



MATERIAL

The 232 series rod seal utilizes an abrasion resistant HNBR seal material, with high-strength thermoplastic anti-extrusion rings as the standard configuration. Additional seal materials are MP03, MN01 and MF01.

Material	Code
HNBR (Seal material)	N03
POM (Backup ring)	L01
HP Polymer (Backup ring)	L120

Note: L01 is used up to 15". L120 is used +15".

OPERATING PARAMETERS

Temperature	MN34	
	°C	°F
Hydraulic oil	-20...+152	-5...+305
Water oil emulsions (HFA)	-20...+55	-5...+130
Water-glycol fluids (HFC)	-20...+55	-5...+130
Polyol esters (HFD)	-20...+37	-5...+100
Speed	0.5 m/s (1.6 ft./sec)	
Pressure	400 bar (6,000 psi)	

Note: For other materials please contact our engineering department.

DESCRIPTION

The 232 Series is a robust three-piece piston seal that consists of a profiled polyurethane seal ring and two active anti-extrusion backup rings. It is designed for double-acting cylinders in heavy-duty applications subject to severe pressure spikes coupled with high running clearance.

PRODUCT BENEFITS

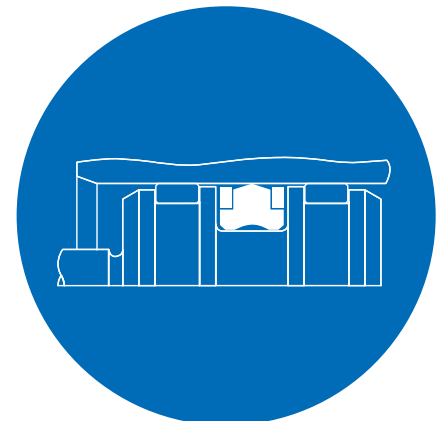
- Long service life under the harshest conditions
- Compatible with water-based and fire resistant fluids
- Optimized for high running clearances
- Easy installation
- Backup ring materials resist swelling

APPLICATIONS

The 232 Series, three-piece piston seal is ideal in heavy duty sealing applications where pressure spiking can occur.

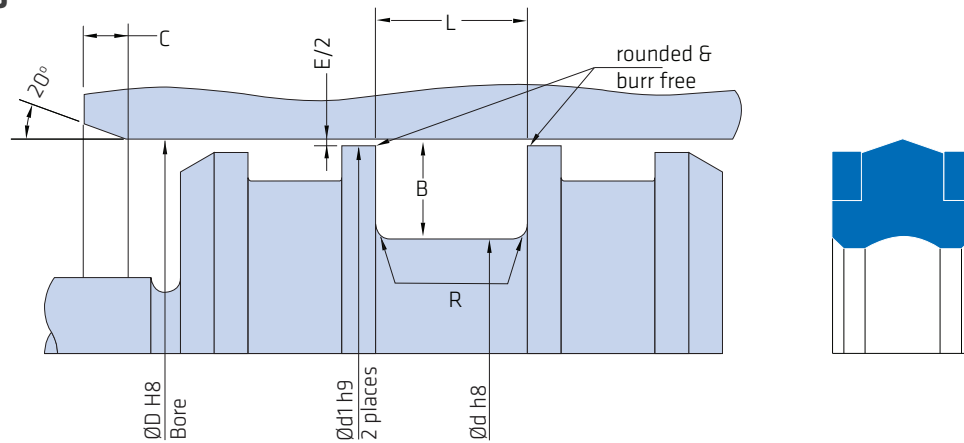
Typical applications include:

- Mining
- Heavy duty clamp cylinders
- Specialty high-pressure cylinders
- Hydraulic rams
- Various advancing and secondary cylinders
- Blow out preventers (BOP)
- Wellhead connectors



Above: Installation Drawing

DESIGN GUIDELINES



METRIC SERIES

	B	L ^{+0.20}	Ød	Ød1	R	C
Series 1	7.5 mm	13.50	D-15	D-E	0.40	6
Series 2	10.0 mm	18.00	D-20	D-E	0.40	8
Series 3	12.5 mm	22.50	D-25	D-E	0.40	9
Series 4	15.0 mm	27.00	D-30	D-E	0.40	11

Pressure	E
≤100 bar	1.00
≤250 bar	0.85
≤400 bar	0.70

Extrusion Gaps

INCH SERIES

	B	L ^{+0.008}	ØD	ØD1	R	C
Series 1	0.250 in	0.619	D-0.500	D-E	0.016	0.275
Series 2	0.313 in	0.688	D-0.625	D-E	0.016	0.375
Series 3	0.375 in	0.688	D-0.750	D-E	0.016	0.375
Series 4	0.500 in	0.825	D-1.000	D-E	0.016	0.500
Series 5	0.750 in	1.100	D-1.500	D-E	0.016	0.600

Pressure	E
≤1450 psi	0.040
≤3625 psi	0.035
≤6000 psi	0.030

Extrusion Gaps

Note: The extrusion gap "E" is suitable for pressure up to 400 bar (6,000 psi) and temperatures up to 80° C (176° F). For higher pressures or temperatures, please consult our engineering department for guidance.

SURFACE FINISH

Surface roughness	Ra	Rt	RMS
Sliding surface	≤0.3 µm	≤3 µm	6-12 RMS
Surface of groove I.D.	≤1.8 µm	≤10 µm	32 RMS
Sides of groove	≤3 µm	≤16 µm	64 RMS

INCH SERIES

Ød	ØD	B	L	PART NUMBER
4.000	3.500	0.250	0.619	232.144847
4.000	3.375	0.313	0.688	232.144880
4.000	3.250	0.375	0.688	232.144924
4.125	3.625	0.250	0.619	232.144848
4.125	3.375	0.375	0.688	232.144925
4.250	3.750	0.250	0.619	232.144849
4.250	3.500	0.375	0.688	232.144926
4.375	3.875	0.250	0.619	232.144850
4.375	3.625	0.375	0.688	232.144927
4.500	4.000	0.250	0.619	232.144851
4.500	3.875	0.313	0.688	232.144881
4.500	3.750	0.375	0.688	232.144928
4.625	4.125	0.250	0.619	232.144852
4.625	4.000	0.313	0.688	232.144882
4.625	3.875	0.375	0.688	232.144929
4.750	4.250	0.250	0.619	232.144853
4.750	4.125	0.313	0.688	232.144883
4.750	4.000	0.375	0.688	232.144930
4.875	4.375	0.250	0.619	232.144854
4.875	4.250	0.313	0.688	232.144884
4.875	4.125	0.375	0.688	232.144931
5.000	4.500	0.250	0.619	232.144855
5.000	4.375	0.313	0.688	232.144885
5.000	4.250	0.375	0.688	232.144932
5.000	4.000	0.500	0.825	232.144981
5.125	4.625	0.250	0.619	232.144856
5.125	4.500	0.313	0.688	232.144886
5.125	4.375	0.375	0.688	232.144933
5.250	4.750	0.250	0.619	232.144857
5.250	4.625	0.313	0.688	232.144887
5.250	4.500	0.375	0.688	232.144934
5.250	4.250	0.500	0.825	232.144982
5.375	4.875	0.250	0.619	232.144858
5.375	4.750	0.313	0.688	232.144888
5.375	4.625	0.375	0.688	232.144935
5.375	4.375	0.500	0.825	232.144983
5.500	5.000	0.250	0.619	232.206437
5.500	4.875	0.313	0.688	232.144889
5.500	4.750	0.375	0.688	232.144936
5.500	4.500	0.500	0.825	232.144984
5.625	5.125	0.250	0.619	232.144860
5.625	5.000	0.313	0.688	232.144890

Ød	ØD	B	L	PART NUMBER
5.625	4.875	0.375	0.688	232.144937
5.750	5.250	0.250	0.619	232.144861
5.750	5.125	0.313	0.688	232.144891
5.750	5.000	0.375	0.688	232.144938
5.750	4.750	0.500	0.825	232.144985
5.875	5.375	0.250	0.619	232.144862
5.875	5.250	0.313	0.688	232.144892
5.875	5.125	0.375	0.688	232.144939
6.000	5.500	0.250	0.619	232.144863
6.000	5.375	0.313	0.688	232.144893
6.000	5.250	0.375	0.688	232.144940
6.000	5.000	0.500	0.825	232.144986
6.125	5.500	0.313	0.688	232.144894
6.250	5.750	0.250	0.619	232.144864
6.250	5.625	0.313	0.688	232.144895
6.250	5.500	0.375	0.688	232.144941
6.250	5.250	0.500	0.825	232.144987
6.375	5.750	0.313	0.688	232.144896
6.500	6.000	0.250	0.619	232.144865
6.500	5.875	0.313	0.688	232.144897
6.500	5.750	0.375	0.688	232.144942
6.500	5.500	0.500	0.825	232.144988
6.625	6.000	0.313	0.688	232.144898
6.750	6.250	0.250	0.619	232.144866
6.750	6.125	0.313	0.688	232.144899
6.750	6.000	0.375	0.688	232.144943
6.750	5.750	0.500	0.825	232.144989
6.875	6.250	0.313	0.688	232.144900
7.000	6.500	0.250	0.619	232.144867
7.000	6.375	0.313	0.688	232.144901
7.000	6.250	0.375	0.688	232.144944
7.000	6.000	0.500	0.825	232.144990
7.125	6.500	0.313	0.688	232.144902
7.250	6.750	0.250	0.619	232.144868
7.250	6.625	0.313	0.688	232.144903
7.250	6.500	0.375	0.688	232.144945
7.250	6.250	0.500	0.825	232.144991
7.375	6.750	0.313	0.688	232.144904
7.500	7.000	0.250	0.619	232.144869
7.500	6.875	0.313	0.688	232.144905
7.500	6.750	0.375	0.688	232.144946
7.500	6.500	0.500	0.825	232.144992

INCH SERIES

Ød	ØD	B	L	PART NUMBER
7.750	7.250	0.250	0.619	232.144870
7.750	7.125	0.313	0.688	232.144906
7.750	7.000	0.375	0.688	232.144947
7.750	6.750	0.500	0.825	232.144993
8.000	7.500	0.250	0.619	232.144871
8.000	7.375	0.313	0.688	232.144907
8.000	7.250	0.375	0.688	232.144948
8.000	7.000	0.500	0.825	232.144994
8.250	7.750	0.250	0.619	232.144872
8.250	7.625	0.313	0.688	232.144908
8.250	7.500	0.375	0.688	232.144949
8.250	7.250	0.500	0.825	232.144995
8.500	8.000	0.250	0.619	232.144873
8.500	7.875	0.313	0.688	232.144909
8.500	7.750	0.375	0.688	232.144950
8.500	7.500	0.500	0.825	232.144996
8.750	8.250	0.250	0.619	232.144874
8.750	8.125	0.313	0.688	232.144910
8.750	8.000	0.375	0.688	232.144951
8.750	7.750	0.500	0.825	232.144997
9.000	8.500	0.250	0.619	232.144875
9.000	8.375	0.313	0.688	232.144911
9.000	8.250	0.375	0.688	232.144952
9.000	8.000	0.500	0.825	232.144998
9.250	8.750	0.250	0.619	232.144876
9.250	8.625	0.313	0.688	232.144912
9.250	8.500	0.375	0.688	232.144953
9.250	8.250	0.500	0.825	232.144999
9.500	9.000	0.250	0.619	232.144877
9.500	8.875	0.313	0.688	232.144913
9.500	8.750	0.375	0.688	232.144954
9.500	8.500	0.500	0.825	232.145000
9.750	9.250	0.250	0.619	232.144878
9.750	9.125	0.313	0.688	232.144914
9.750	9.000	0.375	0.688	232.144955
9.750	8.750	0.500	0.825	232.145001
10.000	9.500	0.250	0.619	232.144879
10.000	9.375	0.313	0.688	232.144915
10.000	9.250	0.375	0.688	232.144956
10.000	9.000	0.500	0.825	232.145002
10.250	9.625	0.313	0.688	232.144916
10.250	9.500	0.375	0.688	232.144957

Ød	ØD	B	L	PART NUMBER
10.500	9.875	0.313	0.688	232.144917
10.500	9.750	0.375	0.688	232.144958
10.500	9.500	0.500	0.825	232.145003
10.500	9.000	0.750	1.100	232.145103
10.750	10.125	0.313	0.688	232.144918
10.750	10.000	0.375	0.688	232.144959
11.000	10.375	0.313	0.688	232.144919
11.000	10.250	0.375	0.688	232.144960
11.000	10.000	0.500	0.825	232.145004
11.000	9.500	0.750	1.100	232.145104
11.250	10.625	0.313	0.688	232.144920
11.250	10.500	0.375	0.688	232.144961
11.500	10.875	0.313	0.688	232.144921
11.500	10.750	0.375	0.688	232.144962
11.500	10.500	0.500	0.825	232.145005
11.500	10.000	0.750	1.100	232.145105
11.750	11.125	0.313	0.688	232.144922
11.750	11.000	0.375	0.688	232.144963
12.000	11.375	0.313	0.688	232.144923
12.000	11.250	0.375	0.688	232.144964
12.000	11.000	0.500	0.825	232.145006
12.000	10.500	0.750	1.100	232.145106
12.500	11.750	0.375	0.688	232.144965
12.500	11.500	0.500	0.825	232.145007
12.500	11.000	0.750	1.100	232.145107
13.000	12.250	0.375	0.688	232.144966
13.000	12.000	0.500	0.825	232.145008
13.000	11.500	0.750	1.100	232.145108
13.500	12.750	0.375	0.688	232.144967
13.500	12.500	0.500	0.825	232.145009
13.500	12.000	0.750	1.100	232.145109
14.000	13.250	0.375	0.688	232.144968
14.000	13.000	0.500	0.825	232.145010
14.000	12.500	0.750	1.100	232.145110
14.500	13.750	0.375	0.688	232.144969
14.500	13.500	0.500	0.825	232.145011
14.500	13.000	0.750	1.100	232.145111
15.000	14.250	0.375	0.688	232.144970
15.000	14.000	0.500	0.825	232.145012
15.000	13.500	0.750	1.100	232.145112
15.500	14.750	0.375	0.688	232.144971
15.500	14.500	0.500	0.825	232.145013

INCH SERIES

Ød	ØD	B	L	PART NUMBER
15.500	14.000	0.750	1.100	232.145113
16.000	15.250	0.375	0.688	232.144972
16.000	15.000	0.500	0.825	232.145014
16.000	14.500	0.750	1.100	232.145114
16.500	15.750	0.375	0.688	232.144973
16.500	15.500	0.500	0.825	232.145015
16.500	15.000	0.750	1.100	232.145115
17.000	16.250	0.375	0.688	232.144974
17.000	16.000	0.500	0.825	232.145016
17.000	15.500	0.750	1.100	232.145116
17.500	16.750	0.375	0.688	232.144975
17.500	16.500	0.500	0.825	232.145017
17.500	16.000	0.750	1.100	232.145117
18.000	17.250	0.375	0.688	232.144976
18.000	17.000	0.500	0.825	232.145018
18.000	16.500	0.750	1.100	232.145118
18.500	17.750	0.375	0.688	232.144977
18.500	17.500	0.500	0.825	232.145019
18.500	17.000	0.750	1.100	232.145119
19.000	18.250	0.375	0.688	232.144978
19.000	18.000	0.500	0.825	232.145020
19.000	17.500	0.750	1.100	232.145120
19.500	18.750	0.375	0.688	232.144979
19.500	18.500	0.500	0.825	232.145021
19.500	18.000	0.750	1.100	232.145121
20.000	19.250	0.375	0.688	232.144980
20.000	19.000	0.500	0.825	232.145022
20.000	18.500	0.750	1.100	232.145122
20.500	19.500	0.500	0.825	232.145023
20.500	19.000	0.750	1.100	232.145123
21.000	20.000	0.500	0.825	232.145024
21.000	19.500	0.750	1.100	232.145124
21.500	20.500	0.500	0.825	232.145025
21.500	20.000	0.750	1.100	232.145125
22.000	21.000	0.500	0.825	232.145026
22.000	20.500	0.750	1.100	232.145126
22.500	21.500	0.500	0.825	232.145027
22.500	21.000	0.750	1.100	232.145127
23.000	22.000	0.500	0.825	232.145028
23.000	21.500	0.750	1.100	232.145128
23.500	22.500	0.500	0.825	232.145029
23.500	22.000	0.750	1.100	232.145129

Ød	ØD	B	L	PART NUMBER
24.000	23.000	0.500	0.825	232.145030
24.000	22.500	0.750	1.100	232.145130
24.500	23.500	0.500	0.825	232.145031
24.500	23.000	0.750	1.100	232.145131
25.000	24.000	0.500	0.825	232.145032
25.000	23.500	0.750	1.100	232.145132
25.500	24.500	0.500	0.825	232.145033
25.500	24.000	0.750	1.100	232.145133
26.000	25.000	0.500	0.825	232.145034
26.000	24.500	0.750	1.100	232.145134
26.500	25.500	0.500	0.825	232.145035
26.500	25.000	0.750	1.100	232.145135
27.000	26.000	0.500	0.825	232.145036
27.000	25.500	0.750	1.100	232.145136
27.500	26.500	0.500	0.825	232.145037
27.500	26.000	0.750	1.100	232.145137
28.000	27.000	0.500	0.825	232.145038
28.000	26.500	0.750	1.100	232.145138
28.500	27.500	0.500	0.825	232.145039
28.500	27.000	0.750	1.100	232.145139
29.000	28.000	0.500	0.825	232.145040
29.000	27.500	0.750	1.100	232.145140
29.500	28.500	0.500	0.825	232.145041
29.500	28.000	0.750	1.100	232.145141
30.000	29.000	0.500	0.825	232.145042
30.000	28.500	0.750	1.100	232.145142
30.500	29.500	0.500	0.825	232.145043
30.500	29.000	0.750	1.100	232.145143
31.000	30.000	0.500	0.825	232.145044
31.000	29.500	0.750	1.100	232.145144
31.500	30.500	0.500	0.825	232.145045
31.500	30.000	0.750	1.100	232.145145
32.000	31.000	0.500	0.825	232.145046
32.000	30.500	0.750	1.100	232.145146
32.500	31.500	0.500	0.825	232.145047
32.500	31.000	0.750	1.100	232.145147
33.000	32.000	0.500	0.825	232.145048
33.000	31.500	0.750	1.100	232.145148
33.500	32.500	0.500	0.825	232.145049
33.500	32.000	0.750	1.100	232.145149
34.000	33.000	0.500	0.825	232.145050
34.000	32.500	0.750	1.100	232.145150

INCH SERIES

Ød	ØD	B	L	PART NUMBER
34.500	33.500	0.500	0.825	232.145051
34.500	33.000	0.750	1.100	232.145151
35.000	34.000	0.500	0.825	232.145052
35.000	33.500	0.750	1.100	232.145152
35.500	34.500	0.500	0.825	232.145053
35.500	34.000	0.750	1.100	232.145153
36.000	35.000	0.500	0.825	232.145054
36.000	34.500	0.750	1.100	232.145154
36.500	35.500	0.500	0.825	232.145055
36.500	35.000	0.750	1.100	232.145155
37.000	36.000	0.500	0.825	232.145056
37.000	35.500	0.750	1.100	232.145156
37.500	36.500	0.500	0.825	232.145057
37.500	36.000	0.750	1.100	232.145157
38.000	37.000	0.500	0.825	232.145058
38.000	36.500	0.750	1.100	232.145158
38.500	37.500	0.500	0.825	232.145059
38.500	37.000	0.750	1.100	232.145159
39.000	38.000	0.500	0.825	232.145060
39.000	37.500	0.750	1.100	232.145160
39.500	38.500	0.500	0.825	232.145061
39.500	38.000	0.750	1.100	232.145161
40.000	39.000	0.500	0.825	232.145062
40.000	38.500	0.750	1.100	232.145162
40.500	39.500	0.500	0.825	232.145063
40.500	39.000	0.750	1.100	232.145163
41.000	40.000	0.500	0.825	232.145064
41.000	39.500	0.750	1.100	232.145164
41.500	40.500	0.500	0.825	232.145065
41.500	40.000	0.750	1.100	232.145165
42.000	41.000	0.500	0.825	232.145066
42.000	40.500	0.750	1.100	232.145166
42.500	41.500	0.500	0.825	232.145067
42.500	41.000	0.750	1.100	232.145167
43.000	42.000	0.500	0.825	232.145068
43.000	41.500	0.750	1.100	232.145168
43.500	42.500	0.500	0.825	232.145069
43.500	42.000	0.750	1.100	232.145169
44.000	43.000	0.500	0.825	232.145070
44.000	42.500	0.750	1.100	232.145170
44.500	43.500	0.500	0.825	232.145071
44.500	43.000	0.750	1.100	232.145171

Ød	ØD	B	L	PART NUMBER
45.000	44.000	0.500	0.825	232.145072
45.000	43.500	0.750	1.100	232.145172
45.500	44.500	0.500	0.825	232.145073
45.500	44.000	0.750	1.100	232.145173
46.000	45.000	0.500	0.825	232.145074
46.000	44.500	0.750	1.100	232.145174
46.500	45.500	0.500	0.825	232.145075
46.500	45.000	0.750	1.100	232.145175
47.000	46.000	0.500	0.825	232.145076
47.000	45.500	0.750	1.100	232.145176
47.500	46.500	0.500	0.825	232.145077
47.500	46.000	0.750	1.100	232.145177
48.000	47.000	0.500	0.825	232.145078
48.000	46.500	0.750	1.100	232.145178
48.500	47.500	0.500	0.825	232.145079
48.500	47.000	0.750	1.100	232.145179
49.000	48.000	0.500	0.825	232.145080
49.000	47.500	0.750	1.100	232.145180
49.500	48.500	0.500	0.825	232.145081
49.500	48.000	0.750	1.100	232.145181
50.000	49.000	0.500	0.825	232.145082
50.000	48.500	0.750	1.100	232.145182
50.500	49.500	0.500	0.825	232.145083
50.500	49.000	0.750	1.100	232.145183
51.000	50.000	0.500	0.825	232.145084
51.000	49.500	0.750	1.100	232.145184
51.500	50.500	0.500	0.825	232.145085
51.500	50.000	0.750	1.100	232.145185
52.000	51.000	0.500	0.825	232.145086
52.000	50.500	0.750	1.100	232.145186
52.500	51.500	0.500	0.825	232.145087
52.500	51.000	0.750	1.100	232.145187
53.000	52.000	0.500	0.825	232.145088
53.000	51.500	0.750	1.100	232.145188
53.500	52.500	0.500	0.825	232.145089
53.500	52.000	0.750	1.100	232.145189
54.000	53.000	0.500	0.825	232.145090
54.000	52.500	0.750	1.100	232.145190
54.500	53.500	0.500	0.825	232.145091
54.500	53.000	0.750	1.100	232.145191
55.000	54.000	0.500	0.825	232.145092
55.000	53.500	0.750	1.100	232.145192

INCH SERIES

Ød	ØD	B	L	PART NUMBER
55.500	54.500	0.500	0.825	232.145093
55.500	54.000	0.750	1.100	232.145193
56.000	55.000	0.500	0.825	232.145094
56.000	54.500	0.750	1.100	232.145194
56.500	55.500	0.500	0.825	232.145095
56.500	55.000	0.750	1.100	232.145195
57.000	56.000	0.500	0.825	232.145096
57.000	55.500	0.750	1.100	232.145196
57.500	56.500	0.500	0.825	232.145097
57.500	56.000	0.750	1.100	232.145197
58.000	57.000	0.500	0.825	232.145098
58.000	56.500	0.750	1.100	232.145198
58.500	57.500	0.500	0.825	232.145099
58.500	57.000	0.750	1.100	232.145199
59.000	58.000	0.500	0.825	232.145100
59.000	57.500	0.750	1.100	232.145200
59.500	58.500	0.500	0.825	232.145101
59.500	58.000	0.750	1.100	232.145201
60.000	59.000	0.500	0.825	232.145102
60.000	58.500	0.750	1.100	232.145202