

5.31.3 O-Ring Glands for Pneumatic Floating Piston Ring Seals

Design Chart 5-3 provides the basis for calculating gland dimensions. For standard O-ring sizes, these dimensions have been calculated and are listed in Design Table 5-3. The procedures for the use of Design Table 5-3 are outlined in Design Guide 5-3.

After selecting gland dimensions, read horizontally to determine proper O-ring size number. Specify compound.

Refer to 8-2, Military Fluid Specification Description, Fluid Compatibility Tables, or Table 3-1 to select the proper compound. The effective part number for an O-ring consists of both a size number and a compound number.

Guide for Design Table 5-3			
If Desired Dimensions Known for	Dimension in Column	Select Closest Horizontally in Column	Read to Determine Dimension for
Bore Dia of cylinder	A	B-1	Groove Dia of piston
		C	OD of piston
		G	Groove width
OD of piston	C	A	Bore Dia of cylinder
		B-1	Groove Dia of piston
		G	Groove width

Design Guide 5-3: Guide For Design Table 5-3

Floating Pneumatic Piston Ring Seal Glands 13.8 Bar (200 psi) Max.

Refer to Design Chart 5-3 (below) and Design Table 5-3 for dimensions.

Gland Detail
Finishes are RMS values

Floating Pneumatic Piston Ring Seal Glands

O-Ring Size (a) Parker No. 2-	W Cross Section		P (c) Peripheral Squeeze (Variable)	L Gland Depth	G Groove Width	E Diametral Clearance	Eccentricity Max. (b)	R Groove Radius
	Nominal	Actual						
006 through 012	1/16	.070 ± .003	.035 to .042	.072 to .076	.075 to .079	.002 to .010	.002	.005 to .015
104 through 116	3/32	.103 ± .003	.038 to .062	.105 to .109	.111 to .115	.002 to .010	.002	.005 to .015
201 through 222	1/8	.139 ± .004	.061 to .082	.143 to .147	.151 to .155	.003 to .011	.003	.010 to .025
309 through 349	3/16	.210 ± .005	.084 to .124	.214 to .218	.229 to .233	.003 to .011	.004	.020 to .035
425 through 460	1/4	.275 ± .006	.140 to .175	.282 to .286	.301 to .305	.004 to .012	.005	.020 to .035

(a) Only sizes listed are recommended for this design.
 (b) Total indicator reading between groove and adjacent bearing surface.
 (c) Use to calculate A^{min} diameter.

Design Chart 5-3: Design Chart for Floating Pneumatic Piston Ring Seal Glands



Floating Pneumatic Piston Ring Seal Gland Dimensions

O-Ring Size Parker No. 2-	Dimensions			Mean O.D. (Ref)	A	B-1	C	G	P
	I.D.	±	W		Bore Dia. (Cylinder) +.004 -.000	Groove Dia. (Piston) +.000 -.004	OD (Piston) +.000 -.004	Groove Width +.004 -.000	Peripheral Squeeze
006	.114	.005	↑	.254	.219	.075	*.217	↑	.035
007	.145	.005	↑	.285	.249	.105	*.247	↑	.036
008	.176	.005	↑	.316	.279	.135	*.277	↑	.037
009	.208	.005	.070	.348	.309	.165	*.307	.075	.039
010	.239	.005	±.003	.379	.339	.195	*.337	↑	.040
011	.301	.005	↓	.441	.400	.256	*.398	↓	.041
012	.364	.005	↓	.504	.462	.318	.460	↓	.042
104	.112	.005	↑	.318	.280	.070	*.278	↑	.038
105	.143	.005	↑	.349	.309	.099	*.307	↑	.040
106	.174	.005	↑	.380	.338	.128	*.336	↑	.042
107	.206	.005	↑	.412	.368	.158	*.366	↑	.044
108	.237	.005	↑	.443	.397	.187	*.395	↑	.046
109	.299	.005	↓	.505	.457	.247	*.455	↓	.048
110	.362	.005	.103	.568	.518	.308	*.516	.111	.050
111	.424	.005	±.003	.630	.578	.368	*.576	↓	.052
112	.487	.005	↓	.693	.639	.429	.637	↓	.054
113	.549	.007	↓	.755	.699	.489	.697	↓	.056
114	.612	.009	↓	.818	.760	.550	.758	↓	.058
115	.674	.009	↓	.880	.820	.610	.818	↓	.060
116	.737	.009	↓	.943	.881	.671	.879	↓	.062
201	.171	.005	↑	.449	.388	.102	*.385	↑	.061
202	.234	.005	↑	.512	.450	.164	*.447	↑	.062
203	.296	.005	↑	.574	.511	.255	*.508	↑	.063
204	.359	.005	↑	.637	.573	.287	.570	↑	.064
205	.421	.005	↑	.699	.634	.348	.631	↑	.065
206	.484	.005	↓	.762	.696	.410	.693	↓	.066
207	.546	.007	↓	.824	.757	.471	.754	↓	.067
208	.609	.009	↓	.887	.819	.533	.816	↓	.068
209	.671	.009	↓	.949	.880	.594	.877	↓	.069
210	.734	.010	↓	1.012	.942	.656	.939	↓	.070
211	.796	.010	.139	1.074	1.003	.717	1.000	.151	.071
212	.859	.010	±.004	1.137	1.065	.779	1.026	↓	.072
213	.921	.010	↓	1.199	1.126	.840	1.123	↓	.073
214	.984	.010	↓	1.262	1.188	.902	1.185	↓	.074
215	1.046	.010	↓	1.324	1.249	.963	1.246	↓	.075
216	1.109	.012	↓	1.387	1.311	1.025	1.308	↓	.076
217	1.171	.012	↓	1.449	1.372	1.086	1.369	↓	.077
218	1.234	.012	↓	1.512	1.434	1.148	1.431	↓	.078
219	1.296	.012	↓	1.574	1.495	1.209	1.492	↓	.079
220	1.359	.012	↓	1.637	1.557	1.271	1.554	↓	.080
221	1.421	.012	↓	1.699	1.618	1.332	1.615	↓	.081
222	1.484	.015	↓	1.762	1.680	1.394	1.677	↓	.082
309	.412	.005	.210	.832	.748	.320	.745	.229	.084
310	.475	.005	±.105	.895	.810	.382	.807	↓	.085
311	.537	.007	↓	.957	.871	.443	.868	↓	.086

* These designs require considerable installation stretch. If assembly breakage is incurred use a compound having higher elongation or use a two-piece piston.

Design Table 5-3: Floating Pneumatic Piston Ring Seal Gland Dimensions

Design Table 5-3 — Floating Pneumatic Piston Ring Seal Gland Dimensions (Continued)

O-Ring Size Parker No. 2-	Dimensions			Mean O.D. (Ref)	A	B-1	C	G	P
	I.D.	±	W		Bore Dia. (Cylinder) +.004 -.000	Groove Dia. (Piston) +.000 -.004	OD (Piston) +.000 -.004	Groove Width +.004 -.000	Peripheral Squeeze
312	.600	.009	↑	1.020	.933	.505	.930	↑	.087
313	.662	.009	↑	1.082	.994	.566	.991	↑	.088
314	.725	.010	↑	1.145	1.056	.628	1.053	↑	.089
315	.787	.010	↑	1.207	1.117	.689	1.114	↑	.090
316	.850	.010	↑	1.270	1.179	.751	1.176	↑	.091
317	.912	.010	↑	1.332	1.240	.812	1.237	↑	.092
318	.975	.010	↑	1.395	1.302	.874	1.299	↑	.093
319	1.037	.010	↑	1.457	1.363	.935	1.360	↑	.094
320	1.100	.012	↑	1.520	1.425	.997	1.422	↑	.095
321	1.162	.012	↑	1.582	1.486	1.058	1.483	↑	.096
322	1.225	.012	↑	1.645	1.548	1.120	1.545	↑	.097
323	1.287	.012	↑	1.707	1.609	1.181	1.636	↑	.098
324	1.350	.012	↑	1.770	1.671	1.243	1.668	↑	.099
325	1.475	.015	↑	1.895	1.795	1.367	1.792	↑	.100
326	1.600	.015	↑	2.020	1.919	1.491	1.916	↑	.101
327	1.725	.015	↑	2.145	2.043	1.615	2.040	↑	.102
328	1.850	.015	↑	2.270	2.167	1.739	2.164	↑	.103
329	1.975	.018	.210	2.395	2.291	1.863	2.288	.229	.104
330	2.100	.018	±.005	2.520	2.415	1.987	2.412	↑	.105
331	2.225	.018	↑	2.645	2.539	2.111	2.536	↑	.106
332	2.350	.018	↑	2.770	2.663	2.235	2.660	↑	.107
333	2.475	.020	↑	2.895	2.787	2.359	2.784	↑	.108
334	2.600	.020	↑	3.020	2.911	2.483	2.908	↑	.109
335	2.725	.020	↑	3.145	3.035	2.607	3.032	↑	.110
336	2.850	.020	↑	3.270	3.159	2.731	3.156	↑	.111
337	2.975	.024	↑	3.395	3.283	2.855	3.280	↑	.112
338	3.100	.024	↑	3.520	3.407	2.979	3.404	↑	.113
339	3.225	.024	↑	3.645	3.531	3.103	3.528	↑	.114
340	3.350	.024	↑	3.770	3.655	3.270	3.652	↑	.115
341	3.475	.024	↑	3.895	3.779	3.351	3.776	↑	.116
342	3.600	.028	↑	4.020	3.903	3.475	3.900	↑	.117
343	3.725	.028	↑	4.145	4.027	3.599	4.024	↑	.118
344	3.850	.028	↑	4.270	4.151	3.723	4.148	↑	.119
345	3.975	.028	↑	4.395	4.275	3.847	4.272	↑	.120
346	4.100	.028	↑	4.520	4.399	3.971	4.396	↑	.121
347	4.225	.030	↑	4.645	4.523	4.095	4.520	↑	.122
348	4.350	.030	↑	4.773	4.647	4.219	4.644	↑	.123
349	4.475	.030	↑	4.895	4.771	4.343	4.768	↑	.124
425	4.475	.033	↑	5.025	4.885	4.321	4.881	↑	.140
426	4.600	.033	↑	5.150	5.009	4.445	5.005	↑	.141
427	4.725	.033	↑	5.275	5.133	4.569	5.129	↑	.142
428	4.850	.033	.275	5.400	5.257	4.693	5.253	.301	.143
429	4.975	.037	±.006	5.525	5.381	4.817	5.377	↑	.144
430	5.100	.037	↑	5.650	5.505	4.941	5.501	↑	.145
431	5.225	.037	↑	5.775	5.629	5.065	5.625	↑	.146
432	5.350	.037	↑	5.900	5.753	5.189	5.749	↑	.147

* These designs require considerable installation stretch. If assembly breakage is incurred use a compound having higher elongation or use a two-piece piston.

Design Table 5-3: Floating Pneumatic Piston Ring Seal Gland Dimensions



Design Table 5-3 — Floating Pneumatic Piston Ring Seal Gland Dimensions (Continued)

O-Ring Size Parker No. 2-	I.D.	Dimensions		Mean O.D. (Ref)	A	B-1	C	G	P
		±	W		Bore Dia. (Cylinder) +.004 -.000	Groove Dia. (Piston) +.000 -.004	OD (Piston) +.000 -.004	Groove Width +.004 -.000	Peripheral Squeeze
433	5.475	.037	↑	6.025	5.877	5.313	5.873	↑	.148
434	5.600	.037	↑	6.150	6.001	5.437	5.997	↑	.149
435	5.725	.037	↑	6.275	6.125	5.561	6.121	↑	.150
436	5.850	.037	↑	6.400	6.249	5.685	6.245	↑	.151
437	5.975	.037	↑	6.525	6.373	5.809	6.369	↑	.152
438	6.225	.040	↑	6.775	6.622	6.058	6.618	↑	.153
439	6.475	.040	↑	7.025	6.871	6.307	6.867	↑	.154
440	6.725	.040	↑	7.275	7.120	6.556	7.116	↑	.155
441	6.975	.040	↑	7.525	7.369	6.805	7.365	↑	.156
442	7.225	.045	.275	7.775	7.618	7.054	7.614	.301	.157
443	7.475	.045	±.006	8.025	7.867	7.303	7.863	↑	.158
444	7.725	.045	↑	8.275	8.116	7.552	8.112	↑	.159
445	7.975	.045	↑	8.525	8.365	7.801	8.361	↑	.160
446	8.475	.055	↑	9.025	8.864	8.300	8.860	↑	.161
447	8.975	.055	↑	9.525	9.363	8.799	9.359	↑	.162
448	9.475	.055	↑	10.025	9.862	9.298	9.858	↑	.163
449	9.975	.055	↑	10.525	10.361	9.797	10.357	↑	.164
450	10.475	.060	↑	11.025	10.860	10.296	10.856	↑	.165
451	10.975	.060	↑	11.525	11.359	10.795	11.355	↑	.166
452	11.475	.060	↑	12.025	11.858	11.294	11.854	↑	.167
453	11.975	.060	↑	12.525	12.357	11.793	12.353	↑	.168
454	12.475	.060	↑	13.025	12.856	12.292	12.852	↑	.169
455	12.975	.060	↑	13.525	13.355	12.791	13.351	↑	.170
456	13.475	.070	↑	14.025	13.854	13.290	13.850	↑	.171
457	13.975	.070	↑	14.525	14.353	13.789	14.349	↑	.172
458	14.475	.070	↑	15.025	14.852	14.288	14.848	↑	.173
459	14.975	.070	↑	15.525	15.351	14.787	15.347	↑	.174
460	15.475	.070	↓	16.025	15.850	15.286	15.846	↓	.175

* These designs require considerable installation stretch. If assembly breakage is incurred use a compound having higher elongation or use a two-piece piston.

Design Table 5-3: Floating Pneumatic Piston Ring Seal Gland Dimensions

Guide For Design Table 5-4

If Desired Dimension is Known for	Select Closest Dimension in Column	Read Horizontally in Column	To Determine Dimension for
OD of shaft	B	A-1 D G	Groove Dia. for shaft Throat Dia. Groove width
Throat Dia.	D	A-1 B G	Groove Dia. for shaft OD of shaft Groove width

Design Guide 5-4: Guide For Design Table 5-4