

Section VI – Back-Up Rings

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Back-Up Rings

6.1 Introduction

Parker's Parbak® back-up rings help prevent extrusion in high pressure service and compensate for loose fitting parts. The use of loose fitting parts makes for cost reduction in the machining of unit components.

The 90 durometer curve in Figure 3-5 may be used to find the maximum recommended clearance at a given pressure for temperatures up to 74°C (165°F) when standard Parbak rings in Parker's N1444-90 nitrile compound are used to protect an O-ring from extrusion. In using these curves, it must be remembered that cylinders tend to expand when pressurized. The clearance that the Parbak will see is the clearance between the piston and the expanded cylinder.

The extrusion curves can be used in two different ways to reap the benefits of Parbaks, depending on the application. In low pressure seals, the curves will indicate wider permissible clearances than those given in the design charts. Tolerances on these can be opened up until they permit these larger clearances to occur, resulting in substantial machining economies. When tolerances are increased, however, one must check to be sure that squeeze values do not become too high or too low.

In high pressure applications, the curves will indicate whether adding a Parbak will permit the use of standard catalog gland dimensions or whether the clearance will need to be reduced further.

In double acting seal assemblies, a Parbak is required on both sides of the O-ring. It is cheap insurance to use two Parbaks even in single acting installations. At assembly, it is too easy to place a single Parbak on the wrong side of the O-ring. By specifying one on each side of the O-ring, there will be one on the low pressure side, where it is needed, and the extra Parbak does no harm.

Unlike many PTFE back-up rings, Parbak rings are continuous; they do not have a cut because they can be stretched over the end of a piston during assembly. Hence they contact the mating O-ring uniformly, and do not cause localized wear spots.

Parbaks are contoured on one face to minimize distortion of the O-ring when under pressure, yet the orientation of the contoured face is immaterial to the proper function of the part because it is flexible.

Parbaks are quick and easy to assemble, minimizing assembly costs, and they cannot fall out of the O-ring groove. Besides their advantages as anti-extrusion devices, Parbak rings help trap lubricant, preserving the O-ring and reducing friction.

The standard sizes are listed in Table 6-1. Refer to the appropriate Design Chart for recommended groove width. Special sizes are also made to order.

6.2 Anti-Extrusion Device Design Hints

1. Wherever possible use two back-up rings, one on each side of the O-ring.
2. If only one back-up ring is used, the O-ring should be placed between it and the source of pressure.
3. Parbaks should be installed with the contoured face against the O-ring, but reversal does no harm.
4. Parker's Parbaks will not "collapse" or cold flow if used with proper groove designs.
5. Use groove widths given in the Static O-Ring Sealing and Dynamic O-Ring Sealing Sections.

6.3 Parbak Elastomer Back-Up Rings

Hard rubber back-up rings combine most of the best features of both leather and PTFE anti-extrusion devices. Although no industrial or military standards have been issued for rubber back-up rings, they have been in use for a number of years. These are special devices designed to satisfy a specific problem.

Parbaks in Parker Seal Group's standard nitrile compound, N1444-90, are generally usable through a temperature range of -40°C to 121°C (-40° to 250°F). Hardening of this material due to high or low temperatures often improves performance as a back-up ring.

Features of Parbak Rings

1. Elastic memory permits Parbak rings to be stretched into place for assembly without preconditioning or cutting.
2. Continuous construction prevents damage to the O-ring seal.
3. Lubrication is enhanced by rubber which absorbs system fluid and does not plate out on rubbing surfaces.

6.4 Other Back-Up Ring Materials

6.4.1 Polytetrafluoroethylene (PTFE) Back-Up Rings

Anti-extrusion rings made from tetrafluoroethylene are impervious to oils and solvents. Acids and inorganic salts have very little effect on PTFE resin. In addition to its good chemical resistance, PTFE may be used over a wide temperature range, from below -73°C to over 204°C (-100°F to over 400°F). Thus, PTFE back-up rings may be used with most elastomeric O-ring seals. For installation, PTFE back-up rings are supplied either scarf or spiral cut as shown in Figure 6-1. These discontinuities may contribute to seal damage due to biting and pinching. PTFE can also impair seal lubrication by plating rubbing surfaces with PTFE resin to which lubricating oil will not adhere.

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6.4.2 Metal Non-Extrusion Rings

In most cases it will be impracticable and unnecessary (under 1380 bar 20,000 psi) to design bolt and rivet seal glands that are self-tightening, i.e., tending to reduce rather than increase seal extrusion clearance as pressure increases. Adequate gland volume should be allowed, in keeping with assembly tolerances. Two designs that have been helpful in alleviating extrusion in ultra high pressure applications are shown in Figure 6-2.

6.4.3 Leather Back-Up Rings

Leather was a standard back-up ring material for many years. Manufacturers of these rings developed special processing methods and impregnations for different types of applications. Standard sizes were established for use with all standard O-rings. If there is any question concerning the suitability of leather for the application, consult the supplier. Leather back-up rings are manufactured as continuous rings and in most cases must be stretched during installation. Less damage will be incurred to the back-up rings if they are soaked in oil before installation. After installation, a short exposure to heat will shrink the leather rings back to size. Leather back-up rings should never be cut to facilitate installation.

6.5 Parbak Compound Information

Some back-up ring materials tend to leave deposits in the micro fine grooves of the surface on which they rub. An ultra smooth, wax-like surface results. Because an O-ring may wipe all lubrication from such a surface, reverse stroking is dry and greatly reduces seal life. Parbaks of N1444-90 and other rubber compounds solve this problem. They do not leave a deposit on the metal surface, thus lubrication remains.

The standard compound for Parbaks is N1444-90. Careful engineering and research has produced N1444-90 which has the best combination of characteristics for the majority of back-up ring installations — broad temperature range, proper hardness, long sealing life, and resistance to a great number of fluids. It is resistant to nearly all hydraulic fluids except certain non-flammable types such as Skydrol. It is also resistant to air and water.

Functional tests have proven that millions of cycles can be obtained with Parbaks, showing their tremendous superiority over the older types of back-up rings.

In addition to N1444-90, Parker Seal has developed other compounds for installations requiring special characteristics. Present capabilities include service at continuous temperatures as high as 204°C (400°F).

Additional assistance in specifying and using Parbak rings is available upon request by calling your Parker Seal representative.

6.6 Parker Parbak 8-Series Dimensions

Parbaks will stretch up to 50%, and are quickly and easily installed. Advantages of the contour design are obtained regardless of how Parbaks are installed. They may be installed with the concave face in either direction, toward or away from the O-ring.

Table 6-1 provides Parker Parbak 8-Series Dimensions.

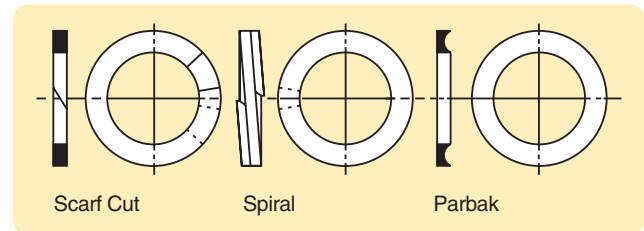


Figure 6-1: Typical Back-Up Rings

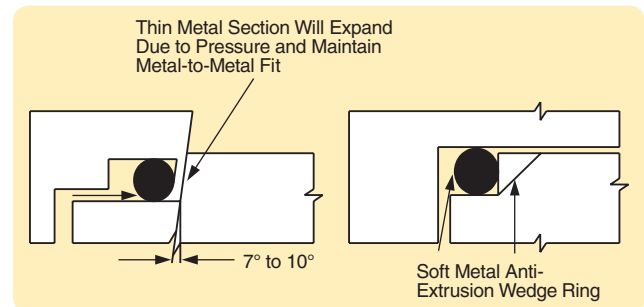
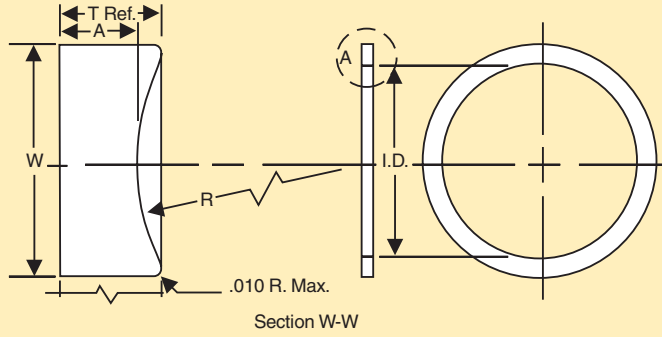


Figure 6-2: Clearance Control for High Pressure Seals

Parker Parbak 8-Series Dimensions



Parker Parbaks were developed primarily for service in petroleum based hydraulic fluids, at -4°C to 121°C (-40°F to 250°F). Parker's standard Parbak compound N1444-90, provides the maximum benefits in back-up ring service. Compounds for use in other fluids and for temperatures up to 204°C (400°F) are available upon request.

Parbaks will stretch up to 50%, and are quickly and easily installed. Advantages of the contour design are obtained regardless of how Parbaks are installed — they may be installed with the concave face in either direction, toward or away from the O-ring.

Parker Parbak 8-Series Dimensions

Dash No.	I.D. (in.)	Tol. ±	R ±.010	T (Ref.)	A (in.)	Tol. ±	W (in.)	Tol. ±	Dash No.	I.D. (in.)	Tol. ±	R ±.010	T (Ref.)	A (in.)	Tol. ±	W (in.)	Tol. ±
004	.096	.005	.087	.049	.045	.003	.053	.003	041	3.018	.024	.087	.049	.045	.003	.053	.003
005	.127	↑	↑	↑	↑	↑	↑	↑	042	3.268	.024	↑	↑	↑	↑	↑	↑
006	.140	↑	↑	↑	↑	↑	↑	↑	043	3.518	.024	↑	↑	↑	↑	↑	↑
007	.171	↑	↑	↑	↑	↑	↑	↑	044	3.768	.027	↑	↑	↑	↑	↑	↑
008	.202	↑	↑	↑	↑	↑	↑	↑	045	4.018	.027	↑	↑	↑	↑	↑	↑
009	.234	↑	↑	↑	↑	↑	↑	↑	046	4.268	.030	↑	↑	↑	↑	↑	↑
010	.265	↑	↑	↑	↑	↑	↑	↑	047	4.518	.030	↑	↑	↑	↑	↑	↑
011	.327	↑	↑	↑	↑	↑	↑	↑	048	4.768	.030	↑	↑	↑	↑	↑	↑
012	.390	↑	↑	↑	↑	↑	↑	↑	049	5.018	.037	↑	↑	↑	↑	↑	↑
013	.455	.005	↑	↑	↑	↑	↑	↑	050	5.268	.037	.087	.049	↑	↑	.053	↑
014	.518	.005	↑	↑	↑	↑	↑	↑	102	.077	.005	.129	.053	↑	↑	.086	↑
015	.580	.007	↑	↑	↑	↑	↑	↑	103	.109	↑	↑	↑	↑	↑	↑	↑
016	.643	.009	↑	↑	↑	↑	↑	↑	104	.140	↑	↑	↑	↑	↑	↑	↑
017	.705	↑	↑	↑	↑	↑	↑	↑	105	.171	↑	↑	↑	↑	↑	↑	↑
018	.768	↑	↑	↑	↑	↑	↑	↑	106	.202	↑	↑	↑	↑	↑	↑	↑
019	.830	↑	↑	↑	↑	↑	↑	↑	107	.234	↑	↑	↑	↑	↑	↑	↑
020	.893	.009	↑	↑	↑	↑	↑	↑	108	.265	↑	↑	↑	↑	↑	↑	↑
021	.955	.010	↑	↑	↑	↑	↑	↑	109	.327	↑	↑	↑	↑	↑	↑	↑
022	1.018	.010	↑	↑	↑	↑	↑	↑	110	.390	↑	↑	↑	↑	↑	↑	↑
023	1.080	.010	↑	↑	↑	↑	↑	↑	111	.452	↑	↑	↑	↑	↑	↑	↑
024	1.143	.010	↑	↑	↑	↑	↑	↑	112	.515	.005	↑	↑	↑	↑	↑	↑
025	1.205	.011	↑	↑	↑	↑	↑	↑	113	.577	.007	↑	↑	↑	↑	↑	↑
026	1.268	.011	↑	↑	↑	↑	↑	↑	114	.640	.009	↑	↑	↑	↑	↑	↑
027	1.330	.011	↑	↑	↑	↑	↑	↑	115	.702	.009	↑	↑	↑	↑	↑	↑
028	1.393	.013	↑	↑	↑	↑	↑	↑	116	.765	.009	↑	↑	↑	↑	↑	↑
029	1.518	.013	↑	↑	↑	↑	↑	↑	117	.831	.010	↑	↑	↑	↑	↑	↑
030	1.643	.013	↑	↑	↑	↑	↑	↑	118	.893	↑	↑	↑	↑	↑	↑	↑
031	1.768	.015	↑	↑	↑	↑	↑	↑	119	.956	↑	↑	↑	↑	↑	↑	↑
032	1.893	.015	↑	↑	↑	↑	↑	↑	120	1.018	↑	↑	↑	↑	↑	↑	↑
033	2.018	.018	↑	↑	↑	↑	↑	↑	121	1.081	↑	↑	↑	↑	↑	↑	↑
034	2.143	↑	↑	↑	↑	↑	↑	↑	122	1.143	.010	↑	↑	↑	↑	↑	↑
035	2.268	↑	↑	↑	↑	↑	↑	↑	123	1.206	.012	↑	↑	↑	↑	↑	↑
036	2.393	↑	↑	↑	↑	↑	↑	↑	124	1.268	↑	↑	↑	↑	↑	↑	↑
037	2.518	.018	↑	↑	↑	↑	↑	↑	125	1.331	↑	↑	↑	↑	↑	↑	↑
038	2.643	.020	↑	↑	↑	↑	↑	↑	126	1.393	↑	↑	↑	↑	↑	↑	↑
039	2.768	.020	↑	↑	↑	↑	↑	↑	127	1.456	↑	↑	↑	↑	↑	↑	↑
040	2.893	.020	.087	.049	.045	.003	.053	.003	128	1.518	.012	.129	.053	.045	.003	.086	.003

Notes: 1. Parbak sizes are designed to correspond with the Parker 2-xxx, 3-xxx and AS568A series O-ring with which they are used.
 2. Complete call-out consists of the digit 8, the dash number for the size wanted and the rubber material. **Example:** N1444-90 8-009.

Table 6-1: Parker Parbak 8-Series Dimensions

Parker Parbak 8-Series Dimensions (Continued)

Dash No.	I.D. (in.)	Tol. ±	R ±.010	T (Ref.)	A (in.)	Tol. ±	W (in.)	Tol. ±	Dash No.	I.D. (in.)	Tol. ±	R ±.010	T (Ref.)	A (in.)	Tol. ±	W (in.)	Tol. ±
129	1.581	.015	↑	↑	↑	↑	↑	↑	206	.518	.005	↑	↑	↑	↑	↑	↑
130	1.643	↑	↑	↑	↑	↑	↑	↑	207	.580	.007	↑	↑	↑	↑	↑	↑
131	1.706	↑	↑	↑	↑	↑	↑	↑	208	.643	.009	↑	↑	↑	↑	↑	↑
132	1.768	↑	↑	↑	↑	↑	↑	↑	209	.705	.009	↑	↑	↑	↑	↑	↑
133	1.831	↓	↑	↑	↑	↑	↑	↑	210	.766	.010	↑	↑	↑	↑	↑	↑
134	1.893	.015	↑	↑	↑	↑	↑	↑	211	.828	↑	↑	↑	↑	↑	↑	↑
135	1.956	.017	↑	↑	↑	↑	↑	↑	212	.891	↓	↑	↑	↑	↑	↑	↑
136	2.018	↑	↑	↑	↑	↑	↑	↑	213	.953	↓	↑	↑	↑	↑	↑	↑
137	2.081	↓	↑	↑	↑	↑	↑	↑	214	1.016	.010	↑	↑	↑	↑	↑	↑
138	2.143	.017	↑	↑	↑	↑	↑	↑	215	1.078	.010	↑	↑	↑	↑	↑	↑
139	2.206	.017	↑	↑	↑	↑	↑	↑	216	1.141	.012	↑	↑	↑	↑	↑	↑
140	2.268	.017	↑	↑	↑	↑	↑	↑	217	1.203	↑	↑	↑	↑	↑	↑	↑
141	2.331	.020	↑	↑	↑	↑	↑	↑	218	1.266	↓	↑	↑	↑	↑	↑	↑
142	2.393	↑	↑	↑	↑	↑	↑	↑	219	1.334	↓	↑	↑	↑	↑	↑	↑
143	2.456	↓	↑	↑	↑	↑	↑	↑	220	1.397	↓	↑	↑	↑	↑	↑	↑
144	2.518	↓	↑	↑	↑	↑	↑	↑	221	1.459	.012	↑	↑	↑	↑	↑	↑
145	2.581	↓	↑	↑	↑	↑	↑	↑	222	1.522	.015	↑	↑	↑	↑	↑	↑
146	2.643	.020	↑	↑	↑	↑	↑	↑	223	1.647	.015	↑	↑	↑	↑	↑	↑
147	2.706	.022	↑	↑	↑	↑	↑	↑	224	1.772	.015	↑	↑	↑	↑	↑	↑
148	2.768	↑	↑	↑	↑	↑	↑	↑	225	1.897	.018	↑	↑	↑	↑	↑	↑
149	2.831	↓	↑	↑	↑	↑	↑	↑	226	2.022	.018	↑	↑	↑	↑	↑	↑
150	2.893	.022	↑	↑	↑	↑	↑	↑	227	2.147	.018	↑	↑	↑	↑	↑	↑
151	3.018	.024	↑	↑	↑	↑	↑	↑	228	2.272	.020	↑	↑	↑	↑	↑	↑
152	3.268	.024	↑	↑	↑	↑	↑	↑	229	2.397	.020	↑	↑	↑	↑	↑	↑
153	3.518	.024	↑	↑	↑	↑	↑	↑	230	2.522	.020	↑	↑	↑	↑	↑	↑
154	3.768	.028	↑	↑	↑	↑	↑	↑	231	2.631	.020	↑	↑	↑	↑	↑	↑
155	4.018	.028	↑	↑	↑	↑	↑	↑	232	2.756	.024	↑	↑	↑	↑	↑	↑
156	4.268	.030	↑	↑	↑	↑	↑	↑	233	2.881	↑	↑	↑	↑	↑	↑	↑
157	4.518	.030	↑	↑	↑	↑	↑	↑	234	3.006	↑	↑	↑	↑	↑	↑	↑
158	4.768	.030	↑	↑	↑	↑	↑	↑	235	3.131	↑	↑	↑	↑	↑	↑	↑
159	5.018	.035	↑	↑	↑	↑	↑	↑	236	3.256	↓	↑	↑	↑	↑	↑	↑
160	5.268	↑	↑	↑	↑	↑	↑	↑	237	3.381	↓	↑	↑	↑	↑	↑	↑
161	5.518	↓	↑	↑	↑	↑	↑	↑	238	3.506	.024	↑	↑	↑	↑	↑	↑
162	5.768	↓	↑	↑	↑	↑	↑	↑	239	3.631	.028	↑	↑	↑	↑	↑	↑
163	6.018	.035	↑	↑	↑	↑	↑	↑	240	3.756	↑	↑	↑	↑	↑	↑	↑
164	6.268	.040	↑	↑	↑	↑	↑	↑	241	3.881	↓	↑	↑	↑	↑	↑	↑
165	6.518	↑	↑	↑	↑	↑	↑	↑	242	4.006	↓	↑	↑	↑	↑	↑	↑
166	6.768	↓	↑	↑	↑	↑	↑	↑	243	4.131	.028	↑	↑	↑	↑	↑	↑
167	7.018	.040	↑	↑	↑	↑	↑	↑	244	4.256	.030	↑	↑	↑	↑	↑	↑
168	7.268	.045	↑	↑	↑	↑	↑	↑	245	4.381	↑	↑	↑	↑	↑	↑	↑
169	7.518	↑	↑	↑	↑	↑	↑	↑	246	4.506	↓	↑	↑	↑	↑	↑	↑
170	7.768	↓	↑	↑	↑	↑	↑	↑	247	4.631	↓	↑	↑	↑	↑	↑	↑
171	8.018	.045	↑	↑	↑	↑	↑	↑	248	4.768	.030	↑	↑	↑	↑	↑	↑
172	8.268	.050	↑	↑	↑	↑	↑	↑	249	4.893	.035	↑	↑	↑	↑	↑	↑
173	8.518	↑	↑	↑	↑	↑	↑	↑	250	5.018	↑	↑	↑	↑	↑	↑	↑
174	8.768	↓	↑	↑	↑	↑	↑	↑	251	5.143	↑	↑	↑	↑	↑	↑	↑
175	9.018	.050	↑	↑	↑	↑	↑	↑	252	5.268	↓	↑	↑	↑	↑	↑	↑
176	9.268	.055	↓	↓	↓	↓	↓	↓	253	5.393	↓	↑	↑	↑	↑	↑	↑
177	9.518	.055	↓	↓	↓	↓	↓	↓	254	5.518	↓	↑	↑	↑	↑	↑	↑
178	9.768	.055	.129	.053	.045	↓	.086	.003	255	5.643	↓	↑	↑	↑	↑	↑	↑
201	.202	.005	↑	↑	↑	↓	.118	.004	256	5.768	↓	↑	↑	↑	↑	↑	↑
202	.265	↑	↑	↑	↑	↓	↑	↑	257	5.893	↓	↑	↑	↑	↑	↑	↑
203	.327	↓	↑	↑	↑	↓	↑	↑	258	6.018	.035	↑	↑	↑	↑	↑	↑
204	.390	↓	↑	↑	↑	↓	↑	↑	259	6.268	.040	↑	↑	↑	↑	↑	↑
205	.455	.005	.174	.050	.040	.003	.118	.004	260	6.518	.040	↓	↓	↓	↓	↓	↓
									261	6.768	.040	.174	.050	.040	.003	.118	.004

Notes: 1. Parbak sizes are designed to correspond with the Parker 2-xxx, 3-xxx and AS568A series O-ring with which they are used.
 2. Complete call-out consists of the digit 8, the dash number for the size wanted and the rubber material. **Example:** N1444-90 8-009.

Table 6-1: Parker Parbak 8-Series Dimensions

Parker Parbak 8-Series Dimensions (Continued)

Dash No.	I.D. (in.)	Tol. ±	R ±.010	T (Ref.)	A (in.)	Tol. ±	W (in.)	Tol. ±	Dash No.	I.D. (in.)	Tol. ±	R ±.010	T (Ref.)	A (in.)	Tol. ±	W (in.)	Tol. ±
262	7.018	.040	.174	.050	.040	.003	.118	.004	341	3.523	.024	.262	.076	.060	.004	.183	.005
263	7.268	.045	↑	↑	↑	↑	↑	↑	342	3.648	.028	↑	↑	↑	↑	↑	↑
264	7.518	↑	↑	↑	↑	↑	↑	↑	343	3.773	↑	↑	↑	↑	↑	↑	↑
265	7.768	↓	↑	↑	↑	↑	↑	↑	344	3.898	↑	↑	↑	↑	↑	↑	↑
266	8.018	.045	↑	↑	↑	↑	↑	↑	345	4.028	↓	↑	↑	↑	↑	↑	↑
267	8.268	.050	↑	↑	↑	↑	↑	↑	346	4.153	.028	↑	↑	↑	↑	↑	↑
268	8.518	↑	↑	↑	↑	↑	↑	↑	347	4.278	.030	↑	↑	↑	↑	↑	↑
269	8.768	↓	↑	↑	↑	↑	↑	↑	348	4.403	↑	↑	↑	↑	↑	↑	↑
270	9.018	.050	↑	↑	↑	↑	↑	↑	349	4.528	↑	↑	↑	↑	↑	↑	↑
271	9.268	.055	↑	↑	↑	↑	↑	↑	350	4.653	↑	↑	↑	↑	↑	↑	↑
272	9.518	.055	↑	↑	↑	↑	↑	↑	351	4.778	↓	↑	↑	↑	↑	↑	↑
273	9.768	.055	↑	↑	↑	↑	↑	↑	352	4.903	.030	↑	↑	↑	↑	↑	↑
274	10.018	.055	↑	↑	↑	↑	↑	↑	353	5.028	.037	↑	↑	↑	↑	↑	↑
275	10.518	.055	↑	↑	↑	↑	↑	↑	354	5.153	.037	↑	↑	↑	↑	↑	↑
276	11.018	.065	↑	↑	↑	↑	↑	↑	355	5.278	.037	↑	↑	↑	↑	↑	↑
277	11.518	↑	↑	↑	↑	↑	↑	↑	356	5.403	.037	↑	↑	↑	↑	↑	↑
278	12.018	↑	↑	↑	↑	↑	↑	↑	357	5.528	↑	↑	↑	↑	↑	↑	↑
279	13.018	↓	↑	↑	↑	↑	↑	↑	358	5.653	↑	↑	↑	↑	↑	↑	↑
280	14.018	↓	↑	↑	↑	↑	↑	↑	359	5.778	↓	↑	↑	↑	↑	↑	↑
281	15.018	.065	↑	↑	↑	↑	↑	↑	360	5.903	↓	↑	↑	↑	↑	↑	↑
282	15.989	.075	↓	↓	↓	↓	↓	↓	361	6.028	.037	↑	↑	↑	↑	↑	↑
283	16.989	.080	↓	↓	↓	↓	↓	↓	362	6.278	.040	↑	↑	↑	↑	↑	↑
284	17.989	.085	.174	.050	.040	.003	.118	.004	363	6.528	↑	↑	↑	↑	↑	↑	↑
309	.450	.005	.262	.076	.060	.004	.183	.005	364	6.778	↓	↑	↑	↑	↑	↑	↑
310	.513	.005	↑	↑	↑	↑	↑	↑	365	7.028	.040	↑	↑	↑	↑	↑	↑
311	.575	.007	↑	↑	↑	↑	↑	↑	366	7.278	.045	↑	↑	↑	↑	↑	↑
312	.638	.009	↑	↑	↑	↑	↑	↑	367	7.528	↑	↑	↑	↑	↑	↑	↑
313	.700	.009	↑	↑	↑	↑	↑	↑	368	7.778	↓	↑	↑	↑	↑	↑	↑
314	.763	.010	↑	↑	↑	↑	↑	↑	369	8.028	.045	↑	↑	↑	↑	↑	↑
315	.825	↑	↑	↑	↑	↑	↑	↑	370	8.278	.050	↑	↑	↑	↑	↑	↑
316	.888	↑	↑	↑	↑	↑	↑	↑	371	8.528	↑	↑	↑	↑	↑	↑	↑
317	.950	↓	↑	↑	↑	↑	↑	↑	372	8.778	↓	↑	↑	↑	↑	↑	↑
318	1.013	↓	↑	↑	↑	↑	↑	↑	373	9.028	.050	↑	↑	↑	↑	↑	↑
319	1.075	.010	↑	↑	↑	↑	↑	↑	374	9.278	.055	↑	↑	↑	↑	↑	↑
320	1.138	.012	↑	↑	↑	↑	↑	↑	375	9.528	↑	↑	↑	↑	↑	↑	↑
321	1.200	.012	↑	↑	↑	↑	↑	↑	376	9.778	↓	↑	↑	↑	↑	↑	↑
322	1.263	.012	↑	↑	↑	↑	↑	↑	377	10.028	.055	↑	↑	↑	↑	↑	↑
323	1.316	.012	↑	↑	↑	↑	↑	↑	378	10.528	.060	↑	↑	↑	↑	↑	↑
324	1.388	.012	↑	↑	↑	↑	↑	↑	379	11.028	.060	↑	↑	↑	↑	↑	↑
325	1.513	.015	↑	↑	↑	↑	↑	↑	380	11.528	.065	↑	↑	↑	↑	↑	↑
326	1.638	↑	↑	↑	↑	↑	↑	↑	381	12.028	.065	↑	↑	↑	↑	↑	↑
327	1.763	↑	↑	↑	↑	↑	↑	↑	382	13.028	.065	↑	↑	↑	↑	↑	↑
328	1.888	.015	↑	↑	↑	↑	↑	↑	383	14.028	.070	↑	↑	↑	↑	↑	↑
329	2.013	.018	↑	↑	↑	↑	↑	↑	384	15.028	.070	↑	↑	↑	↑	↑	↑
330	2.138	↑	↑	↑	↑	↑	↑	↑	385	16.008	.075	↑	↑	↑	↑	↑	↑
331	2.268	↓	↑	↑	↑	↑	↑	↑	386	17.008	.080	↑	↑	↑	↑	↑	↑
332	2.393	.018	↑	↑	↑	↑	↑	↑	387	18.008	.085	↑	↑	↑	↑	↑	↑
333	2.518	.020	↑	↑	↑	↑	↑	↑	388	19.006	.090	↑	↑	↑	↑	↑	↑
334	2.643	.020	↑	↑	↑	↑	↑	↑	389	20.006	.095	↑	↑	↑	↑	↑	↑
335	2.768	.020	↑	↑	↑	↑	↑	↑	390	21.006	.095	↑	↑	↑	↑	↑	↑
336	2.893	.020	↑	↑	↑	↑	↑	↑	391	22.006	.100	↑	↑	↑	↑	↑	↑
337	3.018	.024	↑	↑	↑	↑	↑	↑	392	22.993	.105	↑	↑	↑	↑	↑	↑
338	3.143	↑	↑	↑	↑	↑	↑	↑	393	23.993	.110	↑	↑	↑	↑	↑	↑
339	3.273	↓	↑	↑	↑	↑	↑	↑	394	24.993	.115	↓	↓	↓	↓	↓	↓
340	3.398	.024	.262	.076	.060	.004	.183	.005	395	25.993	.120	.262	.076	.060	.004	.183	.005

Notes: 1. Parbak sizes are designed to correspond with the Parker 2-xxx, 3-xxx and AS568A series O-ring with which they are used.
 2. Complete call-out consists of the digit 8, the dash number for the size wanted and the rubber material. **Example:** N1444-90 8-009.

Table 6-1: Parker Parbak 8-Series Dimensions



Parker Parbak 8-Series Dimensions (Continued)

Dash No.	I.D. (in.)	Tol. ±	R ±.010	T (Ref.)	A (in.)	Tol. ±	W (in.)	Tol. ±	Dash No.	I.D. (in.)	Tol. ±	R ±.010	T (Ref.)	A (in.)	Tol. ±	W (in.)	Tol. ±
425	4.551	.033	.344	.117	.096	.005	.236	.006	451	11.024	.060	.344	.117	.096	.005	.236	.006
426	4.676	↑	↑	↑	↑	↑	↑	↑	452	11.524	↑	↑	↑	↑	↑	↑	↑
427	4.801	↑	↑	↑	↑	↑	↑	↑	453	12.024	↑	↑	↑	↑	↑	↑	↑
428	4.926	.033	↑	↑	↑	↑	↑	↑	454	12.524	↓	↑	↑	↑	↑	↑	↑
429	5.051	.037	↑	↑	↑	↑	↑	↑	455	13.024	.060	↑	↑	↑	↑	↑	↑
430	5.176	↑	↑	↑	↑	↑	↑	↑	456	13.524	.070	↑	↑	↑	↑	↑	↑
431	5.301	↑	↑	↑	↑	↑	↑	↑	457	14.024	↑	↑	↑	↑	↑	↑	↑
432	5.426	↑	↑	↑	↑	↑	↑	↑	458	14.524	↑	↑	↑	↑	↑	↑	↑
433	5.551	↑	↑	↑	↑	↑	↑	↑	459	15.024	↓	↑	↑	↑	↑	↑	↑
434	5.676	↑	↑	↑	↑	↑	↑	↑	460	15.524	.070	↑	↑	↑	↑	↑	↑
435	5.801	↓	↑	↑	↑	↑	↑	↑	461	16.004	.075	↑	↑	↑	↑	↑	↑
436	5.926	↓	↑	↑	↑	↑	↑	↑	462	16.504	.075	↑	↑	↑	↑	↑	↑
437	6.051	.037	↑	↑	↑	↑	↑	↑	463	17.004	.080	↑	↑	↑	↑	↑	↑
438	6.274	.040	↑	↑	↑	↑	↑	↑	464	17.504	.085	↑	↑	↑	↑	↑	↑
439	6.524	↑	↑	↑	↑	↑	↑	↑	465	18.004	.085	↑	↑	↑	↑	↑	↑
440	6.774	↓	↑	↑	↑	↑	↑	↑	466	18.504	.085	↑	↑	↑	↑	↑	↑
441	7.024	.040	↑	↑	↑	↑	↑	↑	467	19.004	.090	↑	↑	↑	↑	↑	↑
442	7.274	.045	↑	↑	↑	↑	↑	↑	468	19.504	.090	↑	↑	↑	↑	↑	↑
443	7.524	↑	↑	↑	↑	↑	↑	↑	469	20.004	.095	↑	↑	↑	↑	↑	↑
444	7.774	↓	↑	↑	↑	↑	↑	↑	470	21.004	.095	↑	↑	↑	↑	↑	↑
445	8.024	.045	↑	↑	↑	↑	↑	↑	471	22.004	.100	↑	↑	↑	↑	↑	↑
446	8.524	.055	↑	↑	↑	↑	↑	↑	472	23.004	.105	↑	↑	↑	↑	↑	↑
447	9.024	↑	↑	↑	↑	↑	↑	↑	473	24.004	.110	↑	↑	↑	↑	↑	↑
448	9.524	↑	↑	↑	↑	↑	↑	↑	474	25.004	.115	↓	↓	↓	↓	↓	↓
449	10.024	.055	↓	↓	↓	↓	↓	↓	475	26.004	.120	.344	.117	.096	.005	.236	.006
450	10.524	.060	.344	.117	.096	.005	.236	.006									

- Notes: 1. Parbak sizes are designed to correspond with the Parker 2-xxx, 3-xxx and AS568A series O-ring with which they are used.
 2. Complete call-out consists of the digit 8, the dash number for the size wanted and the rubber material. **Example:** N1444-90 8-009.

Table 6-1: Parker Parbak 8-Series Dimensions

Back-Up Rings Cross Reference

This cross reference chart is to be utilized when considering the use of Parker's Parbak back-up rings as a retrofit for a

PTFE or leather back-up. Keep in mind, there is **not** a military specification that pertains to Parker's Parbak series back-up rings. This chart is intended as a retrofit guideline only.

Back-Up Rings Cross Reference

Parker N1444-90	MIL-W-5521 Leather	AS8791 PTFE	AS8791 PTFE	MIL-W-5521 Leather	Parker N1444-90	MIL-W-5521 Leather	AS8791 PTFE	AS8791 PTFE	MIL-W-5521 Leather
Parker Parbak Size No.*1	AN6244 ¹ AN6246 ¹	MS27595 ¹ MS28774 ² Dash No.	MS28782 ³ MS28783 ³	MS35803 ¹ Dash No.	Parker Parbak Size No.*1	AN6244 ¹ AN6246 ¹	MS27595 ¹ MS28774 ² Dash No.	MS28782 ³ MS28783 ³	MS35803 ¹ Dash No.
8-004		-004			8-130		-130		
8-005		-005			8-131		-131		
8-006	AN6246-1	-006	MS28782-1	-6	8-132		-132		
8-007	AN6246-2	-007	MS28782-2	-7	8-133		-133		
8-008	AN6246-3	-008	MS28782-3	-8	8-134		-134		
8-009	AN6246-4	-009	MS28782-4	-9	8-135		-135		
8-010	AN6246-5	-010	MS28782-5	-10	8-136		-136		
8-011	AN6246-6	-011	MS28782-6	-11	8-137		-137		
8-012	AN6246-7	-012	MS28782-7	-12	8-138		-138		
8-013		-013			8-139		-139		
8-014		-014			8-140		-140		
8-015		-015			8-141		-141		
8-016		-016			8-142		-142		
8-017		-017			8-143		-143		
8-018		-018			8-144		-144		
8-019		-019			8-145		-145		
8-020		-020			8-146		-146		
8-021		-021			8-147		-147		
8-022		-022			8-148		-148		
8-023		-023			8-149		-149		
8-024		-024			8-210	AN6246-15	-210	MS28782-15	-210
8-025		-025			8-211	AN6246-16	-211	MS28782-16	-211
8-026		-026			8-212	AN6246-17	-212	MS28782-17	-212
8-027		-027			8-213	AN6246-18	-213	MS28782-18	-213
8-028		-028			8-214	AN6246-19	-214	MS28782-19	-214
8-110	AN6246-8	-110	MS28782-8	-110	8-215	AN6246-20	-215	MS28782-20	-215
8-111	AN6246-9	-111	MS28782-9	-111	8-216	AN6246-21	-216	MS28782-21	-216
8-112	AN6246-10	-112	MS28782-10	-112	8-217	AN6246-22	-217	MS28782-22	-217
8-113	AN6246-11	-113	MS28782-11	-113	8-218	AN6246-23	-218	MS28782-23	-218
8-114	AN6246-12	-114	MS28782-12	-114	8-219	AN6246-24	-219	MS28782-24	-219
8-115	AN6246-13	-115	MS28782-13	-115	8-220	AN6246-25	-220	MS28782-25	-220
8-116	AN6246-14	-116	MS28782-14	-116	8-221	AN6246-26	-221	MS28782-26	-221
8-117		-117			8-222	AN6246-27	-222	MS28782-27	-222
8-118		-118			8-223	AN6244-1	-223	MS28783-1	-223
8-119		-119			8-224	AN6244-2	-224	MS28783-2	-224
8-120		-120			8-225	AN6244-3	-225	MS28783-3	-225
8-121		-121			8-226	AN6244-4	-226	MS28783-4	-226
8-122		-122			8-227	AN6244-5	-227	MS28783-5	-227
8-123		-123			8-228	AN6244-6	-228	MS28783-6	-228
8-124		-124			8-229	AN6244-7	-229	MS28783-7	-229
8-125		-125			8-230	AN6244-8	-230	MS28783-8	-230
8-126		-126			8-231	AN6244-9	-231	MS28783-9	-231
8-127		-127			8-232	AN6244-10	-232	MS28783-10	-232
8-128		-128			8-233	AN6244-11	-233	MS28783-11	-233
8-129		-129			8-234	AN6244-12	-234	MS28783-12	-234

*Add Parker compound number N1444-90 to complete the call out. Example: N1444-90 8-009.

Note: These corresponding part numbers do not have identical dimensions, but they are intended for use with O-rings of the same dimensions. Parbak sizes with no corresponding military part number are not shown.

1. Continuous back-up ring.
2. Single turn, scarf cut.
3. Double turn.

Table 6-2: Back-Up Rings Cross Reference



Back-Up Rings Cross Reference (Continued)

Parker N1444-90	MIL-W-5521 Leather	AS8791 PTFE	AS8791 PTFE	MIL-W-5521 Leather	Parker N1444-90	MIL-W-5521 Leather	AS8791 PTFE	AS8791 PTFE	MIL-W-5521 Leather
Parker Parbak Size No.*1	AN6244 ¹ AN6246 ¹	MS27595 ¹ MS28774 ² Dash No.	MS28782 ³ MS28783 ³	MS35803 ¹ Dash No.	Parker Parbak Size No.*1	AN6244 ¹ AN6246 ¹	MS27595 ¹ MS28774 ² Dash No.	MS28782 ³ MS28783 ³	MS35803 ¹ Dash No.
8-235	AN6244-13	-235	MS28783-13	-235	8-336	AN6246-39	-336	MS28782-39	-336
8-236	AN6244-14	-236	MS28783-14	-236	8-337	AN6246-40	-337	MS28782-40	-337
8-237	AN6244-15	-237	MS28783-15	-237	8-338	AN6246-41	-338	MS28782-41	-338
8-238	AN6244-16	-238	MS28783-16	-238	8-339	AN6246-42	-339	MS28782-42	-339
8-239	AN6244-17	-239	MS28783-17	-239	8-340	AN6246-43	-340	MS28782-43	-340
8-240	AN6244-18	-240	MS28783-18	-240	8-341	AN6246-44	-341	MS28782-44	-341
8-241	AN6244-19	-241	MS28783-19	-241	8-342	AN6246-45	-342	MS28782-45	-342
8-242	AN6244-20	-242	MS28783-20	-242	8-343	AN6246-46	-343	MS28782-46	-343
8-243	AN6244-21	-243	MS28783-21	-243	8-344	AN6246-47	-344	MS28782-47	-344
8-244	AN6244-22	-244	MS28783-22	-244	8-345	AN6246-48	-345	MS28782-48	-345
8-245	AN6244-23	-245	MS28783-23	-245	8-346	AN6246-49	-346	MS28782-49	-346
8-246	AN6244-24	-246	MS28783-24	-246	8-347	AN6246-50	-347	MS28782-50	-347
8-247	AN6244-25	-247	MS28783-25	-247	8-348	AN6246-51	-348	MS28782-51	-348
8-248	AN6244-26				8-349	AN6246-52	-349	MS28782-52	-349
8-249	AN6244-27				8-425	AN6246-88	-425	MS28782-88	-425
8-250	AN6244-28				8-426	AN6246-53	-426	MS28782-53	-426
8-251	AN6244-29				8-427	AN6246-54	-427	MS28782-54	-427
8-252	AN6244-30				8-428	AN6246-55	-428	MS28782-55	-428
8-253	AN6244-31				8-429	AN6246-56	-429	MS28782-56	-429
8-254	AN6244-32				8-430	AN6246-57	-430	MS28782-57	-430
8-255	AN6244-33				8-431	AN6246-58	-431	MS28782-58	-431
8-256	AN6244-34				8-432	AN6246-59	-432	MS28782-59	-432
8-257	AN6244-35				8-433	AN6246-60	-433	MS28782-60	-433
8-258	AN6244-36				8-434	AN6246-61	-434	MS28782-61	-434
8-259	AN6244-37				8-435	AN6246-62	-435	MS28782-62	-435
8-260	AN6244-38				8-436	AN6246-63	-436	MS28782-63	-436
8-261	AN6244-39				8-437	AN6246-64	-437	MS28782-64	-437
8-262	AN6244-40				8-438	AN6246-65	-438	MS28782-65	-438
8-263	AN6244-41				8-439	AN6246-66	-439	MS28782-66	-439
8-264	AN6244-42				8-440	AN6246-67	-440	MS28782-67	-440
8-265	AN6244-43				8-441	AN6246-68	-441	MS28782-68	-441
8-266	AN6244-44				8-442	AN6246-69	-442	MS28782-69	-442
8-267	AN6244-45				8-443	AN6246-70	-443	MS28782-70	-443
8-268	AN6244-46				8-444	AN6246-71	-444	MS28782-71	-444
8-269	AN6244-47				8-445	AN6246-72	-445	MS28782-72	-445
8-270	AN6244-48				8-446	AN6246-73	-446	MS28782-73	-446
8-271	AN6244-49				8-447	AN6246-74	-447	MS28782-74	-447
8-272	AN6244-50				8-448	AN6246-75	-448	MS28782-75	-448
8-273	AN6244-51				8-449	AN6246-76	-449	MS28782-76	-449
8-274	AN6244-52				8-450	AN6246-77	-450	MS28782-77	-450
8-325	AN6246-28	-325	MS28782-28	-325	8-451	AN6246-78	-451	MS28782-78	-451
8-326	AN6246-29	-326	MS28782-29	-326	8-452	AN6246-79	-452	MS28782-79	-452
8-327	AN6246-30	-327	MS28782-30	-327	8-453	AN6246-80	-453	MS28782-80	-453
8-328	AN6246-31	-328	MS28782-31	-328	8-454	AN6246-81	-454	MS28782-81	-454
8-329	AN6246-32	-329	MS28782-32	-329	8-455	AN6246-82	-455	MS28782-82	-455
8-330	AN6246-33	-330	MS28782-33	-330	8-456	AN6246-83	-456	MS28782-83	-456
8-331	AN6246-34	-331	MS28782-34	-331	8-457	AN6246-84	-457	MS28782-84	-457
8-332	AN6246-35	-332	MS28782-35	-332	8-458	AN6246-85	-458	MS28782-85	-458
8-333	AN6246-36	-333	MS28782-36	-333	8-459	AN6246-86	-459	MS28782-86	-459
8-334	AN6246-37	-334	MS28782-37	-334	8-460	AN6246-87	-460	MS28782-87	-460
8-335	AN6246-38	-335	MS28782-38	-335					

*Add Parker compound number N1444-90 to complete the call out. Example: N1444-90 8-009.
 Note: These corresponding part numbers do not have identical dimensions, but they are intended for use with O-rings of the same dimensions. Parbak sizes with no corresponding military part number are not shown.

1. Continuous back-up ring.
2. Single turn, scarf cut.
3. Double turn.

Table 6-2: Back-Up Rings Cross Reference



Comparison of Parbak vs. PTFE and Leather Back-Up

Parker Parbaks	PTFE Back-Up Rings	Leather Back-Up Rings
Continuous ring.	Spiral or scarf-cut for most applications. This discontinuity is often a cause of leaks or damage to the O-ring.	Continuous ring.
Easiest and quickest to assemble in either piston or cylinder groove.	Moderately simple to assemble. Scarf or spiral cut can be opened, for assembling over piston or doubled over itself for assembly into cylinder groove.	Difficult to assemble over piston. Must be soaked in oil, stretched, then pounded into place. Less difficult to assemble into cylinder groove.
Good resistance to extrusion. Standard material satisfactory up to (121°C) 250°F. Other compounds available for temperatures as high as (204°C) 400°F.	Tends to soften and extrude at temperatures around (149°C) 300°F.	Tends to harden and crack at high temperature.
Does not cause overly smooth rubbing surface. Maintains lubrication.	Deposits on rubbing surface making it extremely smooth. The O-ring then wipes the surface dry.	Does not cause overly smooth rubbing surface. Maintains lubrication.
Good resistance to radiation. Can be made in compound having even better resistance when required.	Fair resistance to radiation.	No information available.
Continuous ring with no loose particles or sections.	Thin sections of spiral may become lodged under O-ring causing leakage.	Loose leather fibers may become lodged under O-ring causing leakage.
No scarf cut to open. Coefficient of thermal expansion comparable to O-ring material.	Low temperature shrinkage may open up scarf cut, causing temperature leakage.	Continuous ring.
Continuous ring, no scarf cut.	High temperature expansion may overlap scarf cut causing damage to O-ring.	Continuous ring, no scarf cut.
Absorbs slight amount of oil, aiding lubrication.	Almost completely non-absorbent, will not hold enough oil to aid lubrication.	Tends to absorb moisture, increasing possibility of corrosion.
Resists cold flow and tendency to extrude under high pressure.	Will cold flow and extrude at room temperature and high pressure.	Resists cold flow and tendency to extrude under high pressure.
Uniform dimensions.	Uniform dimensions.	Variable dimensions.

Table 6-3: Comparison of Parbak vs. PTFE and Leather Back-Up