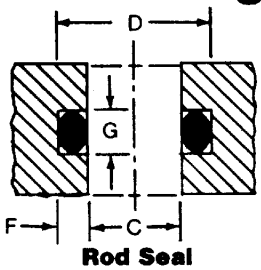
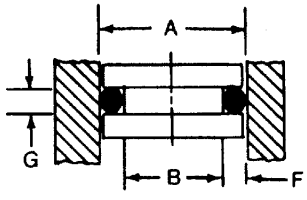
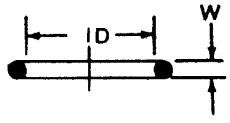
Groove Design For O-Ring Installation



Rod Seal



Piston Seal



O-Ring

Uniform Dash Number	Actual Cross Section Diameter	Diametral Squeeze (Minimum)		Gland Depth F		Groove Width G ±.003			Diametral[2] Clearance (Maximum) D		Eccentricity[3] (Maximum)	Radius (R)
		Dynamic[1]	Static	Dynamic[1] +.000 −.001	Static +.000 −.004	No Backup Ring	One Backup Ring	Two Backup Rings	500 PSI	1500 PSI		
−001	.040 + .003	.004	.006	.033	.031	.056	—	—	.005	.0025	.002	.010
−002	.050 + .003	.005	.008	.042	.039	.070	—	—	.006	.003	.002	.010
−003	.060 + .003	.006	.009	.051	.048	.084	—	—	.007	.0035	.002	.016
−004 thru −050	.070 + .003	.007	.011	.060	.056	.098	.140	.207	.008	.004	.002	.016
−102 thru −178	.103 + .003	.010	.015	.090	.085	.144	.173	.240	.009	.004	.002	.016
−201 thru −284	.139 + .004	.014	.021	.121	.114	.195	.210	.277	.010	.006	.003	.031
−309 thru −395	.210 + .005	.021	.032	.184	.173	.294	.313	.412	.011	.007	.004	.031
−425 thru −475	.275 + .006	.028	.042	.241	.227	.385	.410	.540	.012	.008	.005	.047

Note 1. The following sizes are not normally recommended for dynamic service, although special applications may permit their use:

−001 thru −003	−223 thru −284
−013 thru −050	−350 thru −395
−117 thru −178	−461 thru −475

Note. 2. Clearances shown are based on 70 durometer materials. The clearances must be held to an absolute minimum consistent with design requirements for temperature variations and should not exceed the vales shown.

Note. 3. Total indicator reading between groove and adjacent bearing surface. All surfaces and corners must be free of tool marks and scratches.

O-ring groove dimensions may be calculated as follows:

Rod Seal

Given: **Example**

Rod Diameter C = .500″
O-ring Cross Section W = 3/32″ nominal
Dynamic application
No back-ups required

Determine:

O-ring size = AS-568-112 (1/2″ ID x 3/32″ W nominal dimensions)
Gland Depth F = $.090^{+.000''}_{-.001''}$ (from chart)
Groove Width G = .144 ± .003″ (from chart)
Rod Gland D = C + 2F = .500″ + 2x.090″ = .680″

Piston Seal

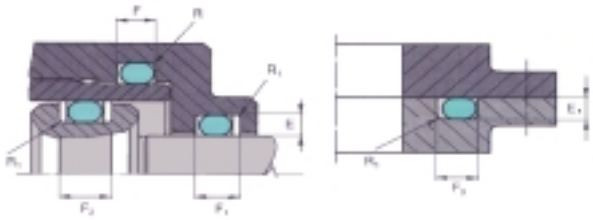
Given: **Example**

Cylinder Bore A = 1.000″
O-ring Cross Section W = 1/8″ nominal
Static application
No back-ups required

Determine:

O-ring size = AS568-210 (1″ OD x 1/8″ W nominal dimensions)
Gland Depth F = $.114^{+.000''}_{-.004''}$ (from chart)
Groove Width G = .195 ± .003″ (from chart)
Piston Groove B = A−2F = 1.000″−2x.114″ = .772″

Groove design
for O-Ring installation



			Radial dynamic and static			Axial-static	Radius	
Cross section	**Groove depth**	*****	**Groove width with 1 back-up ring**	*** with 2 back-up rings**	**Groove depth**	**Groove width**	**without back-up ring**	**with back-up ring**
W mm	**E mm Tol. +0,05**	**F mm Tol. +0,2**	**F1 mm Tol. +0.2**	**F2 mm Tol. +0.2**	**E1 mm Tol. +0.1**	**F3 mm Tol. +0.2**	**R mm**	**R1 mm**
0,40	0,28	0,60	-	-	0,26	0,30	-	-
0,50	0,35	0,70	-	-	0,35	0,70	-	-
0,60	0,45	0,80	-	-	0,40	0,80	-	-
1,00 and 1,02	0,80	1,40	-	-	0,65	1,40	0,2	-
1,10 1,12 and 1,15	0,90	1,50	-	-	0,75	1,50	0,2	-
1,20	0,95	1,70	-	-	0,80	1,70	0,2	-
1,25 and 1,27	1,00	1,80	-	-	0,85	1,80	0,2	-
1,30	1,05	1,80	-	-	0,90	1,80	0,2	-
1.42 and 1,45	1,15	1,90	-	-	0,95	1,90	0,2	-
1,50 and 1,52	1,20	1,90	2,90	3,90	1,00	2,10	0,2	0,2
1,57 1,60 and 1,63	1,30	2,00	3,00	4,00	1,10	2,20	0,3	0,2
1,78 and 1,80	1,45	2,20	3,60	5,00	1,20	2,40	0,4	0,2
1,83	1,50	2,30	3,70	5,10	1,25	2,40	0,5	0,2
1,90 1,98 2,00 and 2,02	1,65	2,50	3,90	5,30	1,40	2,50	0,5	0,2
2,08 and 2,10	1,70	2,60	4,00	5,40	1,45	2,80	0,5	0,2
2,20 and 2,21	1,85	2,70	4,10	5,50	1,55	2,90	0,5	0,3
2,26	1,85	2,80	4,20	5,60	1,55	3,00	0,5	0,3
2,30	1,90	2,80	4,20	5,60	1,60	3,00	0,5	0,3
2,40	2,00	2,90	4,30	5,70	1,70	3,20	0,5	0,3
2,46	2,05	3,00	4,40	5,80	1,75	3,30	0,5	0,3
2,50	2,10	3,00	4,40	5,80	1,80	3,40	0,5	0,3
2,60 2,62 and 2,65	2,25	3,10	4,50	5,90	1,90	3,60	0,6	0,3
2,70 and 2,75	2,30	3,40	4,80	6,20	1,95	3,70	0,6	0,3
2,95 and 3,00	2,50	3,60	5,00	6,40	2,20	3,90	0,8	0,3
3,15	2,70	3,80	5,20	6,60	2,30	4,00	0,8	0,4
3,50 3,53 3,55 and 3,60	3,10	4,20	5,60	7,00	2,70	4,80	1,0	0,4
4,00	3,50	4,70	6,40	8,10	3,10	5,40	1,0	0,4
4,50	4,00	5,20	6,90	8,30	3,40	6,00	1,0	0,4
5,00	4,30	6,00	7,70	9,40	3,90	6,70	1,0	0,4
5,30 and 5,33	4,70	6,20	7,90	9,60	4,30	7,10	1,2	0,6
5,50	4,80	6,40	8,10	9,80	4,40	7,30	1,2	0,6
5,70 and 5,80	5,00	6,70	8,40	10,10	4,60	7,70	1,2	0,6
6,00	5,30	6,90	8,60	10,30	4,80	8,20	1,2	0,6
6.30 and 6,35	5,60	7,30	9,00	10,70	5,10	8,70	1,2	0,6
6,50	5,70	7,60	9,30	11,00	5,40	8,90	1,2	0,6
6,99 and 7,00	6,10	8,20	10,70	13,20	5,80	9,50	1,5	0,6
7,20	6,20	8,50	11,00	13,50	5,90	9,80	1,5	0,6
7,50	6,50	8,80	11,30	13,80	6,20	10,40	1,5	0,6
8,00	7,00	9,30	11,80	14,30	6,60	11,00	1,5	0,6
8,20	7,10	9,60	12,10	14,60	6,70	11,20	1,5	0,6
8,40	7,50	9,70	12,20	14,70	6,90	11,70	2,0	0,6
9,00	7,80	10,60	13,10	15,60	7,40	12,50	2,0	0,6
9,50	8,30	11,10	13,60	16,10	7,80	13,30	2,0	0,6
10,00	8,70	11,70	14,20	16,70	8,30	13,50	2,0	0,6
11,00	9,60	12,90	15,40	17,90	9,10	15,50	3,0	0,6
12,00	10,50	14,00	16,50	19,00	10,30	16,80	3,0	0,6
14,00	12,20	16,40	18,90	21,40	11,60	19,00	3,0	0,6
15,00	13,20	17,40	19,90	22,40	12,50	20,00	3,0	0,6
16,00	14,00	18,70	21,20	23,70	13,50	21,50	3,0	0,6

The groove width can be greater than 20%, if a greater swelling (more than 10%) is to be expected.