SAE Aerospace
An SAE International Group

AEROSPACE STANDARD

SAE AS5861
Issued 2005-12

Retainers, (Back-Up Rings), Hydraulic and Pneumatic, Polytetrafluoroethylene Resin, Solid, Static Gland

RATIONALE

This standard is required so that retainers (back-up rings) will be available for use with static glands per AS5857.

1. SCOPE:

This SAE Aerospace Standard (AS) covers solid polytetrafluoroethylene (PTFE) retainers (back-up rings) for use in static glands in accordance with AS5857. They are for use in hydraulic and pneumatic system components as anti-extrusion devices in conjunction with O-rings, packings and other elastomeric seals.

Because of the construction of groove dimensions, back-ups specific to rod applications are designated “R” - Rod (Female), back-ups specific to piston applications are designated “P” - Piston (Male).

Retainers specified herein have been designed for a temperature range of -65 to 275 °F (-54 to 135 °C) and a nominal operating pressure of 3000 psi (20.6 MPa) for code 09 material and 5000 psi (34.3 MPa) for code 10 material. Material codes are based on AMS 3678 material types.

2. REFERENCES:

2.1 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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2.1.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or Tel: 724-776-4970 (outside USA), www.sae.org.

AS5857	Gland Design, O-ring and Other Elastomeric Seals, Static Applications
AS5860	Retainers, (Back-Up Rings), Hydraulic and Pneumatic, Polytetrafluoroethylene Resin, Single Turn, Static Gland
AMS 3678/9	Virgin Polytetrafluoroethylene (PTFE) Moldings with Pigment for AS4716 and AS5857 Backup Rings
AMS 3678/10	Virgin Polytetrafluoroethylene (PTFE) Moldings or Extrusions with 15% Carbon Fiber

2.1.2 U.S. Government Publications: Available from the Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5096, Tel: 215-697-6257, http://assist.daps.dla.mil/quicksearch/

MIL-STD-2073-1	Standard Practice for Military Packaging

3. TECHNICAL REQUIREMENTS:

3.1 Material:

3.1.1 Code 09, Virgin PTFE With Pigment: Parts made to material code 09 of this standard shall conform to AMS 3678/9, Pigmented Virgin PTFE, Molded.

Parts made to material code 09 of this standard for “R” (Rod) applications shall be green per AMS 3678/9.

Parts made to material code 09 of this standard for “P” (Piston) applications shall be brown per AMS 3678/9.

3.1.2 Code 10, PTFE With 15% Carbon Fiber: Parts made to material code 10 of this standard shall conform to AMS 3678/10, Virgin PTFE Moldings or Extrusions with 15% Carbon Fiber. Color shall be black or dark gray.

3.2 Dimensional Requirements:

Parts shall conform to Figure 1 and the dimensions listed in Table 1.

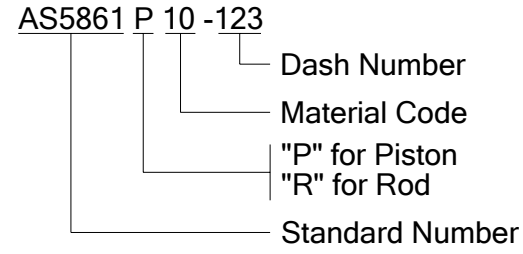
NOTE: Dimensions are based on nominal ring “OD” equal to minimum A for piston back-up rings and nominal ring “ID” equal to maximum B for rod back-up rings. A and B dimensions are from AS5857. Radial width “W” is based on a net fit in the gland at maximum material condition with all features concentric.

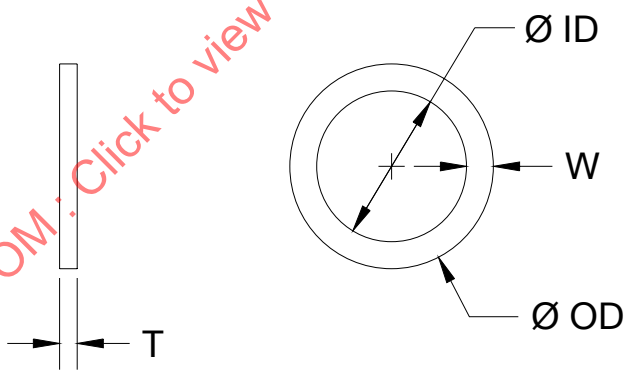
3.2.1 Surfaces and Edges: Surfaces shall be smooth and free from irregularities. Edges shall be clean and sharp.

3.3 Part Number:

The part number consists of the standard number, the piston or rod code, the material code followed by the appropriate three digit dash number taken from Table 1.

Example: AS5861 P 10 -123





See Table 1 for dimensions

FIGURE 1 - Controlled Features

TABLE 1 - Dimensions in Inches

Male (Piston) Applications				Female (Rod) Applications			
Dash No.	OD Dia. ±.001	T ±.002	W ±.001	Dash No.	ID Dia. ±.001	T ±.002	W ±.001
004P	0.185	0.054	0.052	004R	0.076	0.054	0.053
005P	0.217	0.054	0.052	005R	0.108	0.054	0.053
006P	0.230	0.054	0.052	006R	0.123	0.054	0.053
007P	0.261	0.054	0.052	007R	0.154	0.054	0.053
008P	0.293	0.054	0.052	008R	0.185	0.054	0.053
009P	0.326	0.054	0.052	009R	0.217	0.054	0.053
010P	0.357	0.054	0.052	010R	0.248	0.054	0.053
011P	0.420	0.054	0.052	011R	0.310	0.054	0.053
012P	0.485	0.054	0.052	012R	0.373	0.054	0.053
013P	0.550	0.054	0.052	013R	0.435	0.054	0.053
014P	0.613	0.054	0.052	014R	0.498	0.054	0.053
015P	0.675	0.054	0.052	015R	0.560	0.054	0.053
016P	0.738	0.054	0.052	016R	0.623	0.054	0.053
017P	0.800	0.054	0.052	017R	0.685	0.054	0.053
018P	0.863	0.054	0.052	018R	0.748	0.054	0.053
019P	0.925	0.054	0.052	019R	0.810	0.054	0.053
020P	0.991	0.054	0.052	020R	0.873	0.054	0.053
021P	1.053	0.054	0.052	021R	0.935	0.054	0.053
	± .002				± .002		
022P	1.116	0.054	0.052	022R	0.998	0.054	0.053
023P	1.178	0.054	0.052	023R	1.060	0.054	0.053
024P	1.241	0.054	0.052	024R	1.123	0.054	0.053
025P	1.303	0.054	0.052	025R	1.185	0.054	0.053
026P	1.366	0.054	0.052	026R	1.248	0.054	0.053
027P	1.428	0.054	0.052	027R	1.310	0.054	0.053
028P	1.491	0.054	0.052	028R	1.373	0.054	0.053

TABLE 1 - Dimensions in Inches (Continued)

Male (Piston) Applications				Female (Rod) Applications			
Dash No.	OD Dia. ±.001	T ±.002	W ±.001	Dash No.	ID Dia. ±.001	T ±.002	W ±.001
104P	0.286	0.058	0.081	104R	0.123	0.058	0.081
105P	0.317	0.058	0.081	105R	0.154	0.058	0.081
106P	0.349	0.058	0.081	106R	0.185	0.058	0.081
107P	0.382	0.058	0.081	107R	0.217	0.058	0.081
108P	0.414	0.058	0.081	108R	0.248	0.058	0.081
109P	0.477	0.058	0.081	109R	0.310	0.058	0.081
110P	0.541	0.058	0.081	110R	0.373	0.058	0.081
111P	0.604	0.058	0.081	111R	0.435	0.058	0.081
112P	0.668	0.058	0.081	112R	0.498	0.058	0.081
113P	0.734	0.058	0.081	113R	0.560	0.058	0.081
114P	0.800	0.058	0.081	114R	0.623	0.058	0.081
115P	0.863	0.058	0.081	115R	0.685	0.058	0.081
116P	0.925	0.058	0.081	116R	0.748	0.058	0.081
117P	0.991	0.058	0.081	117R	0.810	0.058	0.081
118P	1.053	0.058	0.081	118R	0.873	0.058	0.081
119P	1.116	0.058	0.081	119R	0.935	0.058	0.081
	± .002				± .002		
120P	1.178	0.058	0.081	120R	0.998	0.058	0.081
121P	1.241	0.058	0.081	121R	1.060	0.058	0.081
122P	1.303	0.058	0.081	122R	1.123	0.058	0.081
123P	1.366	0.058	0.081	123R	1.185	0.058	0.081
124P	1.428	0.058	0.081	124R	1.248	0.058	0.081
125P	1.491	0.058	0.081	125R	1.310	0.058	0.081
126P	1.553	0.058	0.081	126R	1.373	0.058	0.081
127P	1.616	0.058	0.081	127R	1.435	0.058	0.081
128P	1.678	0.058	0.081	128R	1.498	0.058	0.081
129P	1.741	0.058	0.081	129R	1.560	0.058	0.081
130P	1.805	0.058	0.081	130R	1.623	0.058	0.081
131P	1.867	0.058	0.081	131R	1.685	0.058	0.081
132P	1.930	0.058	0.081	132R	1.748	0.058	0.081
133P	1.992	0.058	0.081	133R	1.810	0.058	0.081
134P	2.055	0.058	0.081	134R	1.873	0.058	0.081

TABLE 1 - Dimensions in Inches (Continued)

Male (Piston) Applications				Female (Rod) Applications			
Dash No.	OD Dia. ±.002	T ±.002	W ±.001	Dash No.	ID Dia. ±.002	T ±.002	W ±.001
135P	2.118	0.058	0.081	135R	1.936	0.058	0.081
136P	2.180	0.058	0.081	136R	1.998	0.058	0.081
137P	2.243	0.058	0.081	137R	2.061	0.058	0.081
138P	2.305	0.058	0.081	138R	2.123	0.058	0.081
139P	2.368	0.058	0.081	139R	2.186	0.058	0.081
140P	2.430	0.058	0.081	140R	2.248	0.058	0.081
141P	2.493	0.058	0.081	141R	2.311	0.058	0.081
142P	2.555	0.058	0.081	142R	2.373	0.058	0.081
143P	2.618	0.058	0.081	143R	2.436	0.058	0.081
144P	2.680	0.058	0.081	144R	2.498	0.058	0.081
145P	2.743	0.058	0.081	145R	2.561	0.058	0.081
146P	2.805	0.058	0.081	146R	2.623	0.058	0.081
147P	2.868	0.058	0.081	147R	2.686	0.058	0.081
148P	2.930	0.058	0.081	148R	2.748	0.058	0.081
149P	2.993	0.058	0.081	149R	2.811	0.058	0.081
	± .001				± .001		
210P	0.991	0.062	0.111	210R	0.748	0.062	0.112
211P	1.053	0.062	0.111	211R	0.810	0.062	0.112
212P	1.116	0.062	0.111	212R	0.873	0.062	0.112
213P	1.178	0.062	0.111	213R	0.935	0.062	0.112
	± .002				± .002		
214P	1.241	0.062	0.111	214R	0.998	0.062	0.112
215P	1.303	0.062	0.111	215R	1.060	0.062	0.112
216P	1.366	0.062	0.111	216R	1.123	0.062	0.112
217P	1.428	0.062	0.111	217R	1.185	0.062	0.112
218P	1.491	0.062	0.111	218R	1.248	0.062	0.112
219P	1.553	0.062	0.111	219R	1.310	0.062	0.112
220P	1.616	0.062	0.111	220R	1.373	0.062	0.112
221P	1.678	0.062	0.111	221R	1.435	0.062	0.112
222P	1.741	0.062	0.111	222R	1.498	0.062	0.112
223P	1.867	0.062	0.111	223R	1.623	0.062	0.112

TABLE 1 - Dimensions in Inches (Continued)

Male (Piston) Applications				Female (Rod) Applications			
Dash No.	OD Dia. ±.002	T ±.002	W ±.001	Dash No.	ID Dia. ±.002	T ±.002	W ±.001
224P	1.992	0.062	0.111	224R	1.748	0.062	0.112
225P	2.118	0.062	0.111	225R	1.873	0.062	0.112
226P	2.243	0.062	0.111	226R	1.998	0.062	0.112
227P	2.368	0.062	0.111	227R	2.123	0.062	0.112
228P	2.493	0.062	0.111	228R	2.248	0.062	0.112
229P	2.618	0.062	0.111	229R	2.373	0.062	0.112
230P	2.743	0.062	0.111	230R	2.498	0.062	0.112
231P	2.868	0.062	0.111	231R	2.623	0.062	0.112
232P	2.993	0.062	0.111	232R	2.748	0.062	0.112
233P	3.118	0.062	0.111	233R	2.873	0.062	0.112
234P	3.243	0.062	0.111	234R	2.997	0.062	0.112
235P	3.368	0.062	0.111	235R	3.122	0.062	0.112
236P	3.493	0.062	0.111	236R	3.247	0.062	0.112
237P	3.618	0.062	0.111	237R	3.372	0.062	0.112
238P	3.743	0.062	0.111	238R	3.497	0.062	0.112
239P	3.868	0.062	0.111	239R	3.622	0.062	0.112
240P	3.993	0.062	0.111	240R	3.747	0.062	0.112
241P	4.118	0.062	0.111	241R	3.872	0.062	0.112
242P	4.243	0.062	0.111	242R	3.997	0.062	0.112
243P	4.368	0.062	0.111	243R	4.122	0.062	0.112
244P	4.493	0.062	0.111	244R	4.247	0.062	0.112
245P	4.618	0.062	0.111	245R	4.372	0.062	0.112
246P	4.743	0.062	0.111	246R	4.497	0.062	0.112
247P	4.868	0.062	0.111	247R	4.622	0.062	0.112
325P	1.867	0.088	0.171	325R	1.498	0.088	0.173
326P	1.992	0.088	0.171	326R	1.623	0.088	0.173
327P	2.118	0.088	0.171	327R	1.748	0.088	0.173
328P	2.243	0.088	0.171	328R	1.873	0.088	0.173
329P	2.368	0.088	0.171	329R	1.998	0.088	0.173

TABLE 1 - Dimensions in Inches (Continued)

Male (Piston) Applications				Female (Rod) Applications			
Dash No.	OD Dia. ±.002	T ±.002	W ±.001	Dash No.	ID Dia. ±.002	T ±.002	W ±.001
330P	2.493	0.088	0.171	330R	2.123	0.088	0.173
331P	2.618	0.088	0.171	331R	2.248	0.088	0.173
332P	2.743	0.088	0.171	332R	2.373	0.088	0.173
333P	2.868	0.088	0.171	333R	2.498	0.088	0.173
334P	2.993	0.088	0.171	334R	2.623	0.088	0.173
335P	3.118	0.088	0.171	335R	2.748	0.088	0.173
336P	3.243	0.088	0.171	336R	2.873	0.088	0.173
337P	3.368	0.088	0.171	337R	2.997	0.088	0.173
338P	3.493	0.088	0.171	338R	3.122	0.088	0.173
339P	3.618	0.088	0.171	339R	3.247	0.088	0.173
340P	3.743	0.088	0.171	340R	3.372	0.088	0.173
341P	3.868	0.088	0.171	341R	3.497	0.088	0.173
342P	3.993	0.088	0.171	342R	3.622	0.088	0.173
343P	4.118	0.088	0.171	343R	3.747	0.088	0.173
344P	4.243	0.088	0.171	344R	3.872	0.088	0.173
345P	4.368	0.088	0.171	345R	3.997	0.088	0.173
346P	4.493	0.088	0.171	346R	4.122	0.088	0.173
347P	4.618	0.088	0.171	347R	4.247	0.088	0.173
348P	4.743	0.088	0.171	348R	4.372	0.088	0.173
349P	4.868	0.088	0.171	349R	4.497	0.088	0.173
425P	4.974	0.128	0.226	425R	4.497	0.128	0.228
426P	5.099	0.128	0.226	426R	4.622	0.128	0.228
427P	5.224	0.128	0.226	427R	4.747	0.128	0.228
428P	5.349	0.128	0.226	428R	4.872	0.128	0.228
429P	5.474	0.128	0.226	429R	4.997	0.128	0.228
430P	5.599	0.128	0.226	430R	5.122	0.128	0.228
431P	5.724	0.128	0.226	431R	5.247	0.128	0.228
432P	5.849	0.128	0.226	432R	5.372	0.128	0.228
433P	5.974	0.128	0.226	433R	5.497	0.128	0.228
434P	6.099	0.128	0.226	434R	5.622	0.128	0.228

TABLE 1 - Dimensions in Inches (Continued)

Male (Piston) Applications				Female (Rod) Applications			
Dash No.	OD Dia. ±.002	T ±.002	W ±.001	Dash No.	ID Dia. ±.002	T ±.002	W ±.001
435P	6.224	0.128	0.226	435R	5.747	0.128	0.228
436P	6.349	0.128	0.226	436R	5.872	0.128	0.228
437P	6.474	0.128	0.226	437R	5.997	0.128	0.228
438P	6.724	0.128	0.226	438R	6.247	0.128	0.228
439P	6.974	0.128	0.226	439R	6.497	0.128	0.228
440P	7.224	0.128	0.226	440R	6.747	0.128	0.228
441P	7.474	0.128	0.226	441R	6.997	0.128	0.228
442P	7.724	0.128	0.226	442R	7.247	0.128	0.228
443P	7.974	0.128	0.226	443R	7.497	0.128	0.228
444P	8.224	0.128	0.226	444R	7.747	0.128	0.228
445P	8.474	0.128	0.226	445R	7.997	0.128	0.228
	± .003				± .003		
446P	8.974	0.128	0.226	446R	8.497	0.128	0.228
447P	9.474	0.128	0.226	447R	8.997	0.128	0.228
448P	9.974	0.128	0.226	448R	9.497	0.128	0.228
449P	10.474	0.128	0.226	449R	9.997	0.128	0.228
450P	10.974	0.128	0.226	450R	10.497	0.128	0.228
	± .004				± .004		
451P	11.474	0.128	0.226	451R	10.997	0.128	0.228
452P	11.974	0.128	0.226	452R	11.497	0.128	0.228
453P	12.474	0.128	0.226	453R	11.997	0.128	0.228
454P	12.974	0.128	0.226	454R	12.497	0.128	0.228
455P	13.474	0.128	0.226	455R	12.997	0.128	0.228
	± .005				± .005		
456P	13.974	0.128	0.226	456R	13.497	0.128	0.228
457P	14.474	0.128	0.226	457R	13.997	0.128	0.228
458P	14.974	0.128	0.226	458R	14.497	0.128	0.228
459P	15.474	0.128	0.226	459R	14.997	0.128	0.228
460P	15.974	0.128	0.226	460R	15.497	0.128	0.228

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The manufacturer of material shall be responsible for performing all required tests pertaining to material for tensile, elongation and specific gravity and shall furnish a certificate of conformance with each shipment stating that the material conforms to the requirements of AMS 3678/9 or AMS 3678/10 as applicable. Manufacturer of machined retainers shall provide all samples for porosity tests. Purchaser of finished parts reserves the right to perform any confirmatory testing deemed necessary to ensure that the material conforms to the requirements of this standard.

4.2 Classification of Tests:

4.2.1 Physical Properties: Material shall be tested to ensure that Tensile and Elongation and Specific Gravity conform to AMS 3678/9 or AMS 3678/10 as applicable.

NOTE: Tensile and Elongation tests are performed on samples of material, not on the finished retainers. Specific gravity tests may be performed on finished retainers.

4.2.2 Porosity: Porosity test for materials to AMS 3678/9 only shall be carried out on sample parts to Table 2, as specified in 4.4.2.

4.3 Sampling and Testing:

Sufficient parts shall be taken at random from each lot to perform required tests. The number of determinations for each requirement shall be per the applicable test procedure specified by the purchaser, or if not specified therein, shall be per Table 2.

TABLE 2 - Sample Size

Lot Size	Sample Size
2-8	Entire Lot
9-90	8
91-150	12
151-280	19
281-500	21
501-1200	27
1201-3200	35
3201-10,000	38
10,001-35,000	46
35,001-150,000	56
150,001-over	64