local officials if you have questions concerning cadmium's use.

3.3.2 Corrosion Resistant Steel Bite Type Sleeves

Class 17-4PH corrosion resistant steel sleeves shall be passivated per AMS2700 Method 1, or AMS2700 Method 2.

3.4 Identification of Product

All bite type sleeves shall be marked as specified on the applicable drawing in a location not detrimental to the performance of the fitting and not detrimental to the corrosion protection of the fitting.

3.4.1 Manufacturer's Identification

Corrosion resistant steel bite type sleeves shall be trademarked but shall not be marked with the part number and size.

3.4.2 Material Identification

Bite type sleeves shall be marked with the material code letter as shown in Table 1.

3.5 Performance

The bite type sleeves when assembled to tubing and then with fittings per AS18280 shall meet the performance requirements of AS18280 and the following additional requirements.

3.5.1 Joint Strength

This requirement applies to bite type sleeves in sizes 20 and smaller only on 1/8 hard cres tubing per Table 3 of AS18280. The test assembly when assembled at minimum torque shall withstand the loads as specified in Table 2 without slippage of the sleeve on the tubing or cracking of the sleeve when tested at room temperature per 4.1.3.

TABLE 2 - MINIMUM JOINT STRENGTH OF BITE TYPE SLEEVES

Nominal Tube Size in 0.062 Increments	02	03	04	05	06	08	10	12	16	20
Tubing Wall Thickness	0.012	0.016	0.020	0.020	0.028	0.035	0.042	0.058	0.065	0.049
Joint Strength lb	400	800	1300	1800	2500	4200	6200	8800	10 000	9500

3.5.2 Repeated Assembly

The test assembly shall withstand eight repeated assemblies at the specified rated minimum and maximum torque values when tested at room temperature per AS2094 and 4.1.5 without:

a. Leakage at any of the pressure tests.

b. Inability to reassemble the fitting to the point of interface by hand.

c. Nut deformation preventing engagement of the hex of the nut with an open end wrench.

d. Tube collapse below minimum tube opening

3.6 Workmanship

See AS18280.

4. QUALITY ASSURANCE PROVISIONS

The quality assurance provisions shall be in accordance with the applicable portions of AS18280 with the following additional requirements.

4.1 Qualification Inspection

The sleeves shall be subjected to a joint strength test per 4.1.3.

4.1.1 Test Samples

The test samples for the joint strength test shall be as specified in Table 3.

TABLE 3 - TEST SAMPLES FOR QUALIFICATION INSPECTION TESTS

Test	Requirement Paragraph	Test Procedure Paragraph	Fitting Description	Material	Quantity Each
Joint Strength	3.5.1	4.1.3	Straight /1/	All /2/	6

Notes:
/1/ Any straight fitting, union, adapter or plug may be used. There shall be at least one fitting end on each sample that shall be tested with a 24° cone fitting end, nut, and sleeve.
/2/ Each basic type of material shall be tested except that certain alloys and types may be tested in lieu of others as follows: for carbon steel, either 1213, 12L14, or 1215 may be used.

4.1.2 Presetting of Bite Type Sleeves

Bite type sleeves shall be preset on the tubing per AS5148 using a presetting machine or nut and mating fitting end to the number of turns specified. For tube ODs of 1.250 and larger, 5/6 turns shall be used.

4.1.3 Joint Strength Test Procedure

The test specimen shall be mounted in a tensile test machine and strained to rupture at a speed of 0.15 in/min ± 0.04 in/min. No internal pressure shall be applied during the test. The test shall be conducted at room temperature.

4.1.4 Minimum Opening for Bite Type Sleeves

During any of the repeated assembly tests for bite type sleeves on 1/8 hard cres tubing, the internal passage of neither the fitting nor the tubing shall be reduced to a value less than that shown in Table 4 when using tubing specified in Table 2 above (see 4.1.5 and Figure 2).

TABLE 4 - MINIMUM OPENING FOR BITE TYPE SLEEVES AFTER THE REPEATED ASSEMBLY TEST USING 1/8 HARD CRES TUBING

Nominal Tubing OD	Minimum Opening
0.125	0.070
0.188	0.110
0.250	0.165
0.312	0.225
0.375	0.290
0.500	0.400
0.625	0.485
0.750	0.610
1.000	0.840
1.250	1.048
1.500	1.330
2.000	1.780

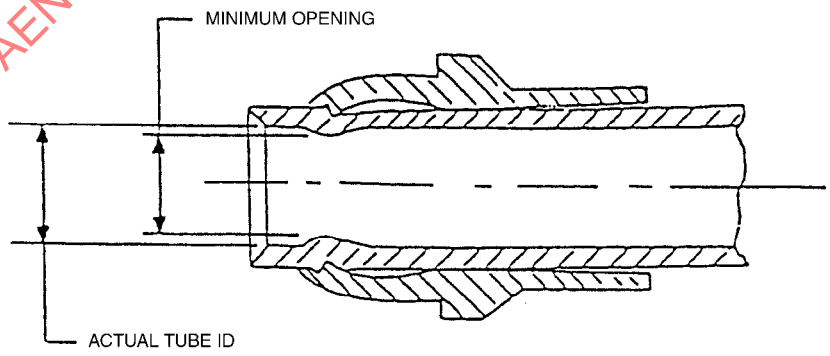

FIGURE 1 - MINIMUM OPENING FOR BITE TYPE SLEEVES

4.1.5 Repeated Assembly Test Procedure

The test specimens shall be assembled to the fitting 24° cone seat, one half of the specimens at the minimum and one half of the specimens at the maximum torque specified in AS18280, as specified and tested per AS2094 except as noted below. After the first tightening the tube and fitting end shall be marked with a longitudinal stripe to indicate their in-line relationship. The test sample joint shall be assembled and disassembled eight successive times. Each disassembly operation shall include the complete removal of the tube from the seat. At reassembly the tube shall be rotated 90° from the previous tube-to-fitting phase relationship. The direction of rotation shall be the same for each reassembly. After the third tightening operation, the test assembly shall be subjected to the proof pressure test as specified in AS18280. After the eighth tightening operation, the test assembly shall be subjected to the burst test as specified in AS18280.

4.2 Quality Conformance Inspection

4.2.1 Sampling

Sampling for the joint strength test shall be performed in accordance with ASQC Z1.4, Inspection Level S-3, with an AQL of 4.0%.

4.2.2 Examination and Inspection

Using the sampling of 4.2.1, each lot of sleeves shall be inspected as specified in 4.1.3 for the requirements of 3.5.1.

5. PREPARATION FOR DELIVERY

See AS18280 for process of attaching hydraulic fitting sleeves to tube ends.

6. NOTES

6.1 Intended Use

See AS18280.

6.2 Assembly

See AS5148.

6.3 Typical Metallurgical Properties for Carbon Steel Sleeves

In order to meet the performance requirements of the joint strength and metallurgical properties tests for carbon steel sleeves, the following metallurgical properties have been found acceptable and were a performance requirement of AS18280. These metallurgical properties are now suggested as nominal values to assist in manufacturing sleeves that will meet the performance requirements.

6.3.1 Sleeve Case Depth

A mean case depth of 0.0013 to 0.0020 in should be maintained when determined by microscopic measurement. A minimum of five measurements should be taken at different points on the sleeve with at least two readings on the inner case (ID) and two in the outer case (OD). The cross section should be taken perpendicular to the axis of the sleeve 0.03 to 0.06 in back of the cutting edge, as illustrated on Figure 2.