SAE Aerospace
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AEROSPACE STANDARD

SAE AS5551

Issued 2005-10

Fitting Assembly - 24° Cone Flareless per AS5827, 5080 psi, Port Connection Port Preparation, Installation and Removal of AS5550 and AS5865

1. SCOPE:

This SAE Aerospace Standard (AS) establishes the requirements for port preparation, installation and removal procedure for AS5550 fitting assembly and AS5865 fitting reducer assembly, 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, 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
AS1241	Fire Resistant Phosphate Ester Hydraulic Fluid for Aircraft
AS5000	Fitting Assembly, 24° Cone Flareless, Extra Fine Threads, Fluid Connection, 5080 psi
AS5550	Fitting Assembly, Ring Locked, Adapter, Flareless to Port, Extra Fine Threads, 5080 psi
AS5827	Fitting End, Flareless, Precision, Extra Fine Threads, Design Standard
AS5865	Fitting Reducer Assembly, Ring Locked, Adapter, Flareless to Port, Extra Fine Threads, 5080 psi

TO PLACE A DOCUMENT ORDER:
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2.2 NAS Publications:

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

NAS1611	Packing, Ethylene Propylene Preformed O-ring Phosphate Ester Resistant
NAS1613	Seal Element, Packing, Preformed, Ethylene Propylene Rubber

3. GENERAL DESIGN INFORMATION:

3.1 These fitting assemblies provide a semi-permanent male fitting for use in fluid systems of 5080 psi and compatible with titanium at -65 to +230 °F temperature range.

3.2 Fitting assembly per AS5550 installed per this document into ports prepared per Section 5 shall have stand-off dimensions “P” and “R” in Figure 1 and Table 1A.

3.3 Fitting reducer assembly per AS5865 installed per this document into ports prepared per Section 5 shall have stand-off dimensions “P” and “R” in Figure 2 and Table 2A.

3.4 O-ring size per Table 1A and Table 1B 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.

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

3.6 Fitting assembly AS5550 removal is accomplished by lifting the lockring out of the port using a removal tool per Table 1B.

3.7 Fitting reducer assembly AS5865 removal is accomplished by lifting the lockring out of the port using a removal tool per Table 2B.

3.8 These fitting assemblies require special tooling for proper installation. Tooling must be certified to have been used during the qualification of fitting assemblies. Tooling is available from Alcoa Fastening Systems, Fullerton, California, USA - Cage Code 66776; or equivalent alternate source (Faber Enterprises, Canoga Park, California, USA - Cage Code 14397).

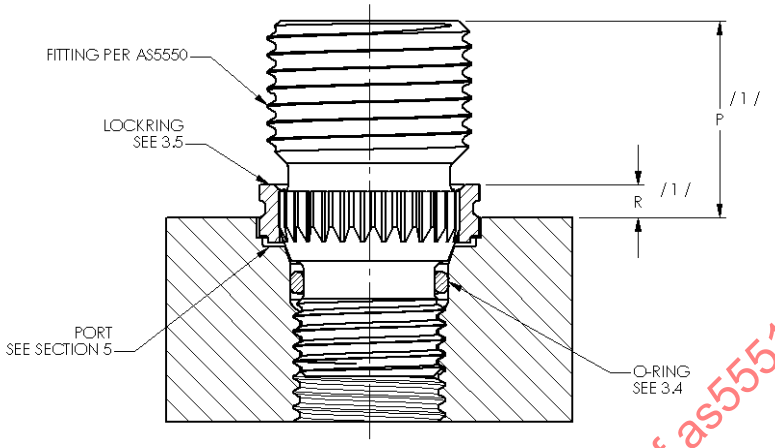

FIGURE 1 - Installed Fitting Assembly

/1/ "P" and "R" dimensions are for design purposes only and represent final stand-off dimensions. Do not use as installation dimensions.

TABLE 1A - O-ring, Stand-off and Torque for AS5550

Port Dash Number	AS5550 Dash Number	O-Ring Size When Used With AS1241 Fluid (Compound NAS1613)	P ±.0175	R Max	Installation Torque lbf.in
04	04	AS568-010	.5870	.124	60- 100
06	06	AS568-012	.6090	.130	180- 245
08	08	AS568-014	.7020	.130	430- 510
10	10	AS568-016	.7650	.130	600- 680
12	12	AS568-116	.8380	.140	855- 945
16	16	AS568-120	.8380	.140	800-1260
20	20	AS568-123	.8380	.140	1520-1680

TABLE 1B - Tooling - Port Preparation and Installation and Removal for AS5550

Union Dash Number	Porting Tool Number	Broach Tool Number	O-Ring Tool Number	Combination Wrench and Drive Tool	Installation Torque lbf.in	Lockring Removal Tool
04	RPT04	RFOPB5004HDB	ORT312	RFKA9904DW	60- 100	RF04LPDE
06	RPT06	RFOPB5006HDB	ORT437	RFKA9906DW	180- 245	RF06LPDE
08	RPT08	RFOPB5008HDB	ORT562	RFKA9908DW	430- 510	RF08LPDE
10	RPT10	RFOPB5010HDB	ORT687	RFKA9910DW	600- 680	RF10LPDE
12	RPT12	RFOPB5012HDB	ORT812	RFKA9912DW	855- 945	RF12LPDE
16	RPT16	RFOPB5016HDB	ORT1125	RFKA9916DW	800-1260	RF16LPDE
20	RPT20	RFOPB5020HDB	ORT1312	RFKA9920DW	1520-1680	RF20LPDE

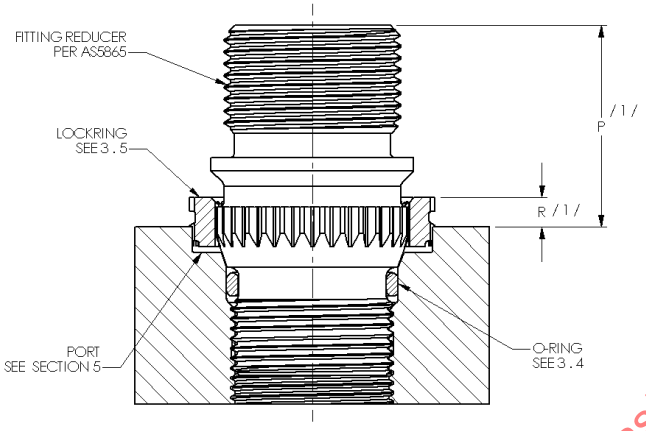

FIGURE 2 - Installed Fitting Reducer Assembly

/1/ “P” and “R” dimensions are for design purposes only and represent final stand-off dimensions. Do not use as installation dimensions.

TABLE 2A - O-ring, Stand-off and Torque for AS5865

Port Dash Number	AS5865 Dash Number	O-Ring Size When Used With AS1241 Fluid (Compound NAS1613)	P ±.0175	R Max	Installation Torque lbf.in
06	0604	AS568-012	.7350	.130	180- 245
08	0806	AS568-014	.7510	.130	430- 510
10	1008	AS568-016	.8450	.130	600- 680
12	1210	AS568-116	.9040	.140	855- 945
16	1612	AS568-120	.9790	.140	800-1260
20	2016	AS568-123	.9590	.140	1520-1680
24	2420	AS568-128	.9800	.140	1900-2940

TABLE 2B - Tooling - Port Preparation and Installation and Removal for AS5865

Reducer Dash Number	Porting Tool Number	Broach Tool Number	O-Ring Tool Number	Drive Wrench Number	Lockring Drive Tool	Lockring Removal Tool
0604	RPT06	RFOPB5006HDB	ORT437	RF6906W	RF9806DEK	RF06LPDE
0806	RPT08	RFOPB5008HDB	ORT562	RF6908W	RF9808DEK	RF08LPDE
1008	RPT10	RFOPB5010HDB	ORT687	RF6910W	RF9810DEK	RF10LPDE
1210	RPT12	RFOPB5012HDB	ORT812	RF6912W	RF9812DEK	RF12LPDE
1612	RPT16	RFOPB5016HDB	ORT1125	RF6916W	RF9816DEK	RF16LPDE
2016	RPT20	RFOPB5020HDB	ORT1312	RF6920W	RF9820DEK	RF20LPDE
2420	RPT24	RFOPB5024HDB	ORT1625	RF6924W	RF9824DEK	RF24LPDE

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 Section 5, Figure 3.

4.1.2 Location of port.

4.1.3 Specific port dash number. If tap drill depth is not through, then specify control dimensions.

4.1.4 Specific fitting assembly size per AS5550 or fitting reducer assembly size per AS5865.

4.1.5 Specific O-ring size and compound (see 3.4).

4.1.6 Install fitting assembly or fitting reducer assembly per AS5551.

4.1.7 Corrosion protection is specified in 6.2.4 (for AS5550) or in 7.2.4 (for AS5865). 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 8.1. Testing other than that shown shall be specified.

4.1.9 The boss material for 5080 psi system must be selected to pass qualification testing as specified in AS5000.

5. PORT CONFIGURATION AND PREPARATION:

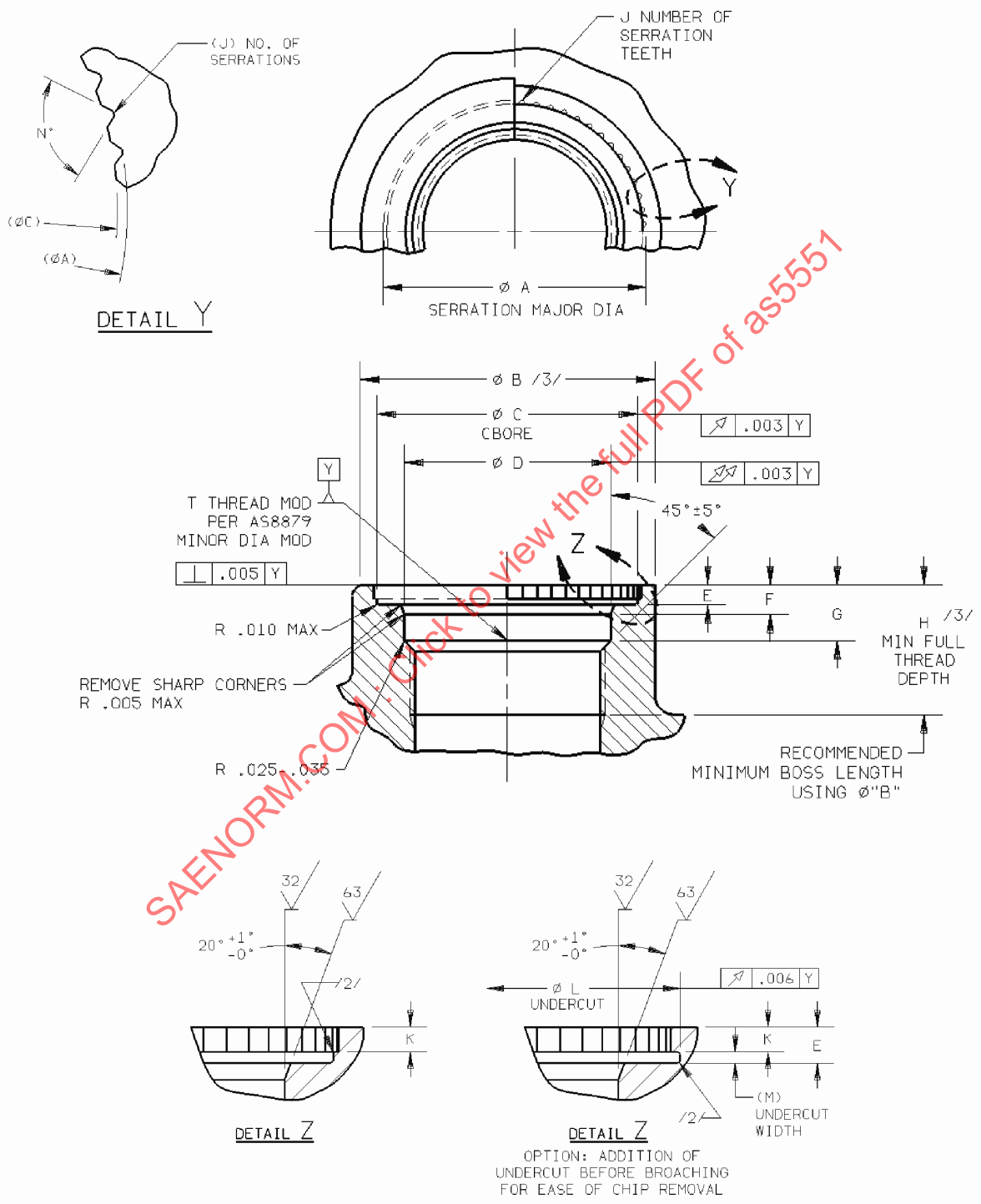

FIGURE 3 - Port

TABLE 3A - Threads and Dimensions A-E

Port Dash Number	T Thread		A Min	B Min	C	D	E
	AS8879 CLASS -3B	Minor Dia MOD					
04	.3125-24UNJF	.2734- .2764	.524	.68	.495- .498	.339- .341	.088-.098
06	.4375-20UNJF	.3903- .3933	.710	.85	.675- .678	.464- .466	.103-.113
08	.5625-18UNJF	.5099- .5129	.826	1.04	.784- .787	.582- .584	.103-.113
10	.6875-24UNJEF	.6484- .6514	1.052	1.17	1.015-1.018	.725- .727	.103-.113
12	.8125-20UNJEF	.7653- .7683	1.182	1.42	1.139-1.142	.899- .901	.103-.113
16	1.1250-18UNJEF	1.0714-1.0744	1.471	1.67	1.427-1.430	1.162-1.164	.103-.113
20	1.3125-18UNJEF	1.2599-1.2629	1.795	1.98	1.750-1.753	1.387-1.389	.130-.140
24	1.6250-18UNJEF	1.5724-1.5754	2.045	2.23	2.000-2.005	1.664-1.666	.130-.140

TABLE 3B - Dimensions F-N and Serrations Gage

Port Dash Number	F	G	H ±.005	J	K Min	L ±.005	M ±.005	N° ±2°	Port Serrations Gage Number (see 5.3)
04	.153-.158	.296-.301	.568	30	.061	.534	.032	78°00’	RFOPB04PSG
06	.168-.173	.311-.316	.631	36	.073	.720	.035	80°00’	RFOPB06PSG
08	.168-.173	.311-.316	.673	40	.073	.831	.035	80°00’	RFOPB08PSG
10	.168-.173	.311-.316	.693	38	.073	1.062	.035	101°30’	RFOPB10PSG
12	.168-.173	.343-.348	.763	40	.073	1.192	.035	93°00’	RFOPB12PSG
16	.168-.173	.343-.348	.806	36	.073	1.481	.035	92°00’	RFOPB16PSG
20	.195-.200	.375-.380	.838	56	.093	1.805	.042	86°15’	RFOPB20PSG
24	.195-.200	.375-.380	.877	81	.093	2.055	.042	87°30’	RFOPB24PSG

5.1 The drill and porting tool method of preparing the machined cavity is mandatory. Drill .015 to .030 smaller than the specified minor diameter modified. The porting tool per Table 1B or Table 2B will size the minor diameter and provide balance of cavity configuration ready for broaching serration.

5.2 After serrations are broached with broach tool per Table 1B or Table 2B, chip removal is required.

5.3 GO/NOGO gage is required to check port serration conformance. Gages are available from Alcoa Fastening Systems, Fullerton, California, USA - Cage Code 66776; or equivalent alternate source(s) as approved in PRI-QPL-AS5000.

5.4 Use of porting tool and broach tool specified in Table 1B or Table 2B is mandatory to provide required port configuration.

6. INSTALLATION OF FITTING ASSEMBLY AS5550 INTO PORT:

6.1 O-ring Installation:

6.1.1 Place the O-ring (per Table 1A) over the small thread of the fitting assembly. Submerge the 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 fitting assembly. Be sure that the O-ring is not twisted and is properly seated in the groove of the fitting assembly. See Figure 4.

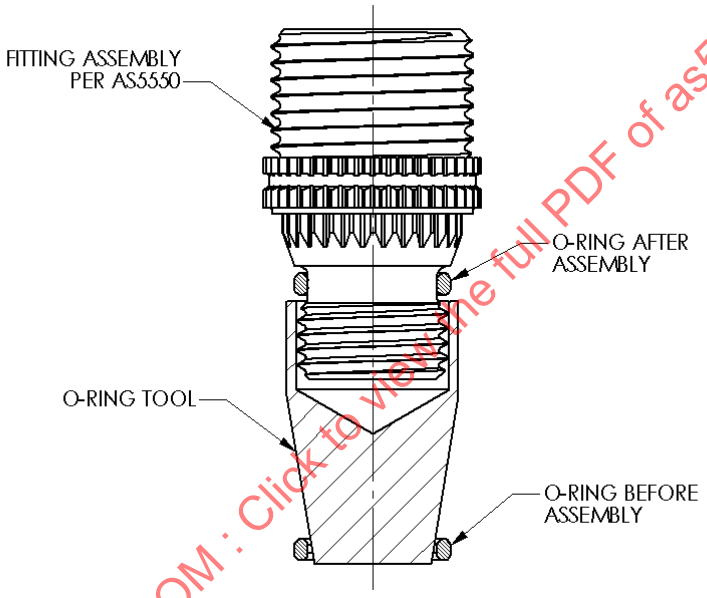

FIGURE 4 - O-ring Installation

6.1.2 Remove the O-ring tool.

6.2 Install Fitting Assembly Into Port:

6.2.1 Lubricate the internal surfaces of the port using the same fluid or lubricant as specified in 6.1.1. Scratches, dings or rough spots are not allowed in O-ring contact area on the fitting assembly or in the port.

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

6.2.3 Using the applicable combination wrench and drive tool in Table 1B, engage the serrations of the tool with the external serrations of the lockring per Figure 5. 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 1A. Note the relationship of the lockring serrations with respect to the prebroached serrations in the port. If they match, proceed to 6.2.4. If the lockring serrations do not match the prebroached serrations in the port, continue to slowly torque toward the maximum value allowed in Table 1A until the serrations match. This will normally take between 3° and 8° of turning, the maximum value need not be reached if the serrations align themselves prior to that value. Do not exceed maximum torque values.

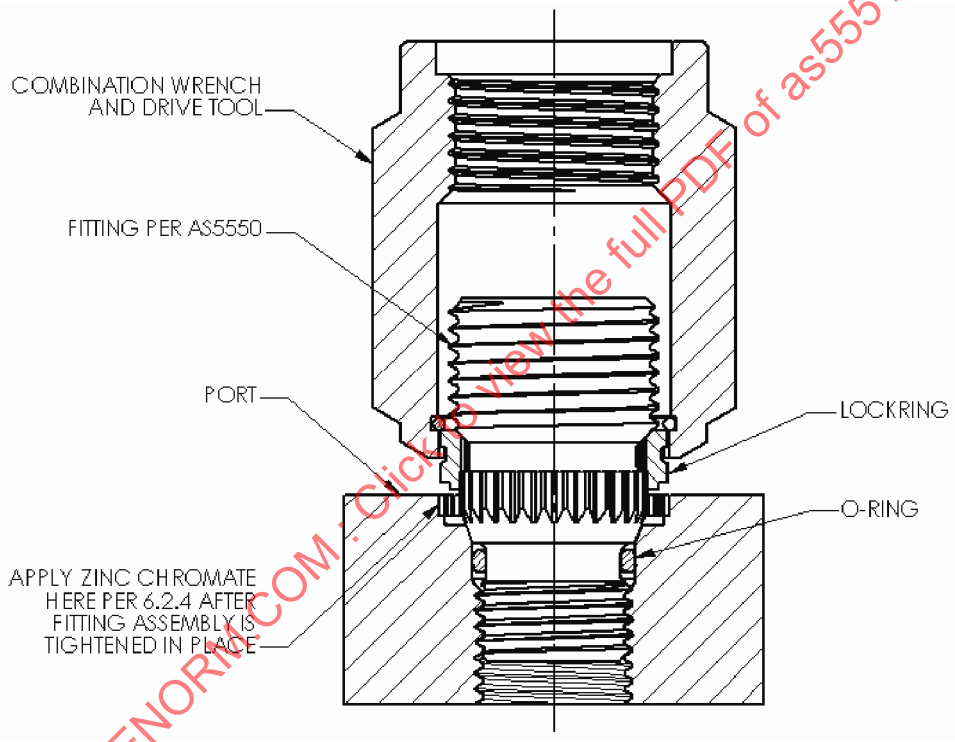

FIGURE 5 - Torquing Fitting Assembly

6.2.4 Apply enough zinc chromate primer (TT-P-1757) with a brush or small syringe to the counterbore area of the port and below the 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).

6.2.5 While the zinc chromate (or other primer) applied per 6.2.4 is still wet, install the lockring by rotating the threaded end of the combination wrench and drive tool clockwise onto the fitting 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 6. 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 9.2. Tighten fitting assembly clockwise per 6.2.3 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.

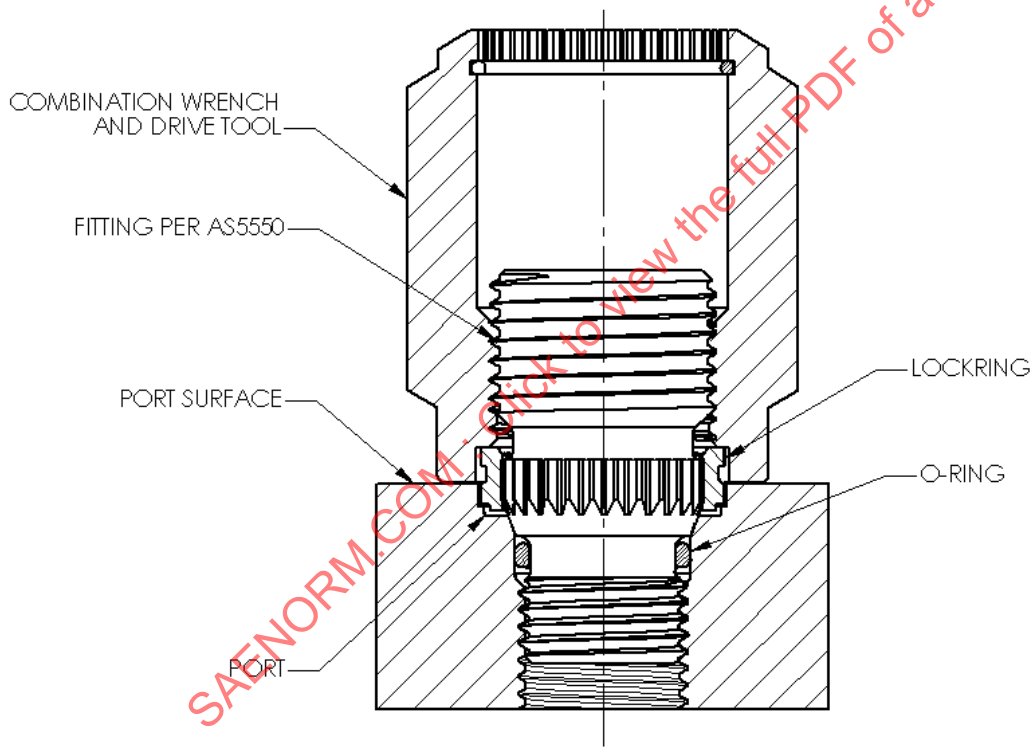

FIGURE 6 - Lockring Installation

6.2.6 Remove the combination wrench and drive tool. Installation is completed.

7. INSTALLATION OF FITTNG REDUCER ASSEMBLY AS5865 INTO PORT:

7.1 O-ring Installation:

7.1.1 Place the O-ring (per Table 2A) over the port end thread of the fitting reducer assembly. Submerge the 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 fitting reducer assembly. Be sure that the O-ring is not twisted and is properly seated in the groove of the fitting reducer assembly. See Figure 7.

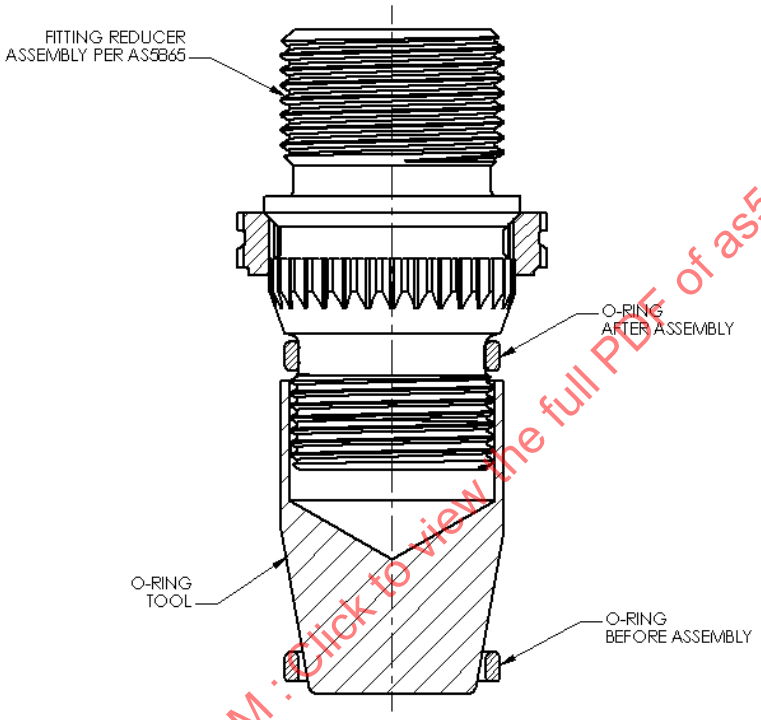

FIGURE 7 - O-ring Installation

7.1.2 Remove the O-ring tool.

7.2 Install Fitting Reducer Assembly Into Port:

7.2.1 Lubricate the internal surfaces of the port using the same fluid or lubricant as specified in 7.1.1. Scratches, dings or rough spots are not allowed in O-ring contact area on the fitting reducer assembly or in the port.

7.2.2 Insert the port end thread of the fitting reducer assembly into port by hand using a clockwise rotation until the fitting reducer assembly is seated. To avoid possible O-ring damage, the fitting reducer assembly should not be rotated in a counterclockwise direction.

7.2.3 Using the applicable wrench in Table 2B, engage the serrations of the tool with the external serrations of the lockring per Figure 8. 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 2A. Note the relationship of the lockring serrations with respect to the prebroached serrations in the port. If they match, proceed to 7.2.4. If the lockring serrations do not match the prebroached serrations in the port, continue to slowly torque toward the maximum value allowed in Table 2A until the serrations match. This will normally take between 3° and 8° of turning, the maximum value need not be reached if the serrations align themselves prior to that value. Do not exceed maximum torque values.

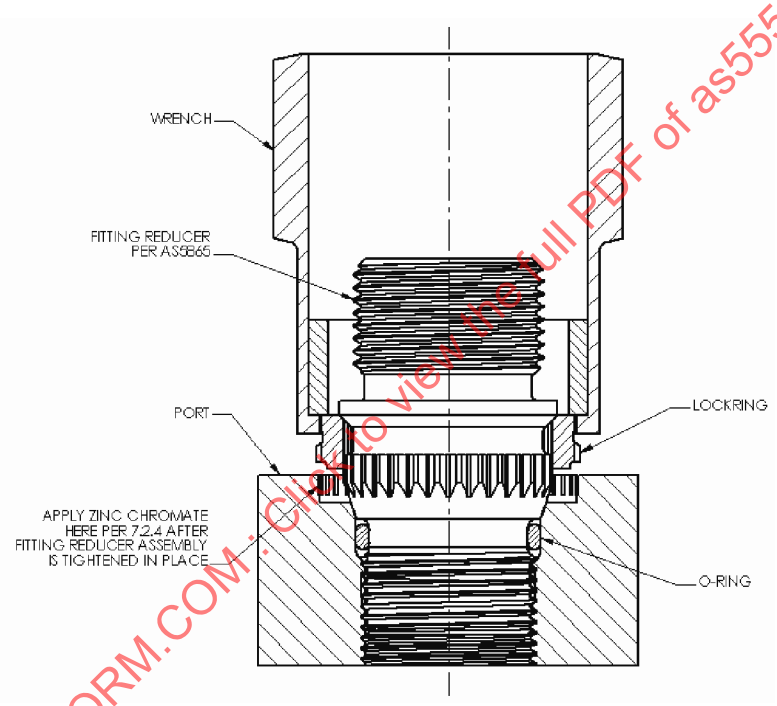

FIGURE 8 - Torquing Fitting Reducer Assembly

7.2.4 Apply enough zinc chromate primer (TT-P-1757) with a brush or small syringe to the counterbore area of the port and below the 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).