AEROSPACE STANDARD	AS5798	
	Issued 2007-07 Reaffirmed 2013-11	

Aerospace Size Standard for Oversize O-rings

RATIONALE

AS5798 has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

This SAE Aerospace Standard (AS) is applicable to military and commercial aircraft. It specifies the dimensions, tolerances and size codes (dash numbers) for use in glands per MIL-G-5514 where squeeze at low temperature is often insufficient to provide a leak-tight seal. The dimensions and tolerances specified in this standard are suitable for any elastomeric material.

This standard should not be used as a part standard, therefore no part numbers like AS5798-001X shall be created.

Each dash number, which should be appended to an appropriate drawing or standard number, identifies one size O-ring only. An AS5798 sized O-ring is intended to replace an AS568 sized O-ring of the same dash number. An X suffix is part of the dash number to signify oversize.

Temperature limitations of 275 °F (135 °C) and coefficient of thermal expansion of 9.0 x 10^{-5} unit length per °F (1.6 x 10^{-4} unit length per °C) were used for swell calculations. Applications that exceed these values should be evaluated for excessive gland fill.

2. REFERENCES

The following publications are provided for information purposes only and are not a required part of this SAE Aerospace Technical Report.

2.1.1 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

AS4716 Aerospace Standard, Gland Design, O-Ring and Other Elastomeric Seals

AS4727 Gland Design, Computation of Squeeze and Gland Volume

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/AS5798

2.1.2 U.S. Government Publications

Available from the Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6257, http://assist.daps.dla.mil/quicksearch/.

MS27595 Retainer, Packing Backup, Continuous Ring, Polytetrafluoroethylene

MIL-G-5514 Gland Design; Packings, Hydraulic, General Requirements for

3. REQUIREMENTS

3.1 Dimensional Requirements

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

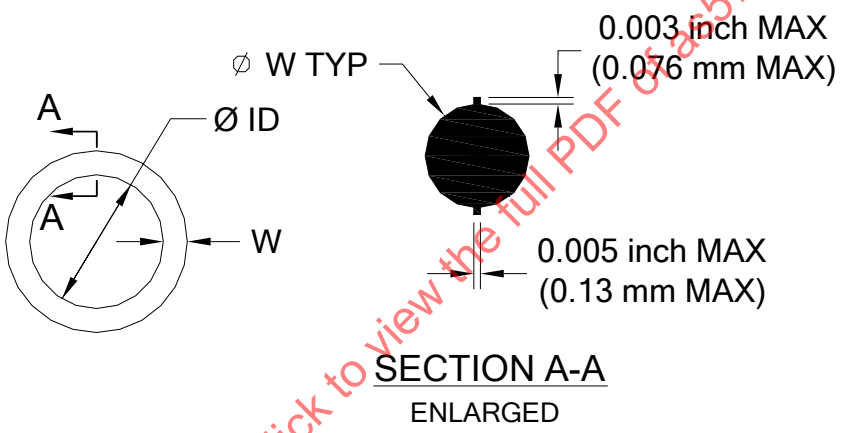

FIGURE 1 - CONTROLLED FEATURES

3.2 Tables

The dimensions of the oversize O-rings are shown in Table 1. The percentage stretch, squeeze and gland fill are shown in Table 2.

TABLE 1 - O-RING DIMENSIONS

Dash Number	ID Inches min	ID Inches max	ID mm min	ID mm max	W Inches min	W Inches max	W mm min	W mm max
001X	0.025	0.033	0.64	0.84	0.039	0.045	0.99	1.14
002X	0.038	0.046	0.97	1.17	0.049	0.055	1.24	1.40
003X	0.052	0.060	1.32	1.52	0.059	0.065	1.50	1.65
004X	0.065	0.075	1.65	1.91	0.070	0.076	1.78	1.93
005X	0.096	0.106	2.44	2.69	0.070	0.076	1.78	1.93
006X	0.109	0.119	2.77	3.02	0.070	0.076	1.78	1.93
007X	0.140	0.150	3.56	3.81	0.070	0.076	1.78	1.93
008X	0.171	0.181	4.34	4.60	0.070	0.076	1.78	1.93
009X	0.203	0.213	5.16	5.41	0.070	0.076	1.78	1.93
010X	0.234	0.244	5.94	6.20	0.070	0.076	1.78	1.93
011X	0.296	0.306	7.52	7.77	0.070	0.076	1.78	1.93
012X	0.356	0.366	9.04	9.30	0.070	0.076	1.78	1.93
013X	0.418	0.428	10.62	10.87	0.070	0.076	1.78	1.93
014X	0.478	0.488	12.14	12.40	0.070	0.076	1.78	1.93
015X	0.538	0.552	13.67	14.02	0.070	0.076	1.78	1.93
016X	0.599	0.617	15.21	15.67	0.070	0.076	1.78	1.93
017X	0.661	0.679	16.79	17.25	0.070	0.076	1.78	1.93
018X	0.724	0.742	18.39	18.85	0.070	0.076	1.78	1.93
019X	0.786	0.804	19.96	20.42	0.070	0.076	1.78	1.93
020X	0.849	0.867	21.56	22.02	0.070	0.076	1.78	1.93
021X	0.911	0.929	23.14	23.60	0.070	0.076	1.78	1.93
022X	0.973	0.993	24.71	25.22	0.070	0.076	1.78	1.93
023X	1.035	1.055	26.29	26.80	0.070	0.076	1.78	1.93
024X	1.098	1.118	27.89	28.40	0.070	0.076	1.78	1.93
025X	1.159	1.181	29.44	30.00	0.070	0.076	1.78	1.93
026X	1.222	1.244	31.04	31.60	0.070	0.076	1.78	1.93
027X	1.284	1.306	32.61	33.17	0.070	0.076	1.78	1.93
028X	1.345	1.371	34.16	34.82	0.070	0.076	1.78	1.93

TABLE 1 - O-RING DIMENSIONS (CONTINUED)

Dash Number	ID Inches min	ID Inches max	ID mm min	ID mm max	W Inches min	W Inches max	W mm min	W mm max
110X	0.355	0.365	9.02	9.27	0.107	0.113	2.72	2.87
111X	0.415	0.425	10.54	10.80	0.107	0.113	2.72	2.87
112X	0.474	0.484	12.04	12.29	0.107	0.113	2.72	2.87
113X	0.534	0.548	13.56	13.92	0.107	0.113	2.72	2.87
114X	0.593	0.611	15.06	15.52	0.107	0.113	2.72	2.87
115X	0.653	0.671	16.59	17.04	0.107	0.113	2.72	2.87
116X	0.714	0.732	18.14	18.59	0.107	0.113	2.72	2.87
117X	0.775	0.795	19.69	20.19	0.107	0.113	2.72	2.87
118X	0.838	0.858	21.29	21.79	0.107	0.113	2.72	2.87
119X	0.900	0.920	22.86	23.37	0.107	0.113	2.72	2.87
120X	0.963	0.983	24.46	24.97	0.107	0.113	2.72	2.87
121X	1.025	1.045	26.04	26.54	0.107	0.113	2.72	2.87
122X	1.088	1.108	27.64	28.14	0.107	0.113	2.72	2.87
123X	1.148	1.172	29.16	29.77	0.107	0.113	2.72	2.87
124X	1.211	1.235	30.76	31.37	0.107	0.113	2.72	2.87
125X	1.273	1.297	32.33	32.94	0.107	0.113	2.72	2.87
126X	1.336	1.360	33.93	34.54	0.107	0.113	2.72	2.87
127X	1.398	1.422	35.51	36.12	0.107	0.113	2.72	2.87
128X	1.461	1.485	37.11	37.72	0.107	0.113	2.72	2.87
129X	1.520	1.550	38.61	39.37	0.107	0.113	2.72	2.87
130X	1.583	1.613	40.21	40.97	0.107	0.113	2.72	2.87
131X	1.645	1.675	41.78	42.55	0.107	0.113	2.72	2.87
132X	1.708	1.738	43.38	44.15	0.107	0.113	2.72	2.87
133X	1.770	1.800	44.96	45.72	0.107	0.113	2.72	2.87
134X	1.833	1.863	46.56	47.32	0.107	0.113	2.72	2.87
135X	1.894	1.928	48.11	48.97	0.107	0.113	2.72	2.87
136X	1.956	1.990	49.68	50.55	0.107	0.113	2.72	2.87
137X	2.019	2.053	51.28	52.15	0.107	0.113	2.72	2.87
138X	2.081	2.115	52.86	53.72	0.107	0.113	2.72	2.87
139X	2.144	2.178	54.46	55.32	0.107	0.113	2.72	2.87

TABLE 1 - O-RING DIMENSIONS (CONTINUED)

Dash Number	ID Inches min	ID Inches max	ID mm min	ID mm max	W Inches min	W Inches max	W mm min	W mm max
140X	2.206	2.240	56.03	56.90	0.107	0.113	2.72	2.87
141X	2.266	2.306	57.56	58.57	0.107	0.113	2.72	2.87
142X	2.328	2.368	59.13	60.15	0.107	0.113	2.72	2.87
143X	2.391	2.431	60.73	61.75	0.107	0.113	2.72	2.87
144X	2.453	2.493	62.31	63.32	0.107	0.113	2.72	2.87
145X	2.516	2.556	63.91	64.92	0.107	0.113	2.72	2.87
146X	2.578	2.618	65.48	66.50	0.107	0.113	2.72	2.87
147X	2.639	2.683	67.03	68.15	0.107	0.113	2.72	2.87
148X	2.701	2.745	68.61	69.72	0.107	0.113	2.72	2.87
149X	2.764	2.808	70.21	71.32	0.107	0.113	2.72	2.87
210X	0.713	0.733	18.11	18.62	0.145	0.153	3.68	3.89
211X	0.772	0.792	19.61	20.12	0.145	0.153	3.68	3.89
212X	0.832	0.852	21.13	21.64	0.145	0.153	3.68	3.89
213X	0.891	0.911	22.63	23.14	0.145	0.153	3.68	3.89
214X	0.954	0.974	24.23	24.74	0.145	0.153	3.68	3.89
215X	1.016	1.036	25.81	26.31	0.145	0.153	3.68	3.89
216X	1.077	1.101	27.36	27.97	0.145	0.153	3.68	3.89
217X	1.139	1.163	28.93	29.54	0.145	0.153	3.68	3.89
218X	1.202	1.226	30.53	31.14	0.145	0.153	3.68	3.89
219X	1.264	1.288	32.11	32.72	0.145	0.153	3.68	3.89
220X	1.327	1.351	33.71	34.32	0.145	0.153	3.68	3.89
221X	1.389	1.413	35.28	35.89	0.145	0.153	3.68	3.89
222X	1.449	1.479	36.80	37.57	0.145	0.153	3.68	3.89
223X	1.574	1.604	39.98	40.74	0.145	0.153	3.68	3.89
224X	1.699	1.729	43.15	43.92	0.145	0.153	3.68	3.89
225X	1.821	1.857	46.25	47.17	0.145	0.153	3.68	3.89
226X	1.946	1.982	49.43	50.34	0.145	0.153	3.68	3.89
227X	2.071	2.107	52.60	53.52	0.145	0.153	3.68	3.89
228X	2.194	2.234	55.73	56.74	0.145	0.153	3.68	3.89
229X	2.319	2.359	58.90	59.92	0.145	0.153	3.68	3.89

TABLE 1 - O-RING DIMENSIONS (CONTINUED)

Dash Number	ID Inches min	ID Inches max	ID mm min	ID mm max	W Inches min	W Inches max	W mm min	W mm max
230X	2.444	2.484	62.08	63.09	0.145	0.153	3.68	3.89
231X	2.569	2.609	65.25	66.27	0.145	0.153	3.68	3.89
232X	2.690	2.738	68.33	69.55	0.145	0.153	3.68	3.89
233X	2.815	2.863	71.50	72.72	0.145	0.153	3.68	3.89
234X	2.940	2.988	74.68	75.90	0.145	0.153	3.68	3.89
235X	3.065	3.113	77.85	79.07	0.145	0.153	3.68	3.89
236X	3.190	3.238	81.03	82.25	0.145	0.153	3.68	3.89
237X	3.315	3.363	84.20	85.42	0.145	0.153	3.68	3.89
238X	3.440	3.488	87.38	88.60	0.145	0.153	3.68	3.89
239X	3.561	3.617	90.45	91.87	0.145	0.153	3.68	3.89
240X	3.686	3.742	93.62	95.05	0.145	0.153	3.68	3.89
241X	3.811	3.867	96.80	98.22	0.145	0.153	3.68	3.89
242X	3.936	3.992	99.97	101.40	0.145	0.153	3.68	3.89
243X	4.061	4.117	103.15	104.57	0.145	0.153	3.68	3.89
244X	4.184	4.244	106.27	107.80	0.145	0.153	3.68	3.89
245X	4.309	4.369	109.45	110.97	0.145	0.153	3.68	3.89
246X	4.434	4.494	112.62	114.15	0.145	0.153	3.68	3.89
247X	4.559	4.619	115.80	117.32	0.145	0.153	3.68	3.89
325X	1.432	1.462	36.37	37.13	0.219	0.229	5.56	5.82
326X	1.557	1.587	39.55	40.31	0.219	0.229	5.56	5.82
327X	1.682	1.712	42.72	43.48	0.219	0.229	5.56	5.82
328X	1.807	1.837	45.90	46.66	0.219	0.229	5.56	5.82
329X	1.929	1.965	49.00	49.91	0.219	0.229	5.56	5.82
330X	2.054	2.090	52.17	53.09	0.219	0.229	5.56	5.82
331X	2.179	2.215	55.35	56.26	0.219	0.229	5.56	5.82
332X	2.304	2.340	58.52	59.44	0.219	0.229	5.56	5.82
333X	2.427	2.467	61.65	62.66	0.219	0.229	5.56	5.82
334X	2.552	2.592	64.82	65.84	0.219	0.229	5.56	5.82

TABLE 1 - O-RING DIMENSIONS (CONTINUED)

Dash Number	ID Inches min	ID Inches max	ID mm min	ID mm max	W Inches min	W Inches max	W mm min	W mm max
335X	2.677	2.717	68.00	69.01	0.219	0.229	5.56	5.82
336X	2.802	2.842	71.17	72.19	0.219	0.229	5.56	5.82
337X	2.923	2.971	74.24	75.46	0.219	0.229	5.56	5.82
338X	3.048	3.096	77.42	78.64	0.219	0.229	5.56	5.82
339X	3.173	3.221	80.59	81.81	0.219	0.229	5.56	5.82
340X	3.298	3.346	83.77	84.99	0.219	0.229	5.56	5.82
341X	3.423	3.471	86.94	88.16	0.219	0.229	5.56	5.82
342X	3.544	3.600	90.02	91.44	0.219	0.229	5.56	5.82
343X	3.669	3.725	93.19	94.62	0.219	0.229	5.56	5.82
344X	3.794	3.850	96.37	97.79	0.219	0.229	5.56	5.82
345X	3.919	3.975	99.54	100.97	0.219	0.229	5.56	5.82
346X	4.044	4.100	102.72	104.14	0.219	0.229	5.56	5.82
347X	4.167	4.227	105.84	107.37	0.219	0.229	5.56	5.82
348X	4.292	4.352	109.02	110.54	0.219	0.229	5.56	5.82
349X	4.417	4.477	112.19	113.72	0.219	0.229	5.56	5.82
425X	4.420	4.486	112.27	113.94	0.280	0.292	7.11	7.42
426X	4.545	4.611	115.44	117.12	0.280	0.292	7.11	7.42
427X	4.670	4.736	118.62	120.29	0.280	0.292	7.11	7.42
428X	4.795	4.861	121.79	123.47	0.280	0.292	7.11	7.42
429X	4.916	4.990	124.87	126.75	0.280	0.292	7.11	7.42
430X	5.041	5.115	128.04	129.92	0.280	0.292	7.11	7.42
431X	5.166	5.240	131.22	133.10	0.280	0.292	7.11	7.42
432X	5.291	5.365	134.39	136.27	0.280	0.292	7.11	7.42
433X	5.416	5.490	137.57	139.45	0.280	0.292	7.11	7.42
434X	5.541	5.615	140.74	142.62	0.280	0.292	7.11	7.42
435X	5.666	5.740	143.92	145.80	0.280	0.292	7.11	7.42
436X	5.791	5.865	147.09	148.97	0.280	0.292	7.11	7.42
437X	5.916	5.990	150.27	152.15	0.280	0.292	7.11	7.42
438X	6.163	6.243	156.54	158.57	0.280	0.292	7.11	7.42
439X	6.413	6.493	162.89	164.92	0.280	0.292	7.11	7.42

TABLE 1 - O-RING DIMENSIONS (CONTINUED)

Dash Number	ID Inches min	ID Inches max	ID mm min	ID mm max	W Inches min	W Inches max	W mm min	W mm max
440X	6.663	6.743	169.24	171.27	0.280	0.292	7.11	7.42
441X	6.913	6.993	175.59	177.62	0.280	0.292	7.11	7.42
442X	7.158	7.248	181.81	184.10	0.280	0.292	7.11	7.42
443X	7.408	7.498	188.16	190.45	0.280	0.292	7.11	7.42
444X	7.658	7.748	194.51	196.80	0.280	0.292	7.11	7.42
445X	7.908	7.998	200.86	203.15	0.280	0.292	7.11	7.42
446X	8.398	8.508	213.31	216.10	0.280	0.292	7.11	7.42
447X	8.898	9.008	226.01	228.80	0.280	0.292	7.11	7.42
448X	9.398	9.508	238.71	241.50	0.280	0.292	7.11	7.42
449X	9.898	10.008	251.41	254.20	0.280	0.292	7.11	7.42
450X	10.393	10.513	263.98	267.03	0.280	0.292	7.11	7.42
451X	10.893	11.013	276.68	279.73	0.280	0.292	7.11	7.42
452X	11.393	11.513	289.38	292.43	0.280	0.292	7.11	7.42
452X	11.893	12.013	302.08	305.13	0.280	0.292	7.11	7.42
454X	12.393	12.513	314.78	317.83	0.280	0.292	7.11	7.42
455X	12.893	13.013	327.48	330.53	0.280	0.292	7.11	7.42
456X	13.383	13.523	339.93	343.48	0.280	0.292	7.11	7.42
457X	13.883	14.023	352.63	356.18	0.280	0.292	7.11	7.42
458X	14.383	14.523	365.33	368.88	0.280	0.292	7.11	7.42
459X	14.883	15.023	378.03	381.58	0.280	0.292	7.11	7.42
460X	15.383	15.523	390.73	394.28	0.280	0.292	7.11	7.42

TABLE 2 - O-RING PERCENTAGE STRETCH, SQUEEZE AND GLAND FILL

Dash Number	Piston Minimum Stretch %	Piston Maximum Stretch %	Piston Minimum Squeeze +75 °F %	Rod Minimum Squeeze +75 °F %	Piston[1] Gland Max Fill +275 °F %	Rod[1] Gland Max Fill +275 °F %
001X	-3.0	32.0	2.7	2.7	108	112
002X	2.2	26.3	3.3	3.3	101	103
003X	3.3	21.2	6.1	6.1	100	102
004X	0.0	16.9	8.2	8.2	103	104
005X	0.9	12.5	9.5	9.5	101	102
006X	2.5	12.8	9.9	9.9	100	101
007X	2.0	10.0	10.5	10.5	99	100
008X	1.7	8.2	10.9	10.9	98	99
009X	1.4	6.9	10.6	10.6	98	98
010X	1.2	6.0	11.0	11.0	97	98
011X	1.0	4.7	11.6	11.6	96	97
012X	1.6	4.8	11.5	11.5	95	96
013X	1.9	4.8	9.4	9.8	94	95
014X	2.3	4.8	9.4	9.7	94	94
015X	1.6	4.6	9.4	9.7	94	95
016X	1.1	4.5	9.5	9.7	94	95
017X	1.0	4.1	9.7	9.9	94	94
018X	0.9	3.7	9.9	10.1	94	94
019X	0.9	3.4	10.0	10.2	94	94
020X	1.2	3.5	9.9	10.3	93	94
021X	1.1	3.3	10.0	10.4	93	94
022X	0.9	3.2	10.1	10.4	93	94
023X	0.9	3.0	10.2	10.5	93	94
024X	0.8	2.8	10.2	10.5	93	94
025X	0.7	2.8	10.3	10.6	93	94
026X	0.6	2.6	10.3	10.6	93	94
027X	0.6	2.5	10.4	10.7	93	94
028X	0.4	2.5	10.4	10.6	93	94

[1]Maximum gland fill for -000 series grooves is based on a zero back-up ring groove which is the worst case configuration for this series.

TABLE 2 - O-RING PERCENTAGE STRETCH, SQUEEZE AND GLAND FILL (CONTINUED)

Dash Number	Piston Minimum Stretch %	Piston Maximum Stretch %	Piston Minimum Squeeze +75 °F %	Rod Minimum Squeeze +75 °F %	Piston[2] Gland Max Fill +275 °F %	Rod[2] Gland Max Fill +275 °F %
110X	1.4	4.8	9.0	8.8	95	95
111X	1.9	4.8	8.9	8.9	94	94
112X	2.3	4.9	8.9	8.8	93	93
113X	1.8	4.9	8.8	8.8	93	93
114X	1.5	4.9	8.8	8.7	93	93
115X	1.8	4.9	8.8	8.8	93	93
116X	1.8	4.6	8.9	8.8	92	92
117X	2.0	4.9	8.8	9.0	92	92
118X	1.7	4.4	9.0	9.1	92	92
119X	1.7	4.2	9.1	9.3	92	92
120X	1.5	3.8	9.3	9.4	92	92
121X	1.5	3.7	9.3	9.5	92	92
122X	1.4	3.4	9.5	9.6	92	92
123X	1.2	3.5	9.5	9.6	92	92
124X	1.1	3.2	9.6	9.7	92	92
125X	1.1	3.1	9.6	9.7	92	92
126X	1.0	2.9	9.7	9.8	92	92
127X	1.0	2.9	9.7	9.4	92	92
128X	0.9	2.7	9.8	9.4	92	92
129X	0.7	2.8	9.7	9.4	92	92
130X	0.7	2.8	9.3	9.4	92	92
131X	0.7	2.7	9.3	9.5	92	92
132X	0.7	2.6	9.4	9.5	92	92
133X	0.7	2.5	9.4	9.1	92	92
134X	0.6	2.4	9.5	9.1	92	92
135X	0.5	2.4	9.5	9.1	92	92
136X	0.5	2.4	9.5	9.1	92	92
137X	0.5	2.3	9.5	9.2	92	92
138X	0.5	2.2	9.6	9.2	92	92
139X	0.5	2.1	9.6	9.3	92	92

[2]Maximum gland fill for -100 series grooves is based on a one back-up ring groove (with a MS27595 back-up ring) which is the worst case configuration for this series.

TABLE 2 - O-RING PERCENTAGE STRETCH, SQUEEZE AND GLAND FILL (CONTINUED)

Dash Number	Piston Minimum Stretch %	Piston Maximum Stretch %	Piston Minimum Squeeze +75 °F %	Rod Minimum Squeeze +75 °F %	Piston[3] Gland Max Fill +275 °F %	Rod[3] Gland Max Fill +275 °F %
140X	0.4	2.1	9.7	9.3	92	92
141X	0.3	2.2	9.1	9.2	92	92
142X	0.3	2.1	9.2	9.3	92	92
143X	0.3	2.0	9.2	9.3	92	92
144X	0.3	2.0	9.2	9.3	92	92
145X	0.3	1.9	9.3	9.4	92	92
146X	0.3	1.9	9.3	9.4	92	92
147X	0.2	1.9	9.3	9.4	92	92
148X	0.2	1.9	9.3	9.4	92	92
149X	0.2	1.8	9.3	9.4	92	92
210X	1.8	4.9	9.2	9.2	90	90
211X	2.0	4.9	9.2	9.2	89	90
212X	2.2	4.9	9.1	9.1	89	89
213X	2.4	4.9	9.1	9.1	89	89
214X	2.3	4.6	9.3	9.3	89	89
215X	2.1	4.3	9.4	9.4	89	89
216X	1.8	4.3	9.4	9.4	89	89
217X	1.7	4.0	9.6	9.6	89	89
218X	1.6	3.8	9.7	9.7	89	89
219X	1.6	3.6	9.8	9.8	89	89
220X	1.5	3.5	9.8	9.8	89	89
221X	1.4	3.3	9.9	9.9	89	89
222X	1.1	3.4	9.9	9.9	89	89
223X	1.1	3.2	9.6	9.7	89	89
224X	1.0	2.9	9.7	9.8	89	89
225X	0.9	3.0	9.7	9.4	89	89
226X	0.8	2.8	9.8	9.5	89	89
227X	0.8	2.6	9.9	9.6	89	89
228X	0.6	2.6	9.6	9.6	89	89
229X	0.6	2.4	9.6	9.7	89	89

[3]Maximum gland fill for -100 and -200 series grooves is based on a one back-up ring groove (with a MS27595 back-up ring) which is the worst case configuration for these series.

TABLE 2 - O-RING PERCENTAGE STRETCH, SQUEEZE AND GLAND FILL (CONTINUED)

Dash Number	Piston Minimum Stretch %	Piston Maximum Stretch %	Piston Minimum Squeeze +75 °F %	Rod Minimum Squeeze +75 ° %	Piston[4] Gland Max Fill +275 ° %	Rod[4] Gland Max Fill +275 °F %
230X	0.6	2.3	9.7	9.7	89	89
231X	0.5	2.2	9.8	9.8	89	89
232X	0.4	2.2	9.7	9.8	89	89
233X	0.3	2.1	9.8	9.8	89	89
234X	0.3	2.0	9.8	9.9	89	89
235X	0.3	2.0	9.9	9.9	89	89
236X	0.3	1.9	9.9	10.0	89	89
237X	0.3	1.8	10.0	10.0	89	89
238X	0.3	1.7	10.0	10.1	89	89
239X	0.2	1.8	10.0	10.0	89	89
240X	0.2	1.7	10.0	10.1	89	89
241X	0.2	1.7	10.1	10.1	89	89
242X	0.2	1.6	10.1	10.1	89	89
243X	0.1	1.6	10.1	10.2	89	89
244X	0.1	1.6	9.8	10.2	89	89
245X	0.1	1.5	9.8	10.2	89	89
246X	0.1	1.5	9.8	9.9	89	89
247X	0.1	1.4	9.9	9.9	89	89
325X	2.1	4.4	9.2	9.0	92	92
326X	2.0	4.0	9.3	9.2	92	92
327X	1.9	3.8	9.5	9.4	92	92
328X	1.7	3.5	9.6	9.3	92	92
329X	1.5	3.5	9.6	9.3	92	92
330X	1.4	3.3	9.5	9.4	92	92
331X	1.3	3.1	9.6	9.5	92	92
332X	1.2	2.9	9.7	9.6	92	92
333X	1.1	2.8	9.7	9.6	92	92
334X	1.0	2.7	9.7	9.7	92	92

[4]Maximum gland fill for -200 and -300 series grooves is based on a one back-up ring groove (with a MS27595 back-up ring) which is the worst case configuration for these series.