AEROSPACE STANDARD

AS1301 REV. E

Issued 1975-08
Revised 2008-01
Reaffirmed 2014-10

Superseding AS1301D

Adapters - Port Connection, Ring Locked Design, Installation and Removal of

RATIONALE

AS1301E has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

This SAE Aerospace Standard (AS) provides the essential minimum design, installation and removal standard for AS1299, AS1985, AS1986, AS4099, AS5368, and AS5986 adapters and is applicable when specified on engineering drawings or in procurement documents.

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 724-776-4970 (outside USA), www.sae.org.

AS568 Aerospace Size Standard for O-Rings

AS1299 Adapter - Port Connection Ring Locked to Flareless Tube End

AS1300 Port - Ring Locked Fluid Connection Type, Standard Dimensions for

AS1985 Adapter, Assembly - Port Connection, Ring Locked to Flared Tube End

AS1986 Fitting Assembly, Adapter, Ring Locked Port Connection to Beam Seal 4000 psi and 5000 psi

AS4099 Adapter, Assembly, Port Connection, Ring Locked to Flareless Tube End

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AS1301E

AS5368 Adapter, Assembly - Port Connection, Ring Locked to Spherical Flared Tube End, 3000 psi

AS5986 Fitting Assembly, Adapter, Ring Locked Port Connection to Beam Seal 4000 psi and 5000 psi

3. GENERAL DESIGN INFORMATION

3.1 These adapters provide a semi-permanent male fitting for use in fluid systems per Table 1 and compatible with titanium at -65 to +450 °F temperature range:

TABLE 1 - PRESSURE SYSTEMS

Standard Number	System Operating Pressure (psi)	System Burst Pressure (psi)	Sizes
AS1299	3000	12,000	All Sizes
AS1985	4000	16,000	All Sizes
AS1986	4000	16,000	02, 03, 05, 14, 20 and 24
AS1986	5000	20,000	04, 06, 08, 10, 12 and 16
AS4099	4000	16,000	All Sizes
AS5368	3000	12,000	All Sizes
AS5986	4000	16,000	02, 03, 05, 14, 20 and 24
AS5986	5000	20,000	04, 06, 08, 10, 12 and 16

3.2 Adapters per AS1299, AS1985, AS1986, AS4099, AS5368 and AS5986 installed per this document into ports per AS1300 shall have a stand-off per dimension “P” in Figure 1 and Table 2.

3.3 O-ring size per Table 2 and per AS568 must be used. The O-ring compound shall be specified by the using design activity and shall be selected based on system fluid and temperature.

3.4 The lockring is driven into the mating port serrations after the adapter has been torqued. This prevents the adapter from rotating in the port during coupling nut assembly and disassembly and also eliminates the necessity of lock wiring the adapter. Only one wrench is required to install or remove coupling nut.

3.5 Adapter removal is accomplished by lifting the lockring out of the port using a removal tool per Table 3.

4. DESIGN REQUIREMENTS

4.1 Minimum data to be specified on engineering drawing or specification.

4.1.1 Port diameter to be at least the minimum specified in AS1300.

4.1.2 Location of port.

4.1.3 Specific port size per AS1300. If tap drill depth is not through, then specify control dimensions.

4.1.4 Specific adapter size per AS1299, AS1985, AS1986, AS4099, AS5368 and AS5986.

4.1.5 Specific O-ring size and compound (see 3.3).

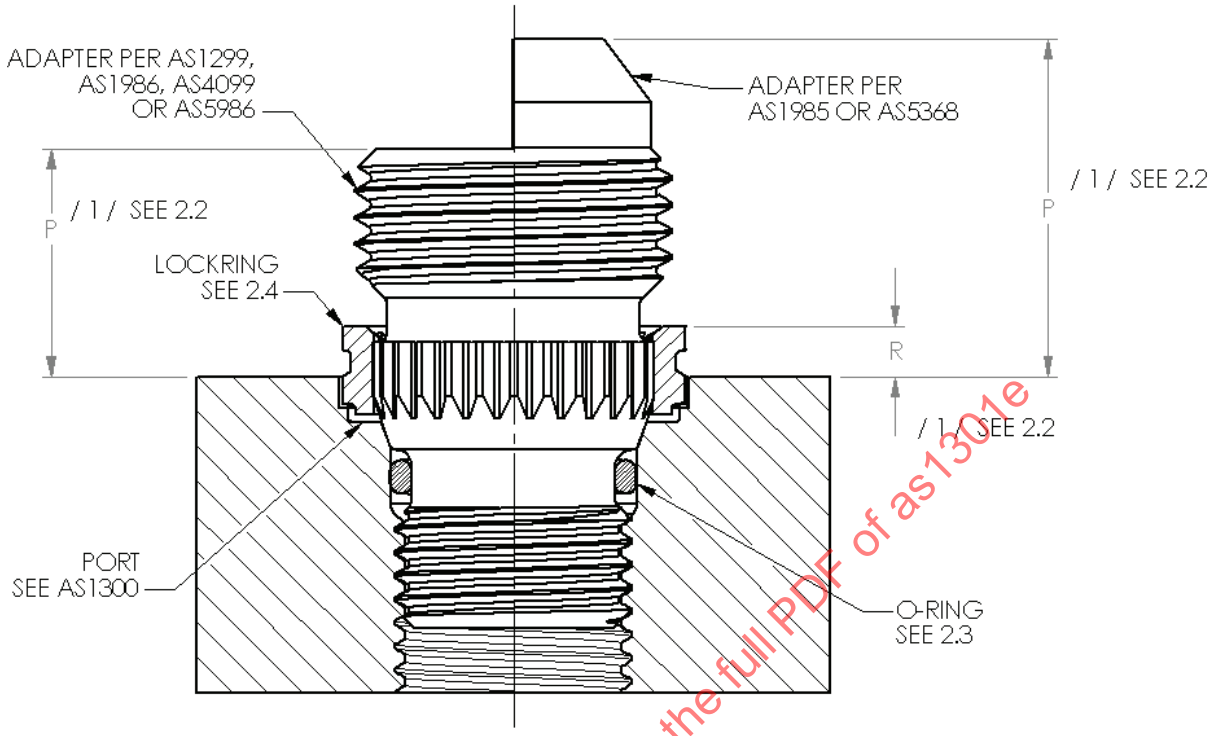

FIGURE 1 - INSTALLED ADAPTER

TABLE 2 - DIMENSIONS

AS1300 Port Dash Number	Adapter Dash Number AS1299	Adapter Dash Number AS1985	Adapter Dash Number AS1986 and AS5986	Adapter Dash Number AS4099	Adapter Dash Number AS5368	O-Ring Size See 3.3	P ±.020 AS1299	P ±.020 AS1985	P ±.020 AS1986 and AS5986	P ±.020 AS4099	P ±.020 AS5368	R Max
02	02	02	02	02	--	AS568-007	.495	.577	.358	.509	--	.124
03	03	03	03	03	--	AS568-008	.517	.608	.389	.556	--	.124
04	04	04	04	04	04	AS568-010	.578	.679	.431	.587	.690	.124
05	05	05	05	05	05	AS568-011	.578	.679	.431	.587	.690	.124
06	06	06	06	06	06	AS568-012	.599	.691	.457	.609	.750	.130
08	08	08	08	08	08	AS568-014	.662	.792	.470	.702	.910	.130
10	10	10	10	10	10	AS568-016	.723	.893	.534	.765	1.010	.130
12	12	12	12	12	12	AS568-116	.733	1.009	.584	.838	1.120	.140
14	--	--	14	--	--	AS568-118	--	--	.602	--	--	.140
16	16	16	16	16	16	AS568-120	.733	1.056	.632	.838	1.160	.140
20	20	20	20	20	--	AS568-123	.758	1.103	.629	.838	--	.140
24	24	24	24	24	--	AS568-128	.768	1.228	.714	.838	--	.140
32	32	32	--	32	--	AS568-137	.847	1.478	--	.838	--	.140

TABLE 3 - TOOLING AND INSTALLATION TORQUE

Adapter Dash Number	Porting Tool Number	Basic Broach Tool Number	O-Ring Tool Number	Combination Wrench and Drive Tool AS1299, AS1985 AS4099 and AS5368	Combination Wrench and Drive Tool AS1986 and AS5986	Installation Torque, lbf·in AS1299, AS1985 AS1986, AS4099 and AS5986	Installation Torque, lbf·in AS5368	Removal Tool
02	RPT02	RFOPB5002	ORT216	RF9802DW	RF5002DW	16-21	--	RF02LPDE
03	RPT03	RFOPB5003	ORT250	RF9803DW	RF5003DW	38-45	--	RF03LPDE
04	RPT04	RFOPB5004	ORT312	RF9804DW	RF5004DW	60-100	50-65	RF04LPDE
05	RPT05	RFOPB5005	ORT375	RF9805DW	RF5005DW	100-120	100-125	RF05LPDE
06	RPT06	RFOPB5006	ORT437	RF9806DW	RF5006DW	180-245	140-200	RF06LPDE
08	RPT08	RFOPB5008	ORT562	RF9808DW	RF5008DW	430-510	270-375	RF08LPDE
10	RPT10	RFOPB5010	ORT687	RF9810DW	RF5010DW	600-680	620-700	RF10LPDE
12	RPT12	RFOPB5012	ORT812	RF9812DW	RF5012DW	855-945	855-945	RF12LPDE
14	RPT14	RFOPB5014	ORT937	--	RF5014DW	995-1105	--	RF14LPDE
16	RPT16	RFOPB5016	ORT1125	RF9816DW	RF5016DW	1140-1260	1140-1260	RF16LPDE
20	RPT20	RFOPB5020	ORT1312	RF9820DW	RF5020TDW	1520-1680	--	RF20LPDE
24	RPT24	RFOPB5024	ORT1625	RF9824DW	RF5024TDW	1900-2100	--	RF24LPDE
32	RPT32	RFOPB5032	ORT2125	RF9832DW	--	2660-2940	--	RF32LPDE

NOTE: These adapters require special tooling for proper installation. Tooling is available from Alcoa Fastening Systems, Fullerton, CA - Cage Code 66776, or equivalent alternate sources (Faber Enterprises, Canoga Park, CA - Cage Code 14397, and McKinnon Industries, a Shur-Lok Company, Irvine, CA - Cage Code 65085)

4.1.6 Install adapter per AS1301.

4.1.7 Corrosion protection is specified in 5.2.4. If materials or fluids require primer different from zinc chromate primer or if an additional sealant is required, so specify.

4.1.8 Pressure testing of individual units is specified in 6.1. Testing other than that shown shall be specified.

4.1.9 The boss material for a 3000, 4000 or 5000 psi system must have a minimum shear strength per Table 4 to resist the axial load being generated from a respective burst pressure of 12,000, 16,000 or 20,000 psi (based on thread minimum shear engagement area shown).

5. INSTALLATION OF ADAPTERS AS1299, AS1985, AS1986, AS4099, AS5368 OR AS5986 INTO PORT AS1300

5.1 O-ring Installation

5.1.1 Place the O-ring (per Table 2) over the small thread of the adapter. Submerge the adapter, O-ring tool and O-ring in the fluid to be used in the working system, or a lubricant compatible with the system fluid and all components. Slide the O-ring over the O-ring tool and onto the adapter. Be sure that the O-ring is not twisted and is properly seated in the groove of the adapter. See Figure 2.

TABLE 4 - AXIAL LOAD AND BOSS FSU MINIMUM

AS1300 Port Dash Number	K /1/ Total Thread Minimum Shear Engagement Area in^2	L Port "D" Maximum Per AS1300 Ref in	M /2/ Axial Load on Adapter Developed by 12,000 psi Burst Pressure lbf	M /2/ Axial Load on Adapter Developed by 16,000 psi Burst Pressure lbf	M /2/ Axial Load on Adapter Developed by 20,000 psi Burst Pressure lbf	N /3/ Boss Material Min Fsu Required to Resist Axial Load (psi) for 12,000 psi	N /3/ Boss Material Min Fsu Required to Resist Axial Load (psi) for 16,000 psi	N /3/ Boss Material Min Fsu Required to Resist Axial Load (psi) for 20,000 psi
02	.0417	.256	618	824	--	14,821	19,760	--
03	.0802	.288	782	1,024	--	9,751	13,005	--
04	.0989	.341	1,096	1,461	1,827	11,082	14,773	18,473
05	.1406	.403	1,531	2,041	--	10,889	14,517	--
06	.1734	.466	2,047	2,729	3,411	11,805	15,739	19,671
08	.2610	.584	3,214	4,286	5,357	12,315	16,422	20,525
10	.3807	.727	4,981	6,642	8,302	13,084	17,447	21,807
12	.4550	.901	7,651	10,201	12,752	16,816	22,420	28,026
14	.6132	1.032	10,037	13,384	--	16,369	21,827	--
16	.7312	1.164	12,770	17,026	21,283	17,465	23,285	29,107
20	.8559	1.389	18,183	24,245	--	21,245	28,327	--
24	1.2328	1.666	26,159	34,879	--	21,220	28,293	--
32	2.1634	2.204	45,782	61,043	--	21,162	28,216	--

NOTES:

/1/Minimum shear engagement area shown is the assembled dimensional value for the overall engaged area of mating port threads (port threads full depth of adapter). It does not represent a dimension of either of the members in an unassembled condition.

/2/ Axial Load = Area x Burst Pressure = $\frac{\pi L^2}{4}$ x Burst Pressure

/3/ Fsu Min = Axial Load ÷ Area = M ÷ K

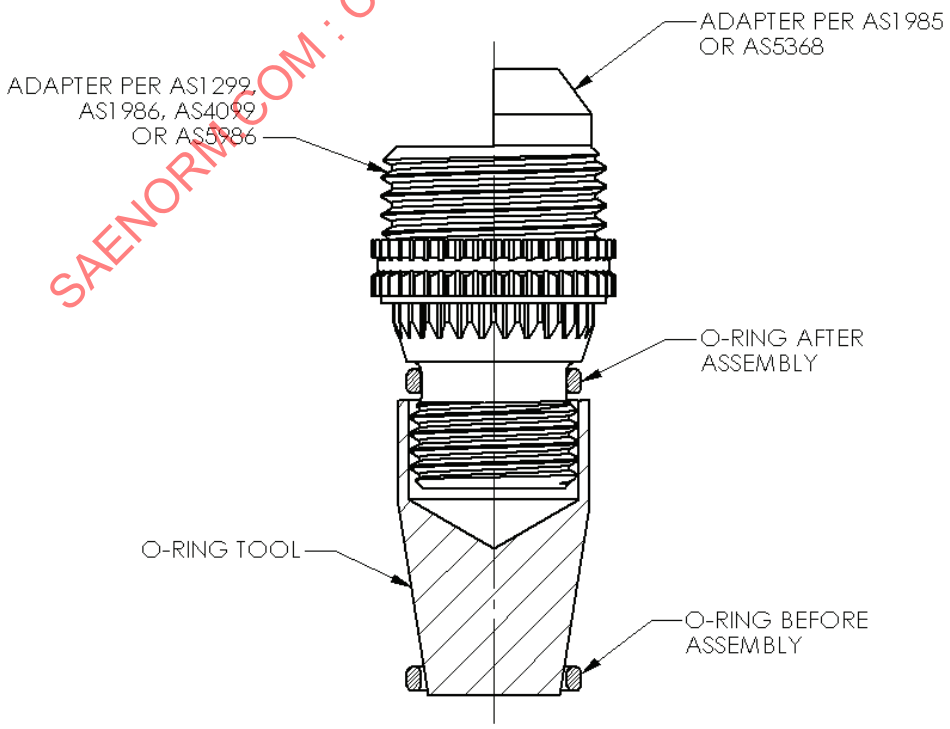

FIGURE 2 - O-RING INSTALLATION

5.1.2 Remove the O-ring tool.

5.2 Install Adapter Assembly Into Port

5.2.1 Lubricate the internal surfaces of the port and the entire adapter assembly using the same fluid or lubricant as specified in 5.1.1. Scratches, dings or rough spots are not allowed in O-ring contact area on the adapter or in the port.

5.2.2 Insert the smaller thread of the adapter into port by hand using a clockwise rotation until the adapter is seated. To avoid possible O-ring damage, the adapter should not be rotated in a counterclockwise direction.

5.2.3 Using the applicable combination wrench and drive tool in Table 3, engage the serrations of the tool with the external serrations of the adapter lockring per Figure 3. Place a torque wrench of the proper size over the hex of the wrench and apply a torque equal to the minimum value specified in Table 3. Note the relationship of the lockring serrations with respect to the prebroached serrations in the port. If they match, proceed to 5.2.4. If the lockring serrations do not match the prebroached serrations in the port, continue to slowly torque the adapter toward the maximum value allowed in Table 3 until the serrations match. This will normally take between 3 degrees and 8 degrees of turning, the maximum value need not be reached if the serrations align themselves prior to that value. Do not exceed maximum torque values.

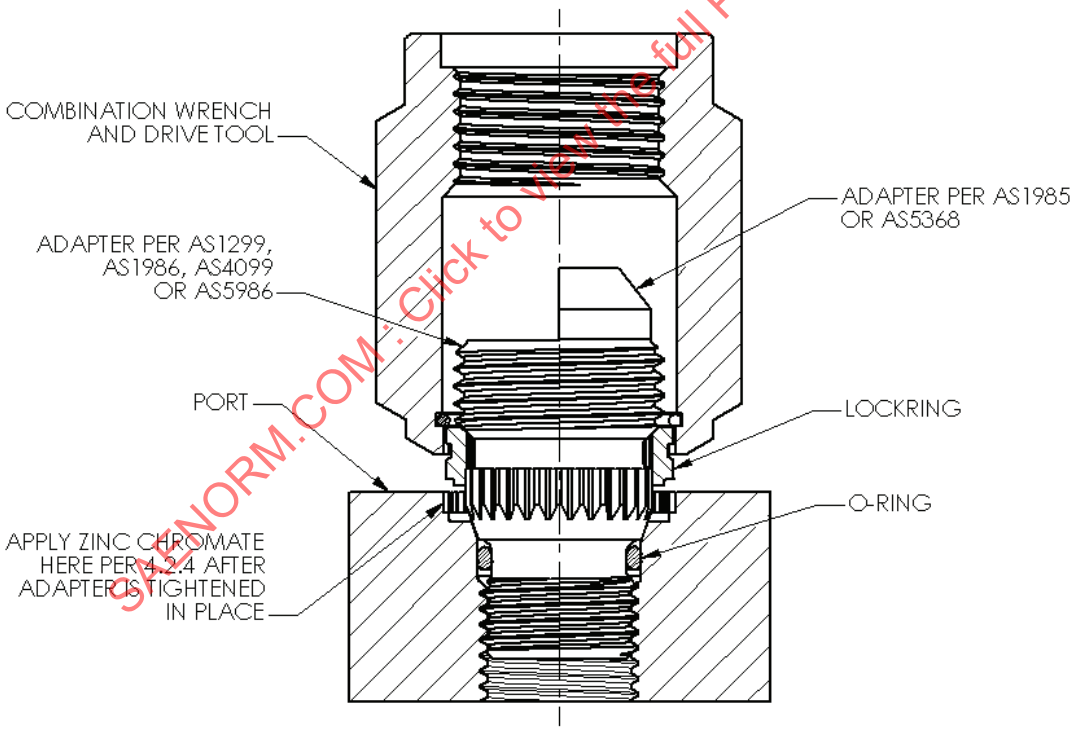

FIGURE 3 - TORQUING ADAPTER ASSEMBLY

5.2.4 Apply enough zinc chromate primer (TT-P-1757) with a brush or small syringe to the counterbore area of the port and below the adapter lockring so primer will be extruded out between external serrations of the lockring and serrations in the port when lockring is installed.

NOTE: Using design activity may specify another primer in place of, or in addition to, zinc chromate (see 4.1.7).

5.2.5 While the zinc chromate (or other primer) applied per 5.2.4 is still wet, install the lockring by rotating the threaded end of the combination wrench and drive tool clockwise onto the adapter assembly until it touches the lockring. Using an open end or socket wrench on the tool, turn the tool in a clockwise direction until it bottoms on the port surface as shown in Figure 4. Visually observe that the tool has bottomed.

CAUTION: Any sudden increase in torque prior to bottoming may indicate that the lockring serrations and the port serrations are not aligned. If this occurs, remove wrench and drive tool by turning counterclockwise. Lift the lockring per 7.2. Tighten adapter clockwise per 5.2.3 until serrations in port and the external serrations on the lockring are aligned. Reinstall lockring and remove excess primer from surface of port and lockring.

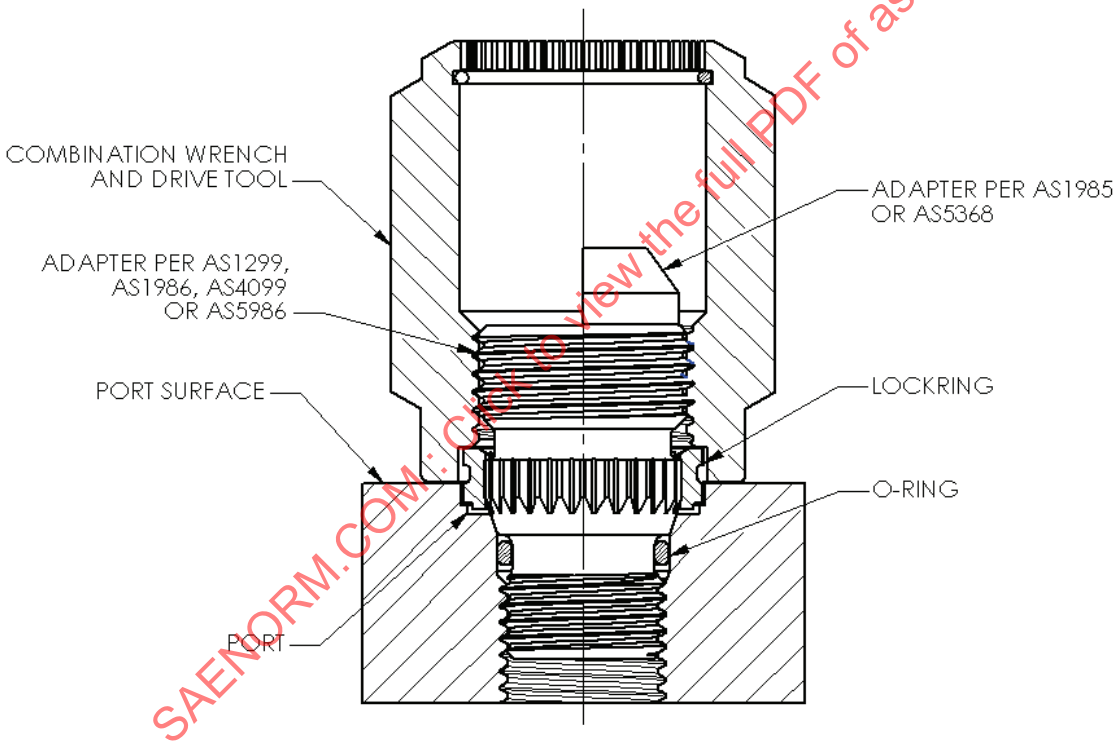

FIGURE 4 - LOCKRING INSTALLATION

6. PRESSURE TESTING

6.1 A pressure test of unit may be conducted at this point. Place a pressure cap on the adapter. Pressurize the unit to 1.5 times the operating pressure for 3 min. There shall be zero leakage. Note that the using design activity may require testing other than that shown. See 4.1.8.

7. REMOVAL OF ADAPTER

7.1 If an additional sealant has been used to cover the lockring, carefully remove sealant to expose lockring.