SAE Aerospace
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AEROSPACE STANDARD

SAE AS8791

REV. A

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Superseding AS8791

(R) Hydraulic and Pneumatic Retainers (Back-Up Rings), Polytetrafluoroethylene (PTFE) Resin

1. SCOPE:

This specification and part standard covers polytetrafluoroethylene (PTFE) resin material and the dimensional requirements for retainers (back-up rings) previously covered by AS8791 and AS8791/1 which superseded MIL-R-8791 and MIL-R-8791/1. The retainers are intended for use in hydraulic and pneumatic system components as anti-extrusion devices in conjunction with packings and O-rings.

1.1 Use:

Retainers to the dimensions in this specification are for use in glands to MIL-G-5514 (formerly MIL-P-5514C, D and E Revisions), Gland Design, Packings, Hydraulic, General Requirements for (Cancelled). They may also be used in glands to AS4716, Gland Design, O-Ring, Packings and Other Elastomeric Seals, however, please refer to the Cautionary and Important Note 1 below.

Caution: A new standard for back-up rings for use in glands to AS4716 is being developed. Until the standard is issued, back-up rings to this specification can continue to be used in AS4716 glands.

Important Note 1: The groove diameters for both rod and piston types to AS4716 differ from those to MIL-G-5514. Dash sizes 325 through 349 and 425 through 437 are identical. For all other sizes, when using back-up rings to this specification in glands to AS4716, the user should check to ensure each application is appropriate.

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1.1 (Continued):

Important Note 2: The dimensional requirements of this specification are the same as former Military Specification MIL-R-8791/1*. As such, no attempt has been made to ensure the lap of the scarf-cut ends is adequately designed to be functionally satisfactory at low temperatures. Users should ensure satisfactory performance by testing at the appropriate low temperature for each application.

*With the exception of dash sizes 004, 005, 006 where the angle of the scarf-cut has been changed for reasons of manufacturability.

1.1.1 MIL-R-8791 (cancelled) and AS8791 (original issue) were used for the material specification for back-up rings to MIL-R-8791/1 (cancelled), AS8791/1, and the following military standards that are inactive for new design: MS27595, MS28773, MS28774, MS28782, MS28783. This specification (AS8791) should be used as the material call-out for the standards listed above.

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,Telephone: (724) 776-4970, Web address: http://www.sae.org

AMS 3678	Molded or Extruded Polytetrafluoroethylene (PTFE) Unfilled, Pigmented and Filled Compounds.
AS4716	Gland Design, O-Ring, Packings and Other Elastomeric Seals.

2.2 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5096, Telephone: (215) 697-2179, Web address: http://assist.daps.mil/

MIL-G-5514	(Formerly MIL-P-5514) Gland Design, Packings, Hydraulic, General Requirements for (Inactive for New Design)
MS27595	Retainer, Packing Backup, Continuous Ring, Tetrafluoroethylene (Inactive for New Design)

2.2 (Continued):

MS28773	Retainer, Packing Backup, Tetrafluoroethylene, Straight Thread Tube Fitting Boss (Inactive for New Design)
MS28774	Retainer, Packing Backup, Single Turn, Tetrafluoroethylene (Inactive for New Design)
MS28782	Retainer, Packing Backup, Teflon (Inactive for New Design)
MS28783	Ring, Gasket, Backup, Teflon (Inactive for New Design)

3. TECHNICAL REQUIREMENTS:

3.1 Material:

Material for parts to this specification shall be virgin polytetrafluoroethylene (PTFE) conforming to AMS 3678 Type 1, Grade B, Virgin Polytetrafluoroethylene (PTFE) Moldings and Extrusions.

3.2 Safety - Hazardous Materials:

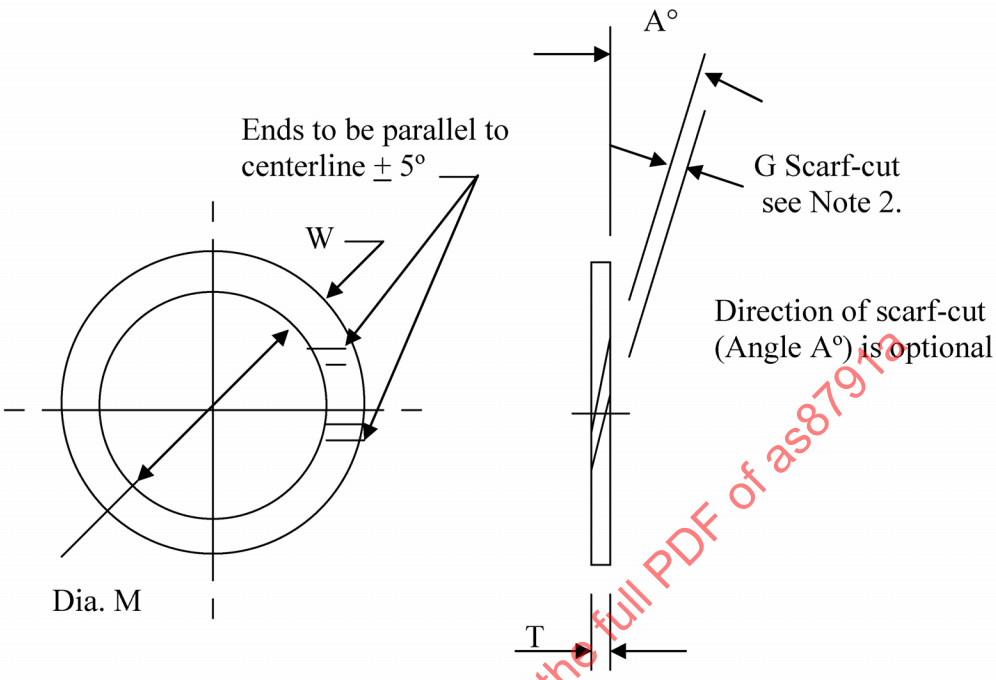
While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

3.3 Dimensional Requirements:

The shape and dimensions of PTFE retainers shall conform to Figure 1 and Table 1.

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

3.3.2 Scarf-cut: When measuring dimension M ± 0.001 inches over a mandrel (see Table 1) the scarf-cut shall not exceed dimension ‘G’ and shall exhibit no overlap. These measurements are to be made at stabilized temperature of 73 °F ± 2 °F (23 °C ± 1 °C).



Notes:

1. All dimensions are in inches.
2. Scarf-cut. When measuring dimension G over a mandrel M ±.001 inches diameter, the scarf-cut shall not exceed dimension G and no overlap of the scarf ends is permitted beyond dimension T.
3. For use in Packing Grooves conforming to MIL-G-5514 and MIL-P-5514C, D and E Revisions, Gland Design, Packings, Hydraulic, General Requirements for (Cancelled). They may also be used in glands to AS4716, Gland Design, O-Ring, Packings and Other Elastomeric Seals. However, please refer to the Cautionary and Important Note below.

   Caution: A new standard for back-up rings for use in glands to AS4716 is being developed. Until the standard is issued, back-up rings to this specification can continue to be used in AS4716 glands.

   Important Note 1: The groove diameters for both rod and piston types to AS4716 differ from those to MIL-G-5514. Dash sizes 325 through 349 and 425 through 437 are identical. For all other sizes, when using back-up rings to this specification in glands to AS4716, the user should check to ensure each application is appropriate.

   (See 1.2).

FIGURE 1 – Retainer, Packing, Hydraulic and Pneumatic, Polytetrafluoroethylene, Single Turn

TABLE 1 - Dash Numbers and Dimensions

Dash No.	M Dia. Gage ±.001	T ±.002	W ±.001	G	A Degrees Range
004	.076	.052/.048	.054/.052	.005/.000	45-42
005	.108	.052/.048	.054/.052	.005/.000	36-33
006	.123	.052/.048	.054/.052	.005/.000	33-30
007	.154	.052/.048	.054/.052	.005/.000	27-24
008	.185	.052/.048	.054/.052	.005/.000	22-19
009	.217	.052/.048	.054/.052	.005/.000	22-19
010	.248	.052/.048	.054/.052	.005/.000	22-19
011	.310	.052/.048	.054/.052	.005/.000	22-19
012	.373	.052/.048	.054/.052	.005/.000	22-19
013	.438	.052/.048	.054/.052	.005/.000	22-19
014	.501	.052/.048	.054/.052	.005/.000	22-19
015	.563	.052/.048	.054/.052	.005/.000	22-19
016	.626	.052/.048	.054/.052	.005/.000	22-19
017	.688	.052/.048	.054/.052	.005/.000	22-19
018	.751	.052/.048	.054/.052	.005/.000	22-19
019	.813	.052/.048	.054/.052	.005/.000	22-19
020	.881	.052/.048	.054/.052	.005/.000	22-19
021	.943	.052/.048	.054/.052	.005/.000	22-19
022	1.006	.052/.048	.054/.052	.005/.000	22-19
023	1.068	.052/.048	.054/.052	.005/.000	22-19
024	1.131	.052/.048	.054/.052	.005/.000	22-19
025	1.193	.052/.048	.054/.052	.005/.000	22-19
026	1.256	.052/.048	.054/.052	.005/.000	22-19
027	1.318	.052/.048	.054/.052	.005/.000	22-19
028	1.381	.052/.048	.054/.052	.005/.000	22-19
110	.373	.056/.052	.087/.085	.006/.000	22-19
111	.435	.056/.052	.087/.085	.006/.000	22-19
112	.498	.056/.052	.087/.085	.006/.000	22-19
113	.560	.056/.052	.087/.085	.006/.000	22-19
114	.623	.056/.052	.087/.085	.006/.000	22-19
115	.685	.056/.052	.087/.085	.006/.000	22-19
116	.748	.056/.052	.087/.085	.006/.000	22-19
117	.815	.056/.052	.087/.085	.006/.000	22-19
118	.878	.056/.052	.087/.085	.006/.000	22-19
119	.940	.056/.052	.087/.085	.006/.000	22-19
120	1.003	.056/.052	.087/.085	.006/.000	22-19
121	1.065	.056/.052	.087/.085	.006/.000	22-19
122	1.128	.056/.052	.087/.085	.006/.000	22-19
123	1.190	.056/.052	.087/.085	.006/.000	22-19
124	1.253	.056/.052	.087/.085	.006/.000	22-19
125	1.315	.056/.052	.087/.085	.006/.000	22-19

TABLE 1 – Dash Numbers and Dimensions (Continued)

Dash No.	M Dia. Gage ±.001	T ±.002	W ±.001	G	A Degrees Range
126	1.380	.056/.052	.087/.085	.006/.000	22-19
127	1.442	.056/.052	.087/.085	.006/.000	22-19
128	1.505	.056/.052	.087/.085	.006/.000	22-19
129	1.564	.056/.052	.087/.085	.006/.000	22-19
130	1.627	.056/.052	.087/.085	.006/.000	22-19
131	1.689	.056/.052	.087/.085	.006/.000	22-19
132	1.752	.056/.052	.087/.085	.006/.000	22-19
133	1.814	.056/.052	.087/.085	.006/.000	22-19
134	1.877	.056/.052	.087/.085	.006/.000	22-19
135	1.940	.056/.052	.087/.085	.006/.000	22-19
136	2.002	.056/.052	.087/.085	.006/.000	22-19
137	2.065	.056/.052	.087/.085	.006/.000	22-19
138	2.127	.056/.052	.087/.085	.006/.000	22-19
139[1]	2.190	.056/.052	.087/.085	.006/.000	22-19
210	.748	.064/.060	.120/.118	.006/.000	22-19
211	.810	.064/.060	.120/.118	.006/.000	22-19
212	.873	.064/.060	.120/.118	.006/.000	22-19
213	.935	.064/.060	.120/.118	.006/.000	22-19
214	.998	.064/.060	.120/.118	.006/.000	22-19
215	1.060	.064/.060	.120/.118	.006/.000	22-19
216	1.123	.064/.060	.120/.118	.006/.000	22-19
217	1.185	.064/.060	.120/.118	.006/.000	22-19
218	1.248	.064/.060	.120/.118	.006/.000	22-19
219	1.310	.064/.060	.120/.118	.006/.000	22-19
220	1.373	.064/.060	.120/.118	.006/.000	22-19
221	1.435	.064/.060	.120/.118	.006/.000	22-19
222	1.498	.064/.060	.120/.118	.006/.000	22-19
223	1.625	.064/.060	.120/.118	.006/.000	22-19
224	1.750	.064/.060	.120/.118	.006/.000	22-19
225	1.875	.064/.060	.120/.118	.006/.000	22-19
226	2.000	.064/.060	.120/.118	.007/.000	22-19
227	2.125	.064/.060	.120/.118	.007/.000	22-19
228	2.250	.064/.060	.120/.118	.007/.000	22-19
229	2.375	.064/.060	.120/.118	.007/.000	22-19
230[1]	2.500	.064/.060	.120/.118	.007/.000	22-19
325	1.498	.090/.086	.184/.182	.007/.000	22-19
326	1.623	.090/.086	.184/.182	.007/.000	22-19
327	1.748	.090/.086	.184/.182	.007/.000	22-19
328	1.873	.090/.086	.184/.182	.007/.000	22-19
329	1.998	.090/.086	.184/.182	.007/.000	22-19
330	2.123	.090/.086	.184/.182	.007/.000	22-19
331	2.248	.090/.086	.184/.182	.007/.000	22-19

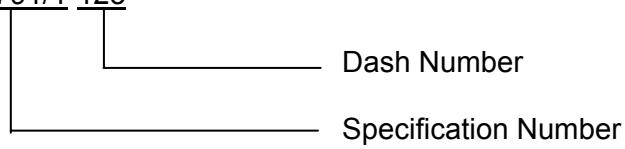
TABLE 1 - Dash Numbers and Dimensions (Continued)

Dash No.	M Dia. Gage ±.001	T ±.002	W ±.001	G	A Degrees Range
332	2.373	.090/.086	.184/.182	.007/.000	22-19
333	2.498	.090/.086	.184/.182	.007/.000	22-19
334	2.623	.090/.086	.184/.182	.007/.000	22-19
335	2.748	.090/.086	.184/.182	.007/.000	22-19
336	2.873	.090/.086	.184/.182	.007/.000	22-19
337	2.997	.090/.086	.184/.182	.007/.000	22-19
338	3.122	.090/.086	.184/.182	.007/.000	22-19
339	3.247	.090/.086	.184/.182	.007/.000	22-19
340	3.372	.090/.086	.184/.182	.007/.000	22-19
341	3.497	.090/.086	.184/.182	.007/.000	22-19
342	3.622	.090/.086	.184/.182	.007/.000	22-19
343	3.747	.090/.086	.184/.182	.007/.000	22-19
344	3.872	.090/.086	.184/.182	.007/.000	22-19
345	3.997	.090/.086	.184/.182	.007/.000	22-19
346	4.122	.090/.086	.184/.182	.007/.000	22-19
347	4.247	.090/.086	.184/.182	.007/.000	22-19
348	4.372	.090/.086	.184/.182	.007/.000	22-19
349	4.497	.090/.086	.184/.182	.007/.000	22-19
425	4.497	.122/.118	.237/.235	.008/.000	22-19
426	4.622	.122/.118	.237/.235	.008/.000	22-19
427	4.747	.122/.118	.237/.235	.008/.000	22-19
428	4.872	.122/.118	.237/.235	.008/.000	22-19
429	4.997	.122/.118	.237/.235	.008/.000	22-19
430	5.122	.122/.118	.237/.235	.008/.000	22-19
431	5.247	.122/.118	.237/.235	.008/.000	22-19
432	5.372	.122/.118	.237/.235	.008/.000	22-19
433	5.497	.122/.118	.237/.235	.008/.000	22-19
434	5.622	.122/.118	.237/.235	.008/.000	22-19
435	5.747	.122/.118	.237/.235	.008/.000	22-19
436	5.872	.122/.118	.237/.235	.008/.000	22-19
437[1]	5.997	.122/.118	.237/.235	.008/.000	22-19

*1 For Larger packing retainers (back-up rings) in this series, uncut packing retainers MS27595 are recommended.

3.3.3 Part Number: The part number consists of the original Military Specification Number, M8791/1, followed by the appropriate dash number taken from Table 1. The original part number designation used by MIL-R-8791/1 has been retained to ensure continuation of supply and to eliminate any confusion that could be caused by changing part number designation.

Example: M8791/1-123



M8791/1-123 indicates: Retainer, Hydraulic and Pneumatic, PTFE, Single Turn; Dash 123 size, Diameter M = 1.190; A° Range = 22-19°

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The manufacturer of material shall supply all samples for required tests for Tensile Strength, Elongation and Specific Gravity as required in AMS3678 and shall be responsible for performing all required tests pertaining to material prior to machining. Manufacturer of machined parts shall supply all samples for required for tests for dimensional stability as required in AMS3678 and for porosity as required in this specification, see 4.2.1, 4.2.2, 4.3, 4.4.1 and shall be responsible for performing all required tests pertaining to finished parts. Purchaser of finished parts reserves the right to perform any confirmatory testing deemed necessary to ensure that the parts conform to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Porosity: The porosity test shall be carried out on sample parts to 4.3. and 4.4.1

4.2.2 Dimensional Stability: Dimensional stability test required in AMS3678 shall be carried out on sample parts to 4.3.