



AEROSPACE STANDARD

AS6369™

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Coupling Assembly, V-Band Sheet Metal Wide Flange, Pneumatic Tube

RATIONALE

This aerospace standard is a departure from the prior qualification practices for the V-band coupling assemblies, AS4751. Prior practice sought to validate this type of assembled coupling design by conducting proof pressure testing but exceeded allowable leakage. AS6369 is to replace AS4751 for future design.

1. SCOPE

This SAE Aerospace Standard (AS) establishes the requirements for a grooved clamp coupling and flanges suitable for joining intermediate pressure and temperature ducting in aircraft pneumatic systems. The coupling joint assembly, hereafter referred to as "the joint", shall operate within the temperature range of -65 °F external ambient to +800 °F internal fluid.

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.

2.1 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.

AS478	Identification Marking Methods
AS7479	Bolts and Screws, Steel, UNS S66286 1650 °F Solution Heat Treated Precipitation Heat Treated Before Roll Threaded
AS8879	Screw Threads - UNJ Profile, Inch Controlled Radius Root with Increased Minor Diameter

2.2 U.S. Military Specifications and Standards

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

MIL-STD-130	Identification Marking of US Military Property
MIL-HDBK-831	Preparation of Test Reports

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2.3 NAS Publication

Available from Aerospace Industries Association, 1000 Wilson Boulevard, Suite 1700, Arlington, VA 22209-3928, Tel: 703-358-1000, www.aia-aerospace.org.

NASM25027 Nut Self Locking

2.4 ASME Standards

Available from ASME, P.O. Box 2900, 22 Law Drive, Fairfield, NJ 07007-2900, Tel: 800-843-2763 (U.S./Canada), 001-800-843-2763 (Mexico), 973-882-1170 (outside North America), www.asme.org.

ASME Y14.100 Engineering Drawing Practices

2.5 AWS Standards

Available from American Welding Society, 8669 NW 36 Street, #130, Miami, FL 33166-6672, Tel: 1-800-443-9353 or 305-443-9353, www.aws.org.

AWS D17.1/D17.1M Specification for Fusion Welding for Aerospace Applications

AWS D17.2/D17.2M Welding, Resistance Spot and Seam

3. TECHNICAL REQUIREMENTS

3.1 Qualification

The joint furnished under this specification shall be representative of products which have been subjected to and which have successfully passed the tests specified in this standard.

3.2 Materials

The joint component materials shall be uniform in quality, free from defects, suitable for service, consistent with good manufacturing practices, and in conformance with the applicable specifications and requirements stated herein. Specific materials used in the joint components shall be specified on the applicable AS standard drawing.

3.2.1 Duct Material

Duct materials shall be stainless steel. The coupling shall meet the requirements herein when assembled on stainless steel flanges.

3.2.2 Equipment Flanges

Equipment Flange materials shall be stainless steel for stainless steel tubing. The flange may be sheet metal formed, solid, machined, forged, or cast shape.

3.3 Design and Construction

The joint consisting of coupling and flanges listed in Table 1 shall fulfill all design and performance requirements of this specification.

3.3.1 Coupling

The material of the coupling shall be corrosion resistant steel as specified on the applicable AS drawing noted in Table 1.

3.3.1.1 Coupling Retainer Strength

The coupling shall maintain joint integrity at operating pressure in the event of coupling retainer failure. The coupling shall be so designed that 0.75 of the coupling retainer circumference shall be sufficient to hold the joint and leakage shall not exceed 0.03 SCFM per inch of diameter at operating pressure of Table 2 at 800 °F.

3.3.2 Flanges

The material of the flanges shall be corrosion resistant steel as specified on the applicable AS drawing shown in Table 1.

Table 1 - Joint component control numbers

Description	AS Number
V-Band Coupling Standard Latch	AS6369/1
Sheet Metal Flange	AS6369/2
Solid Flange End Design Standard	AS6369/3

3.3.3 Welding

Resistance welding shall be in accordance with AWS D17.2/D17.2M. Fusion welding shall be in accordance with AWS D17.1/D17.1M.

3.3.4 Bolt

Bolt material shall be as specified on the applicable AS drawing and comply with AS7479, with a tensile strength of 160 ksi minimum.

3.3.4.1 Bolt Threads

Bolt threads shall conform to AS8879, and may be lubricated using an anti-seize or dry film high temperature lubrication.

NOTE: Addition of lubrication will reduce the necessary torque values by approximately five lb-in and should be verified by the user.

3.3.5 Nut

The nut shall be a self-locking type with a running torque of 3.5 to 30 lb-in. The material shall be as specified on the applicable coupling drawing. The nut shall have a minimum life of five complete full on-off cycles when installed within a speed of 60 to 120 rpm on the bolt, or 15 complete full on-off cycles when installed within a speed not to exceed 25 rpm.

Table 2 - Minimum rated limit load capability

Tube OD (inch)	Operating (psig)		Proof (psig)		Burst (psig)	
	Ambient and -65 °F	800 °F	Ambient and -65 °F	800 °F	Ambient and -65 °F	800 °F
1	422	257	843	514	1265	772
1.25	382	233	763	466	1145	698
1.5	342	208	683	417	1025	625
1.75	302	184	603	368	905	552
2	267	163	533	325	800	488
2.25	237	144	473	289	710	433
2.5	217	132	433	264	650	397
2.75	197	120	393	240	590	360
3	182	111	363	222	545	332
3.5	157	96	313	191	470	287
4	137	83	273	167	410	250
4.5	122	74	243	148	365	223
5	112	68	223	136	335	204
5.5	97	59	193	118	290	177
6	92	56	183	112	275	168
6.5	87	53	173	106	260	159
7	82	50	163	100	245	149
7.5	72	44	143	87	215	131
8	62	38	123	75	185	113
8.5	47	28	93	57	140	85
9	37	22	73	45	110	67
10	32	19	63	39	95	58

3.3.6 Duct Installation

The joint shall be so designed as to permit removal of a single duct section without moving mating ducting axially. Each joint must be manually aligned during assembly. The manually aligned joint shall meet the requirements herein with a total of 0.060 inch transverse mismatch.

3.4 Temperature

The joints shall meet the requirements of this specification under any combination of ambient/fluid temperature exposure within the range of -65 °F external ambient to 800 °F internal fluid.

3.5 Performance

The values specified herein shall define the requirements for satisfactory performance and shall apply to performance under the conditions as specified in 3.4.

3.5.1 Static Leaking

The joint, consisting of the coupling and flanges noted in 3.3 shall show no evidence of leakage in excess of 0.01 SCFM (0.000765 lb dry air per minute) per inch of tube diameter when subjected to the requirements specified herein.

3.5.2 Rated Load Limit (proof) = Two times operating load.

Ultimate = Three times operating load (burst load), 3.5.1 may be exceeded. Deformation may occur, but the joint shall remain intact.

3.5.3 Proof Pressure

The joint shall show no evidence of deformation or leakage in excess of 0.06 SCFM per inch of tube diameter, when subjected to the proof pressure of Table 2.

3.5.4 Burst Pressure

The joint shall not rupture and shall remain intact when subjected to the burst pressure of Table 2, for 2 minutes. Deformation shall be allowed.

3.5.5 Torsional Moment

The joint shall not permanently deform when subjected to the torsional moment specified in Table 3 operating pressure of Table 2 at 70 °F. The joint may rotate to 90°, but shall not leak in excess of the rate specified in 3.5.1.

Table 3 - Torsional load

Tube OD (inch)	Torsional Moment lb-in		Tube OD	Torsional Moment lb-in
1	330		4.5	1500
1.25	415		5	1665
1.5	500		5.5	1835
1.75	585		6	2000
2	665		6.5	2170
2.25	750		7	2330
2.5	830		7.5	2500
2.75	715		8	2670
3	1000		8.5	2840
3.5	1165		9	3010
4	1330		10	3300

3.5.6 Vibration

The joint, when pressurized to operating pressure of Table 2 at ambient temperature shall show no evidence of leakage in excess of that specified in 3.5.1 during or after exposure to vibration levels per 4.5.4 of this specification. There shall be no cracking, or chipping of parts.

3.5.7 Pressure Cycling

The joint shall not permanently deform, or show evidence of fatigue failure after being subjected to 144000 operating pressure impulse cycles per Table 2, and 4.5.5, at 800 °F. Leakage shall not exceed that specified in 3.5.1.

3.5.8 Combined Load and Combined Load Cycling

The joint shall not permanently deform, or show evidence of fatigue failure, and shall not exceed the leakage requirements of 3.5.1 during and after subjection to combined loads per 4.5.6 and 4.5.6.1 at pressures and temperatures of Table 4, as applicable.

Table 4 - Combined loads

Tube OD (inch)	Test Pressure (Oper at 800 °F) psig	Combined Load Test Yield Moment at Test Pressure at 800 °F in lb-in	Combined Load Cycle Bending at 800 °F in lb-in
1	257	525	105
1.25	233	650	145
1.5	208	785	205
1.75	184	925	275
2	163	1080	370
2.25	144	1150	405
2.5	132	1405	540
2.75	120	1585	675
3	111	1770	770
3.5	96	2170	1060
4	83	2615	1405
4.5	74	3085	1760
5	68	3590	2155
5.5	59	4135	2675
6	56	4725	3150
6.5	53	5340	3725
7	50	5990	4245
7.5	44	6695	4895
8	38	7425	5635
8.5	28	8065	6290
9	22	8780	7040
10	19	10685	8460

3.5.9 Angular Misalignment

The joint shall not show permanent deformation, or evidence of leakage in excess of 0.06 SCFM per inch of tube diameter when pressurized at proof pressure of Table 2 at 800 °F after being assembled at an angular misalignment as show in Figure 2.

3.5.10 Thermal Shock

The joint shall not permanently deform and shall not exceed the leakage requirements of 3.5.1 during and after being subjected to a minimum of ten thermal shock cycles of -65 to 800 °F at operating pressure of Table 2.

3.5.11 Compressive Load

The joint shall not permanently deform when subjected to compressive loads of Table 5. Leakage shall not exceed that specified in 3.5.1.