

# PTFE Back-Up Rings

## Design

This range of products is designed to overcome the problems of 'O'-Ring extrusion when the system pressures are greater than the sealing capabilities of an unsupported 'O'-Ring. The use of P.T.F.E. for anti-extrusion rings has many advantages over 'hard rubber' materials, particularly at high system pressures. The cold flow characteristics of PTFE are used to full advantage in reducing the extrusion gaps to a minimum and allowing automatic compensation for wear. The capability of specialist compounding to suit extremes of duty combined with a high resistance to virtually all chemicals, low friction and wear rates render PTFE as the ideal material for anti-extrusion devices.

## Variations

### Spiral



The spiral back up ring is the most common style in use being effectively self adjusting to diametral tolerances. Spiral back up rings are manufactured from virgin PTFE only.

Manufactured to suit O-Rings to BS1806, BS4518, JISB2401, JW17000, MS28782 standards

Order as part number shown on table.e.g. BS 210 or as below...

BS1806 ... BS006	JISB2401 ... JISP003
BS4518 ... BS0031-16	JW17000 ... SJWI7001
MS28782 ... MS28782-001	

### Endless



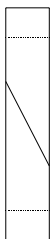
The endless back up ring is used where problems can occur with the rotation of a screwed endcaps which on assembly could cause a spiral type to unwind. Endless back up rings are normally manufactured from virgin PTFE.

Manufactured to suit O-Rings to BS1806, BS4518, JISB2401, MS27595 standards.

Order as part number shown on the table with suffix E, e.g. BS 210/E or as below...

BS1806 ... BS006/E	BS4518 ... BS0031-16/E
JISB2401... JISP003/E	MS27595 ... MS27595-004

### Endless Split



The endless split back up ring is manufactured as the endless style but is split at 30° to facilitate ease of assembly in certain applications. Endless split back up rings are normally manufactured from virgin PTFE.

Manufactured to suit O-Rings to BS1806, BS4518, JISB2401, MS28774, AS8791/1 standards.

Order as part number shown on the table with the suffix ES, e.g. BS 210/ES or as below...

BS1806 ... BS006/ES	BS4518 ... BS0031-16/ES
JISB2401 ... JISP003/ES	MS28774 ... MS28774-004/ES
AS8791/1 ... M8791-004/ES	

## Materials

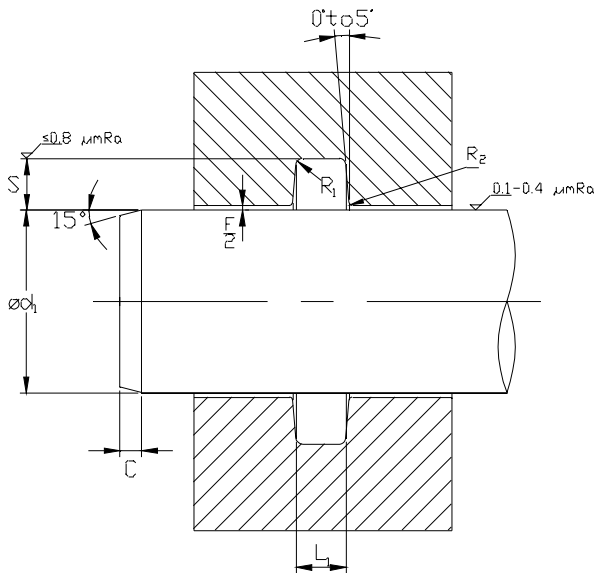
All the above can be supplied in a variety of PTFE materials including Virgin PTFE, Glass Filled PTFE and material specifications to MIL-R-8791/1.

The **Endless** and **Endless Split** Styles can also be supplied in Acetal, Nylon and Peek materials along with a variety of other filled PTFE grades such as Carbon and Bronze.

## Housing

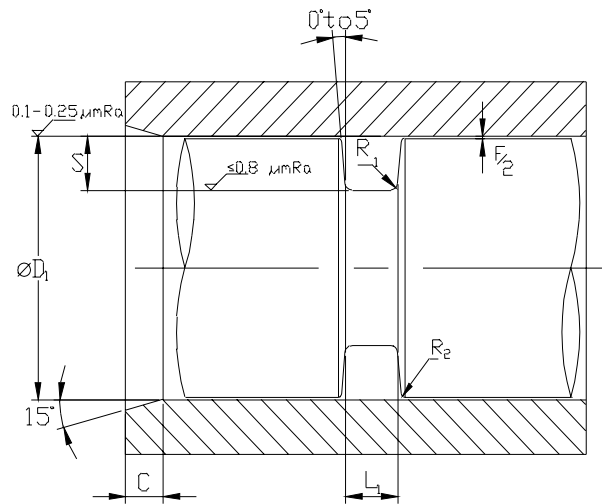
For surface finish and recommended lead in chamfers refer to the illustration below. For housing dimensions and machining tolerances refer to the catalogue page of selected seal. Refer to appendix 4 for value of tolerance symbols.

### HOUSING DIMENSIONS (refer to following tables 1 & 2)



#### Gland housing arrangement

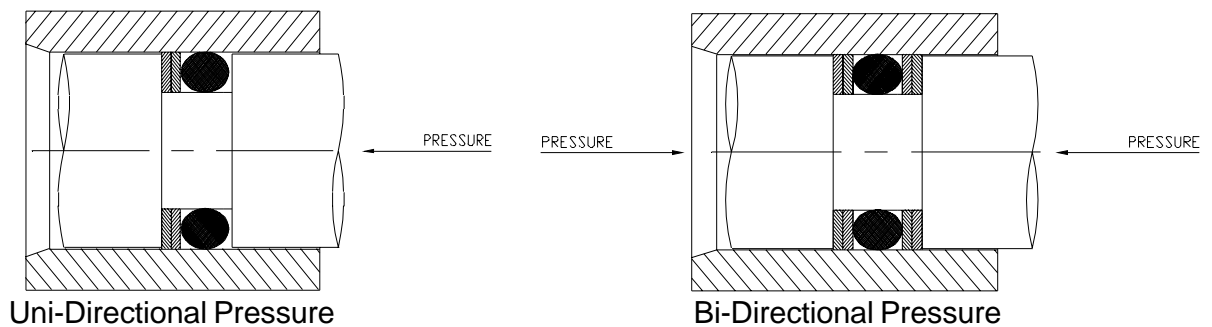
Max groove dia. = Shaft dia.  $d_1$  min. + 2S max  
Min groove dia. = Shaft dia.  $d_1$  min. + 2S min.



#### Piston housing arrangement

Max. groove dia. = Cylinder dia.  $D_1$  min. - 2S min.  
Min. groove dia. = Cylinder dia.  $D_1$  max. - 2S max.

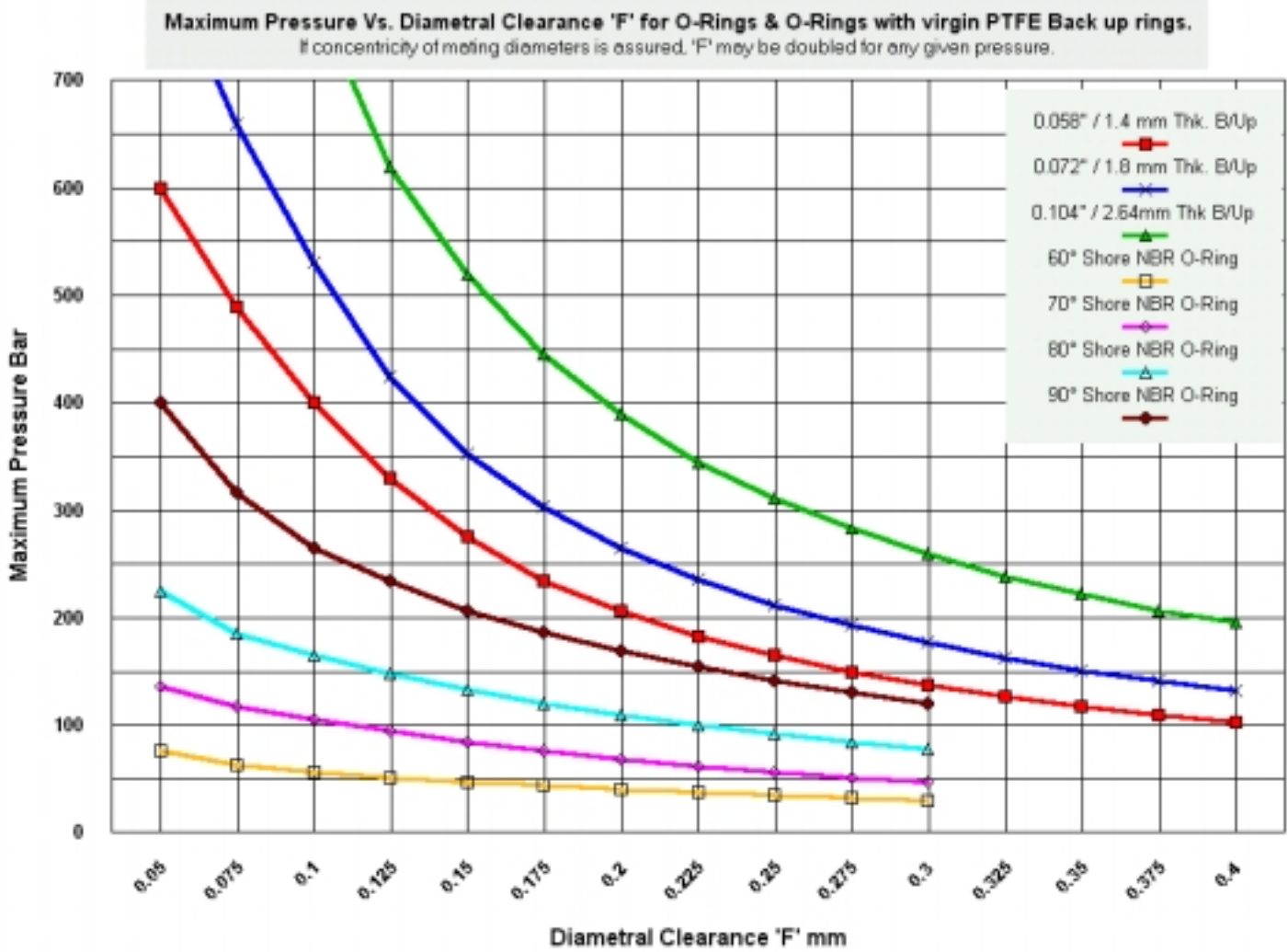
### POSITIONING OF BACK-UP RINGS



## Fitting

For the back up ring to function correctly, it is important that care be taken in fitting the backup within its housing. For a detailed checklist, refer to Appendix 3.

## Operating Conditions



Where O-Rings are used in dynamic applications, an anti-extrusion ring is recommended for pressures >100bar and temperatures >100°C.

Housing groove dimensions for 'O'-Rings to BS1806 and BS4518 fitted with back-up rings in Dynamic and Static diametral applications.  
 Tables 1 & 2 refer to the housing drawings.

<b>IMPERIAL</b>								
Housing groove dimensions for O-Rings to BS1806 fitted with back-up rings in Dynamic & Static diametral applications.								
O-Ring Section	Radial Width 'S'		Groove Width $L_1$				Radius 'R1' Max.	Cham. 'C' Min.
			One back-up ring		Two back-up rings			
	Max.	Min.	Max.	Min.	Max.	Min.		
0.070"	0.062"	0.060"	0.152"	0.147"	0.210"	0.205"	0.030"	0.085"
0.103"	0.094"	0.091"	0.199"	0.194"	0.257"	0.252"	0.030"	0.097"
0.139"	0.125"	0.122"	0.247"	0.241"	0.305"	0.299"	0.030"	0.103"
0.210"	0.188"	0.184"	0.355"	0.348"	0.427"	0.420"	0.030"	0.156"
0.275"	0.250"	0.245"	0.480"	0.473"	0.582"	0.576"	0.030"	0.187"

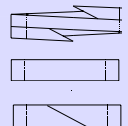
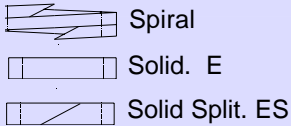
Table 1

<b>METRIC</b>								
Housing groove dimensions for O-Rings to BS4518 fitted with back-up rings in Dynamic & Static diametral applications.								
O-Ring Section	Radial Width 'S'		Groove Width $L_1$				Radius 'R1' Max.	Chamf. 'C' Min.
			One back-up ring		Two back-up rings			
	Max.	Min.	Max.	Min.	Max.	Min.		
1.6 mm	1.3 mm	1.25 mm	4.0 mm	3.8 mm	5.4 mm	5.2 mm	0.5 mm	2.2 mm
2.4 mm	2.09 mm	1.97 mm	4.8 mm	4.6 mm	6.2 mm	6.0 mm	0.5 mm	2.2 mm
3.0 mm	2.65 mm	2.50 mm	5.6 mm	5.4 mm	7.0 mm	6.8 mm	1.0 mm	2.6 mm
5.7 mm	5.18 mm	4.95 mm	9.5 mm	9.3 mm	11.3 mm	11.1 mm	1.0 mm	3.7 mm

Table 2

PTFE Back-Up Rings  
To Suit O-Rings to BS 1806

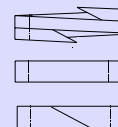
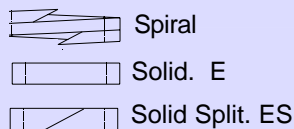
Imperial



Claron Part Number	Nominal Dimensions				Claron Part Number	Nominal Dimensions			
	Ød <sub>1</sub>	ØD <sub>1</sub>	T Max.	O-Ring Section		Ød <sub>1</sub>	ØD <sub>1</sub>	T Max.	O-Ring Section
BS 005	0.109	0.234			BS 113	0.562	0.750		
BS 006	0.125	0.250			BS 114	0.625	0.812		
BS 007	0.156	0.281			BS 115	0.687	0.875		
BS 008	0.187	0.312			BS 116	0.750	0.937		
BS 009	0.219	0.344			BS 117	0.812	1.000		
BS 010	0.250	0.375			BS 118	0.875	1.062		
BS 011	0.312	0.437			BS 119	0.937	1.125		
BS 012	0.375	0.500			BS 120	1.000	1.187		
BS 013	0.437	0.562			BS 121	1.062	1.250		
BS 014	0.500	0.625			BS 122	1.125	1.312		
BS 015	0.562	0.687			BS 123	1.187	1.375		
BS 016	0.625	0.750			BS 124	1.250	1.437		
BS 017	0.687	0.812			BS 125	1.312	1.500		
BS 018	0.750	0.875			BS 126	1.375	1.562		
BS 019	0.812	0.937			BS 127	1.437	1.625		
BS 020	0.875	1.000			BS 128	1.500	1.687		
BS 021	0.937	1.062			BS 129	1.562	1.750		
BS 022	1.000	1.125			BS 130	1.625	1.812		
BS 023	1.062	1.187			BS 131	1.687	1.875		
BS 024	1.125	1.250			BS 132	1.750	1.937		
BS 025	1.187	1.312			BS 133	1.812	2.000		
BS 026	1.250	1.375			BS 134	1.875	2.062		
BS 027	1.312	1.437			BS 135	1.937	2.125	0.058	0.103
BS 028	1.375	1.500	0.058	0.070	BS 136	2.000	2.187		
BS 029	1.500	1.625			BS 137	2.062	2.250		
BS 030	1.625	1.750			BS 138	2.125	2.312		
BS 031	1.750	1.875			BS 139	2.187	2.375		
BS 032	1.875	2.000			BS 140	2.250	2.437		
BS 033	2.000	2.125			BS 141	2.312	2.500		
BS 034	2.125	2.250			BS 142	2.375	2.562		
BS 035	2.250	2.375			BS 143	2.437	2.625		
BS 036	2.375	2.500			BS 144	2.500	2.687		
BS 037	2.500	2.625			BS 145	2.562	2.750		
BS 038	2.625	2.750			BS 146	2.625	2.812		
BS 039	2.750	2.875			BS 147	2.687	2.875		
BS 040	2.875	3.000			BS 148	2.750	2.937		
BS 041	3.000	3.125			BS 149	2.812	3.000		
BS 042	3.250	3.375			BS 150	2.875	3.062		
BS 043	3.500	3.625			BS 151	3.000	3.187		
BS 044	3.750	3.875			BS 152	3.250	3.437		
BS 045	4.000	4.125			BS 153	3.500	3.687		
BS 046	4.250	4.375			BS 154	3.750	3.937		
BS 047	4.500	4.625			BS 155	4.000	4.187		
BS 048	4.750	4.875			BS 156	4.250	4.437		
BS 049	5.000	5.125			BS 157	4.500	4.687		
BS 050	5.250	5.375			BS 158	4.750	4.937		
BS 108	0.250	0.437			BS 159	5.000	5.187		
BS 109	0.312	0.500			BS 160	5.250	5.437		
BS 110	0.375	0.562	0.058	0.103	BS 161	5.500	5.687		
BS 111	0.437	0.625			BS 162	5.750	5.937		
BS 112	0.500	0.687							

PTFE Back-Up Rings  
To Suit O-Rings to BS 1806

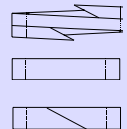
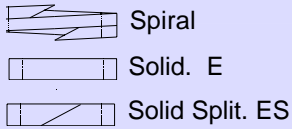
Imperial



Claron Part Number	Nominal Dimensions				Claron Part Number	Nominal Dimensions			
	Ød <sub>1</sub>	ØD <sub>1</sub>	T Max.	O-Ring Section		Ød <sub>1</sub>	ØD <sub>1</sub>	T Max.	O-Ring Section
BS 206	0.500	0.750			BS 256	5.750	6.000		
BS 207	0.562	0.812			BS 257	5.875	6.125		
BS 208	0.625	0.875			BS 258	6.000	6.250		
BS 209	0.687	0.937			BS 259	6.250	6.500		
BS 210	0.750	1.000			BS 260	6.500	6.750		
BS 211	0.812	1.062			BS 261	6.750	7.000		
BS 212	0.875	1.125			BS 262	7.000	7.250		
BS 213	0.937	1.187			BS 263	7.250	7.500		
BS 214	1.000	1.250			BS 264	7.500	7.750		
BS 215	1.062	1.312			BS 265	7.750	8.000		
BS 216	1.125	1.375			BS 266	8.000	8.250		
BS 217	1.187	1.437			BS 267	8.250	8.500		
BS 218	1.250	1.500			BS 268	8.500	8.750		
BS 219	1.312	1.562			BS 269	8.750	9.000		
BS 220	1.375	1.625			BS 270	9.000	9.250		
BS 221	1.437	1.687			BS 271	9.250	9.500	0.058	0.139
BS 222	1.500	1.750			BS 272	9.500	9.750		
BS 223	1.625	1.875			BS 273	9.750	10.000		
BS 224	1.750	2.000			BS 274	10.000	10.250		
BS 225	1.875	2.125			BS 275	10.500	10.750		
BS 226	2.000	2.250			BS 276	11.000	11.250		
BS 227	2.125	2.375			BS 277	11.500	11.750		
BS 228	2.250	2.500			BS 278	12.000	12.250		
BS 229	2.375	2.625	0.058	0.139	BS 279	13.000	13.250		
BS 230	2.500	2.750			BS 280	14.000	14.250		
BS 231	2.625	2.875			BS 281	15.000	15.250		
BS 232	2.750	3.000			BS 282	16.000	16.250		
BS 233	2.875	3.125			BS 283	17.000	17.250		
BS 234	3.000	3.250			BS 284	18.000	18.250		
BS 235	3.125	3.375							
BS 236	3.250	3.500			BS 314	0.750	1.125		
BS 237	3.375	3.625			BS 315	0.812	1.187		
BS 238	3.500	3.750			BS 316	0.875	1.250		
BS 239	3.625	3.875			BS 317	0.937	1.312		
BS 240	3.750	4.000			BS 318	1.000	1.375		
BS 241	3.875	4.125			BS 319	1.062	1.437		
BS 242	4.000	4.250			BS 320	1.125	1.500		
BS 243	4.125	4.375			BS 321	1.187	1.562		
BS 244	4.250	4.500			BS 322	1.250	1.625		
BS 245	4.375	4.625			BS 323	1.312	1.687		
BS 246	4.500	4.750			BS 324	1.375	1.750		
BS 247	4.625	4.875			BS 325	1.500	1.875		
BS 248	4.750	5.000			BS 326	1.625	2.000	0.072	0.210
BS 249	4.875	5.125			BS 327	1.750	2.125		
BS 250	5.000	5.250			BS 328	1.875	2.250		
BS 251	5.125	5.375			BS 329	2.000	2.375		
BS 252	5.250	5.500			BS 330	2.125	2.500		
BS 253	5.375	5.625			BS 331	2.250	2.625		
BS 254	5.500	5.750			BS 332	2.375	2.750		
BS 255	5.625	5.875			BS 333	2.500	2.875		
					BS 334	2.625	3.000		
					BS 335	2.750	3.125		
					BS 336	2.875	3.250		

PTFE Back-Up Rings  
To Suit O-Rings to BS 1806

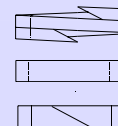
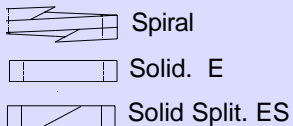
Imperial



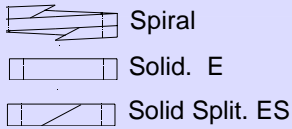
Claron Part Number	Nominal Dimensions				Claron Part Number	Nominal Dimensions			
	Ød <sub>1</sub>	ØD <sub>1</sub>	T Max.	O-Ring Section		Ød <sub>1</sub>	ØD <sub>1</sub>	T Max.	O-Ring Section
BS 337	3.000	3.375			BS 425	4.500	5.000		
BS 338	3.125	3.500			BS 426	4.625	5.125		
BS 339	3.250	3.625			BS 427	4.750	5.250		
BS 340	3.375	3.750			BS 428	4.875	5.375		
BS 341	3.500	3.875			BS 429	5.000	5.500		
BS 342	3.625	4.000			BS 430	5.125	5.625		
BS 343	3.750	4.125			BS 431	5.250	5.750		
BS 344	3.875	4.250			BS 432	5.375	5.875		
BS 345	4.000	4.375			BS 433	5.500	6.000		
BS 346	4.125	4.500			BS 434	5.625	6.125		
BS 347	4.250	4.625			BS 435	5.750	6.250		
BS 348	4.375	4.750			BS 436	5.875	6.375		
BS 349	4.500	4.875			BS 437	6.000	6.500		
BS 350	4.625	5.000			BS 438	6.250	6.750		
BS 351	4.750	5.125			BS 439	6.500	7.000		
BS 352	4.875	5.250			BS 440	6.750	7.250		
BS 353	5.000	5.375			BS 441	7.000	7.500		
BS 354	5.125	5.500			BS 442	7.250	7.750		
BS 355	5.250	5.625			BS 443	7.500	8.000		
BS 356	5.375	5.750			BS 444	7.750	8.250		
BS 357	5.500	5.875			BS 445	8.000	8.500		
BS 358	5.625	6.000			BS 445A	8.250	8.750		
BS 359	5.750	6.125			BS 446	8.500	9.000		
BS 360	5.875	6.250			BS 446A	8.750	9.250		
BS 361	6.000	6.375			BS 447	9.000	9.500		
BS 362	6.250	6.625			BS 447A	9.250	9.750		
BS 363	6.500	6.875	0.072	0.210	BS 448	9.500	10.000	0.104	0.275
BS 364	6.750	7.125			BS 448A	9.750	10.250		
BS 365	7.000	7.375			BS 449	10.000	10.500		
BS 366	7.250	7.625			BS 449A	10.250	10.750		
BS 367	7.500	7.875			BS 450	10.500	11.000		
BS 368	7.750	8.125			BS 450A	10.750	11.250		
BS 369	8.000	8.375			BS 451	11.000	11.500		
BS 370	8.250	8.625			BS 451A	11.250	11.750		
BS 371	8.500	8.875			BS 452	11.500	12.000		
BS 372	8.750	9.125			BS 452A	11.750	12.250		
BS 373	9.000	9.375			BS 453	12.000	12.500		
BS 374	9.250	9.625			BS 454	12.500	13.000		
BS 375	9.500	9.875			BS 455	13.000	13.500		
BS 376	9.750	10.125			BS 456	13.500	14.000		
BS 377	10.000	10.375			BS 457	14.000	14.500		
BS 378	10.500	10.875			BS 458	14.500	15.000		
BS 379	11.000	11.375			BS 459	15.000	15.500		
BS 380	11.500	11.875			BS 460	15.500	16.000		
BS 381	12.000	12.375			BS 461	16.000	16.500		
BS 382	13.000	13.375			BS 462	16.500	17.000		
BS 383	14.000	14.375			BS 463	17.000	17.500		
BS 384	15.000	15.375			BS 464	17.500	18.000		
BS 385	16.000	16.375			BS 465	18.000	18.500		
BS 386	17.000	17.375			BS 466	18.500	19.000		
BS 387	18.000	18.375			BS 467	19.000	19.500		
BS 388	19.000	19.375			BS 468	19.500	20.000		
BS 389	20.000	20.375			BS 469	20.000	20.500		
BS 390	21.000	21.375			BS 470	21.000	21.500		
BS 391	22.000	22.375			BS 471	22.000	22.500		
BS 392	23.000	23.375			BS 472	23.000	23.500		
BS 393	24.000	24.375			BS 473	24.000	24.500		
BS 394	25.000	25.375			BS 474	25.000	25.500		
BS 395	26.000	26.375			BS 475	26.000	26.500		

PTFE Back-Up Rings  
To Suit O-Rings to BS 4518

Metric

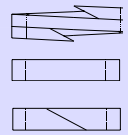


Claron Part Number	Nominal Dimensions				Claron Part Number	Nominal Dimensions			
	Ød <sub>1</sub>	ØD <sub>1</sub>	T Max.	O-Ring Section		Ød <sub>1</sub>	ØD <sub>1</sub>	T Max.	O-Ring Section
BS 0031-16	3.5	6.0			BS 0195-30	20	25		
BS 0041-16	4.5	7.0			BS 0215-30	22	27		
BS 0051-16	5.5	8.0			BS 0225-30	23	28		
BS 0061-16	6.5	9.0			BS 0245-30	25	30		
BS 0071-16	7.5	10.0			BS 0255-30	26	31		
BS 0081-16	8.5	11.0			BS 0265-30	27	32		
BS 0091-16	9.5	12.0			BS 0275-30	28	33		
BS 0101-16	10.5	13.0			BS 0295-30	30	35		
BS 0111-16	11.5	14.0			BS 0315-30	32	37		
BS 0121-16	12.5	15.0			BS 0325-30	33	38		
BS 0131-16	13.5	16.0			BS 0345-30	35	40		
BS 0141-16	14.5	17.0	1.4	1.6	BS 0355-30	36	41		
BS 0151-16	15.5	18.0			BS 0365-30	37	42		
BS 0161-16	16.5	19.0			BS 0375-30	38	43		
BS 0171-16	17.5	20.0			BS 0395-30	40	45		
BS 0181-16	18.5	21.0			BS 0415-30	42	47		
BS 0191-16	19.5	22.0			BS 0425-30	43	48		
BS 0221-16	22.5	25.0			BS 0445-30	45	50		
BS 0251-16	25.5	28.0			BS 0495-30	50	55		
BS 0271-16	27.5	30.0			BS 0545-30	55	60		
BS 0291-16	29.5	32.0			BS 0555-30	56	61		
BS 0321-16	32.5	35.0			BS 0575-30	58	63		
BS 0351-16	35.5	38.0			BS 0595-30	60	65		
BS 0371-16	37.5	40.0			BS 0635-30	64	69		
BS 0036-24	4	8			BS 0645-30	65	70		
BS 0046-24	5	9			BS 0695-30	70	75		
BS 0056-24	6	10			BS 0745-30	75	80		
BS 0066-24	7	11			BS 0795-30	80	85		
BS 0076-24	8	12			BS 0845-30	85	90	1.4	3.0
BS 0086-24	9	13			BS 0895-30	90	95		
BS 0096-24	10	14			BS 0945-30	95	100		
BS 0106-24	11	15			BS 0995-30	100	105		
BS 0116-24	12	16			BS 1045-30	105	110		
BS 0126-24	13	17			BS 1095-30	110	115		
BS 0136-24	14	18			BS 1145-30	115	120		
BS 0146-24	15	19			BS 1195-30	120	125		
BS 0156-24	16	20			BS 1245-30	125	130		
BS 0166-24	17	21			BS 1295-30	130	135		
BS 0176-24	18	22			BS 1345-30	135	140		
BS 0186-24	19	23			BS 1395-30	140	145		
BS 0196-24	20	24			BS 1445-30	145	150		
BS 0206-24	21	25			BS 1495-30	150	155		
BS 0216-24	22	26			BS 1545-30	155	160		
BS 0246-24	25	29			BS 1595-30	160	165		
BS 0276-24	28	32			BS 1645-30	165	170		
BS 0296-24	30	34	1.4	2.4	BS 1695-30	170	175		
BS 0316-24	32	36			BS 1745-30	175	180		
BS 0346-24	35	39			BS 1795-30	180	185		
BS 0356-24	36	40			BS 1845-30	185	190		
BS 0376-24	38	42			BS 1895-30	190	195		
BS 0396-24	40	44			BS 1945-30	195	200		
BS 0416-24	42	46			BS 1995-30	200	205		
BS 0446-24	45	49			BS 2045-30	205	210		
BS 0456-24	46	50			BS 2095-30	210	215		
BS 0476-24	48	52			BS 2195-30	220	225		
BS 0496-24	50	54			BS 2295-30	230	235		
BS 0516-24	52	56			BS 2395-30	240	245		
BS 0536-24	54	58			BS 2495-30	250	255		
BS 0546-24	55	59							
BS 0576-24	58	62							
BS 0586-24	59	63							
BS 0596-24	60	64							
BS 0616-24	62	66							
BS 0626-24	63	67							
BS 0646-24	65	69							
BS 0676-24	68	72							
BS 0696-24	70	74							



PTFE Back-Up Rings  
To Suit O-Rings to BS 4518

Metric



Claron Part Number	Nominal Dimensions				Claron Part Number	Nominal Dimensions			
	Ød <sub>1</sub>	ØD <sub>1</sub>	T Max.	O-Ring Section		Ød <sub>1</sub>	ØD <sub>1</sub>	T Max.	O-Ring Section
BS 0443-57	45	55	1.8	5.7	BS 1743-57	175	185	1.8	5.7
BS 0453-57	46	56			BS 1793-57	180	190		
BS 0493-57	50	60			BS 1843-57	185	195		
BS 0523-57	53	63			BS 1893-57	190	200		
BS 0543-57	55	65			BS 1943-57	195	205		
BS 0553-57	56	66			BS 1993-57	200	210		
BS 0593-57	60	70			BS 2043-57	205	215		
BS 0623-57	63	73			BS 2093-57	210	220		
BS 0643-57	65	75			BS 2143-57	215	225		
BS 0693-57	70	80			BS 2193-57	220	230		
BS 0743-57	75	85			BS 2293-57	230	240		
BS 0793-57	80	90			BS 2393-57	240	250		
BS 0843-57	85	95			BS 2493-57	250	260		
BS 0893-57	90	100			BS 2593-57	260	270		
BS 0943-57	95	105			BS 2693-57	270	280		
BS 0993-57	100	110			BS 2793-57	280	290		
BS 1043-57	105	115			BS 2893-57	290	300		
BS 1093-57	110	120			BS 2993-57	300	310		
BS 1143-57	115	125			BS 3193-57	320	330		
BS 1193-57	120	130			BS 3393-57	340	350		
BS 1243-57	125	135			BS 3593-57	360	370		
BS 1293-57	130	140			BS 3793-57	380	390		
BS 1343-57	135	145			BS 3993-57	400	410		
BS 1393-57	140	150			BS 4193-57	420	430		
BS 1443-57	145	155			BS 4393-57	440	450		
BS 1493-57	150	160			BS 4593-57	460	470		
BS 1543-57	155	165			BS 4793-57	480	490		
BS 1593-57	160	170			BS 4893-57	490	500		
BS 1643-57	165	175			BS 4993-57	500	510		
BS 1693-57	170	180							