

# Back-up Rings



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Protective and supporting  
element

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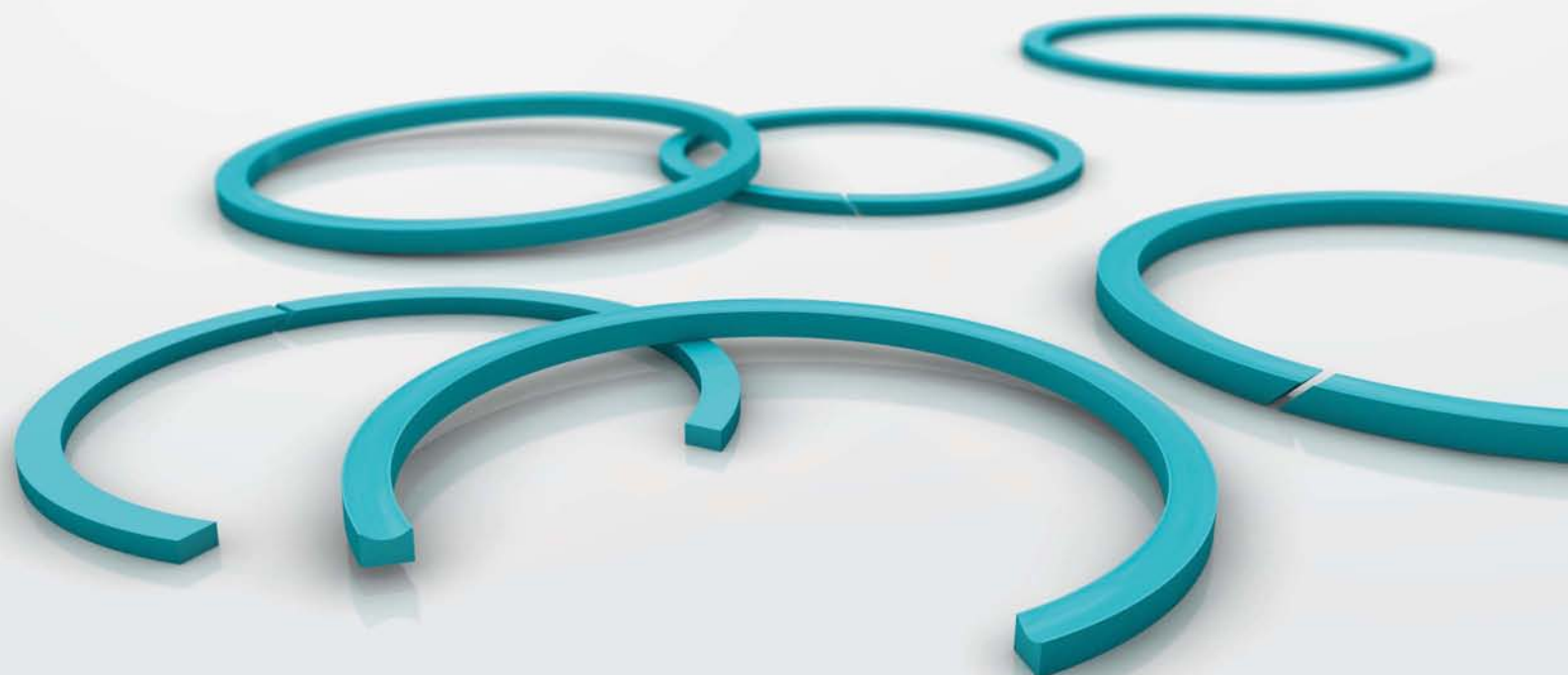
Static and dynamic applications, high pressure

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**Material:**

PTFE, Elastomers and others

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## ■ E General Information

Back-up Rings have no intended sealing function. Instead, as their name indicates, they are protective and supporting elements made from extrusion-resistant materials which generally have a rectangular cross section. They are installed in a groove together with an elastomeric sealing element, preferably with a corresponding O-Ring in static applications.

Due to the tight fit of the Back-up Ring in the housing, they prevent extrusion of the pressurized elastomeric sealing element into the sealing gap.

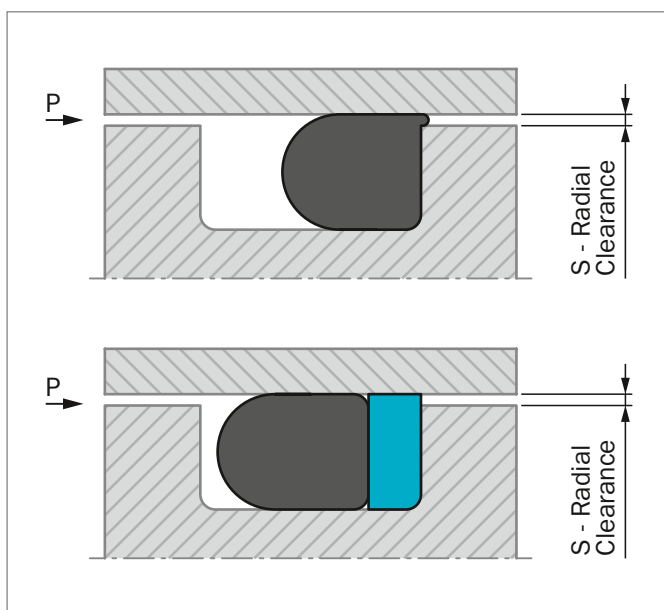


Figure 52: O-Ring installation with and without Back-up Ring

## ADVANTAGES

- Use of O-Rings in high pressure applications
- Use of O-Ring materials with a low hardness
- Compensation of radial sealing gaps
- Use for internal and external sealing applications
- Reciprocating and rotating movements possible
- Compensation for large temperature fluctuations
- Static and dynamic applications

## APPLICATION EXAMPLES

- Injection molding machines
- Machine tools
- Presses
- Excavators
- Agricultural machines
- Valves for hydraulic circuits



## ■ F Back-up Ring Types

### ■ F.1 Overview

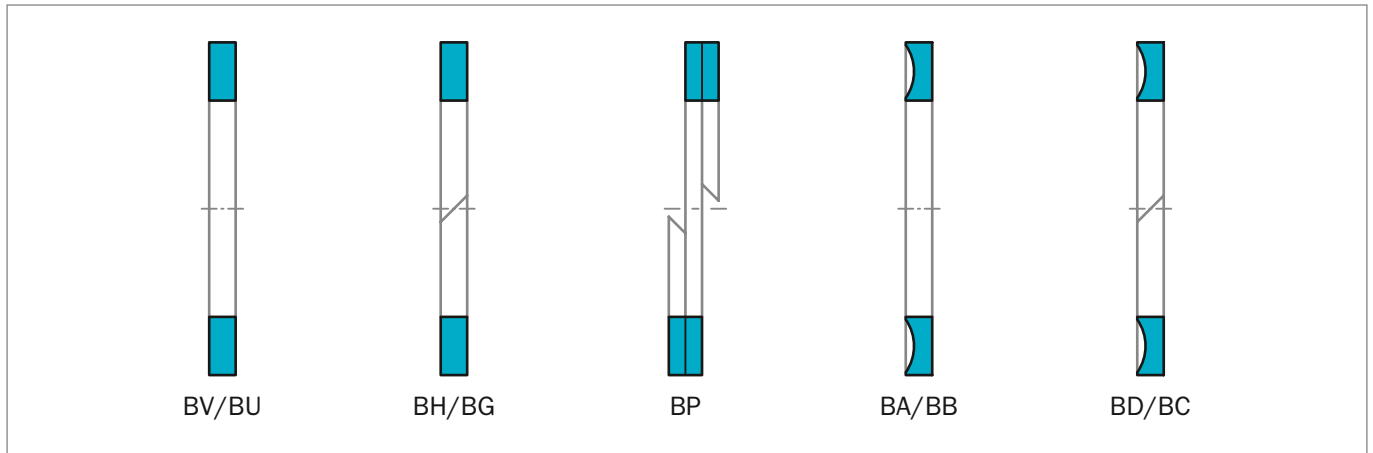


Figure 53: Back-up Ring types

#### External sealing (piston)

##### Type BV

- Rectangular, uncut, PTFE

##### Type BH

- Rectangular, cut, PTFE

##### Type BP

- Spiral, PTFE

##### Type BA

- Concave, uncut, PTFE

##### Type BB

- Concave, uncut, NBR + FKM

##### Type BD

- Concave, cut, PTFE

#### Internal sealing (rod)

##### Type BU

- Rectangular, uncut, PTFE

##### Type BG

- Rectangular, cut, PTFE

##### Type BP

- Spiral, PTFE

##### Type BB

- Concave, uncut, PTFE

##### Type BB

- Concave, uncut, NBR + FKM

##### Type BC

- Concave, cut, PTFE



## ■ F.2 Back-up Ring Types for External Sealing (Piston)

### Back-up Ring types, uncut

#### Type BV

- Rectangular cross section
- Material: PTFE
- Static and dynamic use
- Reciprocating and rotating movements possible

#### Type BB

- Concave cross section
- Material: NBR, FKM
- The large contact surface protects the O-Ring against deformation in case of high pulsating pressures
- Dimensional stability of the O-Ring improves the sealing force and increases the service life
- Preferably for static use
- Reciprocating movements possible

#### Type BA

- Concave cross section
- Material: PTFE
- The large contact surface protects the O-Ring against deformation in case of high pulsating pressures
- Dimensional stability of the O-Ring improves the sealing force and increases the service life
- Static and dynamic use
- Reciprocating and rotating movements possible

### Snap-back Back-up Ring, special Type

- Easy installation in closed grooves due to the snap-back effect of the material
- The dimensions are different compared to the standard Back-up Rings. Production only on request

### Back-up Ring types, cut

#### Type BH

- Rectangular cross section
- Material: PTFE
- Cut angle of 30° or 45°
- Static and dynamic use
- Reciprocating and rotating movements possible
- Preferred for installations in a closed groove where uncut Back-up Rings are not suitable

#### Type BD

- Concave cross-section
- Material: PTFE
- Cut angle of 30° or 45°
- The large contact surface protects the O-Ring against deformation in case of high pulsating pressures
- Dimensional stability of the O-Ring improves the sealing force and increases the service life
- Static and dynamic use
- Reciprocating movements possible
- Preferred for installations in a closed groove where uncut Back-up Rings are not suitable

### Back-up Ring types, spiral

#### Type BP

- Rectangular cross section
- Material: PTFE
- Cut angle of 30° or 45°
- Consists of standard two spiral windings which are cut at the ends at an angle
- Static and dynamic use
- For reciprocating movements only
- Preferred for installations in a closed groove where uncut Back-up Ring are not suitable
- Compensation of large temperature changes and tolerances through a screw-like elongation and contraction. Easy installation in closed grooves for external sealing applications
- The dimensions are different compared to standard Back-up Rings
- Recommended only if service diameter does not exceed 40 times the radial groove depth



## ■ F.3 Back-up Ring Types for Internal Sealing (Rod)

### Back-up Ring types, uncut

#### Type BU

- Rectangular cross section
- Material: PTFE
- Static and dynamic use
- Reciprocating and rotating movements possible

#### Type BB

- Concave cross-section
- Material: PTFE, NBR, FKM
- The large contact surface protects the O-Ring against deformation in case of high pulsating pressures
- Dimensional stability of the O-Ring improves the sealing force and increases the service life
- Static and dynamic use
- Reciprocating movements possible

### Back-up Ring types, cut

#### Type BG

- Rectangular cross section
- Material: PTFE
- Cut angle of 30° or 45°
- Static and dynamic use
- Reciprocating and rotating movement possible
- Preferred for installations in closed grooves where uncut Back-up Rings are not suitable

#### Type BC

- Concave cross-section
- Material: PTFE
- Cut angle of 30° or 45°
- The large contact surface protects the O-Ring against deformation in case of high pulsating pressures
- Dimensional stability of the O-Ring improves the sealing force and increases the service life
- Static and dynamic use
- Reciprocating movements possible
- Preferred for installations in a closed groove where uncut Back-up Rings are not suitable

### Back-up Ring type, spiral

#### Type BP

- Rectangular cross section
- Material: PTFE
- Cut angle of 30° or 45°
- Consists of standard two spiral windings which are cut at the ends at an angle
- Static and dynamic use
- For reciprocating movements only
- Preferred for installations in a closed groove where uncut Back-up Rings are not suitable
- Compensation of large temperature changes and tolerances through a screw-like elongation and contraction
- Recommended only if service diameter does not exceed 40 times the radial groove depth



## ■ G Technical Information

### ■ G.1 Materials

Back-up Rings are manufactured from virgin PTFE as standard. In view of the unfavorable cold flow behavior of virgin PTFE, these Back-up Rings are only used for low to medium loads. For higher load requirements, filled PTFE materials (with glassfiber, bronze, carbon, etc.) have to be used. For sealing against high pressures, Back-up Rings made from specially modified thermoplastic materials are available.

For the series production of larger quantities, injection molded Back-up Rings can be manufactured, e.g. NBR 90 Shore A, FKM 90 Shore A, or thermoplastic elastomers (TPE) on request.

**Table 69: Back-up Ring materials**

Base material	Material code	Type					Dynamic application	
		BU/BV	BG/BH	BP	BB/BA	BC/BD	Pressure	
							MPa	psi
PTFE (virgin) - standard	PT00	•	•	•	•	•	25	3,626
PTFE - glassfibre-filled	PTGB	•	•	•	•	•	40	5,801
PTFE, carbon-filled	PTKC	•	•	•	•	•	40	5,801
PTFE, bronze-filled	PTB4	•	•	•	•	•	40	5,801
TPE-E	PR	•	•	-	•	•	30	4,351
NBR, 90 Shore A	N962N	-	-	-	•	-	20	2,901
FKM, 90 Shore A	V96E1	-	-	-	•	-	20	2,901

### ■ G.2 Technical Data

<b>Static applications:</b>	Up to approximately 250 MPa (36,259 psi) depending on the Back-up Ring material and sealing gap
<b>Dynamic applications:</b>	Reciprocating up to approximately 40 MPa (5,801 psi) Oscillating/slowly rotating up to approximately 15 MPa (2,176 psi)
<b>Speed:</b>	Reciprocating or rotating up to approximately 2 m/s (4.474 mph) depending on the material
<b>Operating temperature:</b>	-200 °C (-328 °F) up to +260 °C (+500 °F) depending on the material

#### IMPORTANT NOTE

The application limits for pressure and temperature given in this catalog are maximum values. During practical applications it should be remembered that due to the interaction of operating parameters, the maximum values must be set correspondingly lower.



### ■ G.3 Design Recommendations

The recommendations for O-Rings are generally valid for the use of Back-up Rings. This applies to the groove design, surface roughness, lead-in chamfers, etc.

When the pressure is applied from one side only, it is sufficient to install a Back-up Ring on the downstream side of the O-Ring. When the seal is exposed to pressure from both sides, two Back-up Rings - one on each side of the O-Ring - have to be used.

#### Permissible sealing gap

The use of Back-up Rings allows the service pressure and/or permissible radial clearance specified in this catalog, Part I: O-Ring, chapter B.2.7 Housing design and dimensions, to be increased.

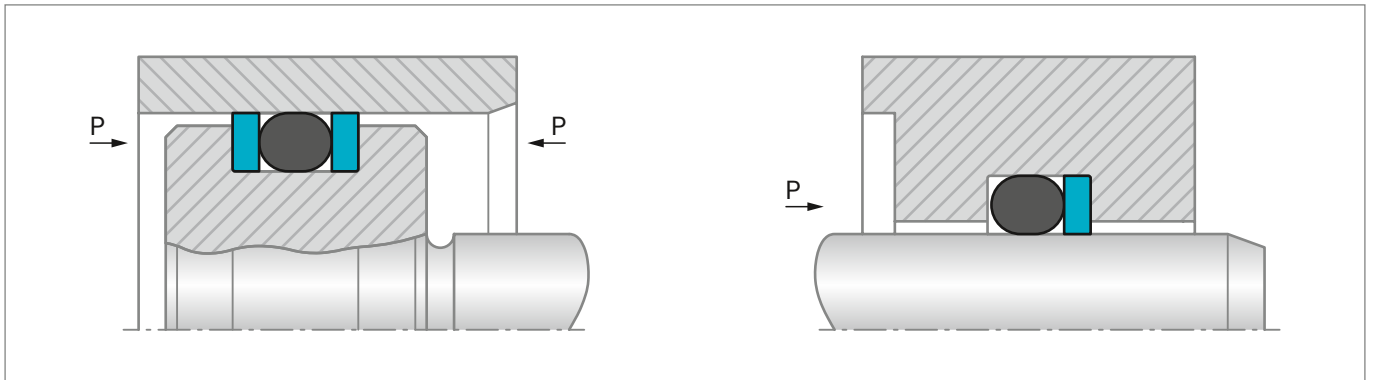


Figure 54: Back-up Ring installation, depending on the direction of the pressure





## ■ H Installation Recommendations and Back-up Ring Dimensions

### ■ H.1 External sealing (Piston), static and dynamic applications

#### H.1.1 RECTANGULAR BACK-UP RING TYPES, UNCUT (BV) AND CUT (BH), MATERIAL PTFE

The following figure and tables include installation recommendations and Back-up Ring dimensions for external sealing applications with the rectangular Back-up Ring types BV (uncut) and BH (cut).

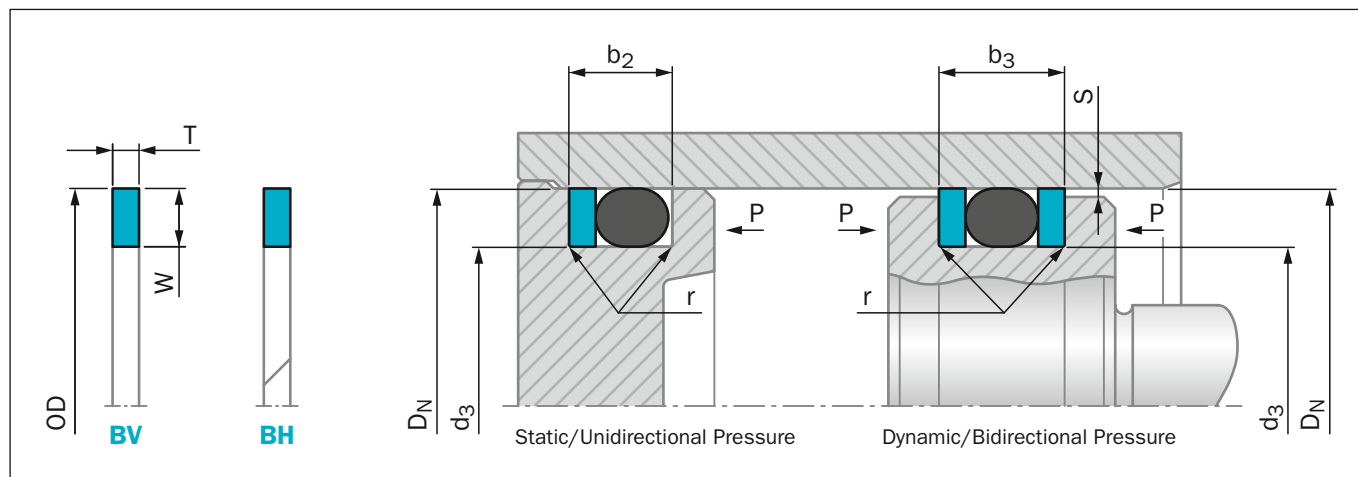


Figure 55: Installation drawing external sealing, rectangular Back-up Ring types

**Table 70: Installation dimensions for rectangular Back-up Ring types, uncut and cut, External sealing, material PTFE – Metric**

O-Ring Cross-Section- Ø d <sub>2</sub>	Back-up Ring Cross-Section			Groove dimensions				
	Radial height W		Thickness	Groove diameter d <sub>3</sub> h9		Groove width		Radius
	Dynamic	Static	T	Dynamic	Static	b <sub>2</sub> +0.25	b <sub>3</sub> +0.25	r ±0.2
mm								
1.50	1.25	1.10	1.0	D <sub>N</sub> - 2.5	D <sub>N</sub> - 2.2	3.0	4.0	0.25
1.60	1.30	1.20	1.0	D <sub>N</sub> - 2.6	D <sub>N</sub> - 2.4	3.1	4.1	0.25
1.78	1.45	1.30	1.4	D <sub>N</sub> - 2.9	D <sub>N</sub> - 2.6	3.8	5.2	0.25
1.80	1.45	1.30	1.4	D <sub>N</sub> - 2.9	D <sub>N</sub> - 2.6	3.8	5.2	0.25
2.00	1.65	1.50	1.4	D <sub>N</sub> - 3.3	D <sub>N</sub> - 3.0	4.1	5.5	0.25
2.40	2.05	1.80	1.4	D <sub>N</sub> - 4.1	D <sub>N</sub> - 3.6	4.6	6.0	0.25
2.50	2.15	1.90	1.4	D <sub>N</sub> - 4.3	D <sub>N</sub> - 3.8	4.7	6.1	0.25
2.62	2.25	2.00	1.4	D <sub>N</sub> - 4.5	D <sub>N</sub> - 4.0	5.0	6.4	0.25
2.65	2.25	2.00	1.4	D <sub>N</sub> - 4.5	D <sub>N</sub> - 4.0	5.0	6.4	0.25
3.00	2.60	2.30	1.4	D <sub>N</sub> - 5.2	D <sub>N</sub> - 4.6	5.4	6.8	0.25
3.53	3.10	2.70	1.4	D <sub>N</sub> - 6.2	D <sub>N</sub> - 5.4	6.2	7.6	0.25
3.55	3.10	2.70	1.4	D <sub>N</sub> - 6.2	D <sub>N</sub> - 5.4	6.2	7.6	0.25
4.00	3.50	3.10	1.7	D <sub>N</sub> - 7.0	D <sub>N</sub> - 6.2	6.9	8.6	0.25
5.00	4.40	4.00	1.7	D <sub>N</sub> - 8.8	D <sub>N</sub> - 8.0	8.3	10.0	0.25
5.30	4.70	4.30	1.7	D <sub>N</sub> - 9.4	D <sub>N</sub> - 8.6	9.0	10.9	0.25
5.33	4.70	4.30	1.7	D <sub>N</sub> - 9.4	D <sub>N</sub> - 8.6	9.0	10.9	0.25



O-Ring Cross-Section- Ø d <sub>2</sub>	Back-up Ring Cross-Section			Groove dimensions				
	Radial height W		Thickness T	Groove diameter d <sub>3</sub> h9		Groove width		Radius r ±0.2
	Dynamic	Static		Dynamic	Static	b <sub>2</sub> +0.25	b <sub>3</sub> +0.25	
mm								
5.70	5.00	4.60	1.7	D <sub>N</sub> - 10.0	D <sub>N</sub> - 9.2	9.0	11.0	0.25
6.00	5.30	4.90	1.7	D <sub>N</sub> - 10.6	D <sub>N</sub> - 9.8	9.3	11.2	0.25
6.99	6.10	5.80	2.5	D <sub>N</sub> - 12.2	D <sub>N</sub> - 11.6	12.3	15.1	0.25
8.00	7.10	6.70	2.5	D <sub>N</sub> - 14.2	D <sub>N</sub> - 13.4	12.6	15.4	0.25
8.40	7.50	7.10	2.5	D <sub>N</sub> - 15.0	D <sub>N</sub> - 14.2	12.8	15.6	0.25

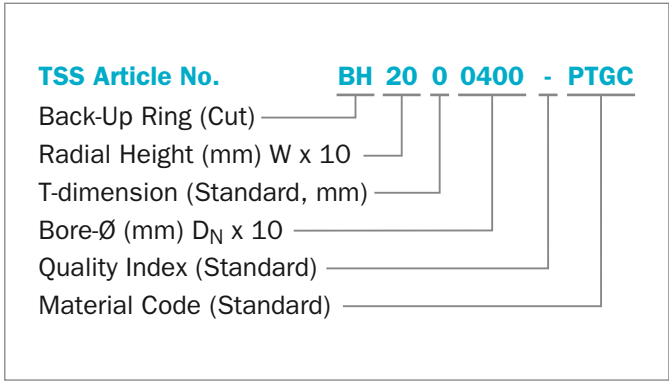
**Table 71: Installation dimensions for rectangular Back-up Ring types, uncut and cut, External sealing, material PTFE – Inch**

O-Ring Cross-Section- Ø d <sub>2</sub>	Back-up Ring Cross-Section			Groove dimensions				
	Radial height W		Thickness T	Groove diameter d <sub>3</sub> h9		Groove width		Radius r ±0.008
	Dynamic	Static		Dynamic	Static	b <sub>2</sub> +0.010	b <sub>3</sub> +0.010	
inch								
0.059	0.049	0.043	0.039	D <sub>N</sub> - 0.098	D <sub>N</sub> - 0.087	0.118	0.157	0.010
0.063	0.051	0.047	0.039	D <sub>N</sub> - 0.102	D <sub>N</sub> - 0.094	0.122	0.161	0.010
0.070	0.057	0.051	0.055	D <sub>N</sub> - 0.114	D <sub>N</sub> - 0.102	0.150	0.205	0.010
0.071	0.057	0.051	0.055	D <sub>N</sub> - 0.114	D <sub>N</sub> - 0.102	0.150	0.205	0.010
0.079	0.065	0.059	0.055	D <sub>N</sub> - 0.130	D <sub>N</sub> - 0.118	0.161	0.217	0.010
0.094	0.081	0.071	0.055	D <sub>N</sub> - 0.161	D <sub>N</sub> - 0.142	0.181	0.236	0.010
0.098	0.085	0.075	0.055	D <sub>N</sub> - 0.169	D <sub>N</sub> - 0.150	0.185	0.240	0.010
0.103	0.089	0.079	0.055	D <sub>N</sub> - 0.177	D <sub>N</sub> - 0.157	0.197	0.252	0.010
0.104	0.089	0.079	0.055	D <sub>N</sub> - 0.177	D <sub>N</sub> - 0.157	0.197	0.252	0.010
0.118	0.102	0.091	0.055	D <sub>N</sub> - 0.205	D <sub>N</sub> - 0.181	0.213	0.268	0.010
0.139	0.122	0.106	0.055	D <sub>N</sub> - 0.244	D <sub>N</sub> - 0.213	0.244	0.299	0.010
0.140	0.122	0.106	0.055	D <sub>N</sub> - 0.244	D <sub>N</sub> - 0.213	0.244	0.299	0.010
0.157	0.138	0.122	0.067	D <sub>N</sub> - 0.276	D <sub>N</sub> - 0.244	0.272	0.339	0.010
0.197	0.173	0.157	0.067	D <sub>N</sub> - 0.346	D <sub>N</sub> - 0.315	0.327	0.394	0.010
0.209	0.185	0.169	0.067	D <sub>N</sub> - 0.370	D <sub>N</sub> - 0.339	0.354	0.429	0.010
0.210	0.185	0.169	0.067	D <sub>N</sub> - 0.370	D <sub>N</sub> - 0.339	0.354	0.429	0.010
0.224	0.197	0.181	0.067	D <sub>N</sub> - 0.394	D <sub>N</sub> - 0.362	0.354	0.433	0.010
0.236	0.209	0.193	0.067	D <sub>N</sub> - 0.417	D <sub>N</sub> - 0.386	0.366	0.441	0.010
0.275	0.240	0.228	0.098	D <sub>N</sub> - 0.480	D <sub>N</sub> - 0.457	0.484	0.594	0.010
0.315	0.280	0.264	0.098	D <sub>N</sub> - 0.559	D <sub>N</sub> - 0.528	0.496	0.606	0.010
0.331	0.295	0.280	0.098	D <sub>N</sub> - 0.591	D <sub>N</sub> - 0.559	0.504	0.614	0.010



**ORDERING EXAMPLE**

<b>Back-up Ring:</b>	Rectangular type BH (cut) for O-Ring seal
<b>Application:</b>	Static, external sealing
<b>Bore diameter:</b>	$D_N = 40.00$ mm (1.575 inch)
<b>O-Ring Cross-Section:</b>	$d_2 = 2.62$ mm (0.103 inch)
<b>Back-up Ring material:</b>	PTFE, glassfiber filled (25%)



For material code see page 149

**Table 72: Preferred series for static applications, rectangular Back-up Ring Types BV (uncut) and BH (cut), External sealing, material PTFE – Metric**

Bore Ø	Groove Ø	Groove width		Radius	Back-up Ring dimension	TSS Part No.		O-Ring TSS Part No.	O-Ring dimension
		$b_2 +0.25$	$b_3 +0.25$			Uncut (BV)	Cut (BH)		
$D_N$ H8	$d_3$ h9			$r \pm 0.2$	OD x W x T				$d_1 \times d_2$
mm									
6.0	3.4	3.8	5.2	0.25	6.0 x 1.3 x 1.4	BV1300060	BH1300060	ORAR00006	2.90 x 1.78
6.0	3.8	3.0	4.0	0.25	6.0 x 1.1 x 1.0	BV1100060	BH1100060	OR1500350	3.50 x 1.50
8.0	5.8	3.0	4.0	0.25	8.0 x 1.1 x 1.0	BV1100080	BH1100080	OR1500550	5.50 x 1.50
10.0	7.8	3.0	4.0	0.25	10.0 x 1.1 x 1.0	BV1100100	BH1100100	OR1500750	7.50 x 1.50
12.0	9.0	4.1	5.5	0.25	12.0 x 1.5 x 1.4	BV1500120	BH1500120	OR2000850	8.50 x 2.00
12.0	9.4	3.8	5.2	0.25	12.0 x 1.3 x 1.4	BV1300120	BH1300120	ORAR00012	9.25 x 1.78
14.0	11.0	4.1	5.5	0.25	14.0 x 1.5 x 1.4	BV1500140	BH1500140	OR2001000	10.00 x 2.00
14.0	11.4	3.8	5.2	0.25	14.0 x 1.3 x 1.4	BV1300140	BH1300140	ORAR00013	10.82 x 1.78
15.0	12.0	4.1	5.5	0.25	15.0 x 1.5 x 1.4	BV1500150	BH1500150	OR2001100	11.00 x 2.00
15.0	12.4	3.8	5.2	0.25	15.0 x 1.3 x 1.4	BV1300150	BH1300150	ORAR00014	12.42 x 1.78
16.0	13.0	4.1	5.5	0.25	16.0 x 1.5 x 1.4	BV1500160	BH1500160	OR2001200	12.00 x 2.00
16.0	13.4	3.8	5.2	0.25	16.0 x 1.3 x 1.4	BV1300160	BH1300160	ORAR00015	14.00 x 1.78
18.0	15.0	4.1	5.5	0.25	18.0 x 1.5 x 1.4	BV1500180	BH1500180	OR2001400	14.00 x 2.00
18.0	15.4	3.8	5.2	0.25	18.0 x 1.3 x 1.4	BV1300180	BH1300180	ORAR00016	15.60 x 1.78
20.0	17.0	4.1	5.5	0.25	20.0 x 1.5 x 1.4	BV1500200	BH1500200	OR2001600	16.00 x 2.00
20.0	17.4	3.8	5.2	0.25	20.0 x 1.3 x 1.4	BV1300200	BH1300200	ORAR00017	17.17 x 1.78
22.0	19.0	4.1	5.5	0.25	22.0 x 1.5 x 1.4	BV1500220	BH1500220	OR2001800	18.00 x 2.00
22.0	19.4	3.8	5.2	0.25	22.0 x 1.3 x 1.4	BV1300220	BH1300220	ORAR00018	18.77 x 1.78
25.0	22.0	4.1	5.5	0.25	25.0 x 1.5 x 1.4	BV1500250	BH1500250	OR2002100	21.00 x 2.00
25.0	22.4	3.8	5.2	0.25	25.0 x 1.3 x 1.4	BV1300250	BH1300250	ORAR00020	21.95 x 1.78
28.0	23.4	5.4	6.8	0.25	28.0 x 2.3 x 1.4	BV2300280	BH2300280	OR3002200	22.00 x 3.00
28.0	24.0	5.0	6.4	0.25	28.0 x 2.0 x 1.4	BV2000280	BH2000280	ORAR00119	23.47 x 2.62
30.0	25.4	5.4	6.8	0.25	30.0 x 2.3 x 1.4	BV2300300	BH2300300	OR3002400	24.00 x 2.00
30.0	26.0	5.0	6.4	0.25	30.0 x 2.0 x 1.4	BV2000300	BH2000300	ORAR00120	25.07 x 2.62
32.0	27.4	5.4	6.8	0.25	32.0 x 2.3 x 1.4	BV2300320	BH2300320	OR3002600	26.00 x 3.00
32.0	28.0	5.0	6.4	0.25	32.0 x 2.0 x 1.4	BV2000320	BH2000320	ORAR00121	26.64 x 2.62
35.0	30.4	5.4	6.8	0.25	35.0 x 2.3 x 1.4	BV2300350	BH2300350	OR3002900	29.30 x 3.00
35.0	31.0	5.0	6.4	0.25	35.0 x 2.0 x 1.4	BV2000350	BH2000350	ORAR00123	29.82 x 2.62

Bore Ø	Groove Ø	Groove width		Radius	Back-up Ring dimension	TSS Part No.		O-Ring TSS Part No.	O-Ring dimension
		$b_2 +0.25$	$b_3 +0.25$			Uncut (BV)	Cut (BH)		
$D_N$ H8	$d_3$ h9			$r \pm 0.2$	OD x W x T				$d_1 \times d_2$
mm									
40.0	35.4	5.4	6.8	0.25	40.0 x 2.3 x 1.4	BV2300400	BH2300400	OR3003400	34.00 x 3.00
40.0	36.0	5.0	6.4	0.25	40.0 x 2.0 x 1.4	BV2000400	BH2000400	ORAR00126	34.59 x 2.62
42.0	37.4	5.4	6.8	0.25	42.0 x 2.3 x 1.4	BV2300420	BH2300420	OR3003600	36.00 x 3.00
42.0	38.0	5.0	6.4	0.25	42.0 x 2.0 x 1.4	BV2000420	BH2000420	ORAR00127	36.17 x 2.62
45.0	40.0	5.4	6.8	0.25	45.0 x 2.3 x 1.4	BV2300450	BH2300450	OR3003900	39.00 x 3.00
45.0	41.0	5.0	6.4	0.25	45.0 x 2.0 x 1.4	BV2000450	BH2000450	ORAR00129	39.34 x 2.62
48.0	41.8	6.9	8.6	0.25	48.0 x 3.1 x 1.7	BV3100480	BH3100480	OR4004000	40.00 x 4.00
48.0	42.6	6.2	7.6	0.25	48.0 x 2.7 x 1.4	BV2700480	BH2700480	ORAR00223	40.87 x 3.53
50.0	43.8	6.9	8.6	0.25	50.0 x 3.1 x 1.7	BV3100500	BH3100500	OR4004200	42.00 x 4.00
50.0	44.6	6.2	7.6	0.25	50.0 x 2.7 x 1.4	BV2700500	BH2700500	ORAR00224	44.04 x 3.53
52.0	45.8	6.9	8.6	0.25	52.0 x 3.1 x 1.7	BV3100520	BH3100520	OR4004400	44.00 x 4.00
52.0	46.6	6.2	7.6	0.25	52.0 x 2.7 x 1.4	BV2700520	BH2700520	ORAR0022	44.04 x 3.53
55.0	48.8	6.9	8.6	0.25	55.0 x 3.1 x 1.7	BV3100550	BH3100550	OR4004700	47.00 x 4.00
55.0	49.6	6.2	7.6	0.25	55.0 x 2.7 x 1.4	BV2700550	BH2700550	ORAR00225	47.22 x 3.53
60.0	53.8	6.9	8.6	0.25	60.0 x 3.1 x 1.7	BV3100600	BH3100600	OR4005200	52.00 x 4.00
60.0	54.6	6.2	7.6	0.25	60.0 x 2.7 x 1.4	BV2700600	BH2700600	ORAR00227	53.57 x 3.53
63.0	56.8	6.9	8.6	0.25	63.0 x 3.1 x 1.7	BV3100630	BH3100630	OR4005500	55.00 x 4.00
63.0	57.6	6.2	7.6	0.25	63.0 x 2.7 x 1.4	BV2700630	BH2700630	ORAR00228	56.74 x 3.53
65.0	58.8	6.9	8.6	0.25	65.0 x 3.1 x 1.7	BV3100650	BH3100650	OR4005700	57.00 x 4.00
65.0	59.6	6.2	7.6	0.25	65.0 x 2.7 x 1.4	BV2700650	BH2700650	ORAR00228	56.74 x 3.53
70.0	63.8	6.9	8.6	0.25	70.0 x 3.1 x 1.7	BV3100700	BH3100700	OR4006200	62.00 x 4.00
70.0	64.6	6.2	7.6	0.25	70.0 x 2.7 x 1.4	BV2700700	BH2700700	ORAR00230	63.09 x 3.53
75.0	68.8	6.9	8.6	0.25	75.0 x 3.1 x 1.7	BV3100750	BH3100750	OR4006700	67.00 x 4.00
75.0	69.6	6.2	7.6	0.25	75.0 x 2.7 x 1.4	BV2700750	BH2700750	ORAR00231	66.27 x 3.53
80.0	73.8	6.9	8.6	0.25	80.0 x 3.1 x 1.7	BV3100800	BH3100800	OR4007200	72.00 x 4.00
80.0	74.6	6.2	7.6	0.25	80.0 x 2.7 x 1.4	BV2700800	BH2700800	ORAR00233	72.62 x 3.53
85.0	78.8	6.9	8.6	0.25	85.0 x 3.1 x 1.7	BV3100850	BH3100850	OR4007700	77.00 x 4.00
85.0	79.6	6.2	7.6	0.25	85.0 x 2.7 x 1.4	BV2700850	BH2700850	ORAR00235	78.97 x 3.53
90.0	81.4	9.0	10.9	0.25	90.0 x 4.3 x 1.7	BV4300900	BH4300900	ORAR00338	78.74 x 5.33
90.0	82.0	8.3	10.0	0.25	90.0 x 4.0 x 1.7	BV4000900	BH4000900	OR5008000	80.00 x 5.00
95.0	86.4	9.0	10.9	0.25	95.0 x 4.3 x 1.7	BV4300950	BH4300950	ORAR00340	85.09 x 5.33
95.0	87.0	8.3	10.0	0.25	95.0 x 4.0 x 1.7	BV4000950	BH4000950	OR5008000	80.00 x 5.00
100.0	91.4	9.0	10.9	0.25	100.0 x 4.3 x 1.7	BV4301000	BH4301000	ORAR0034	91.44 x 5.33
100.0	92.0	8.3	10.0	0.25	100.0 x 4.0 x 1.7	BV4001000	BH4001000	OR5009000	90.00 x 5.00
105.0	96.4	9.0	10.9	0.25	105.0 x 4.3 x 1.7	BV4301050	BH4301050	ORAR00343	94.62 x 5.33
105.0	97.0	8.3	10.0	0.25	105.0 x 4.0 x 1.7	BV4001050	BH4001050	OR5009500	95.00 x 5.00
110.0	101.4	9.0	10.9	0.25	110.0 x 4.3 x 1.7	BV4301100	BH4301100	ORAR00345	100.97 x 5.33
110.0	102.0	8.3	10.0	0.25	110.0 x 4.0 x 1.7	BV4001100	BH4001100	OR5010000	100.00 x 5.00
115.0	106.4	9.0	10.9	0.25	115.0 x 4.3 x 1.7	BV4301150	BH4301150	ORAR00346	104.14 x 5.33
115.0	107.0	8.3	10.0	0.25	115.0 x 4.0 x 1.7	BV4001150	BH4001150	OR5010500	105.00 x 5.00
120.0	111.4	9.0	10.9	0.25	120.0 x 4.3 x 1.7	BV4301200	BH4301200	ORAR00348	110.49 x 5.33
120.0	112.0	8.3	10.0	0.25	120.0 x 4.0 x 1.7	BV4001200	BH4001200	OR5011000	110.00 x 5.00



Bore Ø	Groove Ø	Groove width		Radius r ±0.2	Back-up Ring dimension OD x W x T	TSS Part No.		O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>	
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25			Uncut (BV)	Cut (BH)			
mm										
125.0	116.4	9.0	10.9	0.25	125.0 x 4.3 x 1.7	<a href="#">BV4301250</a>	<a href="#">BH4301250</a>	ORAR00349	113.67 x 5.33	
125.0	117.0	8.3	10.0	0.25	125.0 x 4.0 x 1.7	<a href="#">BV4001250</a>	<a href="#">BH4001250</a>	OR5011500	115.00 x 5.00	
130.0	121.4	9.0	10.9	0.25	130.0 x 4.3 x 1.7	<a href="#">BV4301300</a>	<a href="#">BH4301300</a>	ORAR00351	120.02 x 5.33	
130.0	122.0	8.3	10.0	0.25	130.0 x 4.0 x 1.7	<a href="#">BV4001300</a>	<a href="#">BH4001300</a>	OR5012000	120.00 x 5.00	
135.0	123.4	12.3	15.1	0.25	135.0 x 5.8 x 2.5	<a href="#">BV5801350</a>	<a href="#">BH5801350</a>	ORAR00427	120.02 x 6.99	
140.0	128.4	12.3	15.1	0.25	140.0 x 5.8 x 2.5	<a href="#">BV5801400</a>	<a href="#">BH5801400</a>	ORAR00429	126.37 x 6.99	
150.0	138.4	12.3	15.1	0.25	150.0 x 5.8 x 2.5	<a href="#">BV5801500</a>	<a href="#">BH5801500</a>	ORAR00432	135.89 x 6.99	
160.0	148.4	12.3	15.1	0.25	160.0 x 5.8 x 2.5	<a href="#">BV5801600</a>	<a href="#">BH5801600</a>	ORAR00435	145.42 x 6.99	
170.0	158.4	12.3	15.1	0.25	170.0 x 5.8 x 2.5	<a href="#">BV5801700</a>	<a href="#">BH5801700</a>	ORAR00438	158.12 x 6.99	
180.0	168.4	12.3	15.1	0.25	180.0 x 5.8 x 2.5	<a href="#">BV5801800</a>	<a href="#">BH5801800</a>	ORAR00439	164.47 x 6.99	
190.0	178.4	12.3	15.1	0.25	190.0 x 5.8 x 2.5	<a href="#">BV5801900</a>	<a href="#">BH5801900</a>	ORAR00441	177.17 x 6.99	
200.0	188.4	12.3	15.1	0.25	200.0 x 5.8 x 2.5	<a href="#">BV5802000</a>	<a href="#">BH5802000</a>	ORAR00442	183.52 x 6.99	
210.0	198.4	12.3	15.1	0.25	210.0 x 5.8 x 2.5	<a href="#">BV5802100</a>	<a href="#">BH5802100</a>	ORAR00444	196.22 x 6.99	
220.0	208.4	12.3	15.1	0.25	220.0 x 5.8 x 2.5	<a href="#">BV5802200</a>	<a href="#">BH5802200</a>	ORAR00445	202.57 x 6.99	
230.0	218.4	12.3	15.1	0.25	230.0 x 5.8 x 2.5	<a href="#">BV5802300</a>	<a href="#">BH5802300</a>	ORAR00446	215.27 x 6.99	
240.0	228.4	12.3	15.1	0.25	240.0 x 5.8 x 2.5	<a href="#">BV5802400</a>	<a href="#">BH5802400</a>	ORAR00447	227.97 x 6.99	
250.0	238.4	12.3	15.1	0.25	250.0 x 5.8 x 2.5	<a href="#">BV5802500</a>	<a href="#">BH5802500</a>	ORAR00448	240.67 x 6.99	
280.0	268.4	12.3	15.1	0.25	280.0 x 5.8 x 2.5	<a href="#">BV5802800</a>	<a href="#">BH5802800</a>	ORAR00450	266.07 x 6.99	
300.0	288.4	12.3	15.1	0.25	300.0 x 5.8 x 2.5	<a href="#">BV5803000</a>	<a href="#">BH5803000</a>	ORAR00451	278.77 x 6.99	
320.0	308.4	12.3	15.1	0.25	320.0 x 5.8 x 2.5	<a href="#">BV5803200</a>	<a href="#">BH5803200</a>	ORAR00453	304.17 x 6.99	
350.0	338.4	12.3	15.1	0.25	350.0 x 5.8 x 2.5	<a href="#">BV5803500</a>	-	ORAR00455	329.57 x 6.99	
400.0	388.4	12.3	15.1	0.25	400.0 x 5.8 x 2.5	<a href="#">BV5804000</a>	-	ORAR00459	380.37 x 6.99	
420.0	408.4	12.3	15.1	0.25	420.0 x 5.8 x 2.5	<a href="#">BV5804200</a>	-	ORAR00461	405.26 x 6.99	
450.0	438.4	12.3	15.1	0.25	450.0 x 5.8 x 2.5	<a href="#">BV5804500</a>	-	ORAR00463	430.66 x 6.99	
480.0	468.4	12.3	15.1	0.25	480.0 x 5.8 x 2.5	<a href="#">BV5804800</a>	-	ORAR00465	456.06 x 6.99	
500.0	488.4	12.3	15.1	0.25	500.0 x 5.8 x 2.5	<a href="#">BV5805000</a>	-	ORAR00467	481.46 x 6.99	

Further sizes available on request.

This table shows the possible range of available dimensions (Back-up Rings). However, these dimensions are not always stock items.



**Table 73: Preferred series for static applications, rectangular Back-up Ring  
Types BV (uncut) and BH (cut), External sealing, material PTFE – Inch**

Bore ∅ D <sub>N</sub> H8	Groove ∅ d <sub>3</sub> h9	Groove width		Radius r ±0.008	Back-up Ring dimension OD x W x T	TSS Part No.		O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010			Uncut (BV)	Cut (BH)		
inch									
0.236	0.134	0.150	0.205	0.010	0.236 x 0.051 x 0.055	<a href="#">BV1300060</a>	<a href="#">BH1300060</a>	ORAR00006	0.114 x 0.070
0.236	0.150	0.118	0.157	0.010	0.236 x 0.043 x 0.039	<a href="#">BV1100060</a>	<a href="#">BH1100060</a>	OR1500350	0.138 x 0.059
0.315	0.228	0.118	0.157	0.010	0.315 x 0.043 x 0.039	<a href="#">BV1100080</a>	<a href="#">BH1100080</a>	OR1500550	0.217 x 0.059
0.394	0.307	0.118	0.157	0.010	0.394 x 0.043 x 0.039	<a href="#">BV1100100</a>	<a href="#">BH1100100</a>	OR1500750	0.295 x 0.059
0.472	0.354	0.161	0.217	0.010	0.472 x 0.059 x 0.055	<a href="#">BV1500120</a>	<a href="#">BH1500120</a>	OR2000850	0.335 x 0.079
0.472	0.370	0.150	0.205	0.010	0.472 x 0.051 x 0.055	<a href="#">BV1300120</a>	<a href="#">BH1300120</a>	ORAR00012	0.364 x 0.070
0.551	0.433	0.161	0.217	0.010	0.551 x 0.059 x 0.055	<a href="#">BV1500140</a>	<a href="#">BH1500140</a>	OR2001000	0.394 x 0.079
0.551	0.449	0.150	0.205	0.010	0.551 x 0.051 x 0.055	<a href="#">BV1300140</a>	<a href="#">BH1300140</a>	ORAR00013	0.426 x 0.070
0.591	0.472	0.161	0.217	0.010	0.591 x 0.059 x 0.055	<a href="#">BV1500150</a>	<a href="#">BH1500150</a>	OR2001100	0.433 x 0.079
0.591	0.488	0.150	0.205	0.010	0.591 x 0.051 x 0.055	<a href="#">BV1300150</a>	<a href="#">BH1300150</a>	ORAR00014	0.489 x 0.070
0.630	0.512	0.161	0.217	0.010	0.630 x 0.059 x 0.055	<a href="#">BV1500160</a>	<a href="#">BH1500160</a>	OR2001200	0.472 x 0.079
0.630	0.528	0.150	0.205	0.010	0.630 x 0.051 x 0.055	<a href="#">BV1300160</a>	<a href="#">BH1300160</a>	ORAR00015	0.551 x 0.070
0.709	0.591	0.161	0.217	0.010	0.709 x 0.059 x 0.055	<a href="#">BV1500180</a>	<a href="#">BH1500180</a>	OR2001400	0.551 x 0.079
0.709	0.606	0.150	0.205	0.010	0.709 x 0.051 x 0.055	<a href="#">BV1300180</a>	<a href="#">BH1300180</a>	ORAR00016	0.614 x 0.070
0.787	0.669	0.161	0.217	0.010	0.787 x 0.059 x 0.055	<a href="#">BV1500200</a>	<a href="#">BH1500200</a>	OR2001600	0.630 x 0.079
0.787	0.685	0.150	0.205	0.010	0.787 x 0.051 x 0.055	<a href="#">BV1300200</a>	<a href="#">BH1300200</a>	ORAR00017	0.676 x 0.070
0.866	0.748	0.161	0.217	0.010	0.866 x 0.059 x 0.055	<a href="#">BV1500220</a>	<a href="#">BH1500220</a>	OR2001800	0.709 x 0.079
0.866	0.764	0.150	0.205	0.010	0.866 x 0.051 x 0.055	<a href="#">BV1300220</a>	<a href="#">BH1300220</a>	ORAR00018	0.739 x 0.070
0.984	0.866	0.161	0.217	0.010	0.984 x 0.059 x 0.055	<a href="#">BV1500250</a>	<a href="#">BH1500250</a>	OR2002100	0.827 x 0.079
0.984	0.882	0.150	0.205	0.010	0.984 x 0.051 x 0.055	<a href="#">BV1300250</a>	<a href="#">BH1300250</a>	ORAR00020	0.864 x 0.070
1.102	0.921	0.213	0.268	0.010	1.102 x 0.091 x 0.055	<a href="#">BV2300280</a>	<a href="#">BH2300280</a>	OR3002200	0.866 x 0.118
1.102	0.945	0.197	0.252	0.010	1.102 x 0.079 x 0.055	<a href="#">BV2000280</a>	<a href="#">BH2000280</a>	ORAR00119	0.924 x 0.103
1.181	1.000	0.213	0.268	0.010	1.181 x 0.091 x 0.055	<a href="#">BV2300300</a>	<a href="#">BH2300300</a>	OR3002400	0.945 x 0.079
1.181	1.024	0.197	0.252	0.010	1.102 x 0.079 x 0.055	<a href="#">BV2000280</a>	<a href="#">BH2000280</a>	ORAR00119	0.924 x 0.103
1.260	1.079	0.213	0.268	0.010	1.260 x 0.091 x 0.055	<a href="#">BV2300320</a>	<a href="#">BH2300320</a>	OR3002600	1.024 x 0.118
1.260	1.102	0.197	0.252	0.010	1.260 x 0.079 x 0.055	<a href="#">BV2000320</a>	<a href="#">BH2000320</a>	ORAR00121	1.049 x 0.103
1.378	1.197	0.213	0.268	0.010	1.378 x 0.091 x 0.055	<a href="#">BV2300350</a>	<a href="#">BH2300350</a>	OR3002900	1.154 x 0.118
1.378	1.220	0.197	0.252	0.010	1.378 x 0.079 x 0.055	<a href="#">BV2000350</a>	<a href="#">BH2000350</a>	ORAR00123	1.174 x 0.103
1.575	1.394	0.213	0.268	0.010	1.575 x 0.091 x 0.055	<a href="#">BV2300400</a>	<a href="#">BH2300400</a>	OR3003400	1.339 x 0.118
1.575	1.417	0.197	0.252	0.010	1.575 x 0.079 x 0.055	<a href="#">BV2000400</a>	<a href="#">BH2000400</a>	ORAR00126	1.362 x 0.103
1.654	1.472	0.213	0.268	0.010	1.654 x 0.091 x 0.055	<a href="#">BV2300420</a>	<a href="#">BH2300420</a>	OR3003600	1.417 x 0.118
1.654	1.496	0.197	0.252	0.010	1.654 x 0.079 x 0.055	<a href="#">BV2000420</a>	<a href="#">BH2000420</a>	ORAR00127	1.424 x 0.103
1.772	1.575	0.213	0.268	0.010	1.772 x 0.091 x 0.055	<a href="#">BV2300450</a>	<a href="#">BH2300450</a>	OR3003900	1.535 x 0.118
1.772	1.614	0.197	0.252	0.010	1.772 x 0.079 x 0.055	<a href="#">BV2000450</a>	<a href="#">BH2000450</a>	ORAR00129	1.549 x 0.103
1.890	1.646	0.272	0.339	0.010	1.890 x 0.122 x 0.067	<a href="#">BV3100480</a>	<a href="#">BH3100480</a>	OR4004000	1.575 x 0.157
1.890	1.677	0.244	0.299	0.010	1.890 x 0.106 x 0.055	<a href="#">BV2700480</a>	<a href="#">BH2700480</a>	ORAR00223	1.609 x 0.139
1.969	1.724	0.272	0.339	0.010	1.969 x 0.122 x 0.067	<a href="#">BV3100500</a>	<a href="#">BH3100500</a>	OR4004200	1.654 x 0.157
1.969	1.756	0.244	0.299	0.010	1.969 x 0.106 x 0.055	<a href="#">BV2700500</a>	<a href="#">BH2700500</a>	ORAR00224	1.734 x 0.139
2.047	1.803	0.272	0.339	0.010	2.047 x 0.122 x 0.067	<a href="#">BV3100520</a>	<a href="#">BH3100520</a>	OR4004400	1.732 x 0.157
2.047	1.835	0.244	0.299	0.010	2.047 x 0.106 x 0.055	<a href="#">BV2700520</a>	<a href="#">BH2700520</a>	ORAR00224	1.734 x 0.139



Bore Ø	Groove Ø	Groove width		Radius r	Back-up Ring dimension OD x W x T	TSS Part No.		O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010			Uncut (BV)	Cut (BH)		
D <sub>N</sub> H8	d <sub>3</sub> h9			±0.008					
inch									
2.165	1.921	0.272	0.339	0.010	2.165 x 0.122 x 0.067	<a href="#">BV3100550</a>	<a href="#">BH3100550</a>	OR4004700	1.850 x 0.157
2.165	1.953	0.244	0.299	0.010	2.165 x 0.106 x 0.055	<a href="#">BV2700550</a>	<a href="#">BH2700550</a>	ORAR00225	1.859 x 0.139
2.362	2.118	0.272	0.339	0.010	2.362 x 0.122 x 0.067	<a href="#">BV3100600</a>	<a href="#">BH3100600</a>	OR4005200	2.047 x 0.157
2.362	2.150	0.244	0.299	0.010	2.362 x 0.106 x 0.055	<a href="#">BV2700600</a>	<a href="#">BH2700600</a>	ORAR00227	2.109 x 0.139
2.480	2.236	0.272	0.339	0.010	2.480 x 0.122 x 0.067	<a href="#">BV3100630</a>	<a href="#">BH3100630</a>	OR4005500	2.165 x 0.157
2.480	2.268	0.244	0.299	0.010	2.480 x 0.106 x 0.055	<a href="#">BV2700630</a>	<a href="#">BH2700630</a>	ORAR00228	2.234 x 0.139
2.559	2.315	0.272	0.339	0.010	2.559 x 0.122 x 0.067	<a href="#">BV3100650</a>	<a href="#">BH3100650</a>	OR4005700	2.244 x 0.157
2.559	2.346	0.244	0.299	0.010	2.559 x 0.106 x 0.055	<a href="#">BV2700650</a>	<a href="#">BH2700650</a>	ORAR00228	2.234 x 0.139
2.756	2.512	0.272	0.339	0.010	2.756 x 0.122 x 0.067	<a href="#">BV3100700</a>	<a href="#">BH3100700</a>	OR4006200	2.441 x 0.157
2.756	2.543	0.244	0.299	0.010	2.756 x 0.106 x 0.055	<a href="#">BV2700700</a>	<a href="#">BH2700700</a>	ORAR00230	2.484 x 0.139
2.953	2.709	0.272	0.339	0.010	2.953 x 0.122 x 0.067	<a href="#">BV3100750</a>	<a href="#">BH3100750</a>	OR4006700	2.638 x 0.157
2.953	2.740	0.244	0.299	0.010	2.953 x 0.106 x 0.055	<a href="#">BV2700750</a>	<a href="#">BH2700750</a>	ORAR00231	2.609 x 0.139
3.150	2.906	0.272	0.339	0.010	3.150 x 0.122 x 0.067	<a href="#">BV3100800</a>	<a href="#">BH3100800</a>	OR4007200	2.835 x 0.157
3.150	2.937	0.244	0.299	0.010	3.150 x 0.106 x 0.055	<a href="#">BV2700800</a>	<a href="#">BH2700800</a>	ORAR00233	2.859 x 0.139
3.346	3.102	0.272	0.339	0.010	3.346 x 0.122 x 0.067	<a href="#">BV3100850</a>	<a href="#">BH3100850</a>	OR4007700	3.031 x 0.157
3.346	3.134	0.244	0.299	0.010	3.346 x 0.106 x 0.055	<a href="#">BV2700850</a>	<a href="#">BH2700850</a>	ORAR00235	3.109 x 0.139
3.543	3.205	0.354	0.429	0.010	3.543 x 0.169 x 0.067	<a href="#">BV4300900</a>	<a href="#">BH4300900</a>	ORAR00338	3.100 x 0.210
3.543	3.228	0.327	0.394	0.010	3.543 x 0.157 x 0.067	<a href="#">BV4000900</a>	<a href="#">BH4000900</a>	OR5008000	3.150 x 0.197
3.740	3.402	0.354	0.429	0.010	3.740 x 0.169 x 0.067	<a href="#">BV4300950</a>	<a href="#">BH4300950</a>	ORAR00340	3.350 x 0.210
3.740	3.425	0.327	0.394	0.010	3.740 x 0.157 x 0.067	<a href="#">BV4000950</a>	<a href="#">BH4000950</a>	OR5008000	3.150 x 0.197
3.937	3.598	0.354	0.429	0.010	3.937 x 0.169 x 0.067	<a href="#">BV4301000</a>	<a href="#">BH4301000</a>	ORAR00342	3.600 x 0.210
3.937	3.622	0.327	0.394	0.010	3.937 x 0.157 x 0.067	<a href="#">BV4001000</a>	<a href="#">BH4001000</a>	OR5009000	3.543 x 0.197
4.134	3.795	0.354	0.429	0.010	4.134 x 0.169 x 0.067	<a href="#">BV4301050</a>	<a href="#">BH4301050</a>	ORAR00343	3.725 x 0.210
4.134	3.819	0.327	0.394	0.010	4.134 x 0.157 x 0.067	<a href="#">BV4001050</a>	<a href="#">BH4001050</a>	OR5009500	3.740 x 0.197
4.331	3.992	0.354	0.429	0.010	4.331 x 0.169 x 0.067	<a href="#">BV4301100</a>	<a href="#">BH4301100</a>	ORAR00345	3.975 x 0.210
4.331	4.016	0.327	0.394	0.010	4.331 x 0.157 x 0.067	<a href="#">BV4001100</a>	<a href="#">BH4001100</a>	OR5010000	3.937 x 0.197
4.528	4.189	0.354	0.429	0.010	4.528 x 0.169 x 0.067	<a href="#">BV4301150</a>	<a href="#">BH4301150</a>	ORAR00346	4.100 x 0.210
4.528	4.213	0.327	0.394	0.010	4.528 x 0.157 x 0.067	<a href="#">BV4001150</a>	<a href="#">BH4001150</a>	OR5010500	4.134 x 0.197
4.724	4.386	0.354	0.429	0.010	4.724 x 0.169 x 0.067	<a href="#">BV4301200</a>	<a href="#">BH4301200</a>	ORAR00348	4.350 x 0.210
4.724	4.409	0.327	0.394	0.010	4.724 x 0.157 x 0.067	<a href="#">BV4001200</a>	<a href="#">BH4001200</a>	OR5011000	4.331 x 0.197
4.921	4.583	0.354	0.429	0.010	4.921 x 0.169 x 0.067	<a href="#">BV4301250</a>	<a href="#">BH4301250</a>	ORAR00349	4.475 x 0.210
4.921	4.606	0.327	0.394	0.010	4.921 x 0.157 x 0.067	<a href="#">BV4001250</a>	<a href="#">BH4001250</a>	OR5011500	4.528 x 0.197
5.118	4.780	0.354	0.429	0.010	5.118 x 0.169 x 0.067	<a href="#">BV4301300</a>	<a href="#">BH4301300</a>	ORAR00351	4.725 x 0.210
5.118	4.803	0.327	0.394	0.010	5.118 x 0.157 x 0.067	<a href="#">BV4001300</a>	<a href="#">BH4001300</a>	OR5012000	4.724 x 0.197
5.315	4.858	0.484	0.594	0.010	5.315 x 0.228 x 0.098	<a href="#">BV5801350</a>	<a href="#">BH5801350</a>	ORAR00427	4.725 x 0.275
5.512	5.055	0.484	0.594	0.010	5.512 x 0.228 x 0.098	<a href="#">BV5801400</a>	<a href="#">BH5801400</a>	ORAR00429	4.975 x 0.275
5.906	5.449	0.484	0.594	0.010	5.906 x 0.228 x 0.098	<a href="#">BV5801500</a>	<a href="#">BH5801500</a>	ORAR00432	5.350 x 0.275
6.299	5.843	0.484	0.594	0.010	6.299 x 0.228 x 0.098	<a href="#">BV5801600</a>	<a href="#">BH5801600</a>	ORAR00435	5.725 x 0.275
6.693	6.236	0.484	0.594	0.010	6.693 x 0.228 x 0.098	<a href="#">BV5801700</a>	<a href="#">BH5801700</a>	ORAR00438	6.225 x 0.275
7.087	6.630	0.484	0.594	0.010	7.087 x 0.228 x 0.098	<a href="#">BV5801800</a>	<a href="#">BH5801800</a>	ORAR00439	6.475 x 0.275



Bore Ø	Groove Ø	Groove width		Radius r	Back-up Ring dimension	TSS Part No.		O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010			OD x W x T	Uncut (BV)		
inch									
7.480	7.024	0.484	0.594	0.010	7.480 x 0.228 x 0.098	<a href="#">BV5801900</a>	<a href="#">BH5801900</a>	ORAR00441	6.975 x 0.275
7.874	7.417	0.484	0.594	0.010	7.874 x 0.228 x 0.098	<a href="#">BV5802000</a>	<a href="#">BH5802000</a>	ORAR00442	7.225 x 0.275
8.268	7.811	0.484	0.594	0.010	8.268 x 0.228 x 0.098	<a href="#">BV5802100</a>	<a href="#">BH5802100</a>	ORAR00444	7.725 x 0.275
8.661	8.205	0.484	0.594	0.010	8.661 x 0.228 x 0.098	<a href="#">BV5802200</a>	<a href="#">BH5802200</a>	ORAR00445	7.975 x 0.275
9.055	8.598	0.484	0.594	0.010	9.055 x 0.228 x 0.098	<a href="#">BV5802300</a>	<a href="#">BH5802300</a>	ORAR00446	8.475 x 0.275
9.449	8.992	0.484	0.594	0.010	9.449 x 0.228 x 0.098	<a href="#">BV5802400</a>	<a href="#">BH5802400</a>	ORAR00447	8.975 x 0.275
9.843	9.386	0.484	0.594	0.010	9.843 x 0.228 x 0.098	<a href="#">BV5802500</a>	<a href="#">BH5802500</a>	ORAR00448	9.475 x 0.275
11.024	10.567	0.484	0.594	0.010	11.024 x 0.228 x 0.098	<a href="#">BV5802800</a>	<a href="#">BH5802800</a>	ORAR00450	10.475 x 0.275
11.811	11.354	0.484	0.594	0.010	11.811 x 0.228 x 0.098	<a href="#">BV5803000</a>	<a href="#">BH5803000</a>	ORAR00451	10.975 x 0.275
12.598	12.142	0.484	0.594	0.010	12.598 x 0.228 x 0.098	<a href="#">BV5803200</a>	<a href="#">BH5803200</a>	ORAR00453	11.975 x 0.275
13.780	13.323	0.484	0.594	0.010	13.780 x 0.228 x 0.098	<a href="#">BV5803500</a>	-	ORAR00455	12.975 x 0.275
15.748	15.291	0.484	0.594	0.010	15.748 x 0.228 x 0.098	<a href="#">BV5804000</a>	-	ORAR00459	14.975 x 0.275
16.535	16.079	0.484	0.594	0.010	16.535 x 0.228 x 0.098	<a href="#">BV5804200</a>	-	ORAR00461	15.955 x 0.275
17.717	17.260	0.484	0.594	0.010	17.717 x 0.228 x 0.098	<a href="#">BV5804500</a>	-	ORAR00463	16.955 x 0.275
18.898	18.441	0.484	0.594	0.010	18.898 x 0.228 x 0.098	<a href="#">BV5804800</a>	-	ORAR00465	17.955 x 0.275
19.685	19.228	0.484	0.594	0.010	19.685 x 0.228 x 0.098	<a href="#">BV5805000</a>	-	ORAR00467	18.955 x 0.275

Further sizes available on request.

This table shows the possible range of available dimensions (Back-up Rings). However, these dimensions are not always stock items.





### H.1.2 CONCAVE BACK-UP RING TYPES, UNCUT (BA) AND CUT (BD), MATERIAL PTFE

The following figure and tables include installation recommendations and Back-up Ring dimensions for external sealing applications with the concave Back-up Ring types BA (uncut) and BD (cut).

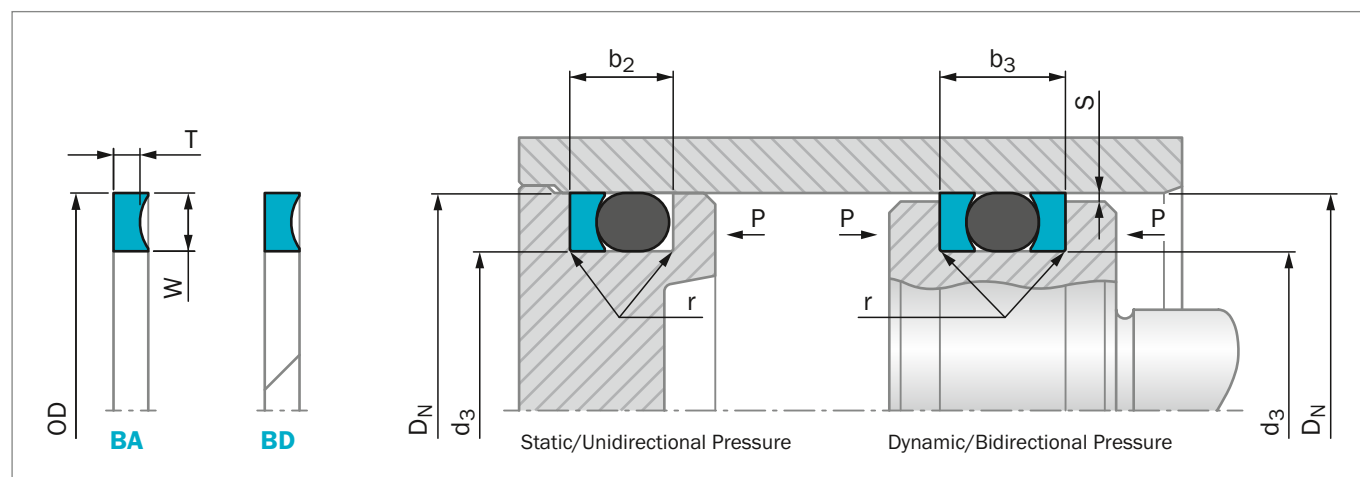


Figure 56: Installation drawing external sealing, concave Back-up Ring types

**Table 74: Installation dimensions for concave Back-up Ring types, uncut and cut, External sealing, material PTFE – Metric**

O-Ring Cross-Section-Ø d <sub>2</sub>	Back-up Ring Cross-Section			Groove dimensions				
	Radial height W		Thickness T	Groove diameter d <sub>3</sub> h <sub>9</sub>		Groove width		Radius
	Dynamic	Static	T	Dynamic	Static	b <sub>2</sub> +0.25	b <sub>3</sub> +0.25	r ±0.2
mm								
1.50	1.25	1.10	1.00	D <sub>N</sub> - 2.5	D <sub>N</sub> - 2.2	3.00	4.00	0.25
1.60	1.30	1.20	1.00	D <sub>N</sub> - 2.6	D <sub>N</sub> - 2.4	3.10	4.10	0.25
1.78	1.45	1.30	1.40	D <sub>N</sub> - 2.9	D <sub>N</sub> - 2.6	3.80	5.20	0.25
1.80	1.45	1.30	1.40	D <sub>N</sub> - 2.9	D <sub>N</sub> - 2.6	3.80	5.20	0.25
2.00	1.65	1.50	1.40	D <sub>N</sub> - 3.3	D <sub>N</sub> - 3.0	4.10	5.50	0.25
2.40	2.05	1.80	1.40	D <sub>N</sub> - 4.1	D <sub>N</sub> - 3.6	4.60	6.00	0.25
2.50	2.15	1.90	1.40	D <sub>N</sub> - 4.3	D <sub>N</sub> - 3.8	4.70	6.10	0.25
2.62	2.25	2.00	1.40	D <sub>N</sub> - 4.5	D <sub>N</sub> - 4.0	5.00	6.40	0.25
2.65	2.25	2.00	1.40	D <sub>N</sub> - 4.5	D <sub>N</sub> - 4.0	5.00	6.40	0.25
3.00	2.60	2.30	1.40	D <sub>N</sub> - 5.2	D <sub>N</sub> - 4.6	5.40	6.80	0.25
3.53	3.10	2.70	1.40	D <sub>N</sub> - 6.2	D <sub>N</sub> - 5.4	6.20	7.60	0.25
3.55	3.10	2.70	1.40	D <sub>N</sub> - 6.2	D <sub>N</sub> - 5.4	6.20	7.60	0.25
4.00	3.50	3.10	1.70	D <sub>N</sub> - 7.0	D <sub>N</sub> - 6.2	6.90	8.60	0.25
5.00	4.40	4.00	1.70	D <sub>N</sub> - 8.8	D <sub>N</sub> - 8.0	8.30	10.00	0.25
5.30	4.70	4.30	1.70	D <sub>N</sub> - 9.4	D <sub>N</sub> - 8.6	9.00	10.90	0.25
5.33	4.70	4.30	1.70	D <sub>N</sub> - 9.4	D <sub>N</sub> - 8.6	9.00	10.90	0.25
5.70	5.00	4.60	1.70	D <sub>N</sub> - 10.0	D <sub>N</sub> - 9.2	9.00	11.00	0.25
6.00	5.30	4.90	1.70	D <sub>N</sub> - 10.6	D <sub>N</sub> - 9.8	9.30	11.20	0.25
6.99	6.10	5.80	2.50	D <sub>N</sub> - 12.2	D <sub>N</sub> - 11.6	12.30	15.10	0.25
8.00	7.10	6.70	2.50	D <sub>N</sub> - 14.2	D <sub>N</sub> - 13.4	12.60	15.40	0.25
8.40	7.50	7.10	2.50	D <sub>N</sub> - 15.0	D <sub>N</sub> - 14.2	12.80	15.60	0.25



**Table 75: Installation dimensions for concave Back-up Ring types, uncut and cut, External sealing , material PTFE – Inch**

O-Ring Cross-Section-Ø d <sub>2</sub>	Back-up Ring Cross-Section			Groove dimensions				
	Radial height W		Thickness T	Groove diameter d <sub>3</sub> h9		Groove width		Radius r
	Dynamic	Static	T	Dynamic	Static	b <sub>2</sub> +0.010	b <sub>3</sub> +0.010	r ±0.008
inch								
0.059	0.049	0.043	0.039	D <sub>N</sub> - 0.098	D <sub>N</sub> - 0.087	0.118	0.157	0.010
0.063	0.051	0.047	0.039	D <sub>N</sub> - 0.102	D <sub>N</sub> - 0.094	0.122	0.161	0.010
0.070	0.057	0.051	0.055	D <sub>N</sub> - 0.114	D <sub>N</sub> - 0.102	0.150	0.205	0.010
0.071	0.057	0.051	0.055	D <sub>N</sub> - 0.130	D <sub>N</sub> - 0.102	0.150	0.205	0.010
0.079	0.065	0.059	0.055	D <sub>N</sub> - 0.130	D <sub>N</sub> - 0.118	0.161	0.217	0.010
0.094	0.081	0.071	0.055	D <sub>N</sub> - 0.161	D <sub>N</sub> - 0.142	0.181	0.236	0.010
0.098	0.085	0.075	0.055	D <sub>N</sub> - 0.169	D <sub>N</sub> - 0.150	0.185	0.240	0.010
0.103	0.089	0.079	0.055	D <sub>N</sub> - 0.177	D <sub>N</sub> - 0.157	0.197	0.252	0.010
0.104	0.089	0.079	0.055	D <sub>N</sub> - 0.177	D <sub>N</sub> - 0.157	0.197	0.252	0.010
0.118	0.102	0.091	0.055	D <sub>N</sub> - 0.205	D <sub>N</sub> - 0.181	0.213	0.268	0.010
0.139	0.122	0.106	0.055	D <sub>N</sub> - 0.244	D <sub>N</sub> - 0.213	0.244	0.299	0.010
0.140	0.122	0.106	0.055	D <sub>N</sub> - 0.244	D <sub>N</sub> - 0.213	0.244	0.299	0.010
0.157	0.138	0.122	0.067	D <sub>N</sub> - 0.276	D <sub>N</sub> - 0.244	0.272	0.339	0.010
0.197	0.173	0.157	0.067	D <sub>N</sub> - 0.346	D <sub>N</sub> - 0.315	0.327	0.394	0.010
0.209	0.185	0.169	0.067	D <sub>N</sub> - 0.370	D <sub>N</sub> - 0.339	0.354	0.429	0.010
0.210	0.185	0.169	0.067	D <sub>N</sub> - 0.370	D <sub>N</sub> - 0.339	0.354	0.429	0.010
0.224	0.197	0.181	0.067	D <sub>N</sub> - 0.394	D <sub>N</sub> - 0.362	0.354	0.433	0.010
0.236	0.209	0.193	0.067	D <sub>N</sub> - 0.417	D <sub>N</sub> - 0.386	0.366	0.441	0.010
0.275	0.240	0.228	0.098	D <sub>N</sub> - 0.480	D <sub>N</sub> - 0.457	0.484	0.594	0.010
0.315	0.280	0.264	0.098	D <sub>N</sub> - 0.559	D <sub>N</sub> - 0.528	0.496	0.606	0.010
0.331	0.295	0.280	0.098	D <sub>N</sub> - 0.591	D <sub>N</sub> - 0.559	0.504	0.614	0.010

**ORDERING EXAMPLE**

<b>Back-up Ring:</b>	Concave, type BD (cut) for O-Ring seal
<b>Application:</b>	Static, external sealing
<b>Bore diameter:</b>	D <sub>N</sub> = 40.00 mm (1.575 inch)
<b>O-Ring Cross-Section:</b>	d <sub>2</sub> = 2.62 mm (0.103 inch)
<b>Back-up Ring material:</b>	PTFE, bronze filled (40%)

For material code see page 149

**TSS Article No.** **BD 20 0 0400 - PTB4**

Back-Up Ring (Cut) ———— BD

Radial Height (mm) W x 10 ———— 20

T-dimension (Standard, mm) ———— 0

Bore-Ø (mm) D<sub>N</sub> x 10 ———— 0400

Quality Index (Standard) ———— -

Material Code (Standard) ———— PTB4



**Table 76: Preferred series for static applications, concave Back-up Ring  
Type BD (cut), External sealing, material PTFE – Metric**

Bore Ø	Groove Ø	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		$b_2 + 0.25$	$b_3 + 0.25$					
$D_N$ H8	$d_3$ h9							
mm								
6.0	3.4	3.8	5.2	0.25	6.0 x 1.3 x 1.4	BD1300060	ORAR00006	2.90 x 1.78
6.0	3.8	3.0	4.0	0.25	6.0 x 1.1 x 1.0	BD1100060	OR1500350	3.50 x 1.50
8.0	5.8	3.0	4.0	0.25	8.0 x 1.1 x 1.0	BD1100080	OR1500550	5.50 x 1.50
10.0	7.8	3.0	4.0	0.25	10.0 x 1.1 x 1.0	BD1100100	OR1500750	7.50 x 1.50
12.0	9.0	4.1	5.5	0.25	12.0 x 1.5 x 1.4	BD1500120	OR2000850	8.50 x 2.00
12.0	9.4	3.8	5.2	0.25	12.0 x 1.3 x 1.4	BD1300120	ORAR00012	9.25 x 1.78
14.0	11.0	4.1	5.5	0.25	14.0 x 1.5 x 1.4	BD1500140	OR2001000	10.00 x 2.00
14.0	11.4	3.8	5.2	0.25	14.0 x 1.3 x 1.4	BD1300140	ORAR00013	10.82 x 1.78
15.0	12.0	4.1	5.5	0.25	15.0 x 1.5 x 1.4	BD1500150	OR2001100	11.00 x 2.00
15.0	12.4	3.8	5.2	0.25	15.0 x 1.3 x 1.4	BD1300150	ORAR00014	12.42 x 1.78
16.0	13.0	4.1	5.5	0.25	16.0 x 1.5 x 1.4	BD1500160	OR2001200	12.00 x 2.00
16.0	13.4	3.8	5.2	0.25	16.0 x 1.3 x 1.4	BD1300160	ORAR00015	14.00 x 1.78
18.0	15.0	4.1	5.5	0.25	18.0 x 1.5 x 1.4	BD1500180	OR2001400	14.00 x 2.00
18.0	15.4	3.8	5.2	0.25	18.0 x 1.3 x 1.4	BD1300180	ORAR00016	15.60 x 1.78
20.0	17.0	4.1	5.5	0.25	20.0 x 1.5 x 1.4	BD1500200	OR2001600	16.00 x 2.00
20.0	17.4	3.8	5.2	0.25	20.0 x 1.3 x 1.4	BD1300200	ORAR00017	17.17 x 1.78
22.0	19.0	4.1	5.5	0.25	22.0 x 1.5 x 1.4	BD1500220	OR2001600	16.00 x 2.00
22.0	19.4	3.8	5.2	0.25	22.0 x 1.3 x 1.4	BD1300220	ORAR00018	18.77 x 1.78
25.0	22.0	4.1	5.5	0.25	25.0 x 1.5 x 1.4	BD1500250	OR2002100	21.00 x 2.00
25.0	22.4	3.8	5.2	0.25	25.0 x 1.3 x 1.4	BD1300250	ORAR00020	21.95 x 1.78
28.0	23.4	5.4	6.8	0.25	28.0 x 2.3 x 1.4	BD2300280	OR3002200	22.00 x 3.00
28.0	24.0	5.0	6.4	0.25	28.0 x 2.0 x 1.4	BD2000280	ORAR00119	23.47 x 2.62
30.0	25.4	5.4	6.8	0.25	30.0 x 2.3 x 1.4	BD2300300	OR3002400	24.00 x 2.00
30.0	26.0	5.0	6.4	0.25	30.0 x 2.0 x 1.4	BD2000300	ORAR00120	25.07 x 2.62
32.0	27.4	5.4	6.8	0.25	32.0 x 2.3 x 1.4	BD2300320	OR3002600	26.00 x 3.00
32.0	28.0	5.0	6.4	0.25	32.0 x 2.0 x 1.4	BD2000320	ORAR00121	26.64 x 2.62
35.0	30.4	5.4	6.8	0.25	35.0 x 2.3 x 1.4	BD2300350	OR3002900	29.30 x 3.00
35.0	31.0	5.0	6.4	0.25	35.0 x 2.0 x 1.4	BD2000350	ORAR00123	29.82 x 2.62
40.0	35.4	5.4	6.8	0.25	40.0 x 2.3 x 1.4	BD2300400	OR3003400	34.00 x 3.00
40.0	36.0	5.0	6.4	0.25	40.0 x 2.0 x 1.4	BD2000400	ORAR00126	34.59 x 2.62
42.0	37.4	5.4	6.8	0.25	42.0 x 2.3 x 1.4	BD2300420	OR3003600	36.00 x 3.00
42.0	38.0	5.0	6.4	0.25	42.0 x 2.0 x 1.4	BD2000420	ORAR00127	36.17 x 2.62
45.0	40.0	5.4	6.8	0.25	45.0 x 2.3 x 1.4	BD2300450	OR3003900	39.00 x 3.00
45.0	41.0	5.0	6.4	0.25	45.0 x 2.0 x 1.4	BD2000450	ORAR00129	39.34 x 2.62
48.0	41.8	6.9	8.6	0.25	48.0 x 3.1 x 1.7	BD3100480	OR4004000	40.00 x 4.00
48.0	42.6	6.2	7.6	0.25	48.0 x 2.7 x 1.4	BD2700480	ORAR00223	40.87 x 3.53
50.0	43.8	6.9	8.6	0.25	50.0 x 3.1 x 1.7	BD3100500	OR4004200	42.00 x 4.00
50.0	44.6	6.2	7.6	0.25	50.0 x 2.7 x 1.4	BD2700500	ORAR00224	44.04 x 3.53
52.0	45.8	6.9	8.6	0.25	52.0 x 3.1 x 1.7	BD3100520	OR4004400	44.00 x 4.00
52.0	46.6	6.2	7.6	0.25	52.0 x 2.7 x 1.4	BD2700520	ORAR00224	44.04 x 3.53



Bore ∅	Groove ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
mm								
55.0	48.8	6.9	8.6	0.25	55.0 x 3.1 x 1.7	BD3100550	OR4004700	47.00 x 4.00
55.0	49.6	6.2	7.6	0.25	55.0 x 2.7 x 1.4	BD2700550	ORAR00225	47.22 x 3.53
60.0	53.8	6.9	8.6	0.25	60.0 x 3.1 x 1.7	BD3100600	OR4005200	52.00 x 4.00
60.0	54.6	6.2	7.6	0.25	60.0 x 2.7 x 1.4	BD2700600	ORAR00227	53.57 x 3.53
63.0	56.8	6.9	8.6	0.25	63.0 x 3.1 x 1.7	BD3100630	OR4005500	55.00 x 4.00
63.0	57.6	6.2	7.6	0.25	63.0 x 2.7 x 1.4	BD2700630	ORAR00228	56.74 x 3.53
65.0	58.8	6.9	8.6	0.25	65.0 x 3.1 x 1.7	BD3100650	OR4005700	57.00 x 4.00
65.0	59.6	6.2	7.6	0.25	65.0 x 2.7 x 1.4	BD2700650	ORAR00228	56.74 x 3.53
70.0	63.8	6.9	8.6	0.25	70.0 x 3.1 x 1.7	BD3100700	OR4006200	62.00 x 4.00
70.0	64.6	6.2	7.6	0.25	70.0 x 2.7 x 1.4	BD2700700	ORAR00230	63.09 x 3.53
75.0	68.8	6.9	8.6	0.25	75.0 x 3.1 x 1.7	BD3100750	OR4006700	67.00 x 4.00
75.0	69.6	6.2	7.6	0.25	75.0 x 2.7 x 1.4	BD2700750	ORAR00231	66.27 x 3.53
80.0	73.8	6.9	8.6	0.25	80.0 x 3.1 x 1.7	BD3100800	OR4007200	72.00 x 4.00
80.0	74.6	6.2	7.6	0.25	80.0 x 2.7 x 1.4	BD2700800	ORAR00233	72.62 x 3.53
85.0	78.8	6.9	8.6	0.25	85.0 x 3.1 x 1.7	BD3100850	OR4007700	77.00 x 4.00
85.0	79.6	5.2	7.6	0.25	85.0 x 2.7 x 1.4	BD2700850	ORAR00235	78.97 x 3.53
90.0	81.4	9.0	10.9	0.25	90.0 x 4.3 x 1.7	BD4300900	ORAR00338	78.74 x 5.33
90.0	82.0	8.3	10.0	0.25	90.0 x 4.0 x 1.7	BD4000900	OR5008000	80.00 x 5.00
95.0	86.4	9.0	10.9	0.25	95.0 x 4.3 x 1.7	BD4300950	ORAR00340	85.09 x 5.33
95.0	87.0	8.3	10.0	0.25	95.0 x 4.0 x 1.7	BD4000950	OR5008000	80.00 x 5.00
100.0	91.4	9.0	10.9	0.25	100.0 x 4.3 x 1.7	BD4301000	ORAR00342	91.44 x 5.33
100.0	92.0	8.3	10.0	0.25	100.0 x 4.0 x 1.7	BD4001000	OR5009000	90.00 x 5.00
105.0	96.4	9.0	10.9	0.25	105.0 x 4.3 x 1.7	BD4301050	ORAR00343	94.62 x 5.33
105.0	97.0	8.3	10.0	0.25	105.0 x 4.0 x 1.7	BD4001050	OR5009500	95.00 x 5.00
110.0	101.4	9.0	10.9	0.25	110.0 x 4.3 x 1.7	BD4301100	ORAR00345	100.97 x 5.33
110.0	102.0	8.3	10.0	0.25	110.0 x 4.0 x 1.7	BD4001100	OR5010000	100.00 x 5.00
115.0	106.4	9.0	10.9	0.25	115.0 x 4.3 x 1.7	BD4301150	ORAR00346	104.14 x 5.33
115.0	107.0	8.3	10.0	0.25	115.0 x 4.0 x 1.7	BD4001150	OR5010500	105.00 x 5.00
120.0	111.4	9.0	10.9	0.25	120.0 x 4.3 x 1.7	BD4301200	ORAR00348	110.49 x 5.33
120.0	112.0	8.3	10.0	0.25	120.0 x 4.0 x 1.7	BD4001200	OR5011000	110.00 x 5.00
125.0	116.4	9.0	10.9	0.25	125.0 x 4.3 x 1.7	BD4301250	ORAR00349	113.67 x 5.33
125.0	117.0	8.3	10.0	0.25	125.0 x 4.0 x 1.7	BD4001250	OR5011500	115.00 x 5.00
130.0	121.4	9.0	10.9	0.25	130.0 x 4.3 x 1.7	BD4301300	ORAR00351	120.02 x 5.33
130.0	122.0	8.3	10.0	0.25	130.0 x 4.0 x 1.7	BD4001300	OR5012000	120.00 x 5.00
135.0	123.4	12.3	15.1	0.25	135.0 x 5.8 x 2.5	BD5801350	ORAR00427	120.02 x 6.99
140.0	128.4	12.3	15.1	0.25	140.0 x 5.8 x 2.5	BD5801400	ORAR00429	126.37 x 6.99
150.0	138.4	12.3	15.1	0.25	150.0 x 5.8 x 2.5	BD5801500	ORAR00432	135.89 x 6.99
160.0	148.4	12.3	15.1	0.25	160.0 x 5.8 x 2.5	BD5801600	ORAR00435	145.42 x 6.99
170.0	158.4	12.3	15.1	0.25	170.0 x 5.8 x 2.5	BD5801700	ORAR00438	158.12 x 6.99
180.0	168.4	12.3	15.1	0.25	180.0 x 5.8 x 2.5	BD5801800	ORAR00439	164.47 x 6.99
190.0	178.4	12.3	15.1	0.25	190.0 x 5.8 x 2.5	BD5801900	ORAR00441	177.17 x 6.99
200.0	188.4	12.3	15.1	0.25	200.0 x 5.8 x 2.5	BD5802000	ORAR00442	183.52 x 6.99



Bore Ø	Groove Ø	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		$b_2 +0.25$	$b_3 +0.25$					
mm								
210.0	198.4	12.3	15.1	0.25	210.0 x 5.8 x 2.5	<a href="#">BD5802100</a>	ORAR00444	196.22 x 6.99
220.0	208.4	12.3	15.1	0.25	220.0 x 5.8 x 2.5	<a href="#">BD5802200</a>	ORAR00445	202.57 x 6.99
230.0	218.4	12.3	15.1	0.25	230.0 x 5.8 x 2.5	<a href="#">BD5802300</a>	ORAR00446	215.27 x 6.99
240.0	228.4	12.3	15.1	0.25	240.0 x 5.8 x 2.5	<a href="#">BD5802400</a>	ORAR00447	227.97 x 6.99
250.0	238.4	12.3	15.1	0.25	250.0 x 5.8 x 2.5	<a href="#">BD5802500</a>	ORAR00448	240.67 x 6.99
280.0	268.4	12.3	15.1	0.25	280.0 x 5.8 x 2.5	<a href="#">BD5802800</a>	ORAR00450	266.07 x 6.99
300.0	288.4	12.3	15.1	0.25	300.0 x 5.8 x 2.5	<a href="#">BD5803000</a>	ORAR00451	278.77 x 6.99
320.0	308.4	12.3	15.1	0.25	320.0 x 5.8 x 2.5	<a href="#">BD5803200</a>	ORAR00453	304.17 x 6.99
350.0	338.4	12.3	15.1	0.25	350.0 x 5.8 x 2.5	<a href="#">BD5803500</a>	ORAR00455	329.57 x 6.99
400.0	388.4	12.3	15.1	0.25	400.0 x 5.8 x 2.5	<a href="#">BD5804000</a>	ORAR00459	380.37 x 6.99
420.0	408.4	12.3	15.1	0.25	420.0 x 5.8 x 2.5	<a href="#">BD5804200</a>	ORAR00461	405.26 x 6.99
450.0	438.4	12.3	15.1	0.25	450.0 x 5.8 x 2.5	<a href="#">BD5804500</a>	ORAR00463	430.66 x 6.99
480.0	468.4	12.3	15.1	0.25	480.0 x 5.8 x 2.5	<a href="#">BD5804800</a>	ORAR00465	456.06 x 6.99
500.0	488.4	12.3	15.1	0.25	500.0 x 5.8 x 2.5	<a href="#">BD5805000</a>	ORAR00467	481.46 x 6.99

Further sizes available on request.

This table shows the possible range of available dimensions (Back-up Rings). However, these dimensions are not always stock items.



**Table 77: Preferred series for static applications, concave Back-up Ring Type BD (cut), External sealing, material PTFE – Inch**

Bore Ø	Groove Ø	Groove width		Radius r ±0.008	Back-up Ring dimension OD x W x T	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
D <sub>N</sub> H8	d <sub>3</sub> h9							
inch								
0.236	0.134	0.150	0.205	0.010	0.24 x 0.05 x 0.06	<a href="#">BD1300060</a>	ORAR00006	0.114 x 0.070
0.236	0.150	0.118	0.157	0.010	0.24 x 0.04 x 0.04	<a href="#">BD1100060</a>	OR1500350	0.138 x 0.059
0.315	0.228	0.118	0.157	0.010	0.31 x 0.04 x 0.04	<a href="#">BD1100080</a>	OR1500550	0.217 x 0.059
0.394	0.307	0.118	0.157	0.010	0.39 x 0.04 x 0.04	<a href="#">BD1100100</a>	OR1500750	0.295 x 0.059
0.472	0.354	0.161	0.217	0.010	0.47 x 0.06 x 0.06	<a href="#">BD1500120</a>	OR2000850	0.335 x 0.079
0.472	0.370	0.150	0.205	0.010	0.47 x 0.05 x 0.06	<a href="#">BD1300120</a>	ORAR00012	0.364 x 0.070
0.551	0.433	0.161	0.217	0.010	0.55 x 0.06 x 0.06	<a href="#">BD1500140</a>	OR2001000	0.394 x 0.079
0.551	0.449	0.150	0.205	0.010	0.55 x 0.05 x 0.06	<a href="#">BD1300140</a>	ORAR00013	0.426 x 0.070
0.591	0.472	0.161	0.217	0.010	0.59 x 0.06 x 0.06	<a href="#">BD1500150</a>	OR2001100	0.433 x 0.079
0.591	0.488	0.150	0.205	0.010	0.59 x 0.05 x 0.06	<a href="#">BD1300150</a>	ORAR00014	0.489 x 0.070
0.630	0.512	0.161	0.217	0.010	0.63 x 0.06 x 0.06	<a href="#">BD1500160</a>	OR2001200	0.472 x 0.079
0.630	0.528	0.150	0.205	0.010	0.63 x 0.05 x 0.06	<a href="#">BD1300160</a>	ORAR00015	0.551 x 0.070
0.709	0.591	0.161	0.217	0.010	0.71 x 0.06 x 0.06	<a href="#">BD1500180</a>	OR2001400	0.551 x 0.079
0.709	0.606	0.150	0.205	0.010	0.71 x 0.05 x 0.06	<a href="#">BD1300180</a>	ORAR00016	0.614 x 0.070
0.787	0.669	0.161	0.217	0.010	0.79 x 0.06 x 0.06	<a href="#">BD1500200</a>	OR2001600	0.630 x 0.079
0.787	0.685	0.150	0.205	0.010	0.79 x 0.05 x 0.06	<a href="#">BD1300200</a>	ORAR00017	0.676 x 0.070
0.866	0.748	0.161	0.217	0.010	0.87 x 0.06 x 0.06	<a href="#">BD1500220</a>	OR2001600	0.630 x 0.079
0.866	0.764	0.150	0.205	0.010	0.87 x 0.05 x 0.06	<a href="#">BD1300220</a>	ORAR00018	0.739 x 0.070
0.984	0.866	0.161	0.217	0.010	0.98 x 0.06 x 0.06	<a href="#">BD1500250</a>	OR2002100	0.827 x 0.079
0.984	0.882	0.150	0.205	0.010	0.98 x 0.05 x 0.06	<a href="#">BD1300250</a>	ORAR00020	0.864 x 0.070
1.102	0.921	0.213	0.268	0.010	1.10 x 0.09 x 0.06	<a href="#">BD2300280</a>	OR3002200	0.866 x 0.118
1.102	0.945	0.197	0.252	0.010	1.10 x 0.08 x 0.06	<a href="#">BD2000280</a>	ORAR00119	0.924 x 0.103
1.181	1.000	0.213	0.268	0.010	1.18 x 0.09 x 0.06	<a href="#">BD2300300</a>	OR3002400	0.945 x 0.079
1.181	1.024	0.197	0.252	0.010	1.18 x 0.08 x 0.06	<a href="#">BD2000300</a>	ORAR00120	0.987 x 0.103
1.260	1.079	0.213	0.268	0.010	1.26 x 0.09 x 0.06	<a href="#">BD2300320</a>	OR3002600	1.024 x 0.118
1.260	1.102	0.197	0.252	0.010	1.26 x 0.08 x 0.06	<a href="#">BD2000320</a>	ORAR00121	1.049 x 0.103
1.378	1.197	0.213	0.268	0.010	1.38 x 0.09 x 0.06	<a href="#">BD2300350</a>	OR3002900	1.154 x 0.118
1.378	1.220	0.197	0.252	0.010	1.38 x 0.08 x 0.06	<a href="#">BD2000350</a>	ORAR00123	1.174 x 0.103
1.575	1.394	0.213	0.268	0.010	1.57 x 0.09 x 0.06	<a href="#">BD2300400</a>	OR3003400	1.339 x 0.118
1.575	1.417	0.197	0.252	0.010	1.57 x 0.08 x 0.06	<a href="#">BD2000400</a>	ORAR00126	1.362 x 0.103
1.654	1.472	0.213	0.268	0.010	1.65 x 0.09 x 0.06	<a href="#">BD2300420</a>	OR3003600	1.417 x 0.118
1.654	1.496	0.197	0.252	0.010	1.65 x 0.08 x 0.06	<a href="#">BD2000420</a>	ORAR00127	1.424 x 0.103
1.772	1.575	0.213	0.268	0.010	1.77 x 0.09 x 0.06	<a href="#">BD2300450</a>	OR3003900	1.535 x 0.118
1.772	1.614	0.197	0.252	0.010	1.77 x 0.08 x 0.06	<a href="#">BD2000450</a>	ORAR00129	1.549 x 0.103
1.890	1.646	0.272	0.339	0.010	1.89 x 0.12 x 0.07	<a href="#">BD3100480</a>	OR4004000	1.575 x 0.157
1.890	1.677	0.244	0.299	0.010	1.89 x 0.11 x 0.06	<a href="#">BD2700480</a>	ORAR00223	1.609 x 0.139
1.969	1.724	0.272	0.339	0.010	1.97 x 0.12 x 0.07	<a href="#">BD3100500</a>	OR4004200	1.654 x 0.157
1.969	1.756	0.244	0.299	0.010	1.97 x 0.11 x 0.06	<a href="#">BD2700500</a>	ORAR00224	1.734 x 0.139
2.047	1.803	0.272	0.339	0.010	2.05 x 0.12 x 0.07	<a href="#">BD3100520</a>	OR4004400	1.732 x 0.157
2.047	1.835	0.244	0.299	0.010	2.05 x 0.11 x 0.06	<a href="#">BD2700520</a>	ORAR00224	1.734 x 0.139



Bore Ø	Groove Ø	Groove width		Radius r ±0.008	Back-up Ring dimension OD x W x T	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
D <sub>N</sub> H8	d <sub>3</sub> h9							
inch								
2.165	1.921	0.272	0.339	0.010	2.17 x 0.12 x 0.07	BD3100550	OR4004700	1.850 x 0.157
2.165	1.953	0.244	0.299	0.010	2.17 x 0.11 x 0.06	BD2700550	ORAR00225	1.859 x 0.139
2.362	2.118	0.272	0.339	0.010	2.36 x 0.12 x 0.07	BD3100600	OR4005200	2.047 x 0.157
2.362	2.150	0.244	0.299	0.010	2.36 x 0.11 x 0.06	BD2700600	ORAR00227	2.109 x 0.139
2.480	2.236	0.272	0.339	0.010	2.48 x 0.12 x 0.07	BD3100630	OR4005500	2.165 x 0.157
2.480	2.268	0.244	0.299	0.010	2.48 x 0.11 x 0.06	BD2700630	ORAR00228	2.234 x 0.139
2.559	2.315	0.272	0.339	0.010	2.56 x 0.12 x 0.07	BD3100650	OR4005700	2.244 x 0.157
2.559	2.346	0.244	0.299	0.010	2.56 x 0.11 x 0.06	BD2700650	ORAR00228	2.234 x 0.139
2.756	2.512	0.272	0.339	0.010	2.76 x 0.12 x 0.07	BD3100700	OR4006200	2.441 x 0.157
2.756	2.543	0.244	0.299	0.010	2.76 x 0.11 x 0.06	BD2700700	ORAR00230	2.484 x 0.139
2.953	2.709	0.272	0.339	0.010	2.95 x 0.12 x 0.07	BD3100750	OR4006700	2.638 x 0.157
2.953	2.740	0.244	0.299	0.010	2.95 x 0.11 x 0.06	BD2700750	ORAR00231	2.609 x 0.139
3.150	2.906	0.272	0.339	0.010	3.15 x 0.12 x 0.07	BD3100800	OR4007200	2.835 x 0.157
3.150	2.937	0.244	0.299	0.010	3.15 x 0.11 x 0.06	BD2700800	ORAR00233	2.859 x 0.139
3.346	3.102	0.272	0.339	0.010	3.35 x 0.12 x 0.07	BD3100850	OR4007700	3.031 x 0.157
3.346	3.134	0.205	0.299	0.010	3.35 x 0.11 x 0.06	BD2700850	ORAR00235	3.109 x 0.139
3.543	3.205	0.354	0.429	0.010	3.54 x 0.17 x 0.07	BD4300900	ORAR00338	3.100 x 0.210
3.543	3.228	0.327	0.394	0.010	3.54 x 0.16 x 0.07	BD4000900	OR5008000	3.150 x 0.197
3.740	3.402	0.354	0.429	0.010	3.74 x 0.17 x 0.07	BD4300950	ORAR00340	3.350 x 0.210
3.740	3.425	0.327	0.394	0.010	3.74 x 0.16 x 0.07	BD4000950	OR5008000	3.150 x 0.197
3.937	3.598	0.354	0.429	0.010	3.94 x 0.17 x 0.07	BD4301000	ORAR00342	3.600 x 0.210
3.937	3.622	0.327	0.394	0.010	3.94 x 0.16 x 0.07	BD4001000	OR5009000	3.543 x 0.197
4.134	3.795	0.354	0.429	0.010	4.13 x 0.17 x 0.07	BD4301050	ORAR00343	3.725 x 0.210
4.134	3.819	0.327	0.394	0.010	4.13 x 0.16 x 0.07	BD4001050	OR5009500	3.740 x 0.197
4.331	3.992	0.354	0.429	0.010	4.33 x 0.17 x 0.07	BD4301100	ORAR00345	3.975 x 0.210
4.331	4.016	0.327	0.394	0.010	4.33 x 0.16 x 0.07	BD4001100	OR5010000	3.937 x 0.197
4.528	4.189	0.354	0.429	0.010	4.53 x 0.17 x 0.07	BD4301150	ORAR00346	4.100 x 0.210
4.528	4.213	0.327	0.394	0.010	4.53 x 0.16 x 0.07	BD4001150	OR5010500	4.134 x 0.197
4.724	4.386	0.354	0.429	0.010	4.72 x 0.17 x 0.07	BD4301200	ORAR00348	4.350 x 0.210
4.724	4.409	0.327	0.394	0.010	4.72 x 0.16 x 0.07	BD4001200	OR5011000	4.331 x 0.197
4.921	4.583	0.354	0.429	0.010	4.92 x 0.17 x 0.07	BD4301250	ORAR00349	4.475 x 0.210
4.921	4.606	0.327	0.394	0.010	4.92 x 0.16 x 0.07	BD4001250	OR5011500	4.528 x 0.197
5.118	4.780	0.354	0.429	0.010	5.12 x 0.17 x 0.07	BD4301300	ORAR00351	4.725 x 0.210
5.118	4.803	0.327	0.394	0.010	5.12 x 0.16 x 0.07	BD4001300	OR5012000	4.724 x 0.197
5.315	4.858	0.484	0.594	0.010	5.31 x 0.23 x 0.10	BD5801350	ORAR00427	4.725 x 0.275
5.512	5.055	0.484	0.594	0.010	5.51 x 0.23 x 0.10	BD5801400	ORAR00429	4.975 x 0.275
5.906	5.449	0.484	0.594	0.010	5.91 x 0.23 x 0.10	BD5801500	ORAR00432	5.350 x 0.275
6.299	5.843	0.484	0.594	0.010	6.30 x 0.23 x 0.10	BD5801600	ORAR00435	5.725 x 0.275
6.693	6.236	0.484	0.594	0.010	6.69 x 0.23 x 0.10	BD5801700	ORAR00438	6.225 x 0.275
7.087	6.630	0.484	0.594	0.010	7.09 x 0.23 x 0.10	BD5801800	ORAR00439	6.475 x 0.275



Bore Ø	Groove Ø	Groove width		Radius r ±0.008	Back-up Ring dimension OD x W x T	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
<b>inch</b>								
7.480	7.024	0.484	0.594	0.010	7.48 x 0.23 x 0.10	<a href="#">BD5801900</a>	ORAR00441	6.975 x 0.275
7.874	7.417	0.484	0.594	0.010	7.87 x 0.23 x 0.10	<a href="#">BD5802000</a>	ORAR00442	7.225 x 0.275
8.268	7.811	0.484	0.594	0.010	8.27 x 0.23 x 0.10	<a href="#">BD5802100</a>	ORAR00444	7.725 x 0.275
8.661	8.205	0.484	0.594	0.010	8.66 x 0.23 x 0.10	<a href="#">BD5802200</a>	ORAR00445	7.975 x 0.275
9.055	8.598	0.484	0.594	0.010	9.06 x 0.23 x 0.10	<a href="#">BD5802300</a>	ORAR00446	8.475 x 0.275
9.449	8.992	0.484	0.594	0.010	9.45 x 0.23 x 0.10	<a href="#">BD5802400</a>	ORAR00447	8.975 x 0.275
9.843	9.386	0.484	0.594	0.010	9.84 x 0.23 x 0.10	<a href="#">BD5802500</a>	ORAR00448	9.475 x 0.275
11.024	10.567	0.484	0.594	0.010	11.02 x 0.23 x 0.10	<a href="#">BD5802800</a>	ORAR00450	10.475 x 0.275
11.811	11.354	0.484	0.594	0.010	11.81 x 0.23 x 0.10	<a href="#">BD5803000</a>	ORAR00451	10.975 x 0.275
12.598	12.142	0.484	0.594	0.010	12.60 x 0.23 x 0.10	<a href="#">BD5803200</a>	ORAR00453	11.975 x 0.275
13.780	13.323	0.484	0.594	0.010	13.78 x 0.23 x 0.10	<a href="#">BD5803500</a>	ORAR00455	12.975 x 0.275
15.748	15.291	0.484	0.594	0.010	15.75 x 0.23 x 0.10	<a href="#">BD5804000</a>	ORAR00459	14.975 x 0.275
16.535	16.079	0.484	0.594	0.010	16.54 x 0.23 x 0.10	<a href="#">BD5804200</a>	ORAR00461	15.955 x 0.275
17.717	17.260	0.484	0.594	0.010	17.72 x 0.23 x 0.10	<a href="#">BD5804500</a>	ORAR00463	16.955 x 0.275
18.898	18.441	0.484	0.594	0.010	18.90 x 0.23 x 0.10	<a href="#">BD5804800</a>	ORAR00465	17.955 x 0.275
19.685	19.228	0.484	0.594	0.010	19.69 x 0.23 x 0.10	<a href="#">BD5805000</a>	ORAR00467	18.955 x 0.275

Further sizes available on request.

This table shows the possible range of available dimensions (Back-up Rings). However, these dimensions are not always stock items.





### H.1.3 SPIRAL BACK-UP RING TYPES (BP), MATERIAL PTFE

The following figure and tables include installation recommendations and Back-up Ring dimensions for external sealing applications with the spiral Back-up Ring types BP.

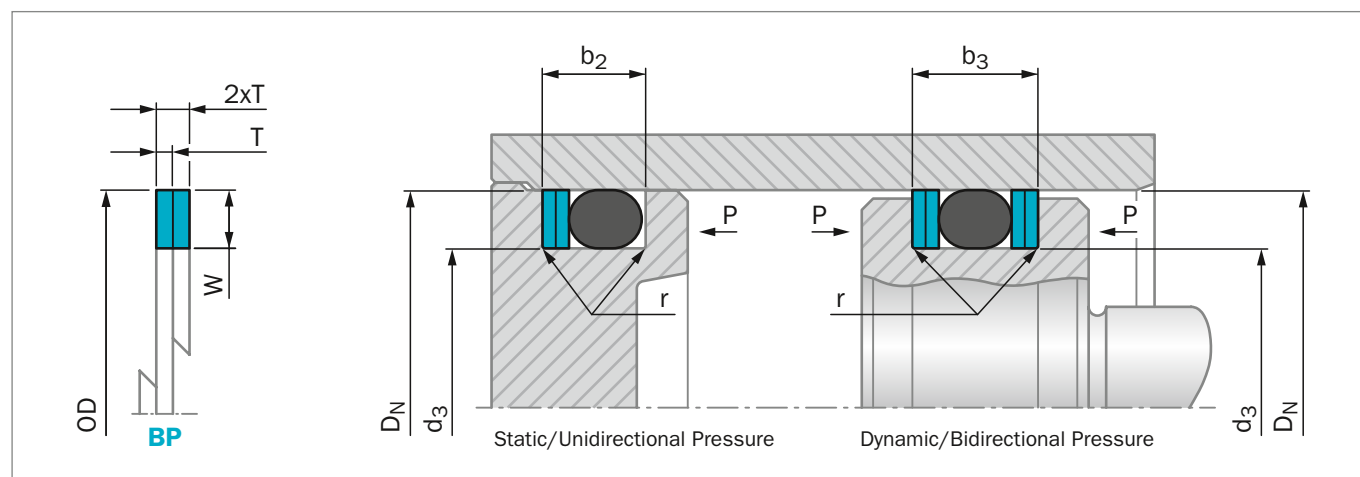


Figure 57: Installation drawing external sealing, spiral Back-up Ring type

**Table 78: Installation dimensions for the spiral Back-up Ring type, External sealing, material PTFE – Metric**

O-Ring Cross-Section-Ø $d_2$	Back-up Ring Cross-Section			Groove dimensions				
	Radial height W		Thickness T	Groove diameter $d_3$ h9		Groove width		Radius
	Dynamic	Static	T	Dynamic	Static	$b_2 + 0.25$	$b_3 + 0.25$	$r \pm 0.2$
mm								
1.50	1.25	1.10	0.50	$D_N - 2.5$	$D_N - 2.2$	3.0	4.0	0.25
1.60	1.30	1.20	0.50	$D_N - 2.6$	$D_N - 2.4$	3.1	4.1	0.25
1.78	1.45	1.30	0.70	$D_N - 2.9$	$D_N - 2.6$	3.8	5.2	0.25
1.80	1.45	1.30	0.70	$D_N - 2.9$	$D_N - 2.6$	3.8	5.2	0.25
2.00	1.65	1.50	0.70	$D_N - 3.3$	$D_N - 3.0$	4.1	5.5	0.25
2.40	2.05	1.80	0.70	$D_N - 4.1$	$D_N - 3.6$	4.6	6.0	0.25
2.50	2.15	1.90	0.70	$D_N - 4.3$	$D_N - 3.8$	4.7	6.1	0.25
2.62	2.25	2.00	0.70	$D_N - 4.5$	$D_N - 4.0$	5.0	6.4	0.25
2.65	2.25	2.00	0.70	$D_N - 4.5$	$D_N - 4.0$	5.0	6.4	0.25
3.00	2.60	2.30	0.70	$D_N - 5.2$	$D_N - 4.6$	5.4	6.8	0.25
3.53	3.10	2.70	0.70	$D_N - 6.2$	$D_N - 5.4$	6.2	7.6	0.25
3.55	3.10	2.70	0.70	$D_N - 6.2$	$D_N - 5.4$	6.2	7.6	0.25
4.00	3.50	3.10	0.85	$D_N - 7.0$	$D_N - 6.2$	6.9	8.6	0.25
5.00	4.40	4.00	0.85	$D_N - 8.8$	$D_N - 8.0$	8.3	10.0	0.25
5.30	4.70	4.30	0.85	$D_N - 9.4$	$D_N - 8.6$	9.0	10.9	0.25
5.33	4.70	4.30	0.85	$D_N - 9.4$	$D_N - 8.6$	9.0	10.9	0.25
5.70	5.00	4.60	0.85	$D_N - 10.0$	$D_N - 9.2$	9.0	11.0	0.25
6.00	5.30	4.90	0.85	$D_N - 10.6$	$D_N - 9.8$	9.3	11.2	0.25
6.99	6.10	5.80	1.25	$D_N - 12.2$	$D_N - 11.6$	12.3	15.1	0.25
8.00	7.10	6.70	1.25	$D_N - 14.2$	$D_N - 13.4$	12.6	15.4	0.25
8.40	7.50	7.10	1.25	$D_N - 15.0$	$D_N - 14.2$	12.8	15.6	0.25



**Table 79: Installation dimensions for the spiral Back-up Ring type, External sealing, material PTFE – Inch**

O-Ring Cross-Section-Ø d <sub>2</sub>	Back-up Ring Cross-Section			Groove dimensions				
	Radial height W		Thickness T	Groove diameter d <sub>3</sub> h9		Groove width		Radius r
	Dynamic	Static	T	Dynamic	Static	b <sub>2</sub> +0.010	b <sub>3</sub> +0.010	r ±0.008
inch								
0.059	0.049	0.043	0.020	D <sub>N</sub> - 0.098	D <sub>N</sub> - 0.087	0.118	0.157	0.010
0.063	0.051	0.047	0.020	D <sub>N</sub> - 0.102	D <sub>N</sub> - 0.094	0.122	0.161	0.010
0.070	0.057	0.051	0.028	D <sub>N</sub> - 0.114	D <sub>N</sub> - 0.102	0.150	0.205	0.010
0.071	0.057	0.051	0.028	D <sub>N</sub> - 0.114	D <sub>N</sub> - 0.102	0.150	0.205	0.010
0.079	0.065	0.059	0.028	D <sub>N</sub> - 0.130	D <sub>N</sub> - 0.118	0.161	0.217	0.010
0.094	0.081	0.071	0.028	D <sub>N</sub> - 0.161	D <sub>N</sub> - 0.142	0.181	0.236	0.010
0.098	0.085	0.075	0.028	D <sub>N</sub> - 0.169	D <sub>N</sub> - 0.150	0.185	0.240	0.010
0.103	0.089	0.079	0.028	D <sub>N</sub> - 0.177	D <sub>N</sub> - 0.157	0.197	0.252	0.010
0.104	0.089	0.079	0.028	D <sub>N</sub> - 0.177	D <sub>N</sub> - 0.157	0.197	0.252	0.010
0.118	0.102	0.091	0.028	D <sub>N</sub> - 0.205	D <sub>N</sub> - 0.181	0.213	0.268	0.010
0.139	0.122	0.106	0.028	D <sub>N</sub> - 0.244	D <sub>N</sub> - 0.213	0.244	0.299	0.010
0.140	0.122	0.106	0.028	D <sub>N</sub> - 0.244	D <sub>N</sub> - 0.213	0.244	0.299	0.010
0.157	0.138	0.122	0.033	D <sub>N</sub> - 0.276	D <sub>N</sub> - 0.244	0.272	0.339	0.010
0.197	0.173	0.157	0.033	D <sub>N</sub> - 0.346	D <sub>N</sub> - 0.315	0.327	0.394	0.010
0.209	0.185	0.169	0.033	D <sub>N</sub> - 0.370	D <sub>N</sub> - 0.339	0.354	0.429	0.010
0.210	0.185	0.169	0.033	D <sub>N</sub> - 0.370	D <sub>N</sub> - 0.339	0.354	0.429	0.010
0.224	0.197	0.181	0.033	D <sub>N</sub> - 0.394	D <sub>N</sub> - 0.362	0.354	0.433	0.010
0.236	0.209	0.193	0.033	D <sub>N</sub> - 0.417	D <sub>N</sub> - 0.386	0.366	0.441	0.010
0.275	0.240	0.228	0.049	D <sub>N</sub> - 0.480	D <sub>N</sub> - 0.457	0.484	0.594	0.010
0.315	0.280	0.264	0.049	D <sub>N</sub> - 0.559	D <sub>N</sub> - 0.528	0.496	0.606	0.010
0.331	0.295	0.280	0.049	D <sub>N</sub> - 0.591	D <sub>N</sub> - 0.559	0.504	0.614	0.010

**ORDERING EXAMPLE**

<b>Back-up Ring:</b>	Type BP (spiral) for O-Ring seal
<b>Application:</b>	Dynamic, external sealing
<b>Bore diameter:</b>	D <sub>N</sub> = 120.00 mm (4.724 inch)
<b>Groove diameter:</b>	d <sub>3</sub> = 111.20 mm (4.378 inch)
<b>O-Ring Cross-Section:</b>	d <sub>2</sub> = 5.00 mm (0.197 inch)
<b>Back-up Ring material:</b>	PTFE, virgin

**TSS Article No.** **BP 44 0 1112 - PT00**

Back-Up Ring (Spiral) — BP

Radial Height (mm) W x 10 — 44

T-dimension (Standard, mm) — 0

Groove-Ø (mm) d<sub>3</sub> x 10 — 1112

Quality Index (Standard) — -

Material Code (Standard) — PT00

For material code see page 149



**Table 80: Preferred series for dynamic application, spiral Back-up Ring  
Type BP, External sealing, material PTFE – Metric**

Bore Ø	Groove Ø	Groove width		Radi- us	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		$b_2 +0.25$	$b_3 +0.25$					
mm								
6.0	3.1	3.8	5.2	0.25	6.0 x 1.45 x 0.70	BP14H00031	ORAR00006	2.90 x 1.78
6.0	3.5	3.0	4.0	0.25	6.0 x 1.25 x 0.50	BP12H00035	OR1500300	3.00 x 1.50
8.0	5.1	3.8	5.2	0.25	8.0 x 1.45 x 0.70	BP14H00051	ORAR00008	4.47 x 1.78
8.0	5.5	3.0	4.0	0.25	8.0 x 1.25 x 0.50	BP12H00055	OR1500500	5.00 x 1.50
10.0	7.1	3.8	5.2	0.25	10.0 x 1.45 x 0.70	BP14H00071	ORAR00011	7.65 x 1.78
10.0	7.5	3.0	4.0	0.25	10.0 x 1.45 x 0.50	BP12H00075	OR1500700	7.00 x 1.50
12.0	8.7	4.1	5.5	0.25	12.0 x 1.65 x 0.70	BP16H00087	OR2000800	8.00 x 2.00
12.0	9.1	3.8	5.2	0.25	12.0 x 1.45 x 0.70	BP14H00091	ORAR00012	9.25 x 1.78
14.0	10.7	4.1	5.5	0.25	14.0 x 1.65 x 0.70	BP16H00107	OR2001000	10.00 x 2.00
14.0	11.1	3.8	5.2	0.25	14.0 x 1.45 x 0.70	BP14H00111	ORAR00013	10.82 x 1.78
15.0	11.7	4.1	5.5	0.25	15.0 x 1.65 x 0.70	BP16H00117	OR2001100	11.00 x 2.00
15.0	12.1	3.8	5.2	0.25	15.0 x 1.45 x 0.70	BP14H00121	ORAR00014	12.42 x 1.78
16.0	12.7	4.1	5.5	0.25	16.0 x 1.65 x 0.70	BP16H00127	OR2001200	12.00 x 2.00
16.0	13.1	3.8	5.2	0.25	16.0 x 1.45 x 0.70	BP14H00131	ORAR00015	14.00 x 1.78
18.0	14.7	4.1	5.5	0.25	18.0 x 1.65 x 0.70	BP16H00147	OR2001400	14.00 x 2.00
18.0	15.1	3.8	5.2	0.25	18.0 x 1.45 x 0.70	BP14H00151	ORAR00016	15.60 x 1.78
20.0	16.7	4.1	5.5	0.25	20.0 x 1.65 x 0.70	BP16H00167	OR2001600	16.00 x 2.00
20.0	17.1	3.8	5.2	0.25	20.0 x 1.45 x 0.70	BP14H00171	ORAR00017	17.17 x 1.78
22.0	18.7	4.1	5.5	0.25	22.0 x 1.65 x 0.70	BP16H00187	OR2001800	18.00 x 2.00
22.0	19.1	3.8	5.2	0.25	22.0 x 1.45 x 0.70	BP14H00191	ORAR00018	18.77 x 1.78
25.0	21.7	4.1	5.5	0.25	25.0 x 1.65 x 0.70	BP16H00217	OR2002100	21.00 x 2.00
25.0	22.1	3.8	5.2	0.25	25.0 x 1.45 x 0.70	BP14H00221	ORAR00020	21.95 x 1.78
28.0	22.8	5.4	6.8	0.25	28.0 x 2.60 x 0.70	BP2600228	OR3002200	22.00 x 3.00
28.0	23.5	5.0	6.4	0.25	28.0 x 2.25 x 0.70	BP22H00235	ORAR00119	23.47 x 2.62
30.0	24.8	5.4	6.8	0.25	30.0 x 2.60 x 0.70	BP2600248	OR3002400	24.00 x 3.00
30.0	25.5	5.0	6.4	0.25	30.0 x 2.25 x 0.70	BP22H00255	ORAR00120	25.07 x 2.62
32.0	26.8	5.4	6.8	0.25	32.0 x 2.60 x 0.70	BP2600268	OR3002600	26.00 x 3.00
35.0	29.8	5.4	6.8	0.25	35.0 x 2.60 x 0.70	BP2600298	OR3002900	29.00 x 3.00
35.0	30.5	5.0	6.4	0.25	35.0 x 2.25 x 0.70	BP22H00305	ORAR00123	29.82 x 2.62
40.0	34.8	5.4	6.8	0.25	40.0 x 2.60 x 0.70	BP2600348	OR3003400	34.00 x 3.00
40.0	35.5	5.0	6.4	0.25	40.0 x 2.25 x 0.70	BP22H00355	ORAR00126	34.59 x 2.62
42.0	36.8	5.4	6.8	0.25	42.0 x 2.60 x 0.70	BP2600368	OR3003600	36.00 x 3.00
42.0	37.5	5.0	6.4	0.25	42.0 x 2.25 x 0.70	BP22H00375	ORAR00127	36.17 x 2.62
45.0	39.8	5.4	6.8	0.25	45.0 x 2.60 x 0.70	BP2600398	OR3003900	39.00 x 3.00
45.0	40.5	5.0	6.4	0.25	45.0 x 2.25 x 0.70	BP22H00405	ORAR00129	39.34 x 2.62
48.0	41.0	6.9	8.6	0.25	48.0 x 3.50 x 0.85	BP3500410	OR4004000	40.00 x 4.00
48.0	41.8	6.2	7.6	0.25	48.0 x 3.10 x 0.70	BP31D0418	ORAR00223	40.87 x 3.53
50.0	43.0	6.9	8.6	0.25	50.0 x 3.50 x 0.85	BP3500430	OR4004200	42.00 x 4.00
50.0	43.8	6.2	7.6	0.25	50.0 x 3.10 x 0.70	BP31D0438	ORAR00224	44.04 x 3.53
52.0	45.0	6.9	8.6	0.25	52.0 x 3.50 x 0.85	BP3500450	OR4004400	44.00 x 4.00



Bore Ø	Groove Ø	Groove width		Radi- us	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
mm								
52.0	45.8	6.2	7.6	0.25	52.0 x 3.10 x 0.70	<a href="#">BP31D0458</a>	ORAR00224	44.04 x 3.53
55.0	48.0	6.9	8.6	0.25	55.0 x 3.50 x 0.85	<a href="#">BP3500480</a>	OR4004700	47.00 x 4.00
55.0	48.8	6.2	7.6	0.25	55.0 x 3.10 x 0.70	<a href="#">BP31D0488</a>	ORAR00225	47.22 x 3.53
60.0	53.0	6.9	8.6	0.25	60.0 x 3.50 x 0.85	<a href="#">BP3500530</a>	OR4005200	52.00 x 4.00
60.0	53.8	6.2	7.6	0.25	60.0 x 3.10 x 0.70	<a href="#">BP31D0538</a>	ORAR00227	53.57 x 3.53
63.0	56.0	6.9	8.6	0.25	63.0 x 3.50 x 0.85	<a href="#">BP3500560</a>	OR4005500	55.00 x 4.00
63.0	56.8	6.2	7.6	0.25	63.0 x 3.10 x 0.70	<a href="#">BP31D0568</a>	ORAR00228	56.74 x 3.53
65.0	58.0	6.9	8.6	0.25	65.0 x 3.50 x 0.85	<a href="#">BP3500580</a>	OR4005700	57.00 x 4.00
65.0	58.8	6.2	7.6	0.25	65.0 x 3.10 x 0.70	<a href="#">BP31D0588</a>	ORAR00228	56.74 x 3.53
70.0	63.0	6.9	8.6	0.25	70.0 x 3.50 x 0.85	<a href="#">BP3500630</a>	OR4006200	62.00 x 4.00
70.0	63.8	6.2	7.6	0.25	70.0 x 3.10 x 0.70	<a href="#">BP31D0638</a>	ORAR00230	63.09 x 3.53
75.0	68.0	6.9	8.6	0.25	75.0 x 3.50 x 0.85	<a href="#">BP3500680</a>	OR4006700	67.00 x 4.00
75.0	68.8	6.2	7.6	0.25	75.0 x 3.10 x 0.70	<a href="#">BP31D0688</a>	ORAR00231	66.27 x 3.53
80.0	73.0	6.9	8.6	0.25	80.0 x 3.50 x 0.85	<a href="#">BP3500730</a>	OR4007200	72.00 x 4.00
80.0	73.8	6.2	7.6	0.25	80.0 x 3.10 x 0.70	<a href="#">BP31D0738</a>	ORAR00233	72.62 x 3.53
85.0	78.0	6.9	8.6	0.25	85.0 x 3.50 x 0.85	<a href="#">BP3500780</a>	OR4007700	77.00 x 4.00
85.0	78.8	6.2	7.6	0.25	85.0 x 3.10 x 0.70	<a href="#">BP31D0788</a>	ORAR00235	78.97 x 3.53
90.0	80.6	9.0	10.9	0.25	90.0 x 4.70 x 0.85	<a href="#">BP4700806</a>	ORAR00338	78.74 x 5.33
90.0	81.2	8.3	10.0	0.25	90.0 x 4.40 x 0.85	<a href="#">BP4400812</a>	OR5008000	80.00 x 5.00
95.0	85.6	9.0	10.9	0.25	95.0 x 4.70 x 0.85	<a href="#">BP4700856</a>	ORAR00340	85.09 x 5.33
95.0	86.2	8.3	10.0	0.25	95.0 x 4.40 x 0.85	<a href="#">BP4400862</a>	OR5008500	85.00 x 5.00
100.0	90.6	9.0	10.9	0.25	100.0 x 4.70 x 0.85	<a href="#">BP4700906</a>	ORAR00342	91.44 x 5.33
100.0	91.2	8.3	10.0	0.25	100.0 x 4.40 x 0.85	<a href="#">BP4400912</a>	OR5009000	90.00 x 5.00
105.0	95.6	9.0	10.9	0.25	105.0 x 4.70 x 0.85	<a href="#">BP4700956</a>	ORAR00343	94.62 x 5.33
105.0	96.2	8.3	10.0	0.25	105.0 x 4.40 x 0.85	<a href="#">BP4400962</a>	OR5009500	95.00 x 5.00
110.0	100.6	9.0	10.9	0.25	110.0 x 4.70 x 0.85	<a href="#">BP4701006</a>	ORAR00345	100.97 x 5.33
110.0	101.2	8.3	10.0	0.25	110.0 x 4.40 x 0.85	<a href="#">BP4401012</a>	OR5010000	100.00 x 5.00
115.0	105.6	9.0	10.9	0.25	115.0 x 4.70 x 0.85	<a href="#">BP4701056</a>	ORAR00346	104.14 x 5.33
115.0	106.2	8.3	10.0	0.25	115.0 x 4.40 x 0.85	<a href="#">BP4401062</a>	OR5010500	105.00 x 5.00
120.0	110.6	9.0	10.9	0.25	120.0 x 4.70 x 0.85	<a href="#">BP4701106</a>	ORAR00348	110.49 x 5.33
120.0	111.2	8.3	10.0	0.25	120.0 x 4.40 x 0.85	<a href="#">BP4401112</a>	OR5011000	110.00 x 5.00
125.0	115.6	9.0	10.9	0.25	125.0 x 4.70 x 0.85	<a href="#">BP4701156</a>	ORAR00349	113.67 x 5.33
125.0	116.2	8.3	10.0	0.25	125.0 x 4.40 x 0.85	<a href="#">BP4401162</a>	OR5011500	115.00 x 5.00
130.0	120.6	9.0	10.9	0.25	130.0 x 4.70 x 0.85	<a href="#">BP4701206</a>	ORAR00351	120.02 x 5.33
130.0	121.2	8.3	10.0	0.25	130.0 x 4.40 x 0.85	<a href="#">BP4401212</a>	OR5012000	120.00 x 5.00
135.0	122.8	12.3	15.1	0.25	135.0 x 6.10 x 1.25	<a href="#">BP6101228</a>	ORAR00427	120.02 x 6.99
140.0	127.8	12.3	15.1	0.25	140.0 x 6.10 x 1.25	<a href="#">BP6101278</a>	ORAR00429	126.37 x 6.99
150.0	137.8	12.3	15.1	0.25	150.0 x 6.10 x 1.25	<a href="#">BP6101378</a>	ORAR00432	135.89 x 6.99
160.0	147.8	12.3	15.1	0.25	160.0 x 6.10 x 1.25	<a href="#">BP6101478</a>	ORAR00435	145.42 x 6.99
170.0	157.8	12.3	15.1	0.25	170.0 x 6.10 x 1.25	<a href="#">BP6101578</a>	ORAR00438	158.12 x 6.99
180.0	167.8	12.3	15.1	0.25	180.0 x 6.10 x 1.25	<a href="#">BP6101678</a>	ORAR00439	164.47 x 6.99
190.0	177.8	12.3	15.1	0.25	190.0 x 6.10 x 1.25	<a href="#">BP6101778</a>	ORAR00441	177.17 x 6.99



Bore Ø	Groove Ø	Groove width		Radi- us	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		$b_2 +0.25$	$b_3 +0.25$					
mm								
200.0	187.8	12.3	15.1	0.25	200.0 x 6.10 x 1.25	<a href="#">BP6101878</a>	ORAR00442	183.52 x 6.99
210.0	197.8	12.3	15.1	0.25	210.0 x 6.10 x 1.25	<a href="#">BP6101978</a>	ORAR00444	196.22 x 6.99
220.0	207.8	12.3	15.1	0.25	220.0 x 6.10 x 1.25	<a href="#">BP6102078</a>	ORAR00445	202.57 x 6.99
230.0	217.8	12.3	15.1	0.25	230.0 x 6.10 x 1.25	<a href="#">BP6102178</a>	ORAR00446	215.27 x 6.99
240.0	227.8	12.3	15.1	0.25	240.0 x 6.10 x 1.25	<a href="#">BP6102278</a>	ORAR00447	227.97 x 6.99
250.0	237.8	12.3	15.1	0.25	250.0 x 6.10 x 1.25	<a href="#">BP6102378</a>	ORAR00448	240.67 x 6.99
280.0	267.8	12.3	15.1	0.25	280.0 x 6.10 x 1.25	<a href="#">BP6102678</a>	ORAR00450	266.07 x 6.99
300.0	287.8	12.3	15.1	0.25	300.0 x 6.10 x 1.25	<a href="#">BP6102878</a>	ORAR00451	278.77 x 6.99
320.0	307.8	12.3	15.1	0.25	320.0 x 6.10 x 1.25	<a href="#">BP6103078</a>	ORAR00453	304.17 x 6.99
350.0	337.8	12.3	15.1	0.25	350.0 x 6.10 x 1.25	<a href="#">BP6103378</a>	ORAR00455	329.57 x 6.99
400.0	387.8	12.3	15.1	0.25	400.0 x 6.10 x 1.25	<a href="#">BP6103878</a>	ORAR00459	380.37 x 6.99
420.0	407.8	12.3	15.1	0.25	420.0 x 6.10 x 1.25	<a href="#">BP6104078</a>	ORAR00461	405.26 x 6.99
450.0	437.8	12.3	15.1	0.25	450.0 x 6.10 x 1.25	<a href="#">BP6104378</a>	ORAR00463	430.66 x 6.99
480.0	467.8	12.3	15.1	0.25	480.0 x 6.10 x 1.25	<a href="#">BP6104678</a>	ORAR00465	456.06 x 6.99
500.0	487.8	12.3	15.1	0.25	500.0 x 6.10 x 1.25	<a href="#">BP6104878</a>	ORAR00467	481.46 x 6.99

Further sizes available on request.

This table shows the possible range of available dimensions (Back-up Rings). However, these dimensions are not always stock items.



**Table 81: Preferred series for dynamic application, spiral Back-up Ring  
Type BP, External sealing, material PTFE – Inch**

Bore Ø	Groove Ø	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
D <sub>N</sub> H8	d <sub>3</sub> h9							
inch								
0.236	0.122	0.150	0.205	0.010	0.236 x 0.057 x 0.028	BP14H00031	ORAR00006	0.114 x 0.070
0.236	0.138	0.118	0.157	0.010	0.236 x 0.049 x 0.020	BP12H00035	OR1500300	0.118 x 0.059
0.315	0.201	0.150	0.205	0.010	0.315 x 0.057 x 0.028	BP14H00051	ORAR00008	0.176 x 0.070
0.315	0.217	0.118	0.157	0.010	0.315 x 0.049 x 0.020	BP12H00055	OR1500500	0.197 x 0.059
0.394	0.280	0.150	0.205	0.010	0.394 x 0.057 x 0.028	BP14H00071	ORAR00011	0.301 x 0.070
0.394	0.295	0.118	0.157	0.010	0.394 x 0.057 x 0.020	BP12H00075	OR1500700	0.276 x 0.059
0.472	0.343	0.161	0.217	0.010	0.472 x 0.065 x 0.028	BP16H00087	OR2000800	0.315 x 0.079
0.472	0.358	0.150	0.205	0.010	0.472 x 0.057 x 0.028	BP14H00091	ORAR00012	0.364 x 0.070
0.551	0.421	0.161	0.217	0.010	0.551 x 0.065 x 0.028	BP16H00107	OR2001000	0.394 x 0.079
0.551	0.437	0.150	0.205	0.010	0.551 x 0.057 x 0.028	BP14H00111	ORAR00013	0.426 x 0.070
0.591	0.461	0.161	0.217	0.010	0.591 x 0.065 x 0.028	BP16H00117	OR2001100	0.433 x 0.079
0.591	0.476	0.150	0.205	0.010	0.591 x 0.057 x 0.028	BP14H00121	ORAR00014	0.489 x 0.070
0.630	0.500	0.161	0.217	0.010	0.630 x 0.065 x 0.028	BP16H00127	OR2001200	0.472 x 0.079
0.630	0.516	0.150	0.205	0.010	0.630 x 0.057 x 0.028	BP14H00131	ORAR00015	0.551 x 0.070
0.709	0.579	0.161	0.217	0.010	0.709 x 0.065 x 0.028	BP16H00147	OR2001400	0.551 x 0.079
0.709	0.594	0.150	0.205	0.010	0.709 x 0.057 x 0.028	BP14H00151	ORAR00016	0.614 x 0.070
0.787	0.657	0.161	0.217	0.010	0.787 x 0.065 x 0.028	BP16H00167	OR2001600	0.630 x 0.079
0.787	0.673	0.150	0.205	0.010	0.787 x 0.057 x 0.028	BP14H00171	ORAR00017	0.676 x 0.070
0.866	0.736	0.161	0.217	0.010	0.866 x 0.065 x 0.028	BP16H00187	OR2001800	0.709 x 0.079
0.866	0.752	0.150	0.205	0.010	0.866 x 0.057 x 0.028	BP14H00191	ORAR00018	0.739 x 0.070
0.984	0.854	0.161	0.217	0.010	0.984 x 0.065 x 0.028	BP16H00217	OR2002100	0.827 x 0.079
0.984	0.870	0.150	0.205	0.010	0.984 x 0.057 x 0.028	BP14H00221	ORAR00020	0.864 x 0.070
1.102	0.898	0.213	0.268	0.010	1.102 x 0.102 x 0.028	BP2600228	OR3002200	0.866 x 0.118
1.102	0.925	0.197	0.252	0.010	1.102 x 0.089 x 0.028	BP22H00235	ORAR00119	0.924 x 0.103
1.181	0.976	0.213	0.268	0.010	1.181 x 0.102 x 0.028	BP2600248	OR3002400	0.945 x 0.118
1.181	1.004	0.197	0.252	0.010	1.181 x 0.089 x 0.028	BP22H00255	ORAR00120	0.987 x 0.103
1.260	1.055	0.213	0.268	0.010	1.260 x 0.102 x 0.028	BP2600268	OR3002600	1.024 x 0.118
1.378	1.173	0.213	0.268	0.010	1.378 x 0.102 x 0.028	BP2600298	OR3002900	1.142 x 0.118
1.378	1.201	0.197	0.252	0.010	1.378 x 0.089 x 0.028	BP22H00305	ORAR00123	1.174 x 0.103
1.575	1.370	0.213	0.268	0.010	1.575 x 0.102 x 0.028	BP2600348	OR3003400	1.339 x 0.118
1.575	1.398	0.197	0.252	0.010	1.575 x 0.089 x 0.028	BP22H00355	ORAR00126	1.362 x 0.103
1.654	1.449	0.213	0.268	0.010	1.654 x 0.102 x 0.028	BP2600368	OR3003600	1.417 x 0.118
1.654	1.476	0.197	0.252	0.010	1.654 x 0.089 x 0.028	BP22H00375	ORAR00127	1.424 x 0.103
1.772	1.567	0.213	0.268	0.010	1.772 x 0.102 x 0.028	BP2600398	OR3003900	1.535 x 0.118
1.772	1.594	0.197	0.252	0.010	1.772 x 0.089 x 0.028	BP22H00405	ORAR00129	1.549 x 0.103
1.890	1.614	0.272	0.339	0.010	1.890 x 0.138 x 0.033	BP3500410	OR4004000	1.575 x 0.157
1.890	1.646	0.244	0.299	0.010	1.890 x 0.122 x 0.028	BP31D0418	ORAR00223	1.609 x 0.139
1.969	1.693	0.272	0.339	0.010	1.969 x 0.138 x 0.033	BP3500430	OR4004200	1.654 x 0.157
1.969	1.724	0.244	0.299	0.010	1.969 x 0.122 x 0.028	BP31D0438	ORAR00224	1.734 x 0.139
2.047	1.772	0.272	0.339	0.010	2.047 x 0.138 x 0.033	BP3500450	OR4004400	1.732 x 0.157



Bore Ø	Groove Ø	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
D <sub>N</sub> H8	d <sub>3</sub> h9							
inch								
2.047	1.803	0.244	0.299	0.010	2.047 x 0.122 x 0.028	BP31D0458	ORAR00224	1.734 x 0.139
2.165	1.890	0.272	0.339	0.010	2.165 x 0.138 x 0.033	BP3500480	OR4004700	1.850 x 0.157
2.165	1.921	0.244	0.299	0.010	2.165 x 0.122 x 0.028	BP31D0488	ORAR00225	1.859 x 0.139
2.362	2.087	0.272	0.339	0.010	2.362 x 0.138 x 0.033	BP3500530	OR4005200	2.047 x 0.157
2.362	2.118	0.244	0.299	0.010	2.362 x 0.122 x 0.028	BP31D0538	ORAR00227	2.109 x 0.139
2.480	2.205	0.272	0.339	0.010	2.480 x 0.138 x 0.033	BP3500560	OR4005500	2.165 x 0.157
2.480	2.236	0.244	0.299	0.010	2.480 x 0.122 x 0.028	BP31D0568	ORAR00228	2.234 x 0.139
2.559	2.283	0.272	0.339	0.010	2.559 x 0.138 x 0.033	BP3500580	OR4005700	2.244 x 0.157
2.559	2.315	0.244	0.299	0.010	2.559 x 0.122 x 0.028	BP31D0588	ORAR00228	2.234 x 0.139
2.756	2.480	0.272	0.339	0.010	2.756 x 0.138 x 0.033	BP3500630	OR4006200	2.441 x 0.157
2.756	2.512	0.244	0.299	0.010	2.756 x 0.122 x 0.028	BP31D0638	ORAR00230	2.484 x 0.139
2.953	2.677	0.272	0.339	0.010	2.953 x 0.138 x 0.033	BP3500680	OR4006700	2.638 x 0.157
2.953	2.709	0.244	0.299	0.010	2.953 x 0.122 x 0.028	BP31D0688	ORAR00231	2.609 x 0.139
3.150	2.874	0.272	0.339	0.010	3.150 x 0.138 x 0.033	BP3500730	OR4007200	2.835 x 0.157
3.150	2.906	0.244	0.299	0.010	3.150 x 0.122 x 0.028	BP31D0738	ORAR00233	2.859 x 0.139
3.346	3.071	0.272	0.339	0.010	3.346 x 0.138 x 0.033	BP3500780	OR4007700	3.031 x 0.157
3.346	3.102	0.244	0.299	0.010	3.346 x 0.122 x 0.028	BP31D0788	ORAR00235	3.109 x 0.139
3.543	3.173	0.354	0.429	0.010	3.543 x 0.185 x 0.033	BP4700806	ORAR00338	3.100 x 0.210
3.543	3.197	0.327	0.394	0.010	3.543 x 0.173 x 0.033	BP4400812	OR5008000	3.150 x 0.197
3.740	3.370	0.354	0.429	0.010	3.740 x 0.185 x 0.033	BP4700856	ORAR00340	3.350 x 0.210
3.740	3.394	0.327	0.394	0.010	3.740 x 0.173 x 0.033	BP4400862	OR5008500	3.346 x 0.197
3.937	3.567	0.354	0.429	0.010	3.937 x 0.185 x 0.033	BP4700906	ORAR00342	3.600 x 0.210
3.937	3.591	0.327	0.394	0.010	3.937 x 0.173 x 0.033	BP4400912	OR5009000	3.543 x 0.197
4.134	3.764	0.354	0.429	0.010	4.134 x 0.185 x 0.033	BP4700956	ORAR00343	3.725 x 0.210
4.134	3.787	0.327	0.394	0.010	4.134 x 0.173 x 0.033	BP4400962	OR5009500	3.740 x 0.197
4.331	3.961	0.354	0.429	0.010	4.331 x 0.185 x 0.033	BP4701006	ORAR00345	3.975 x 0.210
4.331	3.984	0.327	0.394	0.010	4.331 x 0.173 x 0.033	BP4401012	OR5010000	3.937 x 0.197
4.528	4.157	0.354	0.429	0.010	4.528 x 0.185 x 0.033	BP4701056	ORAR00346	4.100 x 0.210
4.528	4.181	0.327	0.394	0.010	4.528 x 0.173 x 0.033	BP4401062	OR5010500	4.134 x 0.197
4.724	4.354	0.354	0.429	0.010	4.724 x 0.185 x 0.033	BP4701106	ORAR00348	4.350 x 0.210
4.724	4.378	0.327	0.394	0.010	4.724 x 0.173 x 0.033	BP4401112	OR5011000	4.331 x 0.197
4.921	4.551	0.35	0.429	0.010	4.921 x 0.185 x 0.033	BP4701156	ORAR00349	4.475 x 0.210
4.921	4.575	0.327	0.394	0.010	4.921 x 0.173 x 0.033	BP4401162	OR5011500	4.528 x 0.197
5.118	4.748	0.354	0.429	0.010	5.118 x 0.185 x 0.033	BP4701206	ORAR00351	4.725 x 0.210
5.118	4.772	0.327	0.394	0.010	5.118 x 0.173 x 0.033	BP4401212	OR5012000	4.724 x 0.197
5.315	4.835	0.484	0.594	0.010	5.315 x 0.240 x 0.049	BP6101228	ORAR00427	4.725 x 0.275
5.512	5.031	0.484	0.594	0.010	5.512 x 0.240 x 0.049	BP6101278	ORAR00429	4.975 x 0.275
5.906	5.425	0.484	0.594	0.010	5.906 x 0.240 x 0.049	BP6101378	ORAR00432	5.350 x 0.275
6.299	5.819	0.484	0.594	0.010	6.299 x 0.240 x 0.049	BP6101478	ORAR00435	5.725 x 0.275
6.693	6.213	0.484	0.594	0.010	6.693 x 0.240 x 0.049	BP6101578	ORAR00438	6.225 x 0.275



Bore ∅	Groove ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		$b_2 +0.010$	$b_3 +0.010$					
inch								
7.087	6.606	0.484	0.594	0.010	7.087 x 0.240 x 0.049	BP6101678	ORAR00439	6.475 x 0.275
7.480	7.000	0.484	0.594	0.010	7.480 x 0.240 x 0.049	BP6101778	ORAR00441	6.975 x 0.275
7.874	7.394	0.484	0.594	0.010	7.874 x 0.240 x 0.049	BP6101878	ORAR00442	7.225 x 0.275
8.268	7.787	0.484	0.594	0.010	8.268 x 0.240 x 0.049	BP6101978	ORAR00444	7.725 x 0.275
8.661	8.181	0.484	0.594	0.010	8.661 x 0.240 x 0.049	BP6102078	ORAR00445	7.975 x 0.275
9.055	8.575	0.484	0.594	0.010	9.055 x 0.240 x 0.049	BP6102178	ORAR00446	8.475 x 0.275
9.449	8.969	0.484	0.594	0.010	9.449 x 0.240 x 0.049	BP6102278	ORAR00447	8.975 x 0.275
9.843	9.362	0.484	0.594	0.010	9.843 x 0.240 x 0.049	BP6102378	ORAR00448	9.475 x 0.275
11.024	10.543	0.484	0.594	0.010	11.024 x 0.240 x 0.049	BP6102678	ORAR00450	10.475 x 0.275
11.811	11.331	0.484	0.594	0.010	11.811 x 0.240 x 0.049	BP6102878	ORAR00451	10.975 x 0.275
12.598	12.118	0.484	0.594	0.010	12.598 x 0.240 x 0.049	BP6103078	ORAR00453	11.975 x 0.275
13.780	13.299	0.484	0.594	0.010	13.780 x 0.240 x 0.049	BP6103378	ORAR00455	12.975 x 0.275
15.748	15.268	0.484	0.594	0.010	15.748 x 0.240 x 0.049	BP6103878	ORAR00459	14.975 x 0.275
16.535	16.055	0.484	0.594	0.010	16.535 x 0.240 x 0.049	BP6104078	ORAR00461	15.955 x 0.275
17.717	17.236	0.484	0.594	0.010	17.717 x 0.240 x 0.049	BP6104378	ORAR00463	16.955 x 0.275
18.898	18.417	0.484	0.594	0.010	18.898 x 0.240 x 0.049	BP6104678	ORAR00465	17.955 x 0.275
19.685	19.205	0.484	0.594	0.010	19.685 x 0.240 x 0.049	BP6104878	ORAR00467	18.955 x 0.275

Further sizes available on request.

This table shows the possible range of available dimensions (Back-up Rings). However, these dimensions are not always stock items.





## ■ H.2 Internal Sealing (Rod), Static and Dynamic Applications

### H.2.1 RECTANGULAR BACK-UP RING TYPES, UNCUT (BU) AND CUT (BG), MATERIAL PTFE

The following figure and tables include installation recommendations and Back-up Ring dimensions for internal sealing applications with the rectangular Back-up Ring types BU (uncut) and BG (cut).

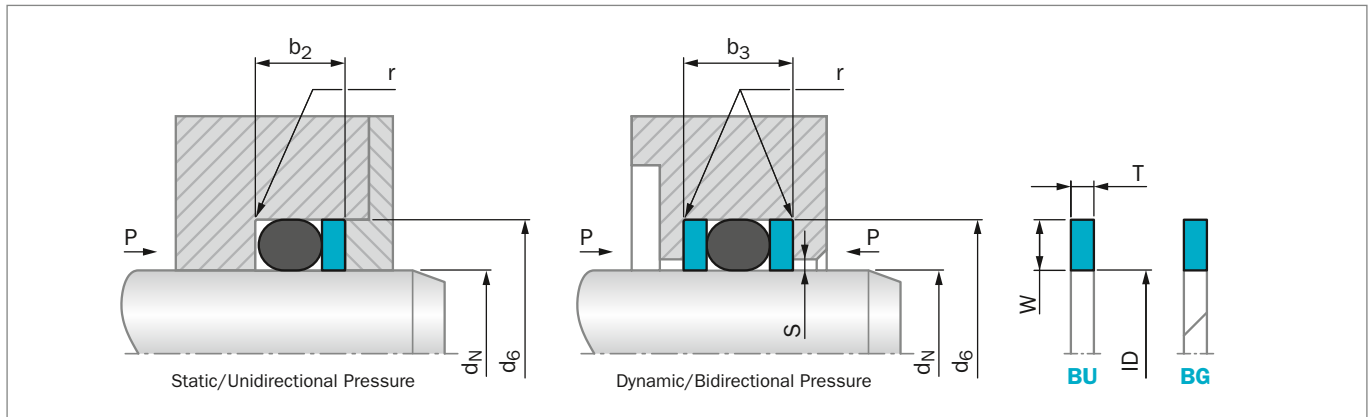


Figure 58: Installation drawing internal sealing, rectangular Back-up Ring types

**Table 82: Installation dimensions for rectangular Back-up Ring types, uncut and cut, Internal sealing, material PTFE – Metric**

O-Ring Cross-Section Ø $d_2$	Back-up Ring Cross section			Groove dimensions				
	Radial height W		Thickness	Groove diameter $d_6$ H9		Groove width		Radius
	Dynamic	Static	T	Dynamic	Static	$b_2 + 0.25$	$b_3 + 0.25$	$r \pm 0.2$
<b>mm</b>								
1.50	1.25	1.10	1.00	$d_N + 2.5$	$d_N + 2.2$	3.00	4.00	0.25
1.60	1.30	1.20	1.00	$d_N + 2.6$	$d_N + 2.4$	3.10	4.10	0.25
1.78	1.45	1.30	1.40	$d_N + 2.9$	$d_N + 2.6$	3.80	5.20	0.25
1.80	1.45	1.30	1.40	$d_N + 2.9$	$d_N + 2.6$	3.80	5.20	0.25
2.00	1.65	1.50	1.40	$d_N + 3.3$	$d_N + 3.0$	4.10	5.50	0.25
2.40	2.05	1.80	1.40	$d_N + 4.1$	$d_N + 3.6$	4.60	6.00	0.25
2.50	2.15	1.90	1.40	$d_N + 4.3$	$d_N + 3.8$	4.70	6.10	0.25
2.62	2.25	2.00	1.40	$d_N + 4.5$	$d_N + 4.0$	5.00	6.40	0.25
2.65	2.25	2.00	1.40	$d_N + 4.5$	$d_N + 4.0$	5.00	6.40	0.25
3.00	2.60	2.30	1.40	$d_N + 5.2$	$d_N + 4.6$	5.40	6.80	0.25
3.53	3.10	2.70	1.40	$d_N + 6.2$	$d_N + 5.4$	6.20	7.60	0.25
3.55	3.10	2.70	1.40	$d_N + 6.2$	$d_N + 5.4$	6.20	7.60	0.25
4.00	3.50	3.10	1.70	$d_N + 7.0$	$d_N + 6.2$	6.90	8.60	0.25
5.00	4.40	4.00	1.70	$d_N + 8.8$	$d_N + 8.0$	8.30	10.00	0.25
5.30	4.70	4.30	1.70	$d_N + 9.4$	$d_N + 8.6$	9.00	10.90	0.25
5.33	4.70	4.30	1.70	$d_N + 9.4$	$d_N + 8.6$	9.00	10.9	0.25
5.70	5.00	4.60	1.70	$d_N + 10.0$	$d_N + 9.2$	9.00	11.00	0.25
6.00	5.30	4.90	1.70	$d_N + 10.6$	$d_N + 9.8$	9.30	11.20	0.25
6.99	6.10	5.80	2.50	$d_N + 12.2$	$d_N + 11.6$	12.30	15.10	0.25
8.00	7.10	6.70	2.50	$d_N + 14.2$	$d_N + 13.4$	12.60	15.40	0.25
8.40	7.50	7.10	2.50	$d_N + 15.0$	$d_N + 14.2$	12.80	15.60	0.25



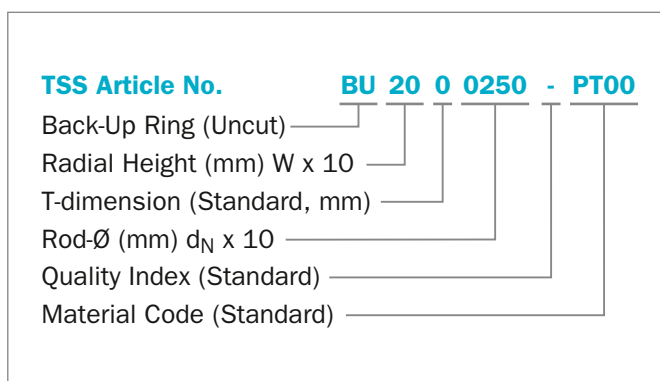
**Table 83: Installation dimensions for rectangular Back-up Ring types, uncut and cut, Internal sealing, material PTFE – Inch**

O-Ring Cross-Section Ø d <sub>2</sub>	Back-up Ring Cross section			Groove dimensions				
	Radial height W		Thickness T	Groove diameter d <sub>6</sub> H9		Groove width		Radius r
	Dynamic	Static	T	Dynamic	Static	b <sub>2</sub> +0.010	b <sub>3</sub> +0.010	r ±0.008
inch								
0.059	0.049	0.043	0.039	d <sub>N</sub> + 0.098	d <sub>N</sub> + 0.087	0.118	0.157	0.010
0.063	0.051	0.047	0.039	d <sub>N</sub> + 0.102	d <sub>N</sub> + 0.094	0.122	0.161	0.010
0.070	0.057	0.051	0.055	d <sub>N</sub> + 0.114	d <sub>N</sub> + 0.102	0.150	0.205	0.010
0.071	0.057	0.051	0.055	d <sub>N</sub> + 0.114	d <sub>N</sub> + 0.102	0.150	0.205	0.010
0.079	0.065	0.059	0.055	d <sub>N</sub> + 0.130	d <sub>N</sub> + 0.118	0.161	0.217	0.010
0.094	0.081	0.071	0.055	d <sub>N</sub> + 0.161	d <sub>N</sub> + 0.142	0.181	0.236	0.010
0.098	0.085	0.075	0.055	d <sub>N</sub> + 0.169	d <sub>N</sub> + 0.150	0.185	0.240	0.010
0.103	0.089	0.079	0.055	d <sub>N</sub> + 0.177	d <sub>N</sub> + 0.157	0.197	0.252	0.010
0.104	0.089	0.079	0.055	d <sub>N</sub> + 0.177	d <sub>N</sub> + 0.157	0.197	0.252	0.010
0.118	0.102	0.091	0.055	d <sub>N</sub> + 0.205	d <sub>N</sub> + 0.181	0.213	0.268	0.010
0.139	0.122	0.106	0.055	d <sub>N</sub> + 0.244	d <sub>N</sub> + 0.213	0.244	0.299	0.010
0.140	0.122	0.106	0.055	d <sub>N</sub> + 0.244	d <sub>N</sub> + 0.213	0.244	0.299	0.010
0.157	0.138	0.122	0.067	d <sub>N</sub> + 0.276	d <sub>N</sub> + 0.244	0.272	0.339	0.010
0.197	0.173	0.157	0.067	d <sub>N</sub> + 0.346	d <sub>N</sub> + 0.315	0.327	0.394	0.010
0.209	0.185	0.169	0.067	d <sub>N</sub> + 0.370	d <sub>N</sub> + 0.339	0.354	0.429	0.010
0.210	0.185	0.169	0.067	d <sub>N</sub> + 0.370	d <sub>N</sub> + 0.339	0.354	0.429	0.010
0.224	0.197	0.181	0.067	d <sub>N</sub> + 0.394	d <sub>N</sub> + 0.362	0.354	0.433	0.010
0.236	0.209	0.193	0.067	d <sub>N</sub> + 0.417	d <sub>N</sub> + 0.386	0.366	0.441	0.010
0.275	0.240	0.228	0.098	d <sub>N</sub> + 0.480	d <sub>N</sub> + 0.457	0.484	0.594	0.010
0.315	0.280	0.264	0.098	d <sub>N</sub> + 0.559	d <sub>N</sub> + 0.528	0.496	0.606	0.010
0.331	0.295	0.280	0.098	d <sub>N</sub> + 0.591	d <sub>N</sub> + 0.559	0.504	0.614	0.010

**ORDERING EXAMPLE**

<b>Back-up Ring:</b>	Type BU (uncut) for O-Ring seal
<b>Application:</b>	Static, internal sealing
<b>Rod diameter:</b>	d <sub>N</sub> = 25.00 mm (0.984 inch)
<b>O-Ring cross section:</b>	d <sub>2</sub> = 2.62 mm (0.103 inch)
<b>Back-up Ring material:</b>	PTFE, virgin

For material code see page 149





**Table 84: Preferred series for static application, rectangular Back-up Ring  
Type BU (uncut), Internal sealing, material PTFE – Metric**

Rod Ø	Groove Ø	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
mm								
4.0	6.20	3.00	4.00	0.25	4.0 x 1.1 x 1.4	BU11L0040	OR1500400	4.00 x 1.50
4.0	6.60	3.80	5.20	0.25	4.0 x 1.3 x 1.4	BU1300040	ORAR00007	3.68 x 1.78
5.0	7.20	3.00	4.00	0.25	5.0 x 1.1 x 1.4	BU1100050	OR1500500	5.00 x 1.50
5.0	7.60	3.80	5.20	0.25	5.0 x 1.3 x 1.4	BU1300050	ORAR00008	4.47 x 1.78
6.0	8.20	3.00	4.00	0.25	6.0 x 1.1 x 1.4	BU1100060	OR1500600	6.00 x 1.50
6.0	8.60	3.80	5.20	0.25	6.0 x 1.3 x 1.4	BU1300060	ORAR00010	6.07 x 1.78
8.0	10.60	3.80	5.20	0.25	8.0 x 1.3 x 1.4	BU1300080	ORAR00011	7.65 x 1.78
8.0	11.00	4.10	5.50	0.25	8.0 x 1.5 x 1.4	BU1500080	OR2000800	8.00 x 2.00
10.0	12.60	3.80	5.20	0.25	10.0 x 1.3 x 1.4	BU1300100	ORAR00013	10.82 x 1.78
10.0	13.00	4.10	5.50	0.25	10.0 x 1.5 x 1.4	BU1500100	OR2001000	10.00 x 2.00
12.0	14.60	3.80	5.20	0.25	12.0 x 1.3 x 1.4	BU1300120	ORAR00014	12.42 x 1.78
12.0	15.00	4.10	5.50	0.25	12.0 x 1.5 x 1.4	BU1500120	OR2001200	12.00 x 2.00
14.0	16.60	3.80	5.20	0.25	14.0 x 1.3 x 1.4	BU1300140	ORAR00015	14.00 x 1.78
14.0	17.00	4.10	5.50	0.25	14.0 x 1.5 x 1.4	BU1500140	OR2001400	14.00 x 2.00
15.0	17.60	3.80	5.20	0.25	15.0 x 1.3 x 1.4	BU1300150	ORAR00016	15.60 x 1.78
15.0	18.00	4.10	5.50	0.25	15.0 x 1.5 x 1.4	BU1500150	OR2001500	15.00 x 2.00
16.0	18.60	3.80	5.20	0.25	16.0 x 1.3 x 1.4	BU1300160	ORAR00016	15.60 x 1.78
16.0	19.00	4.10	5.50	0.25	16.0 x 1.5 x 1.4	BU1500160	OR2001600	16.00 x 2.00
18.0	20.60	3.80	5.20	0.25	18.0 x 1.3 x 1.4	BU1300180	ORAR00018	18.77 x 1.78
18.0	21.00	4.10	5.50	0.25	18.0 x 1.5 x 1.4	BU1500180	OR2001800	18.00 x 2.00
20.0	22.60	3.80	5.20	0.25	20.0 x 1.3 x 1.4	BU1300200	ORAR00019	20.35 x 1.78
20.0	23.00	4.10	5.50	0.25	20.0 x 1.5 x 1.4	BU1500200	OR2002000	20.00 x 2.00
22.0	26.00	5.00	6.40	0.25	22.0 x 2.0 x 1.4	BU2000220	ORAR00118	21.89 x 2.62
22.0	26.60	5.40	6.80	0.25	22.0 x 2.3 x 1.4	BU2300220	OR3002200	22.00 x 3.00
25.0	29.00	5.00	6.40	0.25	25.0 x 2.0 x 1.4	BU2000250	ORAR00120	25.07 x 2.62
25.0	29.60	5.40	6.80	0.25	25.0 x 2.3 x 1.4	BU2300250	OR3002500	25.00 x 3.00
28.0	32.00	5.00	6.40	0.25	28.0 x 2.0 x 1.4	BU2000280	ORAR00122	28.24 x 2.62
28.0	32.60	5.40	6.80	0.25	28.0 x 2.3 x 1.4	BU2300280	OR3002800	28.00 x 2.00
30.0	34.00	5.00	6.40	0.25	30.0 x 2.0 x 1.4	BU2000300	ORAR00123	29.83 x 2.62
30.0	34.60	5.40	6.80	0.25	30.0 x 2.3 x 1.4	BU2300300	OR3003000	30.00 x 3.00
32.0	36.00	5.00	6.40	0.25	32.0 x 2.0 x 1.4	BU2000320	ORAR00125	31.42 x 2.62
32.0	36.60	5.40	6.80	0.25	32.0 x 2.3 x 1.4	BU2300320	OR3003200	32.00 x 3.00
35.0	39.00	5.00	6.40	0.25	35.0 x 2.0 x 1.4	BU2000350	ORAR00126	34.59 x 2.62
35.0	39.60	5.40	6.80	0.25	35.0 x 2.3 x 1.4	BU2300350	OR3003500	35.00 x 3.00
36.0	40.00	5.00	6.40	0.25	36.0 x 2.0 x 1.4	BU2000360	ORAR00127	36.17 x 2.62
36.0	40.60	5.40	6.80	0.25	36.0 x 2.3 x 1.4	BU2300360	OR3003600	36.00 x 3.00
40.0	45.40	6.20	7.60	0.25	40.0 x 2.7 x 1.4	BU2700400	ORAR00223	40.87 x 3.53
40.0	46.10	6.90	8.60	0.25	40.0 x 3.1 x 1.7	BU3100400	OR4004000	40.00 x 4.00
42.0	47.40	6.20	7.60	0.25	42.0 x 2.7 x 1.4	BU2700420	ORAR00223	40.87 x 3.53
42.0	48.20	6.90	8.60	0.25	42.0 x 3.1 x 1.7	BU3100420	OR4004200	42.00 x 4.00



Rod Ø	Groove Ø	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
mm								
45.0	50.40	6.20	7.60	0.25	45.0 x 2.7 x 1.4	BU2700450	ORAR00224	44.04 x 3.53
45.0	51.20	6.90	8.60	0.25	45.0 x 3.1 x 1.7	BU3100450	OR4004500	45.00 x 4.00
48.0	53.40	6.20	7.60	0.25	48.0 x 2.7 x 1.4	BU2700480	ORAR00225	47.22 x 3.53
48.0	54.20	6.90	8.60	0.25	48.0 x 3.1 x 1.7	BU3100480	OR4004800	48.00 x 4.00
50.0	55.40	6.20	7.60	0.25	50.0 x 2.7 x 1.4	BU2700500	ORAR00226	50.39 x 3.53
50.0	56.20	6.90	8.60	0.25	50.0 x 3.1 x 1.7	BU3100500	OR4005000	50.00 x 4.00
52.0	57.40	6.20	7.60	0.25	52.0 x 2.7 x 1.4	BU2700520	ORAR00226	50.39 x 3.53
52.0	58.20	6.90	8.60	0.25	52.0 x 3.1 x 1.7	BU3100520	OR4005200	52.00 x 4.00
55.0	60.40	6.20	7.60	0.25	55.0 x 2.7 x 1.4	BU2700550	ORAR00227	53.57 x 3.53
55.0	61.20	6.90	8.60	0.25	55.0 x 3.1 x 1.7	BU3100550	OR4005500	55.00 x 4.00
56.0	61.40	6.20	7.60	0.25	56.0 x 2.7 x 1.4	BU2700560	ORAR00228	56.74 x 3.53
56.0	62.20	6.90	8.60	0.25	56.0 x 3.1 x 1.7	BU3100560	OR4005600	56.00 x 4.00
60.0	65.40	6.20	7.60	0.25	60.0 x 2.7 x 1.4	BU2700600	ORAR00229	59.92 x 3.53
60.0	66.20	6.90	8.60	0.25	60.0 x 3.1 x 1.7	BU3100600	OR4006000	60.00 x 4.00
63.0	68.40	6.20	7.60	0.25	63.0 x 2.7 x 1.4	BU2700630	ORAR00230	63.09 x 3.53
63.0	69.20	6.90	8.60	0.25	63.0 x 3.1 x 1.7	BU3100630	OR4006300	60.00 x 4.00
65.0	70.40	6.20	7.60	0.25	65.0 x 2.7 x 1.4	BU2700650	ORAR00231	66.27 x 3.53
65.0	71.20	6.90	8.60	0.25	65.0 x 3.1 x 1.7	BU3100650	OR4006500	65.40 x 4.00
70.0	75.40	6.20	7.60	0.25	70.0 x 2.7 x 1.4	BU2700700	ORAR00232	69.44 x 3.53
70.0	76.20	6.90	8.60	0.25	70.0 x 3.1 x 1.7	BU3100700	OR4007000	70.00 x 4.00
75.00	80.40	6.20	7.60	0.25	75.0 x 2.7 x 1.4	BU2700750	ORAR00234	75.79 x 3.53
75.00	81.20	6.90	8.60	0.25	75.0 x 3.1 x 1.7	BU3100750	OR4007500	75.00 x 4.00
80.00	88.00	8.30	10.00	0.25	80.0 x 4.0 x 1.7	BU4000800	OR5008000	80.00 x 5.00
80.00	93.60	9.00	10.90	0.25	80.0 x 4.3 x 1.7	BU4300800	ORAR00339	81.92 x 5.33
85.00	88.60	9.00	10.90	0.25	85.0 x 4.0 x 1.7	BU4000850	OR5008500	85.00 x 5.00
85.00	93.00	8.30	10.00	0.25	85.0 x 4.3 x 1.7	BU4300850	ORAR00340	85.09 x 5.33
90.00	98.00	8.30	10.00	0.25	90.0 x 4.0 x 1.7	BU4000900	OR5009000	90.00 x 5.00
90.00	98.60	9.00	10.90	0.25	90.0 x 4.3 x 1.7	BU4300900	ORAR00342	91.44 x 5.33
95.00	103.00	8.30	10.00	0.25	95.0 x 4.0 x 1.7	BU4000950	OR5009500	95.00 x 5.00
95.00	103.60	9.00	10.90	0.25	95.0 x 4.3 x 1.7	BU4300950	ORAR00343	94.62 x 5.33
100.00	108.00	8.30	10.00	0.25	100.0 x 4.0 x 1.7	BU4001000	OR5010000	100.00 x 5.00
100.00	108.60	9.00	10.90	0.25	100.0 x 4.3 x 1.7	BU4301000	ORAR00345	100.97 x 5.33
105.00	113.00	8.30	10.00	0.25	105.0 x 4.0 x 1.7	BU4001050	OR5010500	105.00 x 5.00
105.00	113.60	9.00	10.90	0.25	105.0 x 4.3 x 1.7	BU4301050	ORAR00346	104.14 x 5.33
110.00	118.00	8.30	10.00	0.25	110.0 x 4.0 x 1.7	BU4001100	OR5011000	110.00 x 5.00
110.00	118.60	9.00	10.90	0.25	110.0 x 4.3 x 1.7	BU4301100	ORAR00348	110.49 x 5.33
115.00	123.00	8.30	10.00	0.25	115.0 x 4.0 x 1.7	BU4001150	OR5011500	115.00 x 5.00
115.00	123.60	9.00	10.90	0.25	115.0 x 4.3 x 1.7	BU4301150	ORAR00349	113.67 x 5.33
120.00	128.00	8.30	10.00	0.25	120.0 x 4.0 x 1.7	BU4001200	OR5012000	120.00 x 5.00
120.00	128.60	9.00	10.90	0.25	120.0 x 4.3 x 1.7	BU4301200	ORAR00351	120.02 x 5.33
125.00	133.00	8.30	10.00	0.25	125.0 x 4.0 x 1.7	BU4001250	OR5012500	125.00 x 5.00
125.00	133.60	9.00	10.90	0.25	125.0 x 4.3 x 1.7	BU4301250	ORAR00353	126.37 x 5.33



Rod Ø	Groove Ø	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
d <sub>N</sub> f7	d <sub>6</sub> H9	mm						
130.00	138.00	8.30	10.00	0.25	130.0 x 4.0 x 1.7	<a href="#">BU4001300</a>	ORAR013000	130.00 x 5.00
130.00	138.60	9.00	10.90	0.25	130.0 x 4.3 x 1.7	<a href="#">BU4301300</a>	ORAR00354	129.54 x 5.33
135.00	146.60	12.30	15.10	0.25	135.0 x 5.8 x 2.5	<a href="#">BU5801350</a>	ORAR00432	135.89 x 6.99
140.00	151.60	12.30	15.10	0.25	140.0 x 5.8 x 2.5	<a href="#">BU5801400</a>	ORAR00433	139.07 x 6.99
150.00	161.60	12.30	15.10	0.25	150.0 x 5.8 x 2.5	<a href="#">BU5801500</a>	ORAR00437	151.77 x 6.99
160.00	171.60	12.30	15.10	0.25	160.0 x 5.8 x 2.5	<a href="#">BU5801600</a>	ORAR00438	158.12 x 6.99
170.00	181.60	12.30	15.10	0.25	170.0 x 5.8 x 2.5	<a href="#">BU5801700</a>	ORAR00440	170.82 x 6.99
180.00	191.60	12.30	15.10	0.25	180.0 x 5.8 x 2.5	<a href="#">BU5801800</a>	ORAR00442	183.52 x 6.99
190.00	201.60	12.30	15.10	0.25	190.0 x 5.8 x 2.5	<a href="#">BU5801900</a>	ORAR00443	189.87 x 6.99
200.00	211.60	12.30	15.10	0.25	200.0 x 5.8 x 2.5	<a href="#">BU5802000</a>	ORAR00445	202.57 x 6.99
210.00	221.60	12.30	15.10	0.25	210.0 x 5.8 x 2.5	<a href="#">BU5802100</a>	ORAR00446	215.27 x 6.99
220.00	231.60	12.30	15.10	0.25	220.0 x 5.8 x 2.5	<a href="#">BU5802200</a>	ORAR00446	215.27 x 6.99
230.00	241.60	12.30	15.10	0.25	230.0 x 5.8 x 2.5	<a href="#">BU5802300</a>	ORAR00447	227.97 x 6.99
240.00	251.60	12.30	15.10	0.25	240.0 x 5.8 x 2.5	<a href="#">BU5802400</a>	ORAR00448	240.67 x 6.99
250.00	261.60	12.30	15.10	0.25	250.0 x 5.8 x 2.5	<a href="#">BU5802500</a>	ORAR00449	253.37 x 6.99
280.00	291.60	12.30	15.10	0.25	280.0 x 5.8 x 2.5	<a href="#">BU5802800</a>	ORAR00451	278.77 x 6.99
300.00	311.60	12.30	15.10	0.25	300.0 x 5.8 x 2.5	<a href="#">BU5803000</a>	ORAR00453	304.17 x 6.99
320.00	331.60	12.30	15.10	0.25	320.0 x 5.8 x 2.5	<a href="#">BU5803200</a>	ORAR00454	316.87 x 6.99
350.00	361.60	12.30	15.10	0.25	350.0 x 5.8 x 2.5	<a href="#">BU5803500</a>	ORAR00457	354.97 x 6.99
360.00	371.60	12.30	15.10	0.25	360.0 x 5.8 x 2.5	<a href="#">BU5803600</a>	ORAR00457	354.97 x 6.99
400.00	411.60	12.30	15.10	0.25	400.0 x 5.8 x 2.5	<a href="#">BU5804000</a>	ORAR00461	405.26 x 6.99

Further sizes available on request.

This table shows the possible range of available dimensions (Back-up Rings). However, these dimensions are not always stock items.



**Table 85: Preferred series for static application, rectangular Back-up Ring Type BU (uncut), Internal sealing, material PTFE – Inch**

Rod Ø	Groove Ø	Groove width		Radius r ±0.008	Back-up Ring dimension ID x W x T	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
inch								
0.157	0.244	0.118	0.157	0.010	0.157 x 0.043 x 0.055	BU11L0040	OR1500400	0.157 x 0.059
0.157	0.260	0.150	0.205	0.010	0.157 x 0.051 x 0.055	BU1300040	ORAR00007	0.145 x 0.070
0.197	0.283	0.118	0.157	0.010	0.197 x 0.043 x 0.055	BU1100050	OR1500500	0.197 x 0.059
0.197	0.299	0.150	0.205	0.010	0.197 x 0.051 x 0.055	BU1300050	ORAR00008	0.176 x 0.070
0.236	0.323	0.118	0.157	0.010	0.236 x 0.043 x 0.055	BU1100060	OR1500600	0.236 x 0.059
0.236	0.339	0.150	0.205	0.010	0.236 x 0.051 x 0.055	BU1300060	ORAR00010	0.239 x 0.070
0.315	0.417	0.150	0.205	0.010	0.315 x 0.051 x 0.055	BU1300080	ORAR00011	0.301 x 0.070
0.315	0.433	0.161	0.217	0.010	0.315 x 0.059 x 0.055	BU1500080	OR2000800	0.315 x 0.079
0.394	0.496	0.150	0.205	0.010	0.394 x 0.051 x 0.055	BU1300100	ORAR00013	0.426 x 0.070
0.394	0.512	0.161	0.217	0.010	0.394 x 0.059 x 0.055	BU1500100	OR2001000	0.394 x 0.079
0.472	0.575	0.150	0.205	0.010	0.472 x 0.051 x 0.055	BU1300120	ORAR00014	0.489 x 0.070
0.472	0.591	0.161	0.217	0.010	0.472 x 0.059 x 0.055	BU1500120	OR2001200	0.472 x 0.079
0.551	0.654	0.150	0.205	0.010	0.551 x 0.051 x 0.055	BU1300140	ORAR00015	0.551 x 0.070
0.551	0.669	0.161	0.217	0.010	0.551 x 0.059 x 0.055	BU1500140	OR2001400	0.551 x 0.079
0.591	0.693	0.150	0.205	0.010	0.591 x 0.051 x 0.055	BU1300150	ORAR00016	0.614 x 0.070
0.591	0.709	0.161	0.217	0.010	0.591 x 0.059 x 0.055	BU1500150	OR2001500	0.591 x 0.079
0.630	0.732	0.150	0.205	0.010	0.630 x 0.051 x 0.055	BU1300160	ORAR00016	0.614 x 0.070
0.630	0.748	0.161	0.217	0.010	0.630 x 0.059 x 0.055	BU1500160	OR2001600	0.630 x 0.079
0.709	0.811	0.150	0.205	0.010	0.709 x 0.051 x 0.055	BU1300180	ORAR00018	0.739 x 0.070
0.709	0.827	0.161	0.217	0.010	0.709 x 0.059 x 0.055	BU1500180	OR2001800	0.709 x 0.079
0.787	0.890	0.150	0.205	0.010	0.787 x 0.051 x 0.055	BU1300200	ORAR00019	0.801 x 0.070
0.787	0.906	0.161	0.217	0.010	0.787 x 0.059 x 0.055	BU1500200	OR2002000	0.787 x 0.079
0.866	1.024	0.197	0.252	0.010	0.866 x 0.079 x 0.055	BU2000220	ORAR00118	0.862 x 0.103
0.866	1.047	0.213	0.268	0.010	0.866 x 0.091 x 0.055	BU2300220	OR3002200	0.866 x 0.118
0.984	1.142	0.197	0.252	0.010	0.984 x 0.079 x 0.055	BU2000250	ORAR00120	0.987 x 0.103
0.984	1.165	0.213	0.268	0.010	0.984 x 0.091 x 0.055	BU2300250	OR3002500	0.984 x 0.118
1.102	1.260	0.197	0.252	0.010	1.102 x 0.079 x 0.055	BU2000280	ORAR00122	1.112 x 0.103
1.102	1.283	0.213	0.268	0.010	1.102 x 0.091 x 0.055	BU2300280	OR3002800	1.102 x 0.079
1.181	1.339	0.197	0.252	0.010	1.181 x 0.079 x 0.055	BU2000300	ORAR00123	1.174 x 0.103
1.181	1.362	0.213	0.268	0.010	1.181 x 0.091 x 0.055	BU2300300	OR3003000	1.181 x 0.118
1.260	1.417	0.197	0.252	0.010	1.260 x 0.079 x 0.055	BU2000320	ORAR00125	1.237 x 0.103
1.260	1.441	0.213	0.268	0.010	1.260 x 0.091 x 0.055	BU2300320	OR3003200	1.260 x 0.118
1.378	1.535	0.197	0.252	0.010	1.378 x 0.079 x 0.055	BU2000350	ORAR00126	1.362 x 0.103
1.378	1.559	0.213	0.268	0.010	1.378 x 0.091 x 0.055	BU2300350	OR3003500	1.378 x 0.118
1.417	1.575	0.197	0.252	0.010	1.417 x 0.079 x 0.055	BU2000360	ORAR00127	1.424 x 0.103
1.417	1.598	0.213	0.268	0.010	1.417 x 0.091 x 0.055	BU2300360	OR3003600	1.417 x 0.118
1.575	1.787	0.244	0.299	0.010	1.575 x 0.106 x 0.055	BU2700400	ORAR00223	1.609 x 0.139
1.575	1.815	0.272	0.339	0.010	1.575 x 0.122 x 0.067	BU3100400	OR4004000	1.575 x 0.157
1.654	1.866	0.244	0.299	0.010	1.654 x 0.106 x 0.055	BU2700420	ORAR00223	1.609 x 0.139
1.654	1.898	0.272	0.339	0.010	1.654 x 0.122 x 0.067	BU3100420	OR4004200	1.654 x 0.157



Rod Ø	Groove Ø	Groove width		Radius r ±0.008	Back-up Ring dimension ID x W x T	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
inch								
1.772	1.984	0.244	0.299	0.010	1.772 x 0.106 x 0.055	BU2700450	ORAR00224	1.734 x 0.139
1.772	2.016	0.272	0.339	0.010	1.772 x 0.122 x 0.067	BU3100450	OR4004500	1.772 x 0.157
1.890	2.102	0.244	0.299	0.010	1.890 x 0.106 x 0.055	BU2700480	ORAR00225	1.859 x 0.139
1.890	2.134	0.272	0.339	0.010	1.890 x 0.122 x 0.067	BU3100480	OR4004800	1.890 x 0.157
1.969	2.181	0.244	0.299	0.010	1.969 x 0.106 x 0.055	BU2700500	ORAR00226	1.984 x 0.139
1.969	2.213	0.272	0.339	0.010	1.969 x 0.122 x 0.067	BU3100500	OR4005000	1.969 x 0.157
2.047	2.260	0.244	0.299	0.010	2.047 x 0.106 x 0.055	BU2700520	ORAR00226	1.984 x 0.139
2.047	2.291	0.272	0.339	0.010	2.047 x 0.122 x 0.067	BU3100520	OR4005200	2.047 x 0.157
2.165	2.378	0.244	0.299	0.010	2.165 x 0.106 x 0.055	BU2700550	ORAR00227	2.109 x 0.139
2.165	2.409	0.272	0.339	0.010	2.165 x 0.122 x 0.067	BU3100550	OR4005500	2.165 x 0.157
2.205	2.417	0.244	0.299	0.010	2.205 x 0.106 x 0.055	BU2700560	ORAR00228	2.234 x 0.139
2.205	2.449	0.272	0.339	0.010	2.205 x 0.122 x 0.067	BU3100560	OR4005600	2.205 x 0.157
2.362	2.575	0.244	0.299	0.010	2.362 x 0.106 x 0.055	BU2700600	ORAR00229	2.359 x 0.139
2.362	2.606	0.272	0.339	0.010	2.362 x 0.122 x 0.067	BU3100600	OR4006000	2.362 x 0.157
2.480	2.693	0.244	0.299	0.010	2.480 x 0.106 x 0.055	BU2700630	ORAR00230	2.484 x 0.139
2.480	2.724	0.272	0.339	0.010	2.480 x 0.122 x 0.067	BU3100630	OR4006300	2.362 x 0.157
2.559	2.772	0.244	0.299	0.010	2.559 x 0.106 x 0.055	BU2700650	ORAR00231	2.609 x 0.139
2.559	2.803	0.272	0.339	0.010	2.559 x 0.122 x 0.067	BU3100650	OR4006500	2.575 x 0.157
2.756	2.969	0.244	0.299	0.010	2.756 x 0.106 x 0.055	BU2700700	ORAR00232	2.734 x 0.139
2.756	3.000	0.272	0.339	0.010	2.756 x 0.122 x 0.067	BU3100700	OR4007000	2.756 x 0.157
2.953	3.165	0.244	0.299	0.010	2.953 x 0.106 x 0.055	BU2700750	ORAR00234	2.984 x 0.139
2.953	3.197	0.272	0.339	0.010	2.953 x 0.122 x 0.067	BU3100750	OR4007500	2.953 x 0.157
3.150	3.465	0.327	0.394	0.010	3.150 x 0.157 x 0.067	BU4000800	OR5008000	3.150 x 0.197
3.150	3.685	0.354	0.429	0.010	3.150 x 0.169 x 0.067	BU4300800	ORAR00339	3.225 x 0.210
3.346	3.488	0.354	0.429	0.010	3.346 x 0.157 x 0.067	BU4000850	OR5008500	3.346 x 0.197
3.346	3.661	0.327	0.394	0.010	3.346 x 0.169 x 0.067	BU4300850	ORAR00340	3.350 x 0.210
3.543	3.858	0.327	0.394	0.010	3.543 x 0.157 x 0.067	BU4000900	OR5009000	3.543 x 0.197
3.543	3.882	0.354	0.429	0.010	3.543 x 0.169 x 0.067	BU4300900	ORAR00342	3.600 x 0.210
3.740	4.055	0.327	0.394	0.010	3.740 x 0.157 x 0.067	BU4000950	OR5009500	3.740 x 0.197
3.740	4.079	0.354	0.429	0.010	3.740 x 0.169 x 0.067	BU4300950	ORAR00343	3.725 x 0.210
3.937	4.252	0.327	0.394	0.010	3.937 x 0.157 x 0.067	BU4001000	OR5010000	3.937 x 0.197
3.937	4.276	0.354	0.429	0.010	3.937 x 0.169 x 0.067	BU4301000	ORAR00345	3.975 x 0.210
4.134	4.449	0.327	0.394	0.010	4.134 x 0.157 x 0.067	BU4001050	OR5010500	4.134 x 0.197
4.134	4.472	0.354	0.429	0.010	4.134 x 0.169 x 0.067	BU4301050	ORAR00346	4.100 x 0.210
4.331	4.646	0.327	0.394	0.010	4.331 x 0.157 x 0.067	BU4001100	OR5011000	4.331 x 0.197
4.331	4.669	0.354	0.429	0.010	4.331 x 0.169 x 0.067	BU4301100	ORAR00348	4.350 x 0.210
4.528	4.843	0.327	0.394	0.010	4.528 x 0.157 x 0.067	BU4001150	OR5011500	4.528 x 0.197
4.528	4.866	0.354	0.429	0.010	4.528 x 0.169 x 0.067	BU4301150	ORAR00349	4.475 x 0.210
4.724	5.039	0.327	0.394	0.010	4.724 x 0.157 x 0.067	BU4001200	OR5012000	4.724 x 0.197
4.724	5.063	0.354	0.429	0.010	4.724 x 0.169 x 0.067	BU4301200	ORAR00351	4.725 x 0.210



Rod ∅	Groove ∅	Groove width		Radius r ±0.008	Back-up Ring dimension ID x W x T	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
inch								
4.921	5.236	0.327	0.394	0.010	4.921 x 0.157 x 0.067	<a href="#">BU4001250</a>	OR5012500	4.921 x 0.197
4.921	5.260	0.354	0.429	0.010	4.921 x 0.169 x 0.067	<a href="#">BU4301250</a>	ORAR00353	4.975 x 0.210
5.118	5.433	0.327	0.394	0.010	5.118 x 0.157 x 0.067	<a href="#">BU4001300</a>	OR5013000	5.118 x 0.197
5.118	5.457	0.354	0.429	0.010	5.118 x 0.169 x 0.067	<a href="#">BU4301300</a>	ORAR00354	5.100 x 0.210
5.315	5.772	0.484	0.594	0.010	5.315 x 0.228 x 0.098	<a href="#">BU5801350</a>	ORAR00432	5.350 x 0.275
5.512	5.969	0.484	0.594	0.010	5.512 x 0.228 x 0.098	<a href="#">BU5801400</a>	ORAR00433	5.475 x 0.275
5.906	6.362	0.484	0.594	0.010	5.906 x 0.228 x 0.098	<a href="#">BU5801500</a>	ORAR00437	5.975 x 0.275
6.299	6.756	0.484	0.594	0.010	6.299 x 0.228 x 0.098	<a href="#">BU5801600</a>	ORAR00438	6.225 x 0.275
6.693	7.150	0.484	0.594	0.010	6.693 x 0.228 x 0.098	<a href="#">BU5801700</a>	ORAR00440	6.725 x 0.275
7.087	7.543	0.484	0.594	0.010	7.087 x 0.228 x 0.098	<a href="#">BU5801800</a>	ORAR00442	7.225 x 0.275
7.480	7.937	0.484	0.594	0.010	7.480 x 0.228 x 0.098	<a href="#">BU5801900</a>	ORAR00443	7.475 x 0.275
7.874	8.331	0.484	0.594	0.010	7.874 x 0.228 x 0.098	<a href="#">BU5802000</a>	ORAR00445	7.975 x 0.275
8.268	8.724	0.484	0.594	0.010	8.268 x 0.228 x 0.098	<a href="#">BU5802100</a>	ORAR00446	8.475 x 0.275
8.661	9.118	0.484	0.594	0.010	8.661 x 0.228 x 0.098	<a href="#">BU5802200</a>	ORAR00446	8.475 x 0.275
9.055	9.512	0.484	0.594	0.010	9.055 x 0.228 x 0.098	<a href="#">BU5802300</a>	ORAR00447	8.975 x 0.275
9.449	9.906	0.484	0.594	0.010	9.449 x 0.228 x 0.098	<a href="#">BU5802400</a>	ORAR00448	9.475 x 0.275
9.843	10.299	0.484	0.594	0.010	9.843 x 0.228 x 0.098	<a href="#">BU5802500</a>	ORAR00449	9.975 x 0.275
11.024	11.480	0.484	0.594	0.010	11.024 x 0.228 x 0.098	<a href="#">BU5802800</a>	ORAR00451	10.975 x 0.275
11.811	12.268	0.484	0.594	0.010	11.811 x 0.228 x 0.098	<a href="#">BU5803000</a>	ORAR00453	11.975 x 0.275
12.598	13.055	0.484	0.594	0.010	12.598 x 0.228 x 0.098	<a href="#">BU5803200</a>	ORAR00454	12.475 x 0.275
13.780	14.236	0.484	0.594	0.010	13.780 x 0.228 x 0.098	<a href="#">BU5803500</a>	ORAR00457	13.975 x 0.275
14.173	14.630	0.484	0.594	0.010	14.173 x 0.228 x 0.098	<a href="#">BU5803600</a>	ORAR00457	13.975 x 0.275
15.748	16.205	0.484	0.594	0.010	15.748 x 0.228 x 0.098	<a href="#">BU5804000</a>	ORAR00461	15.955 x 0.275

Further sizes available on request.

This table shows the possible range of available dimensions (Back-up Rings). However, these dimensions are not always stock items.





## H.2.2 CONCAVE BACK-UP RING TYPES, UN CUT (BB) AND CUT (BC), MATERIAL PTFE

The following figure and tables include installation recommendations and Back-up Ring dimensions for internal sealing applications with the concave Back-up Ring types BB (uncut) and BC (cut).

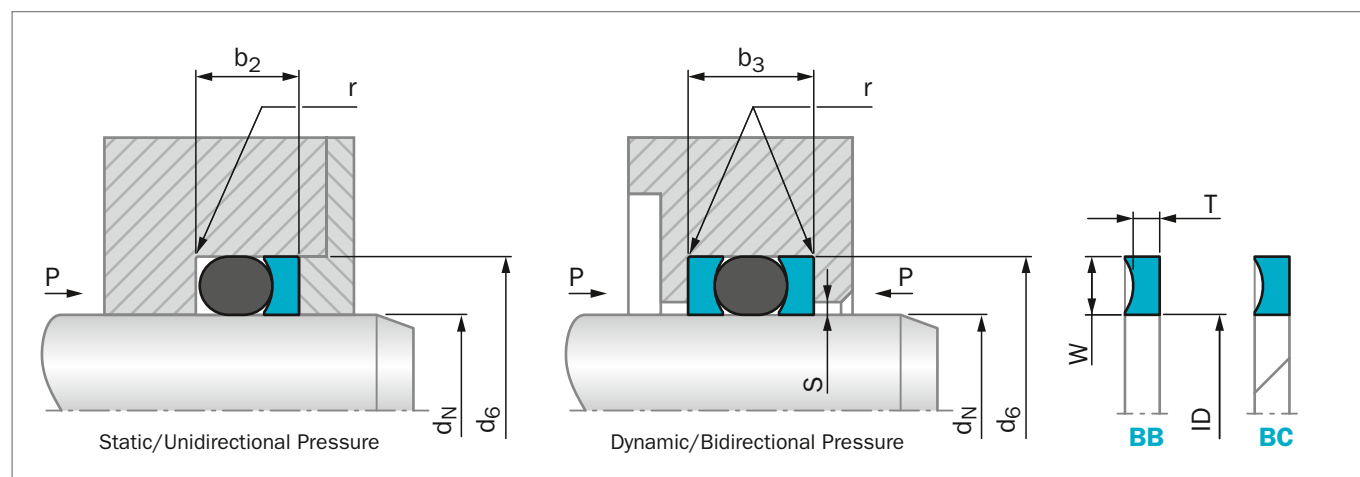


Figure 59: Installation drawing internal sealing, concave Back-up Ring types

**Table 86: Installation dimensions for concave Back-up Ring types, uncut and cut, Internal sealing, material PTFE – Metric**

O-Ring Cross- Section-Ø $d_2$	Back-up Ring Cross section			Groove dimensions				
	Radial height W		Thickness T	Groove diameter $d_6$ H9		Groove width		Radius
	Dynamic	Static	T	Dynamic	Static	$b_2 + 0.25$	$b_3 + 0.25$	$r \pm 0.2$
mm								
1.50	1.25	1.10	1.0	$d_N + 2.5$	$d_N + 2.2$	3.0	4.0	0.25
1.60	1.30	1.20	1.0	$d_N + 2.6$	$d_N + 2.4$	3.1	4.1	0.25
1.78	1.45	1.30	1.4	$d_N + 2.9$	$d_N + 2.6$	3.8	5.2	0.25
1.80	1.45	1.30	1.4	$d_N + 2.9$	$d_N + 2.6$	3.8	5.2	0.25
2.00	1.65	1.50	1.4	$d_N + 3.3$	$d_N + 3.0$	4.1	5.5	0.25
2.40	2.05	1.80	1.4	$d_N + 4.1$	$d_N + 3.6$	4.6	6.0	0.25
2.50	2.15	1.90	1.4	$d_N + 4.3$	$d_N + 3.8$	4.7	6.1	0.25
2.62	2.25	2.00	1.4	$d_N + 4.5$	$d_N + 4.0$	5.0	6.4	0.25
2.65	2.25	2.00	1.4	$d_N + 4.5$	$d_N + 4.0$	5.0	6.4	0.25
3.00	2.60	2.30	1.4	$d_N + 5.2$	$d_N + 4.6$	5.4	6.8	0.25
3.53	3.10	2.70	1.4	$d_N + 6.2$	$d_N + 5.4$	6.2	7.6	0.25
3.55	3.10	2.70	1.4	$d_N + 6.2$	$d_N + 5.4$	6.2	7.6	0.25
4.00	3.50	3.10	1.7	$d_N + 7.0$	$d_N + 6.2$	6.9	8.6	0.25
5.00	4.40	4.00	1.7	$d_N + 8.8$	$d_N + 8.0$	8.3	10.0	0.25
5.30	4.70	4.30	1.7	$d_N + 9.4$	$d_N + 8.6$	9.0	10.9	0.25
5.33	4.70	4.30	1.7	$d_N + 9.4$	$d_N + 8.6$	9.0	10.9	0.25
5.70	5.00	4.60	1.7	$d_N + 10.0$	$d_N + 9.2$	9.0	11.0	0.25
6.00	5.30	4.90	1.7	$d_N + 10.6$	$d_N + 9.8$	9.3	11.2	0.25
6.99	6.10	5.80	2.5	$d_N + 12.2$	$d_N + 11.6$	12.3	15.1	0.25
8.00	7.10	6.70	2.5	$d_N + 14.2$	$d_N + 13.4$	12.6	15.4	0.25
8.40	7.50	7.10	2.5	$d_N + 15.0$	$d_N + 14.2$	12.8	15.6	0.25



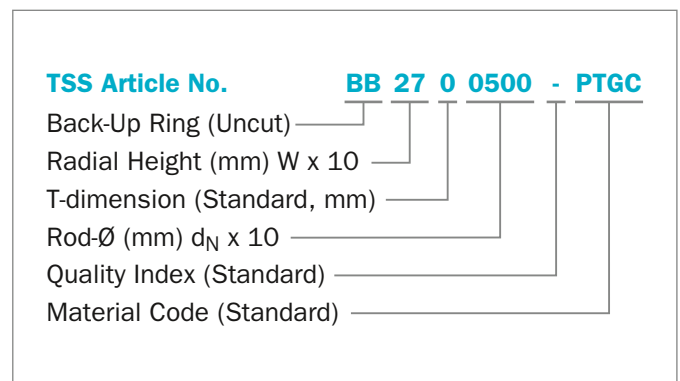
**Table 87: Installation dimensions for concave Back-up Ring types, uncut and cut, Internal sealing, material PTFE – Inch**

O-Ring Cross-Section-Ø d <sub>2</sub>	Back-up Ring Cross section			Groove dimensions				
	Radial height W		Thickness T	Groove diameter d <sub>6</sub> H9		Groove width		Radius r
	Dynamic	Static	T	Dynamic	Static	b <sub>2</sub> +0.010	b <sub>3</sub> +0.010	r ±0.008
inch								
0.059	0.049	0.043	0.039	d <sub>N</sub> + 0.098	d <sub>N</sub> + 0.087	0.118	0.157	0.010
0.063	0.051	0.047	0.039	d <sub>N</sub> + 0.102	d <sub>N</sub> + 0.094	0.122	0.161	0.010
0.070	0.057	0.051	0.055	d <sub>N</sub> + 0.114	d <sub>N</sub> + 0.102	0.150	0.205	0.010
0.071	0.057	0.051	0.055	d <sub>N</sub> + 0.114	d <sub>N</sub> + 0.102	0.150	0.205	0.010
0.079	0.065	0.059	0.055	d <sub>N</sub> + 0.130	d <sub>N</sub> + 0.118	0.161	0.217	0.010
0.094	0.081	0.071	0.055	d <sub>N</sub> + 0.161	d <sub>N</sub> + 0.142	0.181	0.236	0.010
0.098	0.085	0.075	0.055	d <sub>N</sub> + 0.169	d <sub>N</sub> + 0.150	0.185	0.240	0.010
0.103	0.089	0.079	0.055	d <sub>N</sub> + 0.177	d <sub>N</sub> + 0.157	0.197	0.252	0.010
0.104	0.089	0.079	0.055	d <sub>N</sub> + 0.177	d <sub>N</sub> + 0.157	0.197	0.252	0.010
0.118	0.102	0.091	0.055	d <sub>N</sub> + 0.205	d <sub>N</sub> + 0.181	0.213	0.268	0.010
0.139	0.122	0.106	0.055	d <sub>N</sub> + 0.244	d <sub>N</sub> + 0.213	0.244	0.299	0.010
0.140	0.122	0.106	0.055	d <sub>N</sub> + 0.244	d <sub>N</sub> + 0.213	0.244	0.299	0.010
0.157	0.138	0.122	0.067	d <sub>N</sub> + 0.276	d <sub>N</sub> + 0.244	0.272	0.339	0.010
0.197	0.173	0.157	0.067	d <sub>N</sub> + 0.346	d <sub>N</sub> + 0.315	0.327	0.394	0.010
0.209	0.185	0.169	0.067	d <sub>N</sub> + 0.370	d <sub>N</sub> + 0.339	0.354	0.429	0.010
0.210	0.185	0.169	0.067	d <sub>N</sub> + 0.370	d <sub>N</sub> + 0.339	0.354	0.429	0.010
0.224	0.197	0.181	0.067	d <sub>N</sub> + 0.394	d <sub>N</sub> + 0.362	0.354	0.433	0.010
0.236	0.209	0.193	0.067	d <sub>N</sub> + 0.417	d <sub>N</sub> + 0.386	0.366	0.441	0.010
0.275	0.240	0.228	0.098	d <sub>N</sub> + 0.480	d <sub>N</sub> + 0.457	0.484	0.594	0.010
0.315	0.280	0.264	0.098	d <sub>N</sub> + 0.559	d <sub>N</sub> + 0.528	0.496	0.606	0.010
0.331	0.295	0.280	0.098	d <sub>N</sub> + 0.591	d <sub>N</sub> + 0.559	0.504	0.614	0.010

**ORDERING EXAMPLE**

<b>Back-up Ring:</b>	Concave, type BB (uncut) for O-Ring seal
<b>Application:</b>	Static, external sealing
<b>Rod diameter:</b>	d <sub>N</sub> = 50.00 mm (1.969 inch)
<b>O-Ring cross section:</b>	d <sub>2</sub> = 3.53 mm (0.139 inch)
<b>Back-up Ring material:</b>	PTFE, glassfiber filled (25%)

For material code see page 149





**Table 88: Preferred series for static application, concave Back-up Ring  
Type BB (uncut), Internal sealing, material PTFE – Metric**

Rod Ø	Groove Ø	Groove width		Radius r ±0.2	Back-up Ring dimension ID x W x T	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
d <sub>N</sub> f7	d <sub>6</sub> H9							
mm								
4.0	6.2	3.0	4.0	0.25	4.0 x 1.1 x 1.4	BB1100040	OR1500400	4.00 x 1.50
4.0	6.6	3.8	5.2	0.25	4.0 x 1.3 x 1.4	BB1300040	ORAR00007	3.68 x 1.78
5.0	7.2	3.0	4.0	0.25	5.0 x 1.1 x 1.4	BB1100050	OR1500500	5.00 x 1.50
5.0	7.6	3.8	5.2	0.25	5.0 x 1.3 x 1.4	BB1300050	ORAR00008	4.47 x 1.78
6.0	8.2	3.0	4.0	0.25	6.0 x 1.1 x 1.4	BB1100060	OR1500600	6.00 x 1.50
6.0	8.6	3.8	5.2	0.25	6.0 x 2.3 x 1.4	BB1300060	ORAR00010	6.07 x 1.78
8.0	10.6	3.8	5.2	0.25	8.0 x 1.3 x 1.4	BB1300080	ORAR00011	7.65 x 1.78
8.0	11.0	4.1	5.5	0.25	8.0 x 1.5 x 1.4	BB1500080	OR2000800	8.00 x 2.00
10.0	12.6	3.8	5.2	0.25	10.0 x 1.3 x 1.4	BB1300100	ORAR00013	10.82 x 1.78
10.0	13.0	4.1	5.5	0.25	10.0 x 1.5 x 1.4	BB1500100	OR2001000	10.00 x 2.00
12.0	14.6	3.8	5.2	0.25	12.0 x 1.3 x 1.4	BB1300120	ORAR00014	12.42 x 1.78
12.0	15.0	4.1	5.5	0.25	12.0 x 1.5 x 1.4	BB1500120	ORA2001200	12.00 x 2.00
14.0	16.6	3.8	5.2	0.25	14.0 x 1.3 x 1.4	BB1300140	ORAR00015	14.00 x 1.78
14.0	17.0	4.1	5.5	0.25	14.0 x 1.5 x 1.4	BB1500140	OR2001400	14.00 x 2.00
15.0	17.6	3.8	5.2	0.25	15.0 x 1.3 x 1.4	BB1300150	ORAR00016	15.60 x 1.78
15.0	18.0	4.1	5.5	0.25	15.0 x 1.5 x 1.4	BB1500150	OR2001500	15.00 x 2.00
16.0	18.6	3.8	5.2	0.25	16.0 x 1.3 x 1.4	BB1300160	ORAR00016	15.60 x 1.78
16.0	19.0	4.1	5.5	0.25	16.0 x 1.5 x 1.4	BB1500160	OR2001600	16.00 x 2.00
18.0	20.6	3.8	5.2	0.25	18.0 x 1.3 x 1.4	BB1300180	ORAR00018	18.77 x 1.78
18.0	21.0	4.1	5.5	0.25	18.0 x 1.5 x 1.4	BB1500180	OR2001800	18.00 x 2.00
20.0	22.6	3.8	5.2	0.25	20.0 x 1.3 x 1.4	BB1300200	ORAR00019	20.35 x 1.78
20.0	23.0	4.1	5.5	0.25	20.0 x 1.5 x 1.4	BB1500200	OR2002000	20.00 x 2.00
22.0	26.0	5.0	6.4	0.25	22.0 x 2.0 x 1.4	BB2000220	ORAR00118	21.89 x 2.62
22.0	26.6	5.4	6.8	0.25	22.0 x 2.3 x 1.4	BB2300220	OR3002200	22.00 x 3.00
25.0	29.0	5.0	6.4	0.25	25.0 x 2.0 x 1.4	BB2000250	ORAR00120	25.07 x 2.62
25.0	29.6	5.4	6.8	0.25	25.0 x 2.3 x 1.4	BB2300250	OR3002500	25.00 x 3.00
28.0	32.0	5.0	6.4	0.25	28.0 x 2.0 x 1.4	BB2000280	ORAR00122	28.24 x 2.62
28.0	32.6	5.4	6.8	0.25	28.0 x 2.3 x 1.4	BB2300280	OR3002800	28.00 x 2.00
30.0	34.0	5.0	6.4	0.25	30.0 x 2.0 x 1.4	BB2000300	ORAR00123	29.83 x 2.62
30.0	34.6	5.4	6.8	0.25	30.0 x 2.3 x 1.4	BB2300300	OR3003000	30.00 x 3.00
32.0	36.0	5.0	6.4	0.25	32.0 x 2.0 x 1.4	BB2000320	ORAR00125	31.42 x 2.62
32.0	36.6	5.4	6.8	0.25	32.0 x 2.3 x 1.4	BB2300320	OR3003200	32.00 x 3.00
35.0	39.0	5.0	6.4	0.25	35.0 x 2.0 x 1.4	BB2000350	ORAR00126	34.59 x 2.62
35.0	39.6	5.4	6.8	0.25	35.0 x 2.3 x 1.4	BB2300350	OR3003500	35.00 x 3.00
36.0	40.0	5.0	6.4	0.25	36.0 x 2.0 x 1.4	BB2000360	ORAR00127	36.17 x 2.62
36.0	40.6	5.4	6.8	0.25	36.0 x 2.3 x 1.4	BB2300360	OR3003600	36.00 x 3.00
40.0	45.4	6.2	7.6	0.25	40.0 x 2.7 x 1.4	BB2700400	ORAR00223	40.87 x 3.53
40.0	46.2	6.9	8.6	0.25	40.0 x 3.1 x 1.7	BB3100400	OR4004000	40.00 x 4.00
42.0	47.4	6.2	7.6	0.25	42.0 x 2.7 x 1.4	BB2700420	ORAR00223	40.87 x 3.53
42.0	48.2	6.9	8.6	0.25	42.0 x 3.1 x 1.7	BB3100420	OR4004200	42.00 x 4.00



Rod Ø	Groove Ø	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
mm								
45.0	50.4	6.2	7.6	0.25	45.0 x 2.7 x 1.4	BB2700450	ORAR00224	44.04 x 3.53
45.0	51.2	6.9	8.6	0.25	45.0 x 3.1 x 1.7	BB3100450	OR4004500	45.00 x 4.00
48.0	53.4	6.2	7.6	0.25	48.0 x 2.7 x 1.4	BB2700480	ORAR00225	47.22 x 3.53
48.0	54.2	6.9	8.6	0.25	48.0 x 3.1 x 1.7	BB3100480	OR4004800	48.00 x 4.00
50.0	55.4	6.2	7.6	0.25	50.0 x 2.7 x 1.4	BB2700500	ORAR00226	50.39 x 3.53
50.0	56.2	6.9	8.6	0.25	50.0 x 3.1 x 1.7	BB3100500	OR4005000	50.00 x 4.00
52.0	57.4	6.2	7.6	0.25	52.0 x 2.7 x 1.4	BB2700520	ORAR00226	50.39 x 3.53
52.0	58.2	6.9	8.6	0.25	52.0 x 3.1 x 1.7	BB3100520	OR4005200	52.00 x 4.00
55.0	60.4	6.2	7.6	0.25	55.0 x 2.7 x 1.4	BB2700550	ORAR00227	53.57 x 3.53
55.0	61.2	6.9	8.6	0.25	55.0 x 3.1 x 1.7	BB3100550	OR4005500	55.00 x 4.00
56.0	61.4	6.2	7.6	0.25	56.0 x 2.7 x 1.4	BB2700560	ORAR00228	56.74 x 3.53
56.0	62.2	6.9	8.6	0.25	56.0 x 3.1 x 1.7	BB3100560	OR4005600	56.00 x 4.00
60.0	65.4	6.2	7.6	0.25	60.0 x 2.7 x 1.4	BB2700600	ORAR00229	59.92 x 3.53
60.0	66.2	6.9	8.6	0.25	60.0 x 3.1 x 1.7	BB3100600	OR4006000	60.00 x 4.00
63.0	68.4	6.2	7.6	0.25	63.0 x 2.7 x 1.4	BB2700630	ORAR00230	63.09 x 3.53
63.0	69.2	6.9	8.6	0.25	63.0 x 3.1 x 1.7	BB3100630	OR4006300	60.00 x 4.00
65.0	70.4	6.2	7.6	0.25	65.0 x 2.7 x 1.4	BB2700650	ORAR00231	66.27 x 3.53
65.0	71.2	6.9	8.6	0.25	65.0 x 3.1 x 1.7	BB3100650	OR4006500	65.40 x 4.00
70.0	75.4	6.2	7.6	0.25	70.0 x 2.7 x 1.4	BB2700700	ORAR00232	69.44 x 3.53
70.0	76.2	6.9	8.6	0.25	70.0 x 3.1 x 1.7	BB3100700	OR4007000	70.00 x 4.00
75.0	80.4	6.2	7.6	0.25	75.0 x 2.7 x 1.4	BB2700750	ORAR00234	75.79 x 3.53
75.0	81.2	6.9	8.6	0.25	75.0 x 3.1 x 1.7	BB3100750	OR4007500	75.00 x 4.00
80.0	88.0	8.3	10.0	0.25	80.0 x 4.0 x 1.7	BB4000800	OR5008000	80.00 x 5.00
80.0	88.6	9.0	10.9	0.25	80.0 x 4.3 x 1.7	BB4300800	ORAR00339	81.92 x 5.33
85.0	93.0	8.3	10.0	0.25	85.0 x 4.0 x 1.7	BB4000850	OR5008500	85.00 x 5.00
85.0	93.6	9.0	10.9	0.25	85.0 x 4.3 x 1.7	BB4300850	ORAR00340	85.09 x 5.33
90.0	98.0	8.3	10.0	0.25	90.0 x 4.0 x 1.7	BB4000900	OR5009000	90.00 x 5.00
90.0	98.6	9.0	10.9	0.25	90.0 x 4.3 x 1.7	BB4300900	ORAR00342	91.44 x 5.33
95.0	103.0	8.3	10.0	0.25	95.0 x 4.0 x 1.7	BB4000950	OR5009500	95.00 x 5.00
95.0	103.6	9.0	10.9	0.25	95.0 x 4.3 x 1.7	BB4300950	ORAR00343	94.62 x 5.33
100.0	108.0	8.3	10.0	0.25	100.0 x 4.0 x 1.7	BB4001000	OR5010000	100.00 x 5.00
100.0	108.6	9.0	10.9	0.25	100.0 x 4.3 x 1.7	BB4301000	ORAR00345	100.97 x 5.33
105.0	113.0	8.3	10.0	0.25	105.0 x 4.0 x 1.7	BB4001050	OR5010500	105.00 x 5.00
105.0	113.6	9.0	10.9	0.25	105.0 x 4.3 x 1.7	BB4301050	ORAR00346	104.14 x 5.33
110.0	118.0	8.3	10.0	0.25	110.0 x 4.0 x 1.7	BB4001100	OR5011000	110.00 x 5.00
110.0	118.6	9.0	10.9	0.25	110.0 x 4.3 x 1.7	BB4301100	ORAR00348	110.49 x 5.33
115.0	123.0	8.3	10.0	0.25	115.0 x 4.0 x 1.7	BB4001150	OR5011500	115.00 x 5.00
115.0	123.6	9.0	10.9	0.25	115.0 x 4.3 x 1.7	BB4301150	ORAR00349	113.67 x 5.33
120.0	128.0	8.3	10.0	0.25	120.0 x 4.0 x 1.7	BB4001200	OR5012000	120.00 x 5.00
120.0	128.6	9.0	10.9	0.25	120.0 x 4.3 x 1.7	BB4301200	ORAR00351	120.02 x 5.33
125.0	133.0	8.3	10.0	0.25	125.0 x 4.0 x 1.7	BB4001250	OR5012500	125.00 x 5.00
125.0	133.6	9.0	10.9	0.25	125.0 x 4.3 x 1.7	BB4301250	ORAR00353	126.37 x 5.33



Rod Ø	Groove Ø	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
mm								
130.0	138.0	8.3	10.0	0.25	130.0 x 4.0 x 1.7	BB4001300	OR5013000	130.00 x 5.00
130.0	138.6	9.0	10.9	0.25	130.0 x 4.3 x 1.7	BB4301300	ORAR00354	129.54 x 5.33
135.0	146.6	12.3	15.1	0.25	135.0 x 5.8 x 2.5	BB5801350	ORAR00432	135.89 x 6.99
140.0	151.6	12.3	15.1	0.25	140.0 x 5.8 x 2.5	BB5801400	ORAR00433	139.07 x 6.99
150.0	161.6	12.3	15.1	0.25	150.0 x 5.8 x 2.5	BB5801500	ORAR00437	151.77 x 6.99
160.0	171.6	12.3	15.1	0.25	160.0 x 5.8 x 2.5	BB5801600	ORAR00438	158.12 x 6.99
170.0	181.6	12.3	15.1	0.25	170.0 x 5.8 x 2.5	BB5801700	ORAR00440	170.82 x 6.99
180.0	191.6	12.3	15.1	0.25	180.0 x 5.8 x 2.5	BB5801800	ORAR00442	183.52 x 6.99
190.0	201.6	12.3	15.1	0.25	190.0 x 5.8 x 2.5	BB5801900	ORAR00443	189.87 x 6.99
200.0	211.6	12.3	15.1	0.25	200.0 x 5.8 x 2.5	BB5802000	ORAR00445	202.57 x 6.99
210.0	221.6	12.3	15.1	0.25	210.0 x 5.8 x 2.5	BB5802100	ORAR00446	215.27 x 6.99
220.0	231.6	12.3	15.1	0.25	220.0 x 5.8 x 2.5	BB5802200	ORAR00446	215.27 x 6.99
230.0	241.6	12.3	15.1	0.25	230.0 x 5.8 x 2.5	BB5802300	ORAR00447	227.97 x 6.99
240.0	251.6	12.3	15.1	0.25	240.0 x 5.8 x 2.5	BB5802400	ORAR00448	240.67 x 6.99
250.0	261.6	12.3	15.1	0.25	250.0 x 5.8 x 2.5	BB5802500	ORAR00449	253.37 x 6.99
280.0	291.6	12.3	15.1	0.25	280.0 x 5.8 x 2.5	BB5802800	ORAR00451	278.77 x 6.99
300.0	311.6	12.3	15.1	0.25	300.0 x 5.8 x 2.5	BB5803000	ORAR00453	304.17 x 6.99
320.0	331.6	12.3	15.1	0.25	320.0 x 5.8 x 2.5	BB5803200	ORAR00454	316.87 x 6.99
350.0	361.6	12.3	15.1	0.25	350.0 x 5.8 x 2.5	BB5803500	ORAR00457	354.97 x 6.99
360.0	371.6	12.3	15.1	0.25	360.0 x 5.8 x 2.5	BB5803600	ORAR00457	354.97 x 6.99
400.0	411.6	12.3	15.1	0.25	400.0 x 5.8 x 2.5	BB5804000	ORAR00461	405.26 x 6.99

Further sizes available on request.

This table shows the possible range of available dimensions (Back-up Rings). However, these dimensions are not always stock items.



**Table 89: Preferred series for static application, concave Back-up Ring  
Type BB (uncut), Internal sealing, material PTFE – Inch**

Rod Ø	Groove Ø	Groove width		Radius r	Back-up Ring dimension ID x W x T	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
d <sub>N</sub> f7	d <sub>6</sub> H9			±0.008				
inch								
0.157	0.244	0.118	0.157	0.010	0.157 x 0.043 x 0.055	BB1100040	OR1500400	0.157 x 0.059
0.157	0.260	0.150	0.205	0.010	0.157 x 0.051 x 0.055	BB1300040	ORAR00007	0.145 x 0.070
0.197	0.283	0.118	0.157	0.010	0.197 x 0.043 x 0.055	BB1100050	OR1500500	0.197 x 0.059
0.197	0.299	0.150	0.205	0.010	0.197 x 0.051 x 0.055	BB1300050	ORAR00008	0.176 x 0.070
0.236	0.323	0.118	0.157	0.010	0.236 x 0.043 x 0.055	BB1100060	OR1500600	0.236 x 0.059
0.236	0.339	0.150	0.205	0.010	0.236 x 0.091 x 0.055	BB1300060	ORAR00010	0.239 x 0.070
0.315	0.417	0.150	0.205	0.010	0.315 x 0.051 x 0.055	BB1300080	ORAR00011	0.301 x 0.070
0.315	0.433	0.161	0.217	0.010	0.315 x 0.059 x 0.055	BB1500080	OR2000800	0.315 x 0.079
0.394	0.496	0.150	0.205	0.010	0.394 x 0.051 x 0.055	BB1300100	ORAR00013	0.426 x 0.070
0.394	0.512	0.161	0.217	0.010	0.394 x 0.059 x 0.055	BB1500100	OR2001000	0.394 x 0.079
0.472	0.575	0.150	0.205	0.010	0.472 x 0.051 x 0.055	BB1300120	ORAR00014	0.489 x 0.070
0.472	0.591	0.161	0.217	0.010	0.472 x 0.059 x 0.055	BB1500120	OR2001200	0.472 x 0.079
0.551	0.654	0.150	0.205	0.010	0.551 x 0.051 x 0.055	BB1300140	ORAR00015	0.551 x 0.070
0.551	0.669	0.161	0.217	0.010	0.551 x 0.059 x 0.055	BB1500140	OR2001400	0.551 x 0.079
0.591	0.693	0.150	0.205	0.010	0.591 x 0.051 x 0.055	BB1300150	ORAR00016	0.614 x 0.070
0.591	0.709	0.161	0.217	0.010	0.591 x 0.059 x 0.055	BB1500150	OR2001500	0.591 x 0.079
0.630	0.732	0.150	0.205	0.010	0.630 x 0.051 x 0.055	BB1300160	ORAR00016	0.614 x 0.070
0.630	0.748	0.161	0.217	0.010	0.630 x 0.059 x 0.055	BB1500160	OR2001600	0.630 x 0.079
0.709	0.811	0.150	0.205	0.010	0.709 x 0.051 x 0.055	BB1300180	ORAR00018	0.739 x 0.070
0.709	0.827	0.161	0.217	0.010	0.709 x 0.059 x 0.055	BB1500180	OR2001800	0.709 x 0.079
0.787	0.890	0.150	0.205	0.010	0.787 x 0.051 x 0.055	BB1300200	ORAR00019	0.801 x 0.070
0.787	0.906	0.161	0.217	0.010	0.787 x 0.059 x 0.055	BB1500200	OR2002000	0.787 x 0.079
0.866	1.024	0.197	0.252	0.010	0.866 x 0.079 x 0.055	BB2000220	ORAR00118	0.862 x 0.103
0.866	1.047	0.213	0.268	0.010	0.866 x 0.091 x 0.055	BB2300220	OR3002200	0.866 x 0.118
0.984	1.142	0.197	0.252	0.010	0.984 x 0.079 x 0.055	BB2000250	ORAR00120	0.987 x 0.103
0.984	1.165	0.213	0.268	0.010	0.984 x 0.091 x 0.055	BB2300250	OR3002500	0.984 x 0.118
1.102	1.260	0.197	0.252	0.010	1.102 x 0.079 x 0.055	BB2000280	ORAR00122	1.112 x 0.103
1.102	1.283	0.213	0.268	0.010	1.102 x 0.091 x 0.055	BB2300280	OR3002800	1.102 x 0.079
1.181	1.339	0.197	0.252	0.010	1.181 x 0.079 x 0.055	BB2000300	ORAR00123	1.174 x 0.103
1.181	1.362	0.213	0.268	0.010	1.181 x 0.091 x 0.055	BB2300300	OR3003000	1.181 x 0.118
1.260	1.417	0.197	0.252	0.010	1.260 x 0.079 x 0.055	BB2000320	ORAR00125	1.237 x 0.103
1.260	1.441	0.213	0.268	0.010	1.260 x 0.091 x 0.055	BB2300320	OR3003200	1.260 x 0.118
1.378	1.535	0.197	0.252	0.010	1.378 x 0.079 x 0.055	BB2000350	ORAR00126	1.362 x 0.103
1.378	1.559	0.213	0.268	0.010	1.378 x 0.091 x 0.055	BB2300350	OR3003500	1.378 x 0.118
1.417	1.575	0.197	0.252	0.010	1.417 x 0.079 x 0.055	BB2000360	ORAR00127	1.424 x 0.103
1.417	1.598	0.213	0.268	0.010	1.417 x 0.091 x 0.055	BB2300360	OR3003600	1.417 x 0.118
1.575	1.787	0.244	0.299	0.010	1.575 x 0.106 x 0.055	BB2700400	ORAR00223	1.609 x 0.139
1.575	1.819	0.272	0.339	0.010	1.575 x 0.122 x 0.067	BB3100400	OR4004000	1.575 x 0.157
1.654	1.866	0.244	0.299	0.010	1.654 x 0.106 x 0.055	BB2700420	ORAR00223	1.609 x 0.139
1.654	1.898	0.272	0.339	0.010	1.654 x 0.122 x 0.067	BB3100420	OR4004200	1.654 x 0.157



Rod Ø	Groove Ø	Groove width		Radius r	Back-up Ring dimension ID x W x T	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
d <sub>N</sub> f7	d <sub>6</sub> H9			±0.008				
inch								
1.772	1.984	0.244	0.299	0.010	1.772 x 0.106 x 0.055	BB2700450	ORAR00224	1.734 x 0.139
1.772	2.016	0.272	0.339	0.010	1.772 x 0.122 x 0.067	BB3100450	OR4004500	1.772 x 0.157
1.890	2.102	0.244	0.299	0.010	1.890 x 0.106 x 0.055	BB2700480	ORAR00225	1.859 x 0.139
1.890	2.134	0.272	0.339	0.010	1.890 x 0.122 x 0.067	BB3100480	OR4004800	1.890 x 0.157
1.969	2.181	0.244	0.299	0.010	1.969 x 0.106 x 0.055	BB2700500	ORAR00226	1.984 x 0.139
1.969	2.213	0.272	0.339	0.010	1.969 x 0.122 x 0.067	BB3100500	OR4005000	1.969 x 0.157
2.047	2.260	0.244	0.299	0.010	2.047 x 0.106 x 0.055	BB2700520	ORAR00226	1.984 x 0.139
2.047	2.291	0.272	0.339	0.010	2.047 x 0.122 x 0.067	BB3100520	OR4005200	2.047 x 0.157
2.165	2.378	0.244	0.299	0.010	2.165 x 0.106 x 0.055	BB2700550	ORAR00227	2.109 x 0.139
2.165	2.409	0.272	0.339	0.010	2.165 x 0.122 x 0.067	BB3100550	OR4005500	2.165 x 0.157
2.205	2.417	0.244	0.299	0.010	2.205 x 0.106 x 0.055	BB2700560	ORAR00228	2.234 x 0.139
2.205	2.449	0.272	0.339	0.010	2.205 x 0.122 x 0.067	BB3100560	OR4005600	2.205 x 0.157
2.362	2.575	0.244	0.299	0.010	2.362 x 0.106 x 0.055	BB2700600	ORAR00229	2.359 x 0.139
2.362	2.606	0.272	0.339	0.010	2.362 x 0.122 x 0.067	BB3100600	OR4006000	2.362 x 0.157
2.480	2.693	0.244	0.299	0.010	2.480 x 0.106 x 0.055	BB2700630	ORAR00230	2.484 x 0.139
2.480	2.724	0.272	0.339	0.010	2.480 x 0.122 x 0.067	BB3100630	OR4006300	2.362 x 0.157
2.559	2.772	0.244	0.299	0.010	2.559 x 0.106 x 0.055	BB2700650	ORAR00231	2.609 x 0.139
2.559	2.803	0.272	0.339	0.010	2.559 x 0.122 x 0.067	BB3100650	OR4006500	2.575 x 0.157
2.756	2.969	0.244	0.299	0.010	2.756 x 0.106 x 0.055	BB2700700	ORAR00232	2.734 x 0.139
2.756	3.000	0.272	0.339	0.010	2.756 x 0.122 x 0.067	BB3100700	OR4007000	2.756 x 0.157
2.953	3.165	0.244	0.299	0.010	2.953 x 0.106 x 0.055	BB2700750	ORAR00234	2.984 x 0.139
2.953	3.197	0.272	0.339	0.010	2.953 x 0.122 x 0.067	BB3100750	OR4007500	2.953 x 0.157
3.150	3.465	0.327	0.394	0.010	3.150 x 0.157 x 0.067	BB4000800	OR5008000	3.150 x 0.197
3.150	3.488	0.354	0.429	0.010	3.150 x 0.169 x 0.067	BB4300800	ORAR00339	3.225 x 0.210
3.346	3.661	0.327	0.394	0.010	3.346 x 0.157 x 0.067	BB4000850	OR5008500	3.346 x 0.197
3.346	3.685	0.354	0.429	0.010	3.346 x 0.169 x 0.067	BB4300850	ORAR00340	3.350 x 0.210
3.543	3.858	0.327	0.394	0.010	3.543 x 0.157 x 0.067	BB4000900	OR5009000	3.543 x 0.197
3.543	3.882	0.354	0.429	0.010	3.543 x 0.169 x 0.067	BB4300900	ORAR00342	3.600 x 0.210
3.740	4.055	0.327	0.394	0.010	3.740 x 0.157 x 0.067	BB4000950	OR5009500	3.740 x 0.197
3.740	4.079	0.354	0.429	0.010	3.740 x 0.169 x 0.067	BB4300950	ORAR00343	3.725 x 0.210
3.937	4.252	0.327	0.394	0.010	3.937 x 0.157 x 0.067	BB4001000	OR5010000	3.937 x 0.197
3.937	4.276	0.354	0.429	0.010	3.937 x 0.169 x 0.067	BB4301000	ORAR00345	3.975 x 0.210
4.134	4.449	0.327	0.394	0.010	4.134 x 0.157 x 0.067	BB4001050	OR5010500	4.134 x 0.197
4.134	4.472	0.354	0.429	0.010	4.134 x 0.169 x 0.067	BB4301050	ORAR00346	4.100 x 0.210
4.331	4.646	0.327	0.394	0.010	4.331 x 0.157 x 0.067	BB4001100	OR5011000	4.331 x 0.197
4.331	4.669	0.354	0.429	0.010	4.331 x 0.169 x 0.067	BB4301100	ORAR00348	4.350 x 0.210
4.528	4.843	0.327	0.394	0.010	4.528 x 0.157 x 0.067	BB4001150	OR5011500	4.528 x 0.197
4.528	4.866	0.354	0.429	0.010	4.528 x 0.169 x 0.067	BB4301150	ORAR00349	4.475 x 0.210
4.724	5.039	0.327	0.394	0.010	4.724 x 0.157 x 0.067	BB4001200	OR5012000	4.724 x 0.197
4.724	5.063	0.354	0.429	0.010	4.724 x 0.169 x 0.067	BB4301200	ORAR00351	4.725 x 0.210



Rod ∅	Groove ∅	Groove width		Radius r	Back-up Ring dimension ID x W x T	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
d <sub>N</sub> f7	d <sub>6</sub> H9			±0.008				
inch								
4.921	5.236	0.327	0.394	0.010	4.921 x 0.157 x 0.067	BB4001250	OR5012500	4.921 x 0.197
4.921	5.260	0.354	0.429	0.010	4.921 x 0.169 x 0.067	BB4301250	ORAR00353	4.975 x 0.210
5.118	5.433	0.327	0.394	0.010	5.118 x 0.157 x 0.067	BB4001300	OR5013000	5.118 x 0.197
5.118	5.457	0.354	0.429	0.010	5.118 x 0.169 x 0.067	BB4301300	ORAR00354	5.100 x 0.210
5.315	5.772	0.484	0.594	0.010	5.315 x 0.228 x 0.098	BB5801350	ORAR00432	5.350 x 0.275
5.512	5.969	0.484	0.594	0.010	5.512 x 0.228 x 0.098	BB5801400	ORAR00433	5.475 x 0.275
5.906	6.362	0.484	0.594	0.010	5.906 x 0.228 x 0.098	BB5801500	ORAR00437	5.975 x 0.275
6.299	6.756	0.484	0.594	0.010	6.299 x 0.228 x 0.098	BB5801600	ORAR00438	6.225 x 0.275
6.693	7.150	0.484	0.594	0.010	6.693 x 0.228 x 0.098	BB5801700	ORAR00440	6.725 x 0.275
7.087	7.543	0.484	0.594	0.010	7.087 x 0.228 x 0.098	BB5801800	ORAR00442	7.225 x 0.275
7.480	7.937	0.484	0.594	0.010	7.480 x 0.228 x 0.098	BB5801900	ORAR00443	7.475 x 0.275
7.874	8.331	0.484	0.594	0.010	7.874 x 0.228 x 0.098	BB5802000	ORAR00445	7.975 x 0.275
8.268	8.724	0.484	0.594	0.010	8.268 x 0.228 x 0.098	BB5802100	ORAR00446	8.475 x 0.275
8.661	9.118	0.484	0.594	0.010	8.661 x 0.228 x 0.098	BB5802200	ORAR00446	8.475 x 0.275
9.055	9.512	0.484	0.594	0.010	9.055 x 0.228 x 0.098	BB5802300	ORAR00447	8.975 x 0.275
9.449	9.906	0.484	0.594	0.010	9.449 x 0.228 x 0.098	BB5802400	ORAR00448	9.475 x 0.275
9.843	10.299	0.484	0.594	0.010	9.843 x 0.228 x 0.098	BB5802500	ORAR00449	9.975 x 0.275
11.024	11.480	0.484	0.594	0.010	11.024 x 0.228 x 0.098	BB5802800	ORAR00451	10.975 x 0.275
11.811	12.268	0.484	0.594	0.010	11.811 x 0.228 x 0.098	BB5803000	ORAR00453	11.975 x 0.275
12.598	13.055	0.484	0.594	0.010	12.598 x 0.228 x 0.098	BB5803200	ORAR00454	12.475 x 0.275
13.780	14.236	0.484	0.594	0.010	13.780 x 0.228 x 0.098	BB5803500	ORAR00457	13.975 x 0.275
14.173	14.630	0.484	0.594	0.010	14.173 x 0.228 x 0.098	BB5803600	ORAR00457	13.975 x 0.275
15.748	16.205	0.484	0.594	0.010	15.748 x 0.228 x 0.098	BB5804000	ORAR00461	15.955 x 0.275

Further sizes available on request.

This table shows the possible range of available dimensions (Back-up Rings). However, these dimensions are not always stock items.





### H.2.3 SPIRAL BACK-UP RING TYPES (BP), MATERIAL PTFE

The following figure and tables include installation recommendations and Back-up Ring dimensions for internal sealing applications with the spiral Back-up Ring type BP

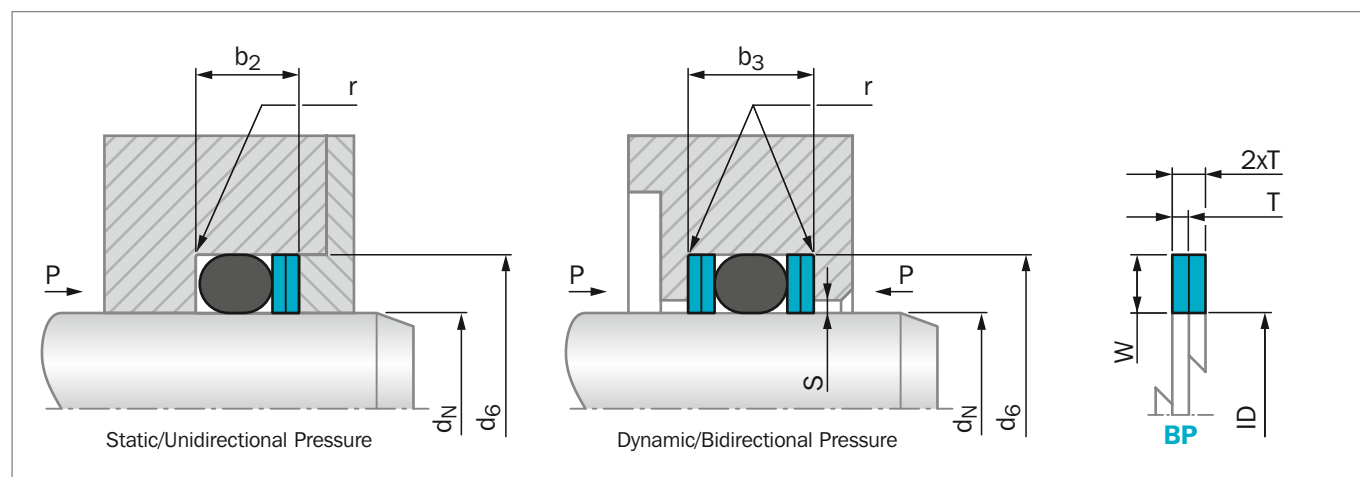


Figure 60: Installation drawing internal sealing, spiral Back-up Ring type

**Table 90: Installation dimensions for the spiral Back-up Ring type, Internal sealing, material PTFE – Metric**

O-Ring Cross- Section-Ø d <sub>2</sub>	Back-up Ring Cross section			Groove dimensions				
	Radial height W		Thickness T	Groove diameter d <sub>6</sub> H9		Groove width		Radius
	Dynamic	Static	T	Dynamic	Static	b <sub>2</sub> +0.25	b <sub>3</sub> +0.25	r ±0.2
mm								
1.50	1.25	1.10	0.50	d <sub>N</sub> + 2.5	d <sub>N</sub> + 2.2	3.0	4.0	0.25
1.60	1.30	1.20	0.50	d <sub>N</sub> + 2.6	d <sub>N</sub> + 2.4	3.1	4.1	0.25
1.78	1.45	1.30	0.70	d <sub>N</sub> + 2.9	d <sub>N</sub> + 2.6	3.8	5.2	0.25
1.80	1.45	1.30	0.70	d <sub>N</sub> + 2.9	d <sub>N</sub> + 2.6	3.8	5.2	0.25
2.00	1.65	1.50	0.70	d <sub>N</sub> + 3.3	d <sub>N</sub> + 3.0	4.1	5.5	0.25
2.40	2.05	1.80	0.70	d <sub>N</sub> + 4.1	d <sub>N</sub> + 3.6	4.6	6.0	0.25
2.50	2.15	1.90	0.70	d <sub>N</sub> + 4.3	d <sub>N</sub> + 3.8	4.7	6.1	0.25
2.62	2.25	2.00	0.70	d <sub>N</sub> + 4.5	d <sub>N</sub> + 4.0	5.0	6.4	0.25
2.65	2.25	2.00	0.70	d <sub>N</sub> + 4.5	d <sub>N</sub> + 4.0	5.0	6.4	0.25
3.00	2.60	2.30	0.70	d <sub>N</sub> + 5.2	d <sub>N</sub> + 4.6	5.4	6.8	0.25
3.53	3.10	2.70	0.70	d <sub>N</sub> + 6.2	d <sub>N</sub> + 5.4	6.2	7.6	0.25
3.55	3.10	2.70	0.70	d <sub>N</sub> + 6.2	d <sub>N</sub> + 5.4	6.2	7.6	0.25
4.00	3.50	3.10	0.85	d <sub>N</sub> + 7.0	d <sub>N</sub> + 6.2	6.9	8.6	0.25
5.00	4.40	4.00	0.85	d <sub>N</sub> + 8.8	d <sub>N</sub> + 8.0	8.3	10.0	0.25
5.30	4.70	4.30	0.85	d <sub>N</sub> + 9.4	d <sub>N</sub> + 8.6	9.0	10.9	0.25
5.33	4.70	4.30	0.85	d <sub>N</sub> + 9.4	d <sub>N</sub> + 8.6	9.0	10.9	0.25
5.70	5.00	4.60	0.85	d <sub>N</sub> + 10.0	d <sub>N</sub> + 9.2	9.0	11.0	0.25
6.00	5.30	4.90	0.85	d <sub>N</sub> + 10.6	d <sub>N</sub> + 9.8	9.3	11.2	0.25
7.00	6.10	5.80	1.25	d <sub>N</sub> + 12.2	d <sub>N</sub> + 11.6	12.3	15.1	0.25
8.00	7.10	6.70	1.25	d <sub>N</sub> + 14.2	d <sub>N</sub> + 13.4	12.6	15.4	0.25
8.40	7.50	7.10	1.25	d <sub>N</sub> + 15.0	d <sub>N</sub> + 14.2	12.8	15.6	0.25

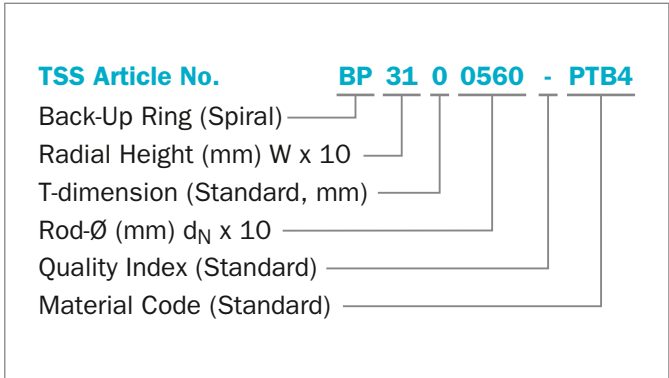


**Table 91: Installation dimensions for the spiral Back-up Ring type, Internal sealing, material PTFE – Inch**

O-Ring Cross-Section-Ø d <sub>2</sub>	Back-up Ring Cross section			Groove dimensions				
	Radial height W		Thickness T	Groove diameter d <sub>6</sub> H9		Groove width		Radius
	Dynamic	Static	T	Dynamic	Static	b <sub>2</sub> +0.010	b <sub>3</sub> +0.010	r ±0.008
inch								
0.059	0.049	0.043	0.020	d <sub>N</sub> + 0.098	d <sub>N</sub> + 0.087	0.118	0.157	0.010
0.063	0.051	0.047	0.020	d <sub>N</sub> + 0.102	d <sub>N</sub> + 0.094	0.122	0.161	0.010
0.070	0.057	0.051	0.028	d <sub>N</sub> + 0.114	d <sub>N</sub> + 0.102	0.150	0.205	0.010
0.071	0.057	0.051	0.028	d <sub>N</sub> + 0.114	d <sub>N</sub> + 0.102	0.150	0.205	0.010
0.079	0.065	0.059	0.028	d <sub>N</sub> + 0.130	d <sub>N</sub> + 0.118	0.161	0.217	0.010
0.094	0.081	0.071	0.028	d <sub>N</sub> + 0.161	d <sub>N</sub> + 0.142	0.181	0.236	0.010
0.098	0.085	0.075	0.028	d <sub>N</sub> + 0.169	d <sub>N</sub> + 0.150	0.185	0.240	0.010
0.103	0.089	0.079	0.028	d <sub>N</sub> + 0.177	d <sub>N</sub> + 0.157	0.197	0.252	0.010
0.104	0.089	0.079	0.028	d <sub>N</sub> + 0.177	d <sub>N</sub> + 0.157	0.197	0.252	0.010
0.118	0.102	0.091	0.028	d <sub>N</sub> + 0.205	d <sub>N</sub> + 0.181	0.213	0.268	0.010
0.139	0.122	0.106	0.028	d <sub>N</sub> + 0.244	d <sub>N</sub> + 0.213	0.244	0.299	0.010
0.140	0.122	0.106	0.028	d <sub>N</sub> + 0.244	d <sub>N</sub> + 0.213	0.244	0.299	0.010
0.157	0.138	0.122	0.033	d <sub>N</sub> + 0.276	d <sub>N</sub> + 0.244	0.272	0.339	0.010
0.197	0.173	0.157	0.033	d <sub>N</sub> + 0.346	d <sub>N</sub> + 0.315	0.327	0.394	0.010
0.209	0.185	0.169	0.033	d <sub>N</sub> + 0.370	d <sub>N</sub> + 0.339	0.354	0.429	0.010
0.210	0.185	0.169	0.033	d <sub>N</sub> + 0.370	d <sub>N</sub> + 0.339	0.354	0.429	0.010
0.224	0.197	0.181	0.033	d <sub>N</sub> + 0.394	d <sub>N</sub> + 0.362	0.354	0.433	0.010
0.236	0.209	0.193	0.033	d <sub>N</sub> + 0.417	d <sub>N</sub> + 0.386	0.366	0.441	0.010
0.276	0.240	0.228	0.049	d <sub>N</sub> + 0.480	d <sub>N</sub> + 0.457	0.484	0.594	0.010
0.315	0.280	0.264	0.049	d <sub>N</sub> + 0.559	d <sub>N</sub> + 0.528	0.496	0.606	0.010
0.331	0.295	0.280	0.049	d <sub>N</sub> + 0.591	d <sub>N</sub> + 0.559	0.504	0.614	0.010

**ORDERING EXAMPLE**

<b>Back-up Ring:</b>	Type BP (spiral) for O-Ring seal
<b>Application:</b>	Dynamic, internal sealing
<b>Rod diameter:</b>	d <sub>N</sub> = 56.00 mm (2.205 inch)
<b>O-Ring cross section:</b>	d <sub>2</sub> = 3.53 mm (0.139 inch)
<b>Back-up Ring material:</b>	PTFE, bronze-filled (40%)



For material code see page 149



**Table 92: Preferred series for dynamic application, spiral Back-up Ring  
Type BP, Internal sealing, material PTFE – Metric**

Rod Ø	Groove Ø	Groove width		Radius r ±0.2	Back-up Ring dimension ID x W x T	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
mm								
4.00	6.50	3.00	4.00	0.25	4.0 x 1.25 x 0.50	BP12H00040	OR1500400	4.00 x 1.50
4.00	6.90	3.80	5.20	0.25	4.0 x 1.45 x 0.70	BP14H00040	ORAR00007	3.68 x 1.78
5.00	7.50	3.00	4.00	0.25	5.0 x 1.25 x 0.50	BP12H00050	OR1500500	5.00 x 1.50
5.00	7.90	3.80	5.20	0.25	5.0 x 1.45 x 0.70	BP14H00050	ORAR00008	4.47x 1.78
6.00	8.50	3.00	4.00	0.25	6.0 x 1.25 x 0.50	BP12H00060	OR1500600	6.00 x 1.50
6.00	8.90	3.80	5.20	0.25	6.0 x 1.45 x 0.70	BP14H00060	ORAR00010	6.07 x 1.78
8.00	10.90	3.80	5.20	0.25	8.0 x 1.45 x 0.70	BP14H00080	ORAR00011	7.65 x 1.78
8.00	11.30	4.10	5.50	0.25	8.0 x 1.65 x 0.70	BP16H00080	OR2000800	8.00 x 2.00
10.00	12.90	3.80	5.20	0.25	10.0 x 1.45 x 0.70	BP14H00100	ORAR00013	10.82 x 1.78
10.00	13.30	4.10	5.50	0.25	10.0 x 1.65 x 0.70	BP16H00100	OR2001000	10.00 x 2.00
12.00	14.90	3.80	5.20	0.25	12.0 x 1.45 x 0.70	BP14H00120	ORAR00014	12.42 x 1.78
12.00	15.30	4.10	5.50	0.25	12.0 x 1.65 x 0.70	BP16H00120	OR2001200	12.00 x 2.00
14.00	16.90	3.80	5.20	0.25	14.0 x 1.45 x 0.70	BP14H00140	ORAR00015	14.00 x 1.78
14.00	17.30	4.10	5.50	0.25	14.0 x 1.65 x 0.70	BP16H00140	OR2001400	14.00 x 2.00
15.00	17.90	3.80	5.20	0.25	15.0 x 1.45 x 0.70	BP14H00150	ORAR00016	15.60 x 1.78
15.00	18.30	4.10	5.50	0.25	15.0 x 1.65 x 0.70	BP16H00150	OR2001500	15.00 x 2.00
16.00	18.90	3.80	5.20	0.25	16.0 x 1.45 x 0.70	BP14H00160	ORAR00016	15.60 x 1.78
16.00	19.30	4.10	5.50	0.25	16.0 x 1.65 x 0.70	BP16H00160	OR2001600	16.00 x 2.00
18.00	20.90	3.80	5.20	0.25	18.0 x 1.45 x 0.70	BP14H00180	ORAR00018	18.77 x 1.78
18.00	21.30	4.10	5.50	0.25	18.0 x 1.65 x 0.70	BP16H00180	OR2001800	18.00 x 2.00
20.00	22.90	3.80	5.20	0.25	20.0 x 1.45 x 0.70	BP14H00200	ORAR00019	20.35 x 1.78
20.00	23.30	4.10	5.50	0.25	20.0 x 1.65 x 0.70	BP16H00200	OR2002000	20.00 x 2.00
22.00	26.50	5.00	6.40	0.25	22.0 x 2.25 x 0.70	BP22H00220	ORAR00118	21.89 x 2.62
22.00	27.20	5.40	6.80	0.25	22.0 x 2.60 x 0.70	BP2600220	OR3002200	22.00 x 3.00
25.00	29.50	5.00	6.40	0.25	25.0 x 2.25 x 0.70	BP22H00250	ORAR00120	25.07 x 2.62
25.00	30.20	5.40	6.80	0.25	25.0 x 2.60 x 0.70	BP2600250	OR3002500	25.00 x 3.00
28.00	32.50	5.00	6.40	0.25	28.0 x 2.25 x 0.70	BP22H00280	ORAR00122	28.24 x 2.62
28.00	33.20	5.40	6.80	0.25	28.0 x 2.60 x 0.70	BP2600280	OR3002800	28.00 x 3.00
30.00	34.50	5.00	6.40	0.25	30.0 x 2.25 x 0.70	BP22H00300	ORAR00123	29.83 x 2.62
30.00	35.20	5.40	6.80	0.25	30.0 x 2.60 x 0.70	BP2600300	OR3003000	30.00 x 3.00
32.00	36.50	5.00	6.40	0.25	32.0 x 2.25 x 0.70	BP22H00320	ORAR00125	31.42 x 2.62
32.00	37.20	5.40	6.80	0.25	32.0 x 2.60 x 0.70	BP2600320	OR3003200	32.00 x 3.00
35.00	39.50	5.00	6.40	0.25	35.0 x 2.25 x 0.70	BP22H00350	ORAR00126	24.59 x 2.62
35.00	40.20	5.40	6.80	0.25	35.0 x 2.60 x 0.70	BP2600350	OR3003500	35.00 x 3.00
36.00	40.50	5.00	6.40	0.25	36.0 x 2.25 x 0.70	BP22H00360	ORAR00127	36.17 x 2.62
36.00	41.20	5.40	6.80	0.25	36.0 x 2.60 x 0.70	BP2600360	OR3003600	36.00 x 3.00
40.00	46.20	6.20	7.60	0.25	40.0 x 3.10 x 0.70	BP31D0400	ORAR00223	40.87 x 3.53
40.00	47.00	6.90	8.60	0.25	40.0 x 3.50 x 0.85	BP3500400	OR4004000	40.00 x 4.00
42.00	48.20	6.20	7.60	0.25	42.0 x 3.10 x 0.70	BP31D0420	ORAR00223	40.87 x 3.53
42.00	49.00	6.90	8.60	0.25	42.0 x 3.50 x 0.70	BP35D0420	OR4004200	42.00 x 2.00



Rod ∅	Groove ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
mm								
45.00	51.20	6.20	7.60	0.25	45.0 x 3.10 x 0.70	BP31D0450	ORAR00224	44.04 x 3.53
45.00	52.00	6.90	8.60	0.25	45.0 x 3.50 x 0.85	BP3500450	OR4004500	45.00 x 4.00
48.00	54.20	6.20	7.60	0.25	48.0 x 3.10 x 0.70	BP31D0480	ORAR00225	47.22 x 3.53
48.00	55.00	6.90	8.60	0.25	48.0 x 3.50 x 0.85	BP3500480	OR4004800	48.00 x 4.00
50.00	56.20	6.20	7.60	0.25	50.0 x 3.10 x 0.70	BP31D0500	ORAR00226	50.39 x 3.53
50.00	57.00	6.90	8.60	0.25	50.0 x 3.50 x 0.85	BP3500500	OR4005000	50.00 x 4.00
52.00	58.20	6.20	7.60	0.25	52.0 x 3.10 x 0.70	BP31D0520	ORAR00226	50.39 x 3.53
52.00	59.00	6.90	8.60	0.25	52.0 x 3.50 x 0.85	BP3500520	OR4005200	52.00 x 4.00
55.00	61.20	6.20	7.60	0.25	55.0 x 3.10 x 0.70	BP31D0550	ORAR00227	53.57 x 3.53
55.00	62.00	6.90	8.60	0.25	55.0 x 3.50 x 0.85	BP3500550	OR4005500	55.00 x 4.00
56.00	62.20	6.20	7.60	0.25	56.0 x 3.10 x 0.70	BP31D0560	ORAR00228	56.74 x 3.53
56.00	63.00	6.90	8.60	0.25	56.0 x 3.50 x 0.85	BP3500560	OR4005600	56.00 x 4.00
60.00	66.20	6.20	7.60	0.25	60.0 x 3.10 x 0.70	BP31D0600	ORAR00229	59.92 x 3.53
60.00	97.00	6.90	8.60	0.25	60.0 x 3.50 x 0.85	BP3500600	OR4006000	60.00 x 4.00
63.00	69.20	6.20	7.60	0.25	63.0 x 3.10 x 0.70	BP31D0630	ORAR00230	63.09 x 3.53
63.00	70.00	6.90	8.60	0.25	63.0 x 3.50 x 0.85	BP3500630	OR4006300	63.00 x 4.00
65.00	71.20	6.20	7.60	0.25	65.0 x 3.10 x 0.70	BP31D0650	ORAR00231	66.27 x 3.53
65.00	72.00	6.90	8.60	0.25	65.0 x 3.50 x 0.85	BP3500650	OR4006500	65.00 x 4.00
70.00	76.20	6.20	7.60	0.25	70.0 x 3.10 x 0.70	BP31D0700	ORAR00232	69.44 x 3.53
70.00	77.00	6.90	8.60	0.25	70.0 x 3.50 x 0.85	BP3500700	OR4007000	70.00 x 4.00
75.00	81.20	6.20	7.60	0.25	75.0 x 3.1 x 0.7	BP31D0750	ORAR00234	75.79 x 3.53
75.00	82.00	6.90	8.60	0.25	75.0 x 3.5 x 0.9	BP3500750	OR4007500	75.00 x 4.00
80.00	88.80	8.30	10.00	0.25	80.0 x 4.4 x 0.9	BP4400800	OR5008000	80.00 x 5.00
80.00	89.40	9.00	10.90	0.25	80.0 x 4.7 x 0.9	BP4700800	ORAR00339	81.92 x 5.33
85.00	93.80	8.30	10.00	0.25	85.0 x 4.4 x 0.9	BP4400850	OR5008500	85.00 x 5.00
80.00	89.40	9.00	10.90	0.25	80.0 x 4.7 x 0.9	BP4700850	ORAR00340	85.09 x 5.33
90.00	98.80	8.30	10.00	0.25	90.0 x 4.4 x 0.9	BP4400900	OR5009000	90.00 x 5.00
90.00	99.40	9.00	10.90	0.25	90.0 x 4.7 x 0.9	BP4700900	ORAR00342	91.44 x 5.33
95.00	103.80	8.30	10.00	0.25	95.0 x 4.4 x 0.9	BP4400950	OR5009500	95.00 x 5.00
95.00	104.40	9.00	10.90	0.25	95.0 x 4.7 x 0.9	BP4700950	ORAR00343	94.62 x 5.33
100.00	108.80	8.30	10.00	0.25	100.0 x 4.4 x 0.9	BP4401000	OR5010000	100.00 x 5.00
100.00	109.40	9.00	10.90	0.25	100.0 x 4.7 x 0.9	BP4701000	ORAR00345	100.97 x 5.33
105.00	113.80	8.30	10.00	0.25	105.0 x 4.4 x 0.9	BP4401050	OR5010500	105.00 x 5.00
105.00	114.40	9.00	10.90	0.25	105.0 x 4.7 x 0.9	BP4701050	ORAR00346	104.14 x 5.33
110.00	118.80	8.30	10.00	0.25	110.0 x 4.4 x 0.9	BP4401100	OR5011000	110.00 x 5.00
110.00	119.40	9.00	10.90	0.25	110.0 x 4.7 x 0.9	BP4701100	ORAR00348	110.49 x 5.33
115.00	123.80	8.30	10.00	0.25	115.0 x 4.4 x 0.9	BP4401150	OR5011500	115.00 x 5.00
115.00	124.40	9.00	10.90	0.25	115.0 x 4.7 x 0.9	BP4701150	ORAR00349	113.67 x 5.33
120.00	128.80	8.30	10.00	0.25	120.0 x 4.4 x 0.9	BP4401200	OR5012000	120.00 x 5.00
120.00	129.40	9.00	10.90	0.25	120.0 x 4.7 x 0.9	BP4701200	ORAR00351	120.02 x 5.33
125.00	133.80	8.30	10.00	0.25	125.0 x 4.4 x 0.9	BP4401250	OR5012500	125.00 x 5.00
125.00	134.40	9.00	10.90	0.25	125.0 x 4.7 x 0.9	BP4701250	ORAR00353	126.37 x 5.33



Rod ∅	Groove ∅	Groove width		Radius r ±0.2	Back-up Ring dimension ID x W x T	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
mm								
130.00	138.80	8.30	10.00	0.25	130.0 x 4.4 x 0.9	BP4401300	OR5013000	130.00 x 5.00
130.00	139.40	9.00	10.90	0.25	130.0 x 4.7 x 0.9	BP4701300	ORAR00354	129.54 x 5.33
135.00	147.20	12.30	15.10	0.25	135.0 x 6.1 x 1.3	BP6101350	ORAR00432	135.89 x 6.99
140.00	152.20	12.30	15.10	0.25	140.0 x 6.1 x 1.3	BP6101400	ORAR00433	139.07 x 6.99
150.00	162.20	12.30	15.10	0.25	150.0 x 6.1 x 1.3	BP6101500	ORAR00437	151.77 x 6.99
160.00	172.20	12.30	15.10	0.25	160.0 x 6.1 x 1.3	BP6101600	ORAR00438	158.12 x 6.99
170.00	182.20	12.30	15.10	0.25	170.0 x 6.1 x 1.3	BP6101700	ORAR00440	170.82 x 6.99
180.00	192.20	12.30	15.10	0.25	180.0 x 6.1 x 1.3	BP6101800	ORAR00442	183.52 x 6.99
190.00	202.20	12.30	15.10	0.25	190.0 x 6.1 x 1.3	BP6101900	ORAR00443	189.87 x 6.99
200.00	212.20	12.30	15.10	0.25	200.0 x 6.1 x 1.3	BP6102000	ORAR00445	202.57 x 6.99
210.00	222.20	12.30	15.10	0.25	210.0 x 6.1 x 1.3	BP6102100	ORAR00446	215.27 x 6.99
220.00	232.20	12.30	15.10	0.25	220.0 x 6.1 x 1.3	BP6102200	ORAR00446	215.27 x 6.99
230.00	242.20	12.30	15.10	0.25	230.0 x 6.1 x 1.3	BP6102300	ORAR00447	227.97 x 6.99
240.00	252.20	12.30	15.10	0.25	240.0 x 6.1 x 1.3	BP6102400	ORAR00448	240.67 x 6.99
250.00	262.20	12.30	15.10	0.25	250.0 x 6.1 x 1.3	BP6102500	ORAR00449	253.37 x 6.99
280.00	292.20	12.30	15.10	0.25	280.0 x 6.1 x 1.3	BP6102800	ORAR00451	278.77 x 6.99
300.00	312.20	12.30	15.10	0.25	300.0 x 6.1 x 1.3	BP6103000	ORAR00453	304.17 x 6.99
320.00	332.20	12.30	15.10	0.25	320.0 x 6.1 x 1.3	BP6103200	ORAR00454	316.87 x 6.99
350.00	362.20	12.30	15.10	0.25	350.0 x 6.1 x 1.3	BP6103500	ORAR00457	354.97 x 6.99
360.00	372.20	12.30	15.10	0.25	360.0 x 6.1 x 1.3	BP6103600	ORAR00457	354.97 x 6.99
400.00	412.20	12.30	15.10	0.25	400.0 x 6.1 x 1.3	BP6104000	ORAR00461	405.26 x 6.99

Further sizes available on request.

This table shows the possible range of available dimensions (Back-up Rings). However, these dimensions are not always stock items.

**Table 93: Preferred series for dynamic application, spiral Back-up Ring  
Type BP, Internal sealing, material PTFE – Inch**

Rod ∅ d <sub>N</sub> f7	Groove ∅ d <sub>6</sub> H9	Groove width		Radius r ±0.008	Back-up Ring dimension ID x W x T	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
inch								
0.157	0.256	0.118	0.157	0.010	0.157 x 0.049 x 0.020	BP12H00040	OR1500400	0.157 x 0.059
0.157	0.272	0.150	0.205	0.010	0.157 x 0.057 x 0.028	BP14H00040	ORAR00007	0.145 x 0.070
0.197	0.295	0.118	0.157	0.010	0.197 x 0.049 x 0.020	BP12H00050	OR1500500	0.197 x 0.059
0.197	0.311	0.150	0.205	0.010	0.197 x 0.057 x 0.028	BP14H00050	ORAR00008	0.176 x 0.070
0.236	0.335	0.118	0.157	0.010	0.236 x 0.049 x 0.020	BP12H00060	OR1500600	0.236 x 0.059
0.236	0.350	0.150	0.205	0.010	0.236 x 0.057 x 0.028	BP14H00060	ORAR00010	0.239 x 0.070
0.315	0.429	0.150	0.205	0.010	0.315 x 0.057 x 0.028	BP14H00080	ORAR00011	0.301 x 0.070
0.315	0.445	0.161	0.217	0.010	0.315 x 0.065 x 0.028	BP16H00080	OR2000800	0.315 x 0.079
0.394	0.508	0.150	0.205	0.010	0.394 x 0.057 x 0.028	BP14H00100	ORAR00013	0.426 x 0.070
0.394	0.524	0.161	0.217	0.010	0.394 x 0.065 x 0.028	BP16H00100	OR2001000	0.394 x 0.079
0.472	0.587	0.150	0.205	0.010	0.472 x 0.057 x 0.028	BP14H00120	ORAR00014	0.489 x 0.070
0.472	0.602	0.161	0.217	0.010	0.472 x 0.065 x 0.028	BP16H00120	OR2001200	0.472 x 0.079
0.551	0.665	0.150	0.205	0.010	0.551 x 0.057 x 0.028	BP14H00140	ORAR00015	0.551 x 0.070
0.551	0.681	0.161	0.217	0.010	0.551 x 0.065 x 0.028	BP16H00140	OR2001400	0.551 x 0.079
0.591	0.705	0.150	0.205	0.010	0.591 x 0.057 x 0.028	BP14H00150	ORAR00016	0.614 x 0.070
0.591	0.720	0.161	0.217	0.010	0.591 x 0.065 x 0.028	BP16H00150	OR2001500	0.591 x 0.079
0.630	0.744	0.150	0.205	0.010	0.630 x 0.057 x 0.028	BP14H00160	ORAR00016	0.614 x 0.070
0.630	0.760	0.161	0.217	0.010	0.630 x 0.065 x 0.028	BP16H00160	OR2001600	0.630 x 0.079
0.709	0.823	0.150	0.205	0.010	0.709 x 0.057 x 0.028	BP14H00180	ORAR00018	0.739 x 0.070
0.709	0.839	0.161	0.217	0.010	0.709 x 0.065 x 0.028	BP16H00180	OR2001800	0.709 x 0.079
0.787	0.902	0.150	0.205	0.010	0.787 x 0.057 x 0.028	BP14H00200	ORAR00019	0.801 x 0.070
0.787	0.917	0.161	0.217	0.010	0.787 x 0.065 x 0.028	BP16H00200	OR2002000	0.787 x 0.079
0.866	1.043	0.197	0.252	0.010	0.866 x 0.089 x 0.028	BP22H00220	ORAR00118	0.862 x 0.103
0.866	1.071	0.213	0.268	0.010	0.866 x 0.102 x 0.028	BP2600220	OR3002200	0.866 x 0.118
0.984	1.161	0.197	0.252	0.010	0.984 x 0.089 x 0.028	BP22H00250	ORAR00120	0.987 x 0.103
0.984	1.189	0.213	0.268	0.010	0.984 x 0.102 x 0.028	BP2600250	OR3002500	0.984 x 0.118
1.102	1.280	0.197	0.252	0.010	1.102 x 0.089 x 0.028	BP22H00280	ORAR00122	1.112 x 0.103
1.102	1.307	0.213	0.268	0.010	1.102 x 0.102 x 0.028	BP2600280	OR3002800	1.102 x 0.118
1.181	1.358	0.197	0.252	0.010	1.181 x 0.089 x 0.028	BP22H00300	ORAR00123	1.174 x 0.103
1.181	1.386	0.213	0.268	0.010	1.181 x 0.102 x 0.028	BP2600300	OR3003000	1.181 x 0.118
1.260	1.437	0.197	0.252	0.010	1.260 x 0.089 x 0.028	BP22H00320	ORAR00125	1.237 x 0.103
1.260	1.465	0.213	0.268	0.010	1.260 x 0.102 x 0.028	BP2600320	OR3003200	1.260 x 0.118
1.378	1.555	0.197	0.252	0.010	1.378 x 0.089 x 0.028	BP22H00350	ORAR00126	0.968 x 0.103
1.378	1.583	0.213	0.268	0.010	1.378 x 0.102 x 0.028	BP2600350	OR3003500	1.378 x 0.118
1.417	1.594	0.197	0.252	0.010	1.417 x 0.089 x 0.028	BP22H00360	ORAR00127	1.424 x 0.103
1.417	1.622	0.213	0.268	0.010	1.378 x 0.102 x 0.028	BP2600350	OR3003500	1.378 x 0.118
1.575	1.819	0.244	0.299	0.010	1.575 x 0.122 x 0.028	BP31D0400	ORAR00223	1.609 x 0.139
1.575	1.850	0.272	0.339	0.010	1.575 x 0.138 x 0.033	BP3500400	OR4004000	1.575 x 0.157
1.654	1.898	0.244	0.299	0.010	1.654 x 0.122 x 0.028	BP31D0420	ORAR00223	1.609 x 0.139
1.654	1.929	0.272	0.339	0.010	1.654 x 0.138 x 0.028	BP35D0420	OR4004200	1.654 x 0.079



Rod Ø	Groove Ø	Groove width		Radius r	Back-up Ring dimension ID x W x T	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
d <sub>N</sub> f7	d <sub>6</sub> H9			±0.008				
inch								
1.772	2.016	0.244	0.299	0.010	1.772 x 0.122 x 0.028	BP31D0450	ORAR00224	1.734 x 0.139
1.772	2.047	0.272	0.339	0.010	1.772 x 0.138 x 0.033	BP3500450	OR4004500	1.772 x 0.157
1.890	2.134	0.244	0.299	0.010	1.890 x 0.122 x 0.028	BP31D0480	ORAR00225	1.859 x 0.139
1.890	2.165	0.272	0.339	0.010	1.890 x 0.138 x 0.033	BP3500480	OR4004800	1.890 x 0.157
1.969	2.213	0.244	0.299	0.010	1.969 x 0.122 x 0.028	BP31D0500	ORAR00226	1.984 x 0.139
1.969	2.244	0.272	0.339	0.010	1.969 x 0.138 x 0.033	BP3500500	OR4005000	1.969 x 0.157
2.047	2.291	0.244	0.299	0.010	2.047 x 0.122 x 0.028	BP31D0520	ORAR00226	1.984 x 0.139
2.047	2.323	0.272	0.339	0.010	2.047 x 0.138 x 0.033	BP3500520	OR4005200	2.047 x 0.157
2.165	2.409	0.244	0.299	0.010	2.165 x 0.122 x 0.028	BP31D0550	ORAR00227	2.109 x 0.139
2.165	2.441	0.272	0.339	0.010	2.165 x 0.138 x 0.033	BP3500550	OR4005500	2.165 x 0.157
2.205	2.449	0.244	0.299	0.010	2.205 x 0.122 x 0.028	BP31D0560	ORAR00228	2.234 x 0.139
2.205	2.480	0.272	0.339	0.010	2.205 x 0.138 x 0.033	BP3500560	OR4005600	2.205 x 0.157
2.362	2.606	0.244	0.299	0.010	2.362 x 0.122 x 0.028	BP31D0600	ORAR00229	2.359 x 0.139
2.362	3.819	0.272	0.339	0.010	2.362 x 0.138 x 0.033	BP3500600	OR4006000	2.362 x 0.157
2.480	2.724	0.244	0.299	0.010	2.480 x 0.122 x 0.028	BP31D0630	ORAR00230	2.484 x 0.139
2.480	2.756	0.272	0.339	0.010	2.480 x 0.138 x 0.033	BP3500630	OR4006300	2.480 x 0.157
2.559	2.803	0.244	0.299	0.010	2.559 x 0.122 x 0.028	BP31D0650	ORAR00231	2.609 x 0.139
2.559	2.835	0.272	0.339	0.010	2.559 x 0.138 x 0.033	BP3500650	OR4006500	2.559 x 0.157
2.756	3.000	0.244	0.299	0.010	2.756 x 0.122 x 0.028	BP31D0700	ORAR00232	2.734 x 0.139
2.756	3.031	0.272	0.339	0.010	2.756 x 0.138 x 0.033	BP3500700	OR4007000	2.756 x 0.157
2.953	3.197	0.244	0.299	0.010	2.953 x 0.122 x 0.028	BP31D0750	ORAR00234	2.984 x 0.139
3.150	3.496	0.327	0.394	0.010	3.150 x 0.173 x 0.033	BP4400800	OR5008000	3.150 x 0.197
2.953	3.197	0.244	0.299	0.010	2.953 x 0.122 x 0.028	BP31D0750	ORAR00234	2.984 x 0.139
2.953	3.228	0.272	0.339	0.010	2.953 x 0.138 x 0.033	BP3500750	OR4007500	2.953 x 0.157
3.150	3.496	0.327	0.394	0.010	3.150 x 0.173 x 0.033	BP4400800	OR5008000	3.150 x 0.197
3.150	3.520	0.354	0.429	0.010	3.150 x 0.185 x 0.033	BP4700800	ORAR00339	3.225 x 0.210
3.346	3.693	0.327	0.394	0.010	3.346 x 0.173 x 0.033	BP4400850	OR5008500	3.346 x 0.197
3.346	3.717	0.354	0.429	0.010	3.346 x 0.185 x 0.033	BP4700850	ORAR00340	3.350 x 0.210
3.543	3.890	0.327	0.394	0.010	3.543 x 0.173 x 0.033	BP4400900	OR5009000	3.543 x 0.197
3.543	3.913	0.354	0.429	0.010	3.543 x 0.185 x 0.033	BP4700900	ORAR00342	3.600 x 0.210
3.740	4.087	0.327	0.394	0.010	3.740 x 0.173 x 0.033	BP4400950	OR5009500	3.740 x 0.197
3.740	4.110	0.354	0.429	0.010	3.740 x 0.185 x 0.033	BP4700950	ORAR00343	3.725 x 0.210
3.937	4.283	0.327	0.394	0.010	3.937 x 0.173 x 0.033	BP4401000	OR5010000	3.937 x 0.197
3.937	4.307	0.354	0.429	0.010	3.937 x 0.185 x 0.033	BP4701000	ORAR00345	3.975 x 0.210
4.134	4.480	0.327	0.394	0.010	4.134 x 0.173 x 0.033	BP4401050	OR5010500	4.134 x 0.197
4.134	4.504	0.354	0.429	0.010	4.134 x 0.185 x 0.033	BP4701050	ORAR00346	4.100 x 0.210
4.331	4.677	0.327	0.394	0.010	4.331 x 0.173 x 0.033	BP4401100	OR5011000	4.331 x 0.197
4.331	4.701	0.354	0.429	0.010	4.331 x 0.185 x 0.033	BP4701100	ORAR00348	4.350 x 0.210
4.528	4.874	0.327	0.394	0.010	4.528 x 0.173 x 0.033	BP4401150	OR5011500	4.528 x 0.197
4.528	4.898	0.354	0.429	0.010	4.528 x 0.185 x 0.033	BP4701150	ORAR00349	4.475 x 0.210



Rod ∅ d <sub>N</sub> f7	Groove ∅ d <sub>6</sub> H9	Groove width		Radius r ±0.008	Back-up Ring dimension ID x W x T	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
inch								
4.724	5.071	0.327	0.394	0.010	4.724 x 0.173 x 0.033	BP4401200	OR5012000	4.724 x 0.197
4.724	5.094	0.354	0.429	0.010	4.724 x 0.185 x 0.033	BP4701200	ORAR00351	4.725 x 0.210
4.921	5.268	0.327	0.394	0.010	4.921 x 0.173 x 0.033	BP4401250	OR5012500	4.921 x 0.197
4.921	5.291	0.354	0.429	0.010	4.921 x 0.185 x 0.033	BP4701250	ORAR00353	4.975 x 0.210
5.118	5.465	0.327	0.394	0.010	5.118 x 0.173 x 0.033	BP4401300	OR5013000	5.118 x 0.197
5.118	5.488	0.354	0.429	0.010	5.118 x 0.185 x 0.033	BP4701300	ORAR00354	5.100 x 0.210
5.315	5.795	0.484	0.594	0.010	5.315 x 0.240 x 0.049	BP6101350	ORAR00432	5.350 x 0.275
5.512	5.992	0.484	0.594	0.010	5.512 x 0.240 x 0.049	BP6101400	ORAR00433	5.475 x 0.275
5.906	6.386	0.484	0.594	0.010	5.906 x 0.240 x 0.049	BP6101500	ORAR00437	5.975 x 0.275
6.299	6.780	0.484	0.594	0.010	6.299 x 0.240 x 0.049	BP6101600	ORAR00438	6.225 x 0.275
6.693	7.173	0.484	0.594	0.010	6.693 x 0.240 x 0.049	BP6101700	ORAR00440	6.725 x 0.275
7.087	7.567	0.484	0.594	0.010	7.087 x 0.240 x 0.049	BP6101800	ORAR00442	7.225 x 0.275
7.480	7.961	0.484	0.594	0.010	7.480 x 0.240 x 0.049	BP6101900	ORAR00443	7.475 x 0.275
7.874	8.354	0.484	0.594	0.010	7.874 x 0.240 x 0.049	BP6102000	ORAR00445	7.975 x 0.275
8.268	8.748	0.484	0.594	0.010	8.268 x 0.240 x 0.049	BP6102100	ORAR00446	8.475 x 0.275
8.661	9.142	0.484	0.594	0.010	8.661 x 0.240 x 0.049	BP6102200	ORAR00446	8.475 x 0.275
9.055	9.535	0.484	0.594	0.010	9.055 x 0.240 x 0.049	BP6102300	ORAR00447	8.975 x 0.275
9.449	9.929	0.484	0.594	0.010	9.449 x 0.240 x 0.049	BP6102400	ORAR00448	9.475 x 0.275
9.843	10.323	0.484	0.594	0.010	9.843 x 0.240 x 0.049	BP6102500	ORAR00449	9.975 x 0.275
11.024	11.504	0.484	0.594	0.010	11.024 x 0.240 x 0.049	BP6102800	ORAR00451	10.975 x 0.275
11.811	12.291	0.484	0.594	0.010	11.811 x 0.240 x 0.049	BP6103000	ORAR00453	11.975 x 0.275
12.598	13.079	0.484	0.594	0.010	12.598 x 0.240 x 0.049	BP6103200	ORAR00454	12.475 x 0.275
13.780	14.260	0.484	0.594	0.010	13.780 x 0.240 x 0.049	BP6103500	ORAR00457	13.975 x 0.275
14.173	14.654	0.484	0.594	0.010	14.173 x 0.240 x 0.049	BP6103600	ORAR00457	13.975 x 0.275
15.748	16.228	0.484	0.594	0.010	15.748 x 0.240 x 0.049	BP6104000	ORAR00461	15.955 x 0.275

Further sizes available on request.

This table shows the possible range of available dimensions (Back-up Rings). However, these dimensions are not always stock items.





### ■ H.3 External (Piston) and Internal (Rod) Sealing, Static Applications only

#### H.3.1 CONCAVE BACK-UP RING TYPE (BB), MATERIAL NBR AND FKM FOR O-RINGS IN ACCORDANCE WITH ISO 3601-1 / AS568

The following figure and tables include installation recommendations and Back-up Ring dimensions for internal and external sealing applications with the concave Back-up Ring type BB (uncut), material NBR and FKM.

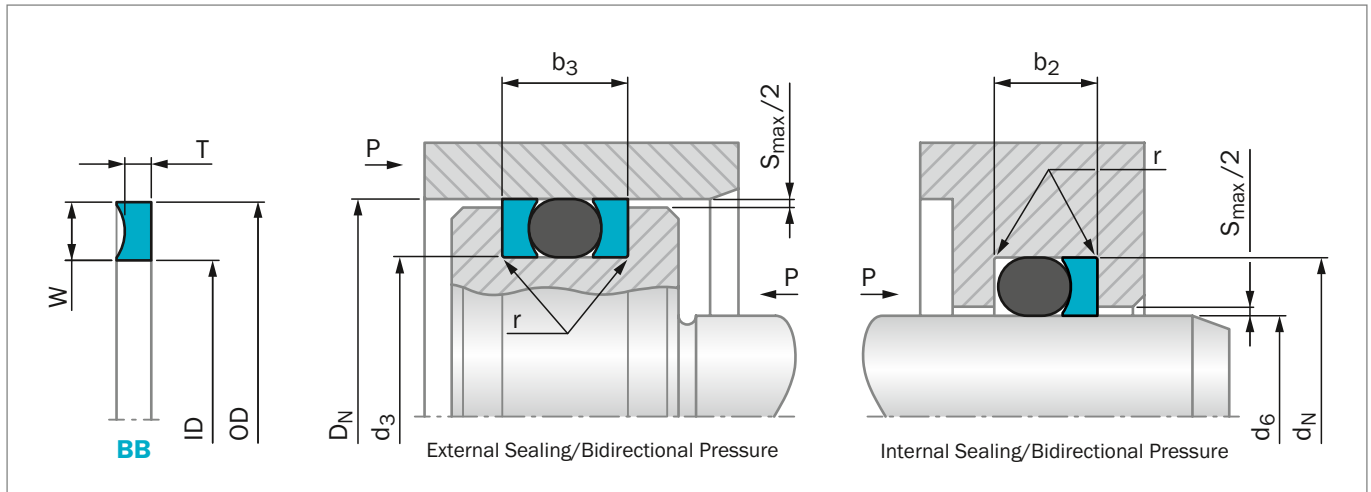


Figure 61: Installation drawing internal and external sealing, concave Back-up Ring type BB

**Table 94: Installation dimensions for the concave Back-up Ring Type BB, External and Internal Sealing, material NBR and FKM – Metric**

O-Ring Cross-Section-Ø in accordance with ISO 3601-1 AS568	Size code (dash-no.) ISO 3601-1 AS568	Back-up Ring Cross section		Groove dimensions					Radial clearance
		Radial height	Thickness	Groove diameter		Groove width		Radius	
				external	internal	b <sub>2</sub> +0.25	b <sub>3</sub> +0.25		
<b>d<sub>2</sub></b>		<b>W</b>	<b>T</b>	<b>d<sub>3</sub> -0.1</b>	<b>d<sub>6</sub> +0.1</b>	<b>b<sub>2</sub> +0.25</b>	<b>b<sub>3</sub> +0.25</b>	<b>r ±0.2</b>	<b>S max.</b>
<b>mm</b>									
1.78	004 to 050	1.35	1.14	D <sub>N</sub> - 2.9	d <sub>N</sub> + 2.9	3.60	5.00	0.25	0.06
2.62	102 to 178	2.18	1.14	D <sub>N</sub> - 4.5	d <sub>N</sub> + 4.5	4.50	5.90	0.25	0.06
3.53	201 to 284	3.00	1.02	D <sub>N</sub> - 6.2	d <sub>N</sub> + 6.2	5.60	7.00	0.25	0.08
5.33	309 to 395	4.65	1.52	D <sub>N</sub> - 9.4	d <sub>N</sub> + 9.4	7.90	9.60	0.25	0.08
6.33	425 to 475	5.99	2.44	D <sub>N</sub> - 12.2	d <sub>N</sub> + 12.2	10.70	13.20	0.25	0.10



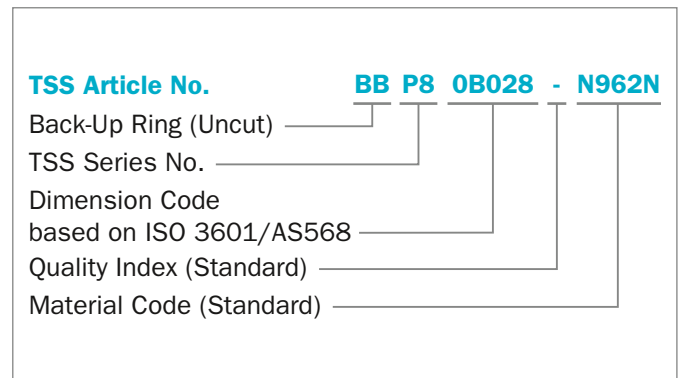
**Table 95: Installation dimensions for the concave Back-up Ring Type BB, External and Internal sealing, material NBR and FKM – Inch**

O-Ring Cross-Section-Ø in accordance with ISO 3601-1 AS568	Size code (dash-no.) ISO 3601-1 AS568	Back-up Ring Cross section		Groove dimensions					Radial clearance S max.
		Radial height W	Thick-ness T	Groove diameter		Groove width	Radius r ±0.008		
				external d <sub>3</sub> -0.004	internal d <sub>6</sub> +0.004				
inch									
0.070	004 to 050	0.053	0.045	D <sub>N</sub> - 0.114	d <sub>N</sub> + 0.114	0.142	004 to 050	0.010	0.002
0.103	102 to 178	0.086	0.045	D <sub>N</sub> - 0.177	d <sub>N</sub> + 0.177	0.177	102 to 178	0.010	0.002
0.139	201 to 284	0.118	0.040	D <sub>N</sub> - 0.244	d <sub>N</sub> + 0.244	0.220	201 to 284	0.010	0.003
0.210	309 to 395	0.183	0.060	D <sub>N</sub> - 0.370	d <sub>N</sub> + 0.370	0.311	309 to 395	0.010	0.003
0.249	425 to 475	0.236	0.096	D <sub>N</sub> - 0.480	d <sub>N</sub> + 0.480	0.421	425 to 475	0.010	0.004

**ORDERING EXAMPLE**

<b>Back-up Ring:</b>	Concave type BB (uncut) for O-Ring seal
<b>Application:</b>	Static, external sealing
<b>Bore diameter:</b>	D <sub>N</sub> = 38.00 mm (1.496 inch)
<b>O-Ring cross section:</b>	d <sub>2</sub> = 1.78 mm (0.070 inch)
<b>Back-up Ring material:</b>	N962N (NBR 90 Shore A)

For material code see page 149



**Table 96: Preferred series for static application, concave Back-up Ring, based on ISO 3601-1 O-Ring series, Type BB (uncut), Internal sealing, material NBR and FKM – Metric**

Rod Ø	Bore Ø	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
d <sub>N</sub> f7	D <sub>N</sub> H9	b <sub>2</sub> +0.25	b <sub>3</sub> +0.25	r ±0.2	ID x OD x T			d <sub>1</sub> x d <sub>2</sub>
mm								
2.0	5.2	3.6	5.0	0.25	2.44 x 5.14 x 1.14	BBP80B004	ORAR00004	1.78 x 1.78
2.5	6.0	3.6	5.0	0.25	3.24 x 5.94 x 1.14	BBP80B005	ORAR00005	2.57 x 1.78
3.0	6.5	3.6	5.0	0.25	3.56 x 6.26 x 1.14	BBP80B006	ORAR00006	2.90 x 1.78
4.0	7.0	3.6	5.0	0.25	4.74 x 7.04 x 1.14	BBP80B007	ORAR00007	3.68 x 1.78
5.0	8.0	3.6	5.0	0.25	5.13 x 7.83 x 1.14	BBP80B008	ORAR00008	4.47 x 1.78
5.5	9.0	3.6	5.0	0.25	5.94 x 8.64 x 1.14	BBP80B009	ORAR00009	5.28 x 1.78
6.5	10.0	3.6	5.0	0.25	6.73 x 9.43 x 1.14	BBP80B010	ORAR00010	6.07 x 1.78
8.0	11.0	3.6	5.0	0.25	8.31 x 11.01 x 1.14	BBP80B011	ORAR00011	7.65 x 1.78
9.5	13.0	3.6	5.0	0.25	9.91 x 12.61 x 1.14	BBP80B012	ORAR00012	9.25 x 1.78
11.0	14.0	3.6	5.0	0.25	11.56 x 14.26 x 1.14	BBP80B013	ORAR00013	10.82 x 1.78



Rod ∅	Bore ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
mm								
13.0	16.0	3.6	5.0	0.25	13.16 x 15.86 x 1.14	BBP80B014	ORAR00014	12.42 x 1.78
14.0	17.0	3.6	5.0	0.25	14.73 x 17.43 x 1.14	BBP80B015	ORAR00015	14.00 x 1.78
16.0	19.0	3.6	5.0	0.25	16.33 x 19.03 x 1.14	BBP80B016	ORAR00016	15.60 x 1.78
17.0	21.0	3.6	5.0	0.25	17.91 x 20.61 x 1.14	BBP80B017	ORAR00017	17.17 x 1.78
19.0	22.0	3.6	5.0	0.25	19.51 x 22.21 x 1.14	BBP80B018	ORAR00018	18.77 x 1.78
20.0	24.0	3.6	5.0	0.25	21.08 x 23.78 x 1.14	BBP80B019	ORAR00019	20.35 x 1.78
22.0	25.0	3.6	5.0	0.25	22.68 x 25.38 x 1.14	BBP80B020	ORAR00020	21.95 x 1.78
24.0	27.0	3.6	5.0	0.25	24.26 x 26.96 x 1.14	BBP80B021	ORAR00021	23.52 x 1.78
25.0	29.0	3.6	5.0	0.25	25.86 x 28.56 x 1.14	BBP80B022	ORAR00022	25.12 x 1.78
27.0	30.0	3.6	5.0	0.25	27.43 x 30.13 x 1.14	BBP80B023	ORAR00023	26.70 x 1.78
29.0	32.0	3.6	5.0	0.25	29.03 x 31.73 x 1.14	BBP80B024	ORAR00024	28.30 x 1.78
30.0	33.0	3.6	5.0	0.25	30.61 x 33.31 x 1.14	BBP80B025	ORAR00025	29.87 x 1.78
32.0	35.0	3.6	5.0	0.25	32.21 x 34.91 x 1.14	BBP80B026	ORAR00026	31.47 x 1.78
33.0	36.5	3.6	5.0	0.25	33.78 x 36.48 x 1.14	BBP80B027	ORAR00027	33.05 x 1.78
35.0	38.0	3.6	5.0	0.25	35.38 x 38.08 x 1.14	BBP80B028	ORAR00028	34.65 x 1.78
38.0	41.0	3.6	5.0	0.25	38.56 x 41.26 x 1.14	BBP80B029	ORAR00029	37.82 x 1.78
41.0	44.5	3.6	5.0	0.25	41.73 x 44.43 x 1.14	BBP80B030	ORAR00030	41.00 x 1.78
44.5	48.0	3.6	5.0	0.25	44.91 x 47.61 x 1.14	BBP80B031	ORAR00031	44.17 x 1.78
48.0	51.0	3.6	5.0	0.25	48.08 x 50.78 x 1.14	BBP80B032	ORAR00032	47.35 x 1.78
51.0	54.0	3.6	5.0	0.25	51.26 x 53.96 x 1.14	BBP80B033	ORAR00033	50.52 x 1.78
54.0	57.0	3.6	5.0	0.25	54.53 x 57.13 x 1.14	BBP80B034	ORAR00034	53.70 x 1.78
57.0	60.0	3.6	5.0	0.25	57.61 x 60.31 x 1.14	BBP80B035	ORAR00035	56.87 x 1.78
60.0	63.5	3.6	5.0	0.25	60.78 x 63.48 x 1.14	BBP80B036	ORAR00036	60.05 x 1.78
63.0	67.0	3.6	5.0	0.25	63.96 x 66.66 x 1.14	BBP80B037	ORAR00037	63.22 x 1.78
67.0	70.0	3.6	5.0	0.25	67.13 x 69.83 x 1.14	BBP80B038	ORAR00038	66.40 x 1.78
70.0	73.0	3.6	5.0	0.25	70.31 x 73.01 x 1.14	BBP80B039	ORAR00039	69.57 x 1.78
73.0	76.0	3.6	5.0	0.25	73.48 x 76.18 x 1.14	BBP80B040	ORAR00040	72.75 x 1.78
76.0	80.0	3.6	5.0	0.25	76.66 x 79.36 x 1.14	BBP80B041	ORAR00041	75.92 x 1.78
83.0	86.0	3.6	5.0	0.25	83.01 x 85.71 x 1.14	BBP80B042	ORAR00042	82.27 x 1.78
89.0	92.0	3.6	5.0	0.25	89.36 x 92.06 x 1.14	BBP80B043	ORAR00043	88.62 x 1.78
95.0	99.0	3.6	5.0	0.25	95.71 x 98.41 x 1.14	BBP80B044	ORAR00044	94.97 x 1.78
102.0	105.0	3.6	5.0	0.25	102.06 x 104.76 x 1.14	BBP80B045	ORAR00045	101.32 x 1.78
108.0	111.0	3.6	5.0	0.25	108.41 x 111.11 x 11.4	BBP80B046	ORAR00046	107.67 x 1.78
114.0	118.0	3.6	5.0	0.25	114.76 x 117.46 x 1.14	BBP80B047	ORAR00047	114.02 x 1.78
121.0	124.0	3.6	5.0	0.25	121.11 x 123.81 x 1.14	BBP80B048	ORAR00048	120.37 x 1.78
127.0	130.0	3.6	5.0	0.25	127.46 x 130.16 x 1.14	BBP80B049	ORAR00049	126.72 x 1.78
133.0	137.0	3.6	5.0	0.25	133.81 x 136.50 x 1.14	BBP80B050	ORAR00050	133.07 x 1.78
1.6	6.3	4.5	5.9	0.25	1.96 x 6.32 x 1.14	BBP80B102	ORAR00102	1.24 x 2.62
2.5	7.0	4.5	5.9	0.25	2.77 x 7.13 x 1.14	BBP80B103	ORAR00103	2.06 x 2.62
3.0	8.0	4.5	5.9	0.25	3.56 x 7.92 x 1.14	BBP80B104	ORAR00104	2.84 x 2.62
4.0	9.0	4.5	5.9	0.25	4.34 x 8.70 x 1.14	BBP80B105	ORAR00105	3.63 x 2.62
5.0	9.5	4.5	5.9	0.25	5.13 x 9.49 x 1.14	BBP80B106	ORAR00106	4.42 x 2.62



Rod ∅	Bore ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
mm								
5.5	10.0	4.5	5.9	0.25	5.94 x 10.30 x 1.14	BBP80B107	ORAR00107	5.23 x 2.62
6.5	11.0	4.5	5.9	0.25	6.73 x 11.09 x 1.14	BBP80B108	ORAR00108	6.02 x 2.62
8.0	13.0	4.5	5.9	0.25	8.31 x 12.67 x 1.14	BBP80B109	ORAR00109	7.59 x 2.62
9.5	14.0	4.5	5.9	0.25	9.91 x 14.27 x 1.14	BBP80B110	ORAR00110	9.19 x 2.62
11.0	16.0	4.5	5.9	0.25	11.48 x 15.84 x 1.14	BBP80B111	ORAR00111	10.77 x 2.62
13.0	17.0	4.5	5.9	0.25	13.08 x 17.44 x 1.14	BBP80B112	ORAR00112	12.37 x 2.62
14.0	19.0	4.5	5.9	0.25	14.66 x 19.02 x 1.14	BBP80B113	ORAR00113	13.94 x 2.62
16.0	21.0	4.5	5.9	0.25	16.26 x 20.62 x 1.14	BBP80B114	ORAR00114	15.54 x 2.62
17.0	22.0	4.5	5.9	0.25	17.83 x 22.19 x 1.14	BBP80B115	ORAR00115	17.12 x 2.62
19.0	24.0	4.5	5.9	0.25	19.43 x 23.79 x 1.14	BBP80B116	ORAR00116	18.72 x 2.62
20.0	25.0	4.5	5.9	0.25	21.11 x 25.47 x 1.14	BBP80B117	ORAR00117	20.29 x 2.62
22.0	27.00	4.5	5.9	0.25	22.68 x 27.04 x 1.14	BBP80B118	ORAR00118	21.89 x 2.62
24.0	29.0	4.5	5.9	0.25	24.28 x 28.64 x 1.14	BBP80B119	ORAR00119	23.47 x 2.62
25.0	30.0	4.5	5.9	0.25	25.86 x 30.22 x 1.14	BBP80B120	ORAR00120	25.07 x 2.62
27.0	32.0	4.5	5.9	0.25	27.46 x 31.82 x 1.14	BBP80B121	ORAR00121	26.64 x 2.62
29.0	33.0	4.5	5.9	0.25	29.03 x 33.39 x 1.14	BBP80B122	ORAR00122	28.24 x 2.62
30.0	35.0	4.5	5.9	0.25	30.63 x 34.99 x 1.14	BBP80B123	ORAR00123	29.82 x 2.62
32.0	36.5	4.5	5.9	0.25	32.21 x 36.57 x 1.14	BBP80B124	ORAR00124	31.42 x 2.62
33.0	38.0	4.5	5.9	0.25	33.81 x 38.17 x 1.14	BBP80B125	ORAR00125	32.99 x 2.62
35.0	40.0	4.5	5.9	0.25	35.38 x 39.74 x 1.14	BBP80B126	ORAR00126	34.59 x 2.62
36.5	41.0	4.5	5.9	0.25	36.98 x 41.34 x 1.14	BBP80B127	ORAR00127	36.17 x 2.62
38.0	43.0	4.5	5.9	0.25	38.56 x 42.92 x 1.14	BBP80B128	ORAR00128	37.77 x 2.62
40.0	44.5	4.5	5.9	0.25	40.16 x 44.52 x 1.14	BBP80B129	ORAR00129	39.34 x 2.62
41.0	46.0	4.5	5.9	0.25	41.73 x 46.09 x 1.14	BBP80B130	ORAR00130	40.94 x 2.62
43.0	48.0	4.5	5.9	0.25	43.33 x 47.69 x 1.14	BBP80B131	ORAR00131	42.52 x 2.62
44.5	50.0	4.5	5.9	0.25	44.91 x 49.27 x 1.14	BBP80B132	ORAR00132	44.12 x 2.62
46.0	51.0	4.5	5.9	0.25	46.51 x 50.87 x 1.14	BBP80B133	ORAR00133	45.69 x 2.62
48.0	52.0	4.5	5.9	0.25	48.08 x 52.44 x 1.14	BBP80B134	ORAR00134	47.29 x 2.62
49.0	54.0	4.5	5.9	0.25	49.86 x 54.04 x 1.14	BBP80B135	ORAR00135	48.90 x 2.62
51.0	55.5	4.5	5.9	0.25	51.26 x 55.62 x 1.14	BBP80B136	ORAR00136	50.47 x 2.62
52.0	57.0	4.5	5.9	0.25	52.86 x 57.22 x 1.14	BBP80B137	ORAR00137	52.07 x 2.62
54.0	58.0	4.5	5.9	0.25	54.43 x 58.79 x 1.14	BBP80B138	ORAR00138	53.64 x 2.62
55.0	60.0	4.5	5.9	0.25	56.03 x 60.39 x 1.14	BBP80B139	ORAR00139	55.25 x 2.62
57.0	62.0	4.5	5.9	0.25	57.61 x 61.97 x 1.14	BBP80B140	ORAR00140	56.82 x 2.62
59.0	63.5	4.5	5.9	0.25	59.21 x 63.57 x 1.14	BBP80B141	ORAR00141	58.42 x 2.62
60.0	65.0	4.5	5.9	0.25	60.78 x 65.14 x 1.14	BBP80B142	ORAR00142	59.99 x 2.62
62.0	67.0	4.5	5.9	0.25	62.38 x 66.74 x 1.14	BBP80B143	ORAR00143	61.60 x 2.62
63.0	68.0	4.5	5.9	0.25	63.96 x 68.32 x 1.14	BBP80B144	ORAR00144	63.17 x 2.62
65.0	70.0	4.5	5.9	0.25	65.56 x 69.92 x 1.14	BBP80B145	ORAR00145	64.77 x 2.62
67.0	71.0	4.5	5.9	0.25	67.13 x 71.49 x 1.14	BBP80B146	ORAR00146	66.34 x 2.62
68.0	73.0	4.5	5.9	0.25	68.73 x 73.09 x 1.14	BBP80B147	ORAR00147	67.95 x 2.62
70.0	75.0	4.5	5.9	0.25	70.31 x 74.67 x 1.14	BBP80B148	ORAR00148	69.52 x 2.62



Rod ∅	Bore ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
mm								
71.0	76.0	4.5	5.9	0.25	71.91 x 76.27 x 1.14	BBP80B149	ORAR00149	71.12 x 2.62
73.0	78.0	4.5	5.9	0.25	73.48 x 77.84 x 1.14	BBP80B150	ORAR00150	72.69 x 2.62
76.0	81.0	4.5	5.9	0.25	76.66 x 81.02 x 1.14	BBP80B151	ORAR00151	75.87 x 2.62
83.0	87.0	4.5	5.9	0.25	83.01 x 87.37 x 1.14	BBP80B152	ORAR00152	82.22 x 2.62
89.0	94.0	4.5	5.9	0.25	89.36 x 93.72 x 1.14	BBP80B153	ORAR00153	88.57 x 2.62
95.0	100.0	4.5	5.9	0.25	95.71 x 100.07 x 1.14	BBP80B154	ORAR00154	94.92 x 2.62
102.0	106.0	4.5	5.9	0.25	102.06 x 106.42 x 1.14	BBP80B155	ORAR00155	101.27 x 2.62
108.0	113.0	4.5	5.9	0.25	108.41 x 112.77 x 1.14	BBP80B156	ORAR00156	107.62 x 2.62
114.0	119.0	4.5	5.9	0.25	114.76 x 119.12 x 1.14	BBP80B157	ORAR00157	113.97 x 2.62
121.0	125.0	4.5	5.9	0.25	121.11 x 125.47 x 1.14	BBP80B158	ORAR00158	120.32 x 2.62
127.0	132.0	4.5	5.9	0.25	127.46 x 131.82 x 1.14	BBP80B159	ORAR00159	126.67 x 2.62
133.0	138.0	4.5	5.9	0.25	133.81 x 138.17 x 1.14	BBP80B160	ORAR00160	133.02 x 2.62
140.0	144.0	4.5	5.9	0.25	140.16 x 144.52 x 1.14	BBP80B161	ORAR00161	139.37 x 2.62
146.0	151.0	4.5	5.9	0.25	146.51 x 150.87 x 1.14	BBP80B162	ORAR00162	145.72 x 2.62
152.0	157.0	4.5	5.9	0.25	152.86 x 157.22 x 1.14	BBP80B163	ORAR00163	152.07 x 2.62
159.0	164.0	4.5	5.9	0.25	159.21 x 163.57 x 1.14	BBP80B164	ORAR00164	158.42 x 2.62
165.0	170.0	4.5	5.9	0.25	165.56 x 169.92 x 1.14	BBP80B165	ORAR00165	164.77 x 2.62
172.0	176.0	4.5	5.9	0.25	171.91 x 176.27 x 1.14	BBP80B166	ORAR00166	171.12 x 2.62
178.0	183.0	4.5	5.9	0.25	178.25 x 182.61 x 1.14	BBP80B167	ORAR00167	177.47 x 2.62
184.0	189.0	4.5	5.9	0.25	184.61 x 188.97 x 1.14	BBP80B168	ORAR00168	183.82 x 2.62
190.0	195.0	4.5	5.9	0.25	190.96 x 195.32 x 1.14	BBP80B169	ORAR00169	190.17 x 2.62
197.0	202.0	4.5	5.9	0.25	197.31 x 201.67 x 1.14	BBP80B170	ORAR00170	196.52 x 2.62
203.0	208.0	4.5	5.9	0.25	203.66 x 208.02 x 1.14	BBP80B171	ORAR00171	202.87 x 2.62
210.0	214.0	4.5	5.9	0.25	210.01 x 214.37 x 1.14	BBP80B172	ORAR00172	209.22 x 2.62
216.0	221.0	4.5	5.9	0.25	216.36 x 220.72 x 1.14	BBP80B173	ORAR00173	215.57 x 2.62
222.0	227.0	4.5	5.9	0.25	222.71 x 227.07 x 1.14	BBP80B174	ORAR00174	221.92 x 2.62
229.0	233.0	4.5	5.9	0.25	229.06 x 233.42 x 1.14	BBP80B175	ORAR00175	228.27 x 2.62
235.0	240.0	4.5	5.9	0.25	235.41 x 239.77 x 1.14	BBP80B176	ORAR00176	234.62 x 2.62
241.0	246.0	4.5	5.9	0.25	241.76 x 246.12 x 1.14	BBP80B177	ORAR00177	240.97 x 2.62
248.0	252.0	4.5	5.9	0.25	248.11 x 252.47 x 1.14	BBP80B178	ORAR00178	247.32 x 2.62
5.0	11.0	5.6	7.0	0.25	5.13 x 11.13 x 1.02	BBP80B201	ORAR00201	4.34 x 3.53
6.5	13.0	5.6	7.0	0.25	6.73 x 12.73 x 1.02	BBP80B202	ORAR00202	5.94 x 3.53
8.0	14.0	5.6	7.0	0.25	8.30 x 14.30 x 1.02	BBP80B203	ORAR00203	7.52 x 3.53
9.5	16.0	5.6	7.0	0.25	9.90 x 15.90 x 1.02	BBP80B204	ORAR00204	9.12 x 3.53
11.0	17.0	5.6	7.0	0.25	11.56 x 17.56 x 1.02	BBP80B205	ORAR00205	10.69 x 3.53
13.0	19.0	5.6	7.0	0.25	13.16 x 19.16 x 1.02	BBP80B206	ORAR00206	12.29 x 3.53
14.0	21.0	5.6	7.0	0.25	14.73 x 20.73 x 1.02	BBP80B207	ORAR00207	13.87 x 3.53
16.0	22.0	5.6	7.0	0.25	16.33 x 22.33 x 1.02	BBP80B208	ORAR00208	15.47 x 3.53
17.0	24.0	5.6	7.0	0.25	17.90 x 23.90 x 1.02	BBP80B209	ORAR00209	17.04 x 3.53
19.0	25.0	5.6	7.0	0.25	19.46 x 25.46 x 1.02	BBP80B210	ORAR00210	18.64 x 3.53
20.0	27.0	5.6	7.0	0.25	21.03 x 27.03 x 1.02	BBP80B211	ORAR00211	20.22 x 3.53
22.0	29.0	5.6	7.0	0.25	22.63 x 28.63 x 1.02	BBP80B212	ORAR00212	21.82 x 3.53



Rod ∅	Bore ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
mm								
24.0	30.0	5.6	7.0	0.25	24.21 x 30.21 x 1.02	BBP80B213	ORAR00213	23.39 x 3.53
25.0	32.0	5.6	7.0	0.25	25.81 x 31.81 x 1.02	BBP80B214	ORAR00214	25.00 x 3.53
27.0	33.0	5.6	7.0	0.25	27.38 x 33.38 x 1.02	BBP80B215	ORAR00215	26.57 x 3.53
29.0	35.0	5.6	7.0	0.25	28.98 x 34.98 x 1.02	BBP80B216	ORAR00216	28.17 x 3.53
30.0	36.5	5.6	7.0	0.25	30.56 x 36.56 x 1.02	BBP80B217	ORAR00217	29.74 x 3.53
32.0	38.0	5.6	7.0	0.25	32.16 x 38.16 x 1.02	BBP80B218	ORAR00218	31.34 x 3.53
33.0	40.0	5.6	7.0	0.25	33.88 x 39.88 x 1.02	BBP80B219	ORAR00219	32.92 x 3.53
35.0	41.0	5.6	7.0	0.25	35.50 x 41.50 x 1.02	BBP80B220	ORAR00220	34.52 x 3.53
36.0	43.0	5.6	7.0	0.25	37.06 x 43.06 x 1.02	BBP80B221	ORAR00221	36.09 x 3.53
38.0	44.5	5.6	7.0	0.25	38.66 x 44.66 x 1.02	BBP80B222	ORAR00222	37.69 x 3.53
41.0	48.0	5.6	7.0	0.25	41.83 x 47.83 x 1.02	BBP80B223	ORAR00223	40.87 x 3.53
44.5	51.0	5.6	7.0	0.25	45.01 x 51.01 x 1.02	BBP80B224	ORAR00224	44.04 x 3.53
48.0	54.0	5.6	7.0	0.25	48.18 x 54.18 x 1.02	BBP80B225	ORAR00225	47.22 x 3.53
51.0	57.0	5.6	7.0	0.25	51.36 x 57.36 x 1.02	BBP80B226	ORAR00226	50.39 x 3.53
54.0	60.0	5.6	7.0	0.25	54.53 x 60.53 x 1.02	BBP80B227	ORAR00227	53.57 x 3.53
57.0	63.5	5.6	7.0	0.25	57.71 x 63.71 x 1.02	BBP80B228	ORAR00228	56.74 x 3.53
60.0	67.0	5.6	7.0	0.25	60.88 x 68.88 x 1.02	BBP80B229	ORAR00229	59.92 x 3.53
63.5	70.0	5.6	7.0	0.25	64.06 x 70.06 x 1.02	BBP80B230	ORAR00230	63.09 x 3.53
67.0	73.0	5.6	7.0	0.25	66.83 x 72.83 x 1.02	BBP80B231	ORAR00231	66.27 x 3.53
70.0	76.0	5.6	7.0	0.25	70.00 x 76.00 x 1.02	BBP80B232	ORAR00232	69.44 x 3.53
73.0	79.0	5.6	7.0	0.25	73.18 x 79.18 x 1.02	BBP80B233	ORAR00233	72.62 x 3.53
76.0	83.0	5.6	7.0	0.25	76.35 x 82.35 x 1.02	BBP80B234	ORAR00234	75.79 x 3.53
79.5	86.0	5.6	7.0	0.25	79.53 x 85.53 x 1.02	BBP80B235	ORAR00235	78.97 x 3.53
83.0	89.0	5.6	7.0	0.25	82.70 x 88.70 x 1.02	BBP80B236	ORAR00236	82.14 x 3.53
86.0	92.0	5.6	7.0	0.25	85.88 x 91.88 x 1.02	BBP80B237	ORAR00237	85.32 x 3.53
90.0	95.0	5.6	7.0	0.25	89.05 x 95.05 x 1.02	BBP80B238	ORAR00238	88.49 x 3.53
92.0	98.0	5.6	7.0	0.25	92.23 x 98.23 x 1.02	BBP80B239	ORAR00239	91.67 x 3.53
95.0	102.0	5.6	7.0	0.25	95.40 x 101.40 x 1.02	BBP80B240	ORAR00240	94.84 x 3.53
98.0	105.0	5.6	7.0	0.25	98.58 x 104.58 x 1.02	BBP80B241	ORAR00241	98.02 x 3.53
102.0	108.0	5.6	7.0	0.25	101.75 x 107.75 x 1.02	BBP80B242	ORAR00242	101.19 x 3.53
105.0	111.0	5.6	7.0	0.25	104.93 x 110.93 x 1.02	BBP80B243	ORAR00243	104.37 x 3.53
108.0	114.0	5.6	7.0	0.25	108.10 x 114.10 x 1.02	BBP80B244	ORAR00244	107.54 x 3.53
111.0	118.0	5.6	7.0	0.25	111.28 x 117.28 x 1.02	BBP80B245	ORAR00245	110.72 x 3.53
114.0	121.0	5.6	7.0	0.25	114.45 x 120.45 x 1.02	BBP80B246	ORAR00246	113.89 x 3.53
118.0	124.0	5.6	7.0	0.25	117.63 x 123.63 x 1.02	BBP80B247	ORAR00247	117.07 x 3.53
121.0	127.0	5.6	7.0	0.25	121.11 x 127.11 x 1.02	BBP80B248	ORAR00248	120.24 x 3.53
124.0	130.0	5.6	7.0	0.25	124.28 x 130.28 x 1.02	BBP80B249	ORAR00249	123.42 x 3.53
127.0	133.0	5.6	7.0	0.25	127.46 x 133.46 x 1.02	BBP80B250	ORAR00250	126.59 x 3.53
130.0	136.5	5.6	7.0	0.25	130.63 x 136.63 x 1.02	BBP80B251	ORAR00251	129.77 x 3.53
133.0	140.0	5.6	7.0	0.25	133.81 x 139.81 x 1.02	BBP80B252	ORAR00252	132.94 x 3.53
136.5	143.0	5.6	7.0	0.25	136.98 x 142.98 x 1.02	BBP80B253	ORAR00253	136.12 x 3.53
140.0	146.0	5.6	7.0	0.25	140.16 x 146.16 x 1.02	BBP80B254	ORAR00254	139.29 x 3.53



Rod ∅	Bore ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
mm								
143.0	150.0	5.6	7.0	0.25	143.33 x 149.33 x 1.02	BBP80B255	ORAR00255	142.47 x 3.53
146.0	152.0	5.6	7.0	0.25	146.51 x 152.51 x 1.02	BBP80B256	ORAR00256	145.64 x 3.53
149.0	156.0	5.6	7.0	0.25	149.68 x 155.68 x 1.02	BBP80B257	ORAR00257	148.82 x 3.53
152.0	159.0	5.6	7.0	0.25	152.86 x 158.86 x 1.02	BBP80B258	ORAR00258	151.99 x 3.53
159.0	165.0	5.6	7.0	0.25	159.21 x 165.21 x 1.02	BBP80B259	ORAR00259	158.34 x 3.53
165.0	172.0	5.6	7.0	0.25	165.56 x 171.56 x 1.02	BBP80B260	ORAR00260	164.69 x 3.53
172.0	190.5	5.6	7.0	0.25	184.61 x 190.61 x 1.02	BBP80B263	ORAR00261	171.04 x 3.53
178.0	178.0	5.6	7.0	0.25	171.91 x 177.91 x 1.02	BBP80B261	ORAR00262	177.39 x 3.53
184.0	184.0	5.6	7.0	0.25	178.26 x 184.26 x 1.02	BBP80B262	ORAR00263	183.74 x 3.53
190.5	197.0	5.6	7.0	0.25	190.96 x 196.96 x 1.02	BBP80B264	ORAR00264	190.09 x 3.53
197.0	203.0	5.6	7.0	0.25	197.31 x 203.31 x 1.02	BBP80B265	ORAR00265	196.44 x 3.53
203.0	210.0	5.6	7.0	0.25	203.66 x 209.66 x 1.02	BBP80B266	ORAR00266	202.79 x 3.53
210.0	215.9	5.6	7.0	0.25	210.01 x 216.01 x 1.02	BBP80B267	ORAR00267	209.14 x 3.53
215.9	222.3	5.6	7.0	0.25	216.36 x 222.36 x 1.02	BBP80B268	ORAR00268	215.49 x 3.53
222.3	229.0	5.6	7.0	0.25	222.71 x 228.71 x 1.02	BBP80B269	ORAR00269	221.84 x 3.53
228.6	235.0	5.6	7.0	0.25	229.06 x 235.06 x 1.02	BBP80B270	ORAR00270	228.19 x 3.53
235.0	241.0	5.6	7.0	0.25	235.41 x 241.41 x 1.02	BBP80B271	ORAR00271	234.54 x 3.53
241.0	248.0	5.6	7.0	0.25	241.76 x 247.76 x 1.02	BBP80B272	ORAR00272	240.89 x 3.53
248.0	254.0	5.6	7.0	0.25	248.11 x 254.11 x 1.02	BBP80B273	ORAR00273	247.24 x 3.53
254.0	260.0	5.6	7.0	0.25	254.46 x 260.46 x 1.02	BBP80B274	ORAR00274	253.59 x 3.53
267.0	273.0	5.6	7.0	0.25	267.16 x 273.16 x 1.02	BBP80B275	ORAR00275	266.29 x 3.53
280.0	286.0	5.6	7.0	0.25	279.86 x 285.86 x 1.02	BBP80B276	ORAR00276	278.99 x 3.53
292.0	299.0	5.6	7.0	0.25	292.56 x 298.56 x 1.02	BBP80B277	ORAR00277	291.69 x 3.53
305.0	311.0	5.6	7.0	0.25	305.26 x 311.26 x 1.02	BBP80B278	ORAR00278	304.39 x 3.53
330.0	336.0	5.6	7.0	0.25	330.66 x 336.66 x 1.02	BBP80B279	ORAR00279	329.79 x 3.53
356.0	362.0	5.6	7.0	0.25	356.05 x 362.05 x 1.02	BBP80B280	ORAR00280	355.19 x 3.53
381.0	387.0	5.6	7.0	0.25	381.46 x 387.46 x 1.02	BBP80B281	ORAR00281	380.59 x 3.53
406.0	413.0	5.6	7.0	0.25	406.12 x 412.12 x 1.02	BBP80B282	ORAR00282	405.26 x 3.53
432.0	438.0	5.6	7.0	0.25	431.52 x 437.52 x 1.02	BBP80B283	ORAR00283	430.66 x 3.53
457.0	464.0	5.6	7.0	0.25	456.92 x 462.92 x 1.02	BBP80B284	ORAR00284	456.06 x 3.53
11.0	21.0	7.9	9.6	0.25	11.43 x 20.73 x 1.52	BBP80B309	ORAR00309	10.46 x 5.33
13.0	22.0	7.9	9.6	0.25	13.03 x 22.33 x 1.52	BBP80B310	ORAR00310	12.07 x 5.33
14.0	24.0	7.9	9.6	0.25	14.60 x 23.90 x 1.52	BBP80B311	ORAR00311	13.64 x 5.33
16.0	25.0	7.9	9.6	0.25	16.20 x 25.50 x 1.52	BBP80B312	ORAR00312	15.24 x 5.33
17.0	27.0	7.9	9.6	0.25	17.78 x 27.08 x 1.52	BBP80B313	ORAR00313	16.81 x 5.33
19.0	29.0	7.9	9.6	0.25	19.38 x 28.68 x 1.52	BBP80B314	ORAR00314	18.42 x 5.33
20.0	30.0	7.9	9.6	0.25	20.96 x 30.26 x 1.52	BBP80B315	ORAR00315	19.99 x 5.33
22.0	32.0	7.9	9.6	0.25	22.56 x 31.86 x 1.52	BBP80B316	ORAR00316	21.59 x 5.33
24.0	33.0	7.9	9.6	0.25	24.13 x 33.43 x 1.52	BBP80B317	ORAR00317	23.16 x 5.33
25.0	35.0	7.9	9.6	0.25	25.73 x 35.03 x 1.52	BBP80B318	ORAR00318	24.77 x 5.33
27.0	36.5	7.9	9.6	0.25	27.31 x 36.61 x 1.52	BBP80B319	ORAR00319	26.34 x 5.33
29.0	38.0	7.9	9.6	0.25	28.91 x 38.21 x 1.52	BBP80B320	ORAR00320	27.94 x 5.33



Rod ∅	Bore ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
mm								
30.0	40.0	7.9	9.6	0.25	30.42 x 39.72 x 1.52	BBP80B321	ORAR00321	29.51 x 5.33
32.0	41.0	7.9	9.6	0.25	32.08 x 41.38 x 1.52	BBP80B322	ORAR00322	31.12 x 5.33
33.0	43.0	7.9	9.6	0.25	33.43 x 42.73 x 1.52	BBP80B323	ORAR00323	32.69 x 5.33
35.0	44.5	7.9	9.6	0.25	35.26 x 44.56 x 1.52	BBP80B324	ORAR00324	34.29 x 5.33
38.0	48.0	7.9	9.6	0.25	38.43 x 47.73 x 1.52	BBP80B325	ORAR00325	37.47 x 5.33
41.0	51.0	7.9	9.6	0.25	41.61 x 50.91 x 1.52	BBP80B326	ORAR00326	40.64 x 5.33
44.5	54.0	7.9	9.6	0.25	44.78 x 54.08 x 1.52	BBP80B327	ORAR00327	43.82 x 5.33
48.0	57.0	7.9	9.6	0.25	47.96 x 57.26 x 1.52	BBP80B328	ORAR00328	46.99 x 5.33
51.0	60.0	7.9	9.6	0.25	51.13 x 60.43 x 1.52	BBP80B329	ORAR00329	50.17 x 5.33
54.0	63.5	7.9	9.6	0.25	54.31 x 63.61 x 1.52	BBP80B330	ORAR00330	53.34 x 5.33
57.0	67.0	7.9	9.6	0.25	57.61 x 66.91 x 1.52	BBP80B331	ORAR00331	56.52 x 5.33
60.0	70.0	7.9	9.6	0.25	60.78 x 70.08 x 1.52	BBP80B332	ORAR00332	59.69 x 5.33
64.0	73.0	7.9	9.6	0.25	63.96 x 73.26 x 1.52	BBP80B333	ORAR00333	62.87 x 5.33
67.0	76.0	7.9	9.6	0.25	67.13 x 76.43 x 1.52	BBP80B334	ORAR00334	66.04 x 5.33
70.0	80.0	7.9	9.6	0.25	70.31 x 79.61 x 1.52	BBP80B335	ORAR00335	69.22 x 5.33
73.0	83.0	7.9	9.6	0.25	73.48 x 82.78 x 1.52	BBP80B336	ORAR00336	72.39 x 5.33
76.0	86.0	7.9	9.6	0.25	76.66 x 85.96 x 1.52	BBP80B337	ORAR00337	75.57 x 5.33
80.0	89.0	7.9	9.6	0.25	79.83 x 89.13 x 1.52	BBP80B338	ORAR00338	78.74 x 5.33
83.0	92.0	7.9	9.6	0.25	83.13 x 92.43 x 1.52	BBP80B339	ORAR00339	81.92 x 5.33
86.0	95.0	7.9	9.6	0.25	86.31 x 95.61 x 1.52	BBP80B340	ORAR00340	85.09 x 5.33
90.0	98.0	7.9	9.6	0.25	89.48 x 98.78 x 1.52	BBP80B341	ORAR00341	88.27 x 5.33
92.0	102.0	7.9	9.6	0.25	92.66 x 101.96 x 1.52	BBP80B342	ORAR00342	91.44 x 5.33
95.0	105.0	7.9	9.6	0.25	95.83 x 105.13 x 1.52	BBP80B343	ORAR00343	94.62 x 5.33
98.0	108.0	7.9	9.6	0.25	99.01 x 108.31 x 1.52	BBP80B344	ORAR00344	97.79 x 5.33
102.0	111.0	7.9	9.6	0.25	102.31 x 111.61 x 1.52	BBP80B345	ORAR00345	100.97 x 5.33
105.0	114.0	7.9	9.6	0.25	105.49 x 114.79 x 1.52	BBP80B346	ORAR00346	104.14 x 5.33
108.0	118.0	7.9	9.6	0.25	108.66 x 117.96 x 1.52	BBP80B347	ORAR00347	107.32 x 5.33
111.0	121.0	7.9	9.6	0.25	111.84 x 121.14 x 1.52	BBP80B348	ORAR00348	110.49 x 5.33
114.0	124.0	7.9	9.6	0.25	115.01 x 124.31 x 1.52	BBP80B349	ORAR00349	113.67 x 5.33
115.0	130.0	7.9	9.6	0.25	121.36 x 130.66 x 1.52	BBP80B351	ORAR00351	120.02 x 5.33
118.0	127.0	7.9	9.6	0.25	118.19 x 127.49 x 1.52	BBP80B350	ORAR00350	116.84 x 5.33
124.0	133.0	7.9	9.6	0.25	124.54 x 133.84 x 1.52	BBP80B352	ORAR00352	123.19 x 5.33
127.0	137.0	7.9	9.6	0.25	127.71 x 137.01 x 1.52	BBP80B353	ORAR00353	126.37 x 5.33
130.0	140.0	7.9	9.6	0.25	130.89 x 140.19 x 1.52	BBP80B354	ORAR00354	129.54 x 5.33
134.0	143.0	7.9	9.6	0.25	134.09 x 143.39 x 1.52	BBP80B355	ORAR00355	132.72 x 5.33
137.0	146.0	7.9	9.6	0.25	137.24 x 146.54 x 1.52	BBP80B356	ORAR00356	135.89 x 5.33
140.0	150.0	7.9	9.6	0.25	140.41 x 149.71 x 1.52	BBP80B357	ORAR00357	139.07 x 5.33
143.0	152.0	7.9	9.6	0.25	143.59 x 152.89 x 1.52	BBP80B358	ORAR00358	142.24 x 5.33
146.0	156.0	7.9	9.6	0.25	146.76 x 156.06 x 1.52	BBP80B359	ORAR00359	145.42 x 5.33
150.0	159.0	7.9	9.6	0.25	149.94 x 159.24 x 1.52	BBP80B360	ORAR00360	148.49 x 5.33
152.0	162.0	7.9	9.6	0.25	153.11 x 162.41 x 1.52	BBP80B361	ORAR00361	151.77 x 5.33
159.0	168.0	7.9	9.6	0.25	159.46 x 168.76 x 1.52	BBP80B362	ORAR00362	158.12 x 5.33





Rod ∅	Bore ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
mm								
165.0	175.0	7.9	9.6	0.25	165.81 x 175.11 x 1.52	BBP80B363	ORAR00363	164.47 x 5.33
172.0	181.0	7.9	9.6	0.25	172.16 x 181.46 x 1.52	BBP80B364	ORAR00364	170.82 x 5.33
178.0	187.0	7.9	9.6	0.25	178.51 x 187.81 x 1.52	BBP80B365	ORAR00365	177.17 x 5.33
184.0	194.0	7.9	9.6	0.25	184.86 x 194.16 x 1.52	BBP80B366	ORAR00366	183.52 x 5.33
191.0	200.0	7.9	9.6	0.25	191.21 x 200.51 x 1.52	BBP80B367	ORAR00367	189.87 x 5.33
197.0	206.0	7.9	9.6	0.25	197.56 x 206.86 x 1.52	BBP80B368	ORAR00368	196.22 x 5.33
203.0	213.0	7.9	9.6	0.25	203.91 x 213.21 x 1.52	BBP80B369	ORAR00369	202.57 x 5.33
210.0	220.0	7.9	9.6	0.25	210.26 x 219.56 x 1.52	BBP80B370	ORAR00370	208.92 x 5.33
216.0	225.0	7.9	9.6	0.25	216.61 x 225.91 x 1.52	BBP80B371	ORAR00371	215.27 x 5.33
222.0	232.0	7.9	9.6	0.25	222.96 x 232.26 x 1.52	BBP80B372	ORAR00372	221.62 x 5.33
229.0	238.0	7.9	9.6	0.25	229.31 x 238.61 x 1.52	BBP80B373	ORAR00373	227.97 x 5.33
235.0	244.5	7.9	9.6	0.25	235.66 x 244.96 x 1.52	BBP80B374	ORAR00374	234.32 x 5.33
241.0	251.0	7.9	9.6	0.25	242.01 x 251.31 x 1.52	BBP80B375	ORAR00375	240.67 x 5.33
248.0	257.0	7.9	9.6	0.25	248.36 x 257.66 x 1.52	BBP80B376	ORAR00376	247.02 x 5.33
254.0	264.0	7.9	9.6	0.25	254.71 x 264.01 x 1.52	BBP80B377	ORAR00377	253.37 x 5.33
267.0	276.0	7.9	9.6	0.25	267.41 x 276.71 x 1.52	BBP80B378	ORAR00378	266.07 x 5.33
280.0	290.0	7.9	9.6	0.25	280.11 x 289.41 x 1.52	BBP80B379	ORAR00379	278.77 x 5.33
292.0	302.0	7.9	9.6	0.25	292.81 x 302.11 x 1.52	BBP80B380	ORAR00380	291.47 x 5.33
305.0	315.0	7.9	9.6	0.25	305.51 x 314.81 x 1.52	BBP80B381	ORAR00381	304.17 x 5.33
330.0	340.0	7.9	9.6	0.25	330.91 x 340.21 x 1.52	BBP80B382	ORAR00382	329.57 x 5.33
356.0	366.0	7.9	9.6	0.25	356.31 x 365.61 x 1.52	BBP80B383	ORAR00383	354.97 x 5.33
381.0	390.5	7.9	9.6	0.25	381.71 x 391.01 x 1.52	BBP80B384	ORAR00384	380.37 x 5.33
407.0	416.0	7.9	9.6	0.25	406.60 x 415.90 x 1.52	BBP80B385	ORAR00385	405.26 x 5.33
432.0	441.0	7.9	9.6	0.25	432.00 x 441.30 x 1.52	BBP80B386	ORAR00386	430.66 x 5.33
457.0	467.0	7.9	9.6	0.25	457.40 x 466.70 x 1.52	BBP80B387	ORAR00387	456.06 x 5.33
483.0	492.0	7.9	9.6	0.25	482.75 x 492.05 x 1.52	BBP80B388	ORAR00388	481.46 x 5.33
508.0	518.0	7.9	9.6	0.25	508.15 x 517.45 x 1.52	BBP80B389	ORAR00389	506.86 x 5.33
533.0	543.0	7.9	9.6	0.25	533.55 x 542.85 x 1.52	BBP80B390	ORAR00390	532.26 x 5.33
559.0	568.0	7.9	9.6	0.25	558.95 x 568.25 x 1.52	BBP80B391	ORAR00391	557.66 x 5.33
584.0	593.0	7.9	9.6	0.25	584.02 x 593.32 x 1.52	BBP80B392	ORAR00392	582.68 x 5.33
610.0	619.0	7.9	9.6	0.25	609.42 x 618.72 x 1.52	BBP80B393	ORAR00393	608.08 x 5.33
635.0	644.0	7.9	9.6	0.25	634.82 x 644.12 x 1.52	BBP80B394	ORAR00394	633.48 x 5.33
660.0	670.0	7.9	9.6	0.25	660.22 x 669.52 x 1.52	BBP80B395	ORAR00395	658.88 x 5.33
114.0	128.0	10.7	13.2	0.25	115.60 x 127.58 x 2.44	BBP80B425	ORAR00425	113.67 x 6.99
118.0	131.0	10.7	13.2	0.25	118.77 x 130.75 x 2.44	BBP80B426	ORAR00426	116.84 x 6.99
121.0	134.0	10.7	13.2	0.25	121.95 x 133.93 x 2.44	BBP80B427	ORAR00427	120.02 x 6.99
124.0	137.0	10.7	13.2	0.25	125.20 x 137.18 x 2.44	BBP80B428	ORAR00428	123.19 x 6.99
127.0	140.0	10.7	13.2	0.25	128.30 x 140.28 x 2.44	BBP80B429	ORAR00429	126.37 x 6.99
130.0	143.0	10.7	13.2	0.25	131.47 x 143.45 x 2.44	BBP80B430	ORAR00430	129.54 x 6.99
134.0	147.0	10.7	13.2	0.25	134.65 x 146.63 x 2.44	BBP80B431	ORAR00431	132.72 x 6.99
137.0	150.0	10.7	13.2	0.25	137.82 x 149.80 x 2.44	BBP80B432	ORAR00432	135.89 x 6.99
140.0	152.0	10.7	13.2	0.25	141.00 x 152.98 x 2.44	BBP80B433	ORAR00433	139.07 x 6.99



Rod ∅	Bore ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.25	b <sub>3</sub> +0.25					
mm								
143.0	156.0	10.7	13.2	0.25	144.17 x 156.15 x 2.44	BBP80B434	ORAR00434	142.24 x 6.99
146.0	159.0	10.7	13.2	0.25	147.35 x 159.33 x 2.44	BBP80B435	ORAR00435	145.42 x 6.99
150.0	162.0	10.7	13.2	0.25	150.52 x 162.50 x 2.44	BBP80B436	ORAR00436	148.59 x 6.99
153.0	165.0	10.7	13.2	0.25	153.70 x 165.68 x 2.44	BBP80B437	ORAR00437	151.77 x 6.99
159.0	172.0	10.7	13.2	0.25	159.36 x 171.34 x 2.44	BBP80B438	ORAR00438	158.12 x 6.99
165.0	178.0	10.7	13.2	0.25	165.71 x 177.69 x 2.44	BBP80B439	ORAR00439	164.47 x 6.99
172.0	184.0	10.7	13.2	0.25	172.06 x 184.04 x 2.44	BBP80B440	ORAR00440	170.82 x 6.99
178.0	190.5	10.7	13.2	0.25	178.41 x 190.39 x 2.44	BBP80B441	ORAR00441	177.17 x 6.99
185.0	197.0	10.7	13.2	0.25	184.76 x 196.74 x 2.44	BBP80B442	ORAR00442	183.52 x 6.99
190.0	203.0	10.7	13.2	0.25	191.11 x 203.09 x 2.44	BBP80B443	ORAR00443	189.87 x 6.99
197.0	210.0	10.7	13.2	0.25	197.46 x 209.44 x 2.44	BBP80B444	ORAR00444	196.22 x 6.99
203.0	216.0	10.7	13.2	0.25	203.81 x 215.79 x 2.44	BBP80B445	ORAR00445	202.57 x 6.99
216.0	229.0	10.7	13.2	0.25	216.51 x 228.49 x 2.44	BBP80B446	ORAR00446	215.27 x 6.99
229.0	241.0	10.7	13.2	0.25	229.21 x 241.19 x 2.44	BBP80B447	ORAR00447	227.97 x 6.99
241.0	254.0	10.7	13.2	0.25	241.91 x 253.89 x 2.44	BBP80B448	ORAR00448	240.67 x 6.99
254.0	267.0	10.7	13.2	0.25	254.61 x 266.59 x 2.44	BBP80B449	ORAR00449	253.37 x 6.99
267.0	280.0	10.7	13.2	0.25	267.31 x 279.29 x 2.44	BBP80B450	ORAR00450	266.07 x 6.99
280.0	292.0	10.7	13.2	0.25	280.01 x 291.99 x 2.44	BBP80B451	ORAR00451	278.77 x 6.99
292.0	305.0	10.7	13.2	0.25	292.71 x 304.69 x 2.44	BBP80B452	ORAR00452	291.47 x 6.99
305.0	218.0	10.7	13.2	0.25	305.41 x 317.39 x 2.44	BBP80B453	ORAR00453	304.17 x 6.99
318.0	330.0	10.7	13.2	0.25	318.11 x 330.09 x 2.44	BBP80B454	ORAR00454	316.87 x 6.99
330.0	343.0	10.7	13.2	0.25	330.81 x 342.79 x 2.44	BBP80B455	ORAR00455	329.57 x 6.99
343.0	356.0	10.7	13.2	0.25	343.51 x 355.49 x 2.44	BBP80B456	ORAR00456	342.47 x 6.99
356.0	368.0	10.7	13.2	0.25	356.21 x 361.09 x 2.44	BBP80B457	ORAR00457	354.97 x 6.99
368.0	381.0	10.7	13.2	0.25	368.91 x 380.89 x 2.44	BBP80B458	ORAR00458	367.67 x 6.99
381.0	394.0	10.7	13.2	0.25	381.61 x 393.51 x 2.44	BBP80B459	ORAR00459	380.37 x 6.99
394.0	406.0	10.7	13.2	0.25	394.31 x 406.29 x 2.44	BBP80B460	ORAR00460	393.07 x 6.99
407.0	419.0	10.7	13.2	0.25	406.50 x 418.48 x 2.44	BBP80B461	ORAR00461	405.26 x 6.99
420.0	432.0	10.7	13.2	0.25	419.20 x 431.18 x 2.44	BBP80B462	ORAR00462	417.96 x 6.99
432.0	444.5	10.7	13.2	0.25	431.90 x 443.88 x 2.44	BBP80B463	ORAR00463	430.66 x 6.99
445.0	457.0	10.7	13.2	0.25	444.60 x 456.58 x 2.44	BBP80B464	ORAR00464	443.36 x 6.99
458.0	470.0	10.7	13.2	0.25	457.30 x 469.28 x 2.44	BBP80B465	ORAR00465	456.06 x 6.99
470.0	483.0	10.7	13.2	0.25	470.00 x 481.98 x 2.44	BBP80B466	ORAR00466	468.76 x 6.99
483.0	495.0	10.7	13.2	0.25	482.70 x 494.68 x 2.44	BBP80B467	ORAR00467	481.38 x 6.99
495.0	508.0	10.7	13.2	0.25	495.40 x 507.38 x 2.44	BBP80B468	ORAR00468	494.16 x 6.99
508.0	521.0	10.7	13.2	0.25	508.10 x 520.08 x 2.44	BBP80B469	ORAR00469	506.86 x 6.99
533.0	546.0	10.7	13.2	0.25	533.50 x 545.80 x 2.44	BBP80B470	ORAR00470	532.26 x 6.99
559.0	572.0	10.7	13.2	0.25	558.90 x 570.88 x 2.44	BBP80B471	ORAR00471	557.66 x 6.99
584.0	597.0	10.7	13.2	0.25	584.30 x 596.28 x 2.44	BBP80B472	ORAR00472	582.68 x 6.99
610.0	622.0	10.7	13.2	0.25	609.70 x 621.68 x 2.44	BBP80B473	ORAR00473	608.08 x 6.99
635.0	648.0	10.7	13.2	0.25	635.10 x 647.08 x 2.44	BBP80B474	ORAR00474	633.48 x 6.99
660.0	673.0	10.7	13.2	0.25	660.50 x 672.48 x 2.44	BBP80B475	ORAR00475	658.88 x 6.99



**Table 97: Preferred series for static application, concave Back-up Ring, based on ISO 3601-1 O-Ring series, Type BB (uncut), Internal sealing, material NBR and FKM – Inch**

Rod Ø	Bore Ø	Groove width		Radius r ±0.008	Back-up Ring dimension ID x OD x T	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension d <sub>1</sub> x d <sub>2</sub>
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
inch								
0.079	0.205	0.142	0.197	0.010	0.096 x 0.202 x 0.045	BBP80B004	ORAR00004	0.070 x 0.070
0.098	0.236	0.142	0.197	0.010	0.128 x 0.234 x 0.045	BBP80B005	ORAR00005	0.101 x 0.070
0.118	0.256	0.142	0.197	0.010	0.140 x 0.246 x 0.045	BBP80B006	ORAR00006	0.114 x 0.070
0.157	0.276	0.142	0.197	0.010	0.187 x 0.277 x 0.045	BBP80B007	ORAR00007	0.145 x 0.070
0.197	0.315	0.142	0.197	0.010	0.202 x 0.308 x 0.045	BBP80B008	ORAR00008	0.176 x 0.070
0.217	0.354	0.142	0.197	0.010	0.234 x 0.340 x 0.045	BBP80B009	ORAR00009	0.208 x 0.070
0.256	0.394	0.142	0.197	0.010	0.265 x 0.371 x 0.045	BBP80B010	ORAR00010	0.239 x 0.070
0.315	0.433	0.142	0.197	0.010	0.327 x 0.433 x 0.045	BBP80B011	ORAR00011	0.301 x 0.070
0.374	0.512	0.142	0.197	0.010	0.390 x 0.496 x 0.045	BBP80B012	ORAR00012	0.364 x 0.070
0.433	0.551	0.142	0.197	0.010	0.455 x 0.561 x 0.045	BBP80B013	ORAR00013	0.426 x 0.070
0.512	0.630	0.142	0.197	0.010	0.518 x 0.624 x 0.045	BBP80B014	ORAR00014	0.489 x 0.070
0.551	0.669	0.142	0.197	0.010	0.580 x 0.686 x 0.045	BBP80B015	ORAR00015	0.551 x 0.070
0.630	0.748	0.142	0.197	0.010	0.643 x 0.749 x 0.045	BBP80B016	ORAR00016	0.614 x 0.070
0.669	0.827	0.142	0.197	0.010	0.705 x 0.811 x 0.045	BBP80B017	ORAR00017	0.676 x 0.070
0.748	0.866	0.142	0.197	0.010	0.768 x 0.874 x 0.045	BBP80B018	ORAR00018	0.739 x 0.070
0.787	0.945	0.142	0.197	0.010	0.830 x 0.936 x 0.045	BBP80B019	ORAR00019	0.801 x 0.070
0.866	0.984	0.142	0.197	0.010	0.893 x 0.999 x 0.045	BBP80B020	ORAR00020	0.864 x 0.070
0.945	1.063	0.142	0.197	0.010	0.955 x 1.061 x 0.045	BBP80B021	ORAR00021	0.926 x 0.070
0.984	1.142	0.142	0.197	0.010	1.018 x 1.124 x 0.045	BBP80B022	ORAR00022	0.989 x 0.070
1.063	1.181	0.142	0.197	0.010	1.080 x 1.186 x 0.045	BBP80B023	ORAR00023	1.051 x 0.070
1.142	1.260	0.142	0.197	0.010	1.143 x 1.249 x 0.045	BBP80B024	ORAR00024	1.114 x 0.070
1.181	1.299	0.142	0.197	0.010	1.205 x 1.311 x 0.045	BBP80B025	ORAR00025	1.176 x 0.070
1.260	1.378	0.142	0.197	0.010	1.268 x 1.374 x 0.045	BBP80B026	ORAR00026	1.239 x 0.070
1.299	1.437	0.142	0.197	0.010	1.330 x 1.436 x 0.045	BBP80B027	ORAR00027	1.301 x 0.070
1.378	1.496	0.142	0.197	0.010	1.393 x 1.499 x 0.045	BBP80B028	ORAR00028	1.364 x 0.070
1.496	1.614	0.142	0.197	0.010	1.518 x 1.624 x 0.045	BBP80B029	ORAR00029	1.489 x 0.070
1.614	1.752	0.142	0.197	0.010	1.643 x 1.749 x 0.045	BBP80B030	ORAR00030	1.614 x 0.070
1.752	1.890	0.142	0.197	0.010	1.768 x 1.874 x 0.045	BBP80B031	ORAR00031	1.739 x 0.070
1.890	2.008	0.142	0.197	0.010	1.893 x 1.999 x 0.045	BBP80B032	ORAR00032	1.864 x 0.070
2.008	2.126	0.142	0.197	0.010	2.018 x 2.124 x 0.045	BBP80B033	ORAR00033	1.989 x 0.070
2.126	2.244	0.142	0.197	0.010	2.147 x 2.249 x 0.045	BBP80B034	ORAR00034	2.114 x 0.070
2.244	2.362	0.142	0.197	0.010	2.268 x 2.374 x 0.045	BBP80B035	ORAR00035	2.239 x 0.070
2.362	2.500	0.142	0.197	0.010	2.393 x 2.499 x 0.045	BBP80B036	ORAR00036	2.364 x 0.070
2.480	2.638	0.142	0.197	0.010	2.518 x 2.624 x 0.045	BBP80B037	ORAR00037	2.489 x 0.070
2.638	2.756	0.142	0.197	0.010	2.643 x 2.749 x 0.045	BBP80B038	ORAR00038	2.614 x 0.070
2.756	2.874	0.142	0.197	0.010	2.768 x 2.874 x 0.045	BBP80B039	ORAR00039	2.739 x 0.070
2.874	2.992	0.142	0.197	0.010	2.893 x 2.999 x 0.045	BBP80B040	ORAR00040	2.864 x 0.070
2.992	3.150	0.142	0.197	0.010	3.018 x 3.124 x 0.045	BBP80B041	ORAR00041	2.989 x 0.070
3.268	3.386	0.142	0.197	0.010	3.268 x 3.374 x 0.045	BBP80B042	ORAR00042	3.239 x 0.070
3.504	3.622	0.142	0.197	0.010	3.518 x 3.624 x 0.045	BBP80B043	ORAR00043	3.489 x 0.070



Rod ∅	Bore ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
inch								
3.740	3.898	0.142	0.197	0.010	3.768 x 3.874 x 0.045	BBP80B044	ORAR00044	3.739 x 0.070
4.016	4.134	0.142	0.197	0.010	4.018 x 4.124 x 0.045	BBP80B045	ORAR00045	3.989 x 0.070
4.252	4.370	0.142	0.197	0.010	4.268 x 4.374 x 0.045	BBP80B046	ORAR00046	4.239 x 0.070
4.488	4.646	0.142	0.197	0.010	4.518 x 4.624 x 0.045	BBP80B047	ORAR00047	4.489 x 0.070
4.764	4.882	0.142	0.197	0.010	4.768 x 4.874 x 0.045	BBP80B048	ORAR00048	4.739 x 0.070
5.000	5.118	0.142	0.197	0.010	5.018 x 5.124 x 0.045	BBP80B049	ORAR00049	4.989 x 0.070
5.236	5.394	0.142	0.197	0.010	5.268 x 5.374 x 0.045	BBP80B050	ORAR00050	5.239 x 0.070
0.063	0.248	0.177	0.232	0.010	0.077 x 0.249 x 0.045	BBP80B102	ORAR00102	0.049 x 0.103
0.098	0.276	0.177	0.232	0.010	0.109 x 0.281 x 0.045	BBP80B103	ORAR00103	0.081 x 0.103
0.118	0.315	0.177	0.232	0.010	0.140 x 0.312 x 0.045	BBP80B104	ORAR00104	0.112 x 0.103
0.157	0.354	0.177	0.232	0.010	0.171 x 0.343 x 0.045	BBP80B105	ORAR00105	0.143 x 0.103
0.197	0.374	0.177	0.232	0.010	0.202 x 0.374 x 0.045	BBP80B106	ORAR00106	0.174 x 0.103
0.217	0.394	0.177	0.232	0.010	0.234 x 0.406 x 0.045	BBP80B107	ORAR00107	0.206 x 0.103
0.256	0.433	0.177	0.232	0.010	0.265 x 0.437 x 0.045	BBP80B108	ORAR00108	0.237 x 0.103
0.315	0.512	0.177	0.232	0.010	0.327 x 0.499 x 0.045	BBP80B109	ORAR00109	0.299 x 0.103
0.374	0.551	0.177	0.232	0.010	0.390 x 0.562 x 0.045	BBP80B110	ORAR00110	0.362 x 0.103
0.433	0.630	0.177	0.232	0.010	0.452 x 0.624 x 0.045	BBP80B111	ORAR00111	0.424 x 0.103
0.512	0.669	0.177	0.232	0.010	0.515 x 0.687 x 0.045	BBP80B112	ORAR00112	0.487 x 0.103
0.551	0.748	0.177	0.232	0.010	0.577 x 0.749 x 0.045	BBP80B113	ORAR00113	0.549 x 0.103
0.630	0.827	0.177	0.232	0.010	0.640 x 0.812 x 0.045	BBP80B114	ORAR00114	0.612 x 0.103
0.669	0.866	0.177	0.232	0.010	0.702 x 0.874 x 0.045	BBP80B115	ORAR00115	0.674 x 0.103
0.748	0.945	0.177	0.232	0.010	0.765 x 0.937 x 0.045	BBP80B116	ORAR00116	0.737 x 0.103
0.787	0.984	0.177	0.232	0.010	0.831 x 1.003 x 0.045	BBP80B117	ORAR00117	0.799 x 0.103
0.866	1.063	0.177	0.232	0.010	0.893 x 1.065 x 0.045	BBP80B118	ORAR00118	0.862 x 0.103
0.945	1.142	0.177	0.232	0.010	0.956 x 1.128 x 0.045	BBP80B119	ORAR00119	0.924 x 0.103
0.984	1.181	0.177	0.232	0.010	1.018 x 1.190 x 0.045	BBP80B120	ORAR00120	0.987 x 0.103
1.063	1.260	0.177	0.232	0.010	1.081 x 1.253 x 0.045	BBP80B121	ORAR00121	1.049 x 0.103
1.142	1.299	0.177	0.232	0.010	1.143 x 1.315 x 0.045	BBP80B122	ORAR00122	1.112 x 0.103
1.181	1.378	0.177	0.232	0.010	1.206 x 1.378 x 0.045	BBP80B123	ORAR00123	1.174 x 0.103
1.260	1.437	0.177	0.232	0.010	1.268 x 1.440 x 0.045	BBP80B124	ORAR00124	1.237 x 0.103
1.299	1.496	0.177	0.232	0.010	1.331 x 1.503 x 0.045	BBP80B125	ORAR00125	1.299 x 0.103
1.378	1.575	0.177	0.232	0.010	1.393 x 1.565 x 0.045	BBP80B126	ORAR00126	1.362 x 0.103
1.437	1.614	0.177	0.232	0.010	1.456 x 1.628 x 0.045	BBP80B127	ORAR00127	1.424 x 0.103
1.496	1.693	0.177	0.232	0.010	1.518 x 1.690 x 0.045	BBP80B128	ORAR00128	1.487 x 0.103
1.575	1.752	0.177	0.232	0.010	1.581 x 1.753 x 0.045	BBP80B129	ORAR00129	1.549 x 0.103
1.614	1.811	0.177	0.232	0.010	1.643 x 1.815 x 0.045	BBP80B130	ORAR00130	1.612 x 0.103
1.693	1.890	0.177	0.232	0.010	1.706 x 1.878 x 0.045	BBP80B131	ORAR00131	1.674 x 0.103
1.752	1.969	0.177	0.232	0.010	1.768 x 1.940 x 0.045	BBP80B132	ORAR00132	1.737 x 0.103
1.811	2.008	0.177	0.232	0.010	1.831 x 2.003 x 0.045	BBP80B133	ORAR00133	1.799 x 0.103
1.890	2.047	0.177	0.232	0.010	1.893 x 2.065 x 0.045	BBP80B134	ORAR00134	1.862 x 0.103
1.929	2.126	0.177	0.232	0.010	1.963 x 2.128 x 0.045	BBP80B135	ORAR00135	1.925 x 0.103
2.008	2.185	0.177	0.232	0.010	2.018 x 2.190 x 0.045	BBP80B136	ORAR00136	1.987 x 0.103



Rod ∅	Bore ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
inch								
2.047	2.244	0.177	0.232	0.010	2.081 x 2.253 x 0.045	BBP80B137	ORAR00137	2.050 x 0.103
2.126	2.283	0.177	0.232	0.010	2.143 x 2.315 x 0.045	BBP80B138	ORAR00138	2.112 x 0.103
2.165	2.362	0.177	0.232	0.010	2.206 x 2.378 x 0.045	BBP80B139	ORAR00139	2.175 x 0.103
2.244	2.441	0.177	0.232	0.010	2.268 x 2.440 x 0.045	BBP80B140	ORAR00140	2.237 x 0.103
2.323	2.500	0.177	0.232	0.010	2.331 x 2.503 x 0.045	BBP80B141	ORAR00141	2.300 x 0.103
2.362	2.559	0.177	0.232	0.010	2.393 x 2.565 x 0.045	BBP80B142	ORAR00142	2.362 x 0.103
2.441	2.638	0.177	0.232	0.010	2.456 x 2.628 x 0.045	BBP80B143	ORAR00143	2.425 x 0.103
2.480	2.677	0.177	0.232	0.010	2.518 x 2.690 x 0.045	BBP80B144	ORAR00144	2.487 x 0.103
2.559	2.756	0.177	0.232	0.010	2.581 x 2.753 x 0.045	BBP80B145	ORAR00145	2.550 x 0.103
2.638	2.795	0.177	0.232	0.010	2.643 x 2.815 x 0.045	BBP80B146	ORAR00146	2.612 x 0.103
2.677	2.874	0.177	0.232	0.010	2.706 x 2.878 x 0.045	BBP80B147	ORAR00147	2.675 x 0.103
2.756	2.953	0.177	0.232	0.010	2.768 x 2.940 x 0.045	BBP80B148	ORAR00148	2.737 x 0.103
2.795	2.992	0.177	0.232	0.010	2.831 x 3.003 x 0.045	BBP80B149	ORAR00149	2.800 x 0.103
2.874	3.071	0.177	0.232	0.010	2.893 x 3.065 x 0.045	BBP80B150	ORAR00150	2.862 x 0.103
2.992	3.189	0.177	0.232	0.010	3.018 x 3.190 x 0.045	BBP80B151	ORAR00151	2.987 x 0.103
3.268	3.425	0.177	0.232	0.010	3.268 x 3.440 x 0.045	BBP80B152	ORAR00152	3.237 x 0.103
3.504	3.701	0.177	0.232	0.010	3.518 x 3.690 x 0.045	BBP80B153	ORAR00153	3.487 x 0.103
3.740	3.937	0.177	0.232	0.010	3.768 x 3.937 x 0.045	BBP80B154	ORAR00154	3.737 x 0.103
4.016	4.173	0.177	0.232	0.010	4.018 x 4.190 x 0.045	BBP80B155	ORAR00155	3.987 x 0.103
4.252	4.449	0.177	0.232	0.010	4.268 x 4.440 x 0.045	BBP80B156	ORAR00156	4.237 x 0.103
4.488	4.685	0.177	0.232	0.010	4.518 x 4.690 x 0.045	BBP80B157	ORAR00157	4.487 x 0.103
4.764	4.921	0.177	0.232	0.010	4.768 x 4.940 x 0.045	BBP80B158	ORAR00158	4.737 x 0.103
5.000	5.197	0.177	0.232	0.010	5.018 x 5.190 x 0.045	BBP80B159	ORAR00159	4.987 x 0.103
5.236	5.433	0.177	0.232	0.010	5.268 x 5.440 x 0.045	BBP80B160	ORAR00160	5.237 x 0.103
5.512	5.669	0.177	0.232	0.010	5.518 x 5.690 x 0.045	BBP80B161	ORAR00161	5.487 x 0.103
5.748	5.945	0.177	0.232	0.010	5.768 x 5.940 x 0.045	BBP80B162	ORAR00162	5.737 x 0.103
5.984	6.181	0.177	0.232	0.010	6.018 x 6.190 x 0.045	BBP80B163	ORAR00163	5.987 x 0.103
6.260	6.457	0.177	0.232	0.010	6.268 x 6.440 x 0.045	BBP80B164	ORAR00164	6.237 x 0.103
6.496	6.693	0.177	0.232	0.010	6.518 x 6.690 x 0.045	BBP80B165	ORAR00165	6.487 x 0.103
6.772	6.929	0.177	0.232	0.010	6.768 x 6.940 x 0.045	BBP80B166	ORAR00166	6.737 x 0.103
7.008	7.205	0.177	0.232	0.010	7.018 x 7.189 x 0.045	BBP80B167	ORAR00167	6.987 x 0.103
7.244	7.441	0.177	0.232	0.010	7.268 x 7.440 x 0.045	BBP80B168	ORAR00168	7.237 x 0.103
7.480	7.677	0.177	0.232	0.010	7.518 x 7.690 x 0.045	BBP80B169	ORAR00169	7.487 x 0.103
7.756	7.953	0.177	0.232	0.010	7.768 x 7.940 x 0.045	BBP80B170	ORAR00170	7.737 x 0.103
7.992	8.189	0.177	0.232	0.010	8.018 x 8.190 x 0.045	BBP80B171	ORAR00171	7.987 x 0.103
8.268	8.425	0.177	0.232	0.010	8.268 x 8.440 x 0.045	BBP80B172	ORAR00172	8.237 x 0.103
8.504	8.701	0.177	0.232	0.010	8.518 x 8.690 x 0.045	BBP80B173	ORAR00173	8.487 x 0.103
8.740	8.937	0.177	0.232	0.010	8.768 x 8.940 x 0.045	BBP80B174	ORAR00174	8.737 x 0.103
9.016	9.173	0.177	0.232	0.010	9.018 x 9.190 x 0.045	BBP80B175	ORAR00175	8.987 x 0.103
9.252	9.449	0.177	0.232	0.010	9.268 x 9.440 x 0.045	BBP80B176	ORAR00176	9.237 x 0.103
9.488	9.685	0.177	0.232	0.010	9.518 x 9.690 x 0.045	BBP80B177	ORAR00177	9.487 x 0.103
9.764	9.921	0.177	0.232	0.010	9.768 x 9.940 x 0.045	BBP80B178	ORAR00178	9.737 x 0.103



Rod ∅	Bore ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
inch								
0.197	0.433	0.220	0.276	0.010	0.202 x 0.438 x 0.040	BBP80B201	ORAR00201	0.171 x 0.139
0.256	0.512	0.220	0.276	0.010	0.265 x 0.501 x 0.040	BBP80B202	ORAR00202	0.234 x 0.139
0.315	0.551	0.220	0.276	0.010	0.327 x 0.563 x 0.040	BBP80B203	ORAR00203	0.296 x 0.139
0.374	0.630	0.220	0.276	0.010	0.390 x 0.626 x 0.040	BBP80B204	ORAR00204	0.359 x 0.139
0.433	0.669	0.220	0.276	0.010	0.455 x 0.691 x 0.040	BBP80B205	ORAR00205	0.421 x 0.139
0.512	0.748	0.220	0.276	0.010	0.518 x 0.754 x 0.040	BBP80B206	ORAR00206	0.484 x 0.139
0.551	0.827	0.220	0.276	0.010	0.580 x 0.816 x 0.040	BBP80B207	ORAR00207	0.546 x 0.139
0.630	0.866	0.220	0.276	0.010	0.643 x 0.879 x 0.040	BBP80B208	ORAR00208	0.609 x 0.139
0.669	0.945	0.220	0.276	0.010	0.705 x 0.941 x 0.040	BBP80B209	ORAR00209	0.671 x 0.139
0.748	0.984	0.220	0.276	0.010	0.766 x 1.002 x 0.040	BBP80B210	ORAR00210	0.734 x 0.139
0.787	1.063	0.220	0.276	0.010	0.828 x 1.064 x 0.040	BBP80B211	ORAR00211	0.796 x 0.139
0.866	1.142	0.220	0.276	0.010	0.891 x 1.127 x 0.040	BBP80B212	ORAR00212	0.859 x 0.139
0.945	1.181	0.220	0.276	0.010	0.953 x 1.189 x 0.040	BBP80B213	ORAR00213	0.921 x 0.139
0.984	1.260	0.220	0.276	0.010	1.016 x 1.252 x 0.040	BBP80B214	ORAR00214	0.984 x 0.139
1.063	1.299	0.220	0.276	0.010	1.078 x 1.314 x 0.040	BBP80B215	ORAR00215	1.046 x 0.139
1.142	1.378	0.220	0.276	0.010	1.141 x 1.377 x 0.040	BBP80B216	ORAR00216	1.109 x 0.139
1.181	1.437	0.220	0.276	0.010	1.203 x 1.439 x 0.040	BBP80B217	ORAR00217	1.171 x 0.139
1.260	1.496	0.220	0.276	0.010	1.266 x 1.502 x 0.040	BBP80B218	ORAR00218	1.234 x 0.139
1.299	1.575	0.220	0.276	0.010	1.334 x 1.570 x 0.040	BBP80B219	ORAR00219	1.296 x 0.139
1.378	1.614	0.220	0.276	0.010	1.398 x 1.634 x 0.040	BBP80B220	ORAR00220	1.359 x 0.139
1.417	1.693	0.220	0.276	0.010	1.459 x 1.695 x 0.040	BBP80B221	ORAR00221	1.421 x 0.139
1.496	1.752	0.220	0.276	0.010	1.522 x 1.758 x 0.040	BBP80B222	ORAR00222	1.484 x 0.139
1.614	1.890	0.220	0.276	0.010	1.647 x 1.883 x 0.040	BBP80B223	ORAR00223	1.609 x 0.139
1.752	2.008	0.220	0.276	0.010	1.772 x 2.008 x 0.040	BBP80B224	ORAR00224	1.734 x 0.139
1.890	2.126	0.220	0.276	0.010	1.897 x 2.133 x 0.040	BBP80B225	ORAR00225	1.859 x 0.139
2.008	2.244	0.220	0.276	0.010	2.022 x 2.258 x 0.040	BBP80B226	ORAR00226	1.984 x 0.139
2.126	2.362	0.220	0.276	0.010	2.147 x 2.383 x 0.040	BBP80B227	ORAR00227	2.109 x 0.139
2.244	2.500	0.220	0.276	0.010	2.272 x 2.508 x 0.040	BBP80B228	ORAR00228	2.234 x 0.139
2.362	2.638	0.220	0.276	0.010	2.397 x 2.712 x 0.040	BBP80B229	ORAR00229	2.359 x 0.139
2.500	2.756	0.220	0.276	0.010	2.522 x 2.758 x 0.040	BBP80B230	ORAR00230	2.484 x 0.139
2.638	2.874	0.220	0.276	0.010	2.631 x 2.867 x 0.040	BBP80B231	ORAR00231	2.609 x 0.139
2.756	2.992	0.220	0.276	0.010	2.756 x 2.992 x 0.040	BBP80B232	ORAR00232	2.734 x 0.139
2.874	3.110	0.220	0.276	0.010	2.881 x 3.117 x 0.040	BBP80B233	ORAR00233	2.859 x 0.139
2.992	3.268	0.220	0.276	0.010	3.006 x 3.242 x 0.040	BBP80B234	ORAR00234	2.984 x 0.139
3.130	3.386	0.220	0.276	0.010	3.131 x 3.367 x 0.040	BBP80B235	ORAR00235	3.109 x 0.139
3.268	3.504	0.220	0.276	0.010	3.256 x 3.492 x 0.040	BBP80B236	ORAR00236	3.234 x 0.139
3.386	3.622	0.220	0.276	0.010	3.381 x 3.617 x 0.040	BBP80B237	ORAR00237	3.359 x 0.139
3.543	3.740	0.220	0.276	0.010	3.506 x 3.742 x 0.040	BBP80B238	ORAR00238	3.484 x 0.139
3.622	3.858	0.220	0.276	0.010	3.631 x 3.867 x 0.040	BBP80B239	ORAR00239	3.609 x 0.139
3.740	4.016	0.220	0.276	0.010	3.756 x 3.992 x 0.040	BBP80B240	ORAR00240	3.734 x 0.139
3.858	4.134	0.220	0.276	0.010	3.881 x 4.117 x 0.040	BBP80B241	ORAR00241	3.859 x 0.139
4.016	4.252	0.220	0.276	0.010	4.006 x 4.242 x 0.040	BBP80B242	ORAR00242	3.984 x 0.139



Rod ∅	Bore ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
inch								
4.134	4.370	0.220	0.276	0.010	4.131 x 4.367 x 0.040	BBP80B243	ORAR00243	4.109 x 0.139
4.252	4.488	0.220	0.276	0.010	4.256 x 4.492 x 0.040	BBP80B244	ORAR00244	4.234 x 0.139
4.370	4.646	0.220	0.276	0.010	4.381 x 4.617 x 0.040	BBP80B245	ORAR00245	4.359 x 0.139
4.488	4.764	0.220	0.276	0.010	4.506 x 4.742 x 0.040	BBP80B246	ORAR00246	4.484 x 0.139
4.646	4.882	0.220	0.276	0.010	4.631 x 4.867 x 0.040	BBP80B247	ORAR00247	4.609 x 0.139
4.764	5.000	0.220	0.276	0.010	4.768 x 5.004 x 0.040	BBP80B248	ORAR00248	4.734 x 0.139
4.882	5.118	0.220	0.276	0.010	4.893 x 5.129 x 0.040	BBP80B249	ORAR00249	4.859 x 0.139
5.000	5.236	0.220	0.276	0.010	5.018 x 5.254 x 0.040	BBP80B250	ORAR00250	4.984 x 0.139
5.118	5.374	0.220	0.276	0.010	5.143 x 5.379 x 0.040	BBP80B251	ORAR00251	5.109 x 0.139
5.236	5.512	0.220	0.276	0.010	5.268 x 5.504 x 0.040	BBP80B252	ORAR00252	5.234 x 0.139
5.374	5.630	0.220	0.276	0.010	5.393 x 5.629 x 0.040	BBP80B253	ORAR00253	5.359 x 0.139
5.512	5.748	0.220	0.276	0.010	5.518 x 5.754 x 0.040	BBP80B254	ORAR00254	5.484 x 0.139
5.630	5.906	0.220	0.276	0.010	5.643 x 5.879 x 0.040	BBP80B255	ORAR00255	5.609 x 0.139
5.748	5.984	0.220	0.276	0.010	5.768 x 6.004 x 0.040	BBP80B256	ORAR00256	5.734 x 0.139
5.866	6.142	0.220	0.276	0.010	5.893 x 6.129 x 0.040	BBP80B257	ORAR00257	5.859 x 0.139
5.984	6.260	0.220	0.276	0.010	6.018 x 6.254 x 0.040	BBP80B258	ORAR00258	5.984 x 0.139
6.260	6.496	0.220	0.276	0.010	6.268 x 6.504 x 0.040	BBP80B259	ORAR00259	6.234 x 0.139
6.496	6.772	0.220	0.276	0.010	6.518 x 6.754 x 0.040	BBP80B260	ORAR00260	6.484 x 0.139
6.772	7.500	0.220	0.276	0.010	7.268 x 7.504 x 0.040	BBP80B263	ORAR00261	6.734 x 0.139
7.008	7.008	0.220	0.276	0.010	6.768 x 7.004 x 0.040	BBP80B261	ORAR00262	6.984 x 0.139
7.244	7.244	0.220	0.276	0.010	7.018 x 7.254 x 0.040	BBP80B262	ORAR00263	7.234 x 0.139
7.500	7.756	0.220	0.276	0.010	7.518 x 7.754 x 0.040	BBP80B264	ORAR00264	7.484 x 0.139
7.756	7.992	0.220	0.276	0.010	7.768 x 8.004 x 0.040	BBP80B265	ORAR00265	7.734 x 0.139
7.992	8.268	0.220	0.276	0.010	8.018 x 8.254 x 0.040	BBP80B266	ORAR00266	7.984 x 0.139
8.268	8.500	0.220	0.276	0.010	8.268 x 8.504 x 0.040	BBP80B267	ORAR00267	8.234 x 0.139
8.500	8.752	0.220	0.276	0.010	8.518 x 8.754 x 0.040	BBP80B268	ORAR00268	8.484 x 0.139
8.752	9.016	0.220	0.276	0.010	8.768 x 9.004 x 0.040	BBP80B269	ORAR00269	8.734 x 0.139
9.000	9.252	0.220	0.276	0.010	9.018 x 9.254 x 0.040	BBP80B270	ORAR00270	8.984 x 0.139
9.252	9.488	0.220	0.276	0.010	9.268 x 9.504 x 0.040	BBP80B271	ORAR00271	9.234 x 0.139
9.488	9.764	0.220	0.276	0.010	9.518 x 9.754 x 0.040	BBP80B272	ORAR00272	9.484 x 0.139
9.764	10.000	0.220	0.276	0.010	9.768 x 10.004 x 0.040	BBP80B273	ORAR00273	9.734 x 0.139
10.000	10.236	0.220	0.276	0.010	10.018 x 10.254 x 0.040	BBP80B274	ORAR00274	9.984 x 0.139
10.512	10.748	0.220	0.276	0.010	10.518 x 10.754 x 0.040	BBP80B275	ORAR00275	10.484 x 0.139
11.024	11.260	0.220	0.276	0.010	11.018 x 11.254 x 0.040	BBP80B276	ORAR00276	10.984 x 0.139
11.496	11.772	0.220	0.276	0.010	11.518 x 11.754 x 0.040	BBP80B277	ORAR00277	11.484 x 0.139
12.008	12.244	0.220	0.276	0.010	12.018 x 12.254 x 0.040	BBP80B278	ORAR00278	11.984 x 0.139
12.992	13.228	0.220	0.276	0.010	13.018 x 13.254 x 0.040	BBP80B279	ORAR00279	12.984 x 0.139
14.016	14.252	0.220	0.276	0.010	14.018 x 14.254 x 0.040	BBP80B280	ORAR00280	13.984 x 0.139
15.000	15.236	0.220	0.276	0.010	15.018 x 15.254 x 0.040	BBP80B281	ORAR00281	14.984 x 0.139
15.984	16.260	0.220	0.276	0.010	15.989 x 16.225 x 0.040	BBP80B282	ORAR00282	15.955 x 0.139
17.008	17.244	0.220	0.276	0.010	16.989 x 17.225 x 0.040	BBP80B283	ORAR00283	16.955 x 0.139
17.992	18.268	0.220	0.276	0.010	17.989 x 18.225 x 0.040	BBP80B284	ORAR00284	17.955 x 0.139



Rod ∅	Bore ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
inch								
0.433	0.827	0.311	0.378	0.010	0.450 x 0.816 x 0.060	BBP80B309	ORAR00309	0.412 x 0.210
0.512	0.866	0.311	0.378	0.010	0.513 x 0.879 x 0.060	BBP80B310	ORAR00310	0.475 x 0.210
0.551	0.945	0.311	0.378	0.010	0.575 x 0.941 x 0.060	BBP80B311	ORAR00311	0.537 x 0.210
0.630	0.984	0.311	0.378	0.010	0.638 x 1.004 x 0.060	BBP80B312	ORAR00312	0.600 x 0.210
0.669	1.063	0.311	0.378	0.010	0.700 x 1.066 x 0.060	BBP80B313	ORAR00313	0.662 x 0.210
0.748	1.142	0.311	0.378	0.010	0.763 x 1.129 x 0.060	BBP80B314	ORAR00314	0.725 x 0.210
0.787	1.181	0.311	0.378	0.010	0.825 x 1.191 x 0.060	BBP80B315	ORAR00315	0.787 x 0.210
0.866	1.260	0.311	0.378	0.010	0.888 x 1.254 x 0.060	BBP80B316	ORAR00316	0.850 x 0.210
0.945	1.299	0.311	0.378	0.010	0.950 x 1.316 x 0.060	BBP80B317	ORAR00317	0.912 x 0.210
0.984	1.378	0.311	0.378	0.010	1.013 x 1.379 x 0.060	BBP80B318	ORAR00318	0.975 x 0.210
1.063	1.437	0.311	0.378	0.010	1.075 x 1.441 x 0.060	BBP80B319	ORAR00319	1.037 x 0.210
1.142	1.496	0.311	0.378	0.010	1.138 x 1.504 x 0.060	BBP80B320	ORAR00320	1.100 x 0.210
1.181	1.575	0.311	0.378	0.010	1.198 x 1.564 x 0.060	BBP80B321	ORAR00321	1.162 x 0.210
1.260	1.614	0.311	0.378	0.010	1.263 x 1.629 x 0.060	BBP80B322	ORAR00322	1.225 x 0.210
1.299	1.693	0.311	0.378	0.010	1.316 x 1.682 x 0.060	BBP80B323	ORAR00323	1.287 x 0.210
1.378	1.752	0.311	0.378	0.010	1.388 x 1.754 x 0.060	BBP80B324	ORAR00324	1.350 x 0.210
1.496	1.890	0.311	0.378	0.010	1.513 x 1.879 x 0.060	BBP80B325	ORAR00325	1.475 x 0.210
1.614	2.008	0.311	0.378	0.010	1.638 x 2.004 x 0.060	BBP80B326	ORAR00326	1.600 x 0.210
1.752	2.126	0.311	0.378	0.010	1.763 x 2.129 x 0.060	BBP80B327	ORAR00327	1.725 x 0.210
1.890	2.244	0.311	0.378	0.010	1.888 x 2.254 x 0.060	BBP80B328	ORAR00328	1.850 x 0.210
2.008	2.362	0.311	0.378	0.010	2.013 x 2.379 x 0.060	BBP80B329	ORAR00329	1.975 x 0.210
2.126	2.500	0.311	0.378	0.010	2.138 x 2.504 x 0.060	BBP80B330	ORAR00330	2.100 x 0.210
2.244	2.638	0.311	0.378	0.010	2.268 x 2.634 x 0.060	BBP80B331	ORAR00331	2.225 x 0.210
2.362	2.756	0.311	0.378	0.010	2.393 x 2.759 x 0.060	BBP80B332	ORAR00332	2.350 x 0.210
2.520	2.874	0.311	0.378	0.010	2.518 x 2.884 x 0.060	BBP80B333	ORAR00333	2.475 x 0.210
2.638	2.992	0.311	0.378	0.010	2.643 x 3.009 x 0.060	BBP80B334	ORAR00334	2.600 x 0.210
2.756	3.150	0.311	0.378	0.010	2.768 x 3.134 x 0.060	BBP80B335	ORAR00335	2.725 x 0.210
2.874	3.268	0.311	0.378	0.010	2.893 x 3.259 x 0.060	BBP80B336	ORAR00336	2.850 x 0.210
2.992	3.386	0.311	0.378	0.010	3.018 x 3.384 x 0.060	BBP80B337	ORAR00337	2.975 x 0.210
3.150	3.504	0.311	0.378	0.010	3.143 x 3.509 x 0.060	BBP80B338	ORAR00338	3.100 x 0.210
3.268	3.622	0.311	0.378	0.010	3.273 x 3.639 x 0.060	BBP80B339	ORAR00339	3.225 x 0.210
3.386	3.740	0.311	0.378	0.010	3.398 x 3.764 x 0.060	BBP80B340	ORAR00340	3.350 x 0.210
3.543	3.858	0.311	0.378	0.010	3.523 x 3.889 x 0.060	BBP80B341	ORAR00341	3.475 x 0.210
3.622	4.016	0.311	0.378	0.010	3.648 x 4.014 x 0.060	BBP80B342	ORAR00342	3.600 x 0.210
3.740	4.134	0.311	0.378	0.010	3.773 x 4.139 x 0.060	BBP80B343	ORAR00343	3.725 x 0.210
3.858	4.252	0.311	0.378	0.010	3.898 x 4.264 x 0.060	BBP80B344	ORAR00344	3.850 x 0.210
4.016	4.370	0.311	0.378	0.010	4.028 x 4.394 x 0.060	BBP80B345	ORAR00345	3.975 x 0.210
4.134	4.488	0.311	0.378	0.010	4.153 x 4.519 x 0.060	BBP80B346	ORAR00346	4.100 x 0.210
4.252	4.646	0.311	0.378	0.010	4.278 x 4.644 x 0.060	BBP80B347	ORAR00347	4.225 x 0.210
4.370	4.764	0.311	0.378	0.010	4.403 x 4.769 x 0.060	BBP80B348	ORAR00348	4.350 x 0.210
4.488	4.882	0.311	0.378	0.010	4.528 x 4.894 x 0.060	BBP80B349	ORAR00349	4.475 x 0.210
4.528	5.118	0.311	0.378	0.010	4.778 x 5.144 x 0.060	BBP80B351	ORAR00351	4.725 x 0.210





Rod ∅	Bore ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
inch								
4.646	5.000	0.311	0.378	0.010	4.653 x 5.019 x 0.060	BBP80B350	ORAR00350	4.600 x 0.210
4.882	5.236	0.311	0.378	0.010	4.903 x 5.269 x 0.060	BBP80B352	ORAR00352	4.850 x 0.210
5.000	5.394	0.311	0.378	0.010	5.028 x 5.394 x 0.060	BBP80B353	ORAR00353	4.975 x 0.210
5.118	5.512	0.311	0.378	0.010	5.153 x 5.519 x 0.060	BBP80B354	ORAR00354	5.100 x 0.210
5.276	5.630	0.311	0.378	0.010	5.279 x 5.645 x 0.060	BBP80B355	ORAR00355	5.225 x 0.210
5.394	5.748	0.311	0.378	0.010	5.403 x 5.769 x 0.060	BBP80B356	ORAR00356	5.350 x 0.210
5.512	5.906	0.311	0.378	0.010	5.528 x 5.894 x 0.060	BBP80B357	ORAR00357	5.475 x 0.210
5.630	5.984	0.311	0.378	0.010	5.653 x 6.019 x 0.060	BBP80B358	ORAR00358	5.600 x 0.210
5.748	6.142	0.311	0.378	0.010	5.778 x 6.144 x 0.060	BBP80B359	ORAR00359	5.725 x 0.210
5.906	6.260	0.311	0.378	0.010	5.903 x 6.269 x 0.060	BBP80B360	ORAR00360	5.846 x 0.210
5.984	6.378	0.311	0.378	0.010	6.028 x 6.394 x 0.060	BBP80B361	ORAR00361	5.975 x 0.210
6.260	6.614	0.311	0.378	0.010	6.278 x 6.644 x 0.060	BBP80B362	ORAR00362	6.225 x 0.210
6.496	6.890	0.311	0.378	0.010	6.528 x 6.894 x 0.060	BBP80B363	ORAR00363	6.475 x 0.210
6.772	7.126	0.311	0.378	0.010	6.778 x 7.144 x 0.060	BBP80B364	ORAR00364	6.725 x 0.210
7.008	7.362	0.311	0.378	0.010	7.028 x 7.394 x 0.060	BBP80B365	ORAR00365	6.975 x 0.210
7.244	7.638	0.311	0.378	0.010	7.278 x 7.644 x 0.060	BBP80B366	ORAR00366	7.225 x 0.210
7.520	7.874	0.311	0.378	0.010	7.528 x 7.894 x 0.060	BBP80B367	ORAR00367	7.475 x 0.210
7.756	8.110	0.311	0.378	0.010	7.778 x 8.144 x 0.060	BBP80B368	ORAR00368	7.725 x 0.210
7.992	8.386	0.311	0.378	0.010	8.028 x 8.394 x 0.060	BBP80B369	ORAR00369	7.975 x 0.210
8.268	8.661	0.311	0.378	0.010	8.278 x 8.644 x 0.060	BBP80B370	ORAR00370	8.225 x 0.210
8.504	8.858	0.311	0.378	0.010	8.528 x 8.894 x 0.060	BBP80B371	ORAR00371	8.475 x 0.210
8.740	9.134	0.311	0.378	0.010	8.778 x 9.144 x 0.060	BBP80B372	ORAR00372	8.725 x 0.210
9.016	9.370	0.311	0.378	0.010	9.028 x 9.394 x 0.060	BBP80B373	ORAR00373	8.975 x 0.210
9.252	9.626	0.311	0.378	0.010	9.278 x 9.644 x 0.060	BBP80B374	ORAR00374	9.225 x 0.210
9.488	9.882	0.311	0.378	0.010	9.528 x 9.894 x 0.060	BBP80B375	ORAR00375	9.475 x 0.210
9.764	10.118	0.311	0.378	0.010	9.778 x 10.144 x 0.060	BBP80B376	ORAR00376	9.725 x 0.210
10.000	10.394	0.311	0.378	0.010	10.028 x 10.394 x 0.060	BBP80B377	ORAR00377	9.975 x 0.210
10.512	10.866	0.311	0.378	0.010	10.528 x 10.894 x 0.060	BBP80B378	ORAR00378	10.475 x 0.210
11.024	11.417	0.311	0.378	0.010	11.028 x 11.394 x 0.060	BBP80B379	ORAR00379	10.975 x 0.210
11.496	11.890	0.311	0.378	0.010	11.528 x 11.894 x 0.060	BBP80B380	ORAR00380	11.475 x 0.210
12.008	12.402	0.311	0.378	0.010	12.028 x 12.394 x 0.060	BBP80B381	ORAR00381	11.975 x 0.210
12.992	13.386	0.311	0.378	0.010	13.028 x 13.394 x 0.060	BBP80B382	ORAR00382	12.975 x 0.210
14.016	14.409	0.311	0.378	0.010	14.028 x 14.394 x 0.060	BBP80B383	ORAR00383	13.975 x 0.210
15.000	15.374	0.311	0.378	0.010	15.028 x 15.394 x 0.060	BBP80B384	ORAR00384	14.975 x 0.210
16.024	16.378	0.311	0.378	0.010	16.008 x 16.374 x 0.060	BBP80B385	ORAR00385	15.955 x 0.210
17.008	17.362	0.311	0.378	0.010	17.008 x 17.374 x 0.060	BBP80B386	ORAR00386	16.955 x 0.210
17.992	18.386	0.311	0.378	0.010	18.008 x 18.374 x 0.060	BBP80B387	ORAR00387	17.955 x 0.210
19.016	19.370	0.311	0.378	0.010	19.006 x 19.372 x 0.060	BBP80B388	ORAR00388	18.955 x 0.210
20.000	20.394	0.311	0.378	0.010	20.006 x 20.372 x 0.060	BBP80B389	ORAR00389	19.955 x 0.210
20.984	21.378	0.311	0.378	0.010	21.006 x 21.372 x 0.060	BBP80B390	ORAR00390	20.955 x 0.210
22.008	22.362	0.311	0.378	0.010	22.006 x 22.372 x 0.060	BBP80B391	ORAR00391	21.955 x 0.210
22.992	23.346	0.311	0.378	0.010	22.993 x 23.359 x 0.060	BBP80B392	ORAR00392	22.940 x 0.210



Rod ∅	Bore ∅	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		b <sub>2</sub> +0.010	b <sub>3</sub> +0.010					
inch								
24.016	24.370	0.311	0.378	0.010	23.993 x 24.359 x 0.060	BBP80B393	ORAR00393	23.940 x 0.210
25.000	25.354	0.311	0.378	0.010	24.993 x 25.359 x 0.060	BBP80B394	ORAR00394	24.940 x 0.210
25.984	26.378	0.311	0.378	0.010	25.993 x 26.359 x 0.060	BBP80B395	ORAR00395	25.940 x 0.210
4.488	5.039	0.421	0.520	0.010	4.551 x 5.023 x 0.096	BBP80B425	ORAR00425	4.475 x 0.275
4.646	5.157	0.421	0.520	0.010	4.676 x 5.148 x 0.096	BBP80B426	ORAR00426	4.600 x 0.275
4.764	5.276	0.421	0.520	0.010	4.801 x 5.273 x 0.096	BBP80B427	ORAR00427	4.725 x 0.275
4.882	5.394	0.421	0.520	0.010	4.929 x 5.401 x 0.096	BBP80B428	ORAR00428	4.850 x 0.275
5.000	5.512	0.421	0.520	0.010	5.051 x 5.523 x 0.096	BBP80B429	ORAR00429	4.975 x 0.275
5.118	5.630	0.421	0.520	0.010	5.176 x 5.648 x 0.096	BBP80B430	ORAR00430	5.100 x 0.275
5.276	5.787	0.421	0.520	0.010	5.301 x 5.773 x 0.096	BBP80B431	ORAR00431	5.225 x 0.275
5.394	5.906	0.421	0.520	0.010	5.426 x 5.898 x 0.096	BBP80B432	ORAR00432	5.350 x 0.275
5.512	5.984	0.421	0.520	0.010	5.551 x 6.023 x 0.096	BBP80B433	ORAR00433	5.475 x 0.275
5.630	6.142	0.421	0.520	0.010	5.676 x 6.148 x 0.096	BBP80B434	ORAR00434	5.600 x 0.275
5.394	5.906	0.421	0.520	0.010	5.426 x 5.898 x 0.096	BBP80B432	ORAR00432	5.350 x 0.275
5.512	5.984	0.421	0.520	0.010	5.551 x 6.023 x 0.096	BBP80B433	ORAR00433	5.475 x 0.275
6.024	6.496	0.421	0.520	0.010	6.051 x 6.523 x 0.096	BBP80B437	ORAR00437	5.975 x 0.275
6.260	6.772	0.421	0.520	0.010	6.274 x 6.746 x 0.096	BBP80B438	ORAR00438	6.225 x 0.275
6.496	7.008	0.421	0.520	0.010	6.524 x 6.996 x 0.096	BBP80B439	ORAR00439	6.475 x 0.275
6.772	7.244	0.421	0.520	0.010	6.774 x 7.246 x 0.096	BBP80B440	ORAR00440	6.725 x 0.275
7.008	7.500	0.421	0.520	0.010	7.024 x 7.496 x 0.096	BBP80B441	ORAR00441	6.975 x 0.275
7.283	7.756	0.421	0.520	0.010	7.274 x 7.746 x 0.096	BBP80B442	ORAR00442	7.225 x 0.275
7.480	7.992	0.421	0.520	0.010	7.524 x 7.996 x 0.096	BBP80B443	ORAR00443	7.475 x 0.275
7.756	8.268	0.421	0.520	0.010	7.774 x 8.246 x 0.096	BBP80B444	ORAR00444	7.725 x 0.275
7.992	8.504	0.421	0.520	0.010	8.024 x 8.496 x 0.096	BBP80B445	ORAR00445	7.975 x 0.275
8.504	9.016	0.421	0.520	0.010	8.524 x 8.996 x 0.096	BBP80B446	ORAR00446	8.475 x 0.275
9.016	9.488	0.421	0.520	0.010	9.024 x 9.496 x 0.096	BBP80B447	ORAR00447	8.975 x 0.275
9.488	10.000	0.421	0.520	0.010	9.524 x 9.996 x 0.096	BBP80B448	ORAR00448	9.475 x 0.275
10.000	10.512	0.421	0.520	0.010	10.024 x 10.496 x 0.096	BBP80B449	ORAR00449	9.975 x 0.275
10.512	11.024	0.421	0.520	0.010	10.524 x 10.996 x 0.096	BBP80B450	ORAR00450	10.475 x 0.275
11.024	11.496	0.421	0.520	0.010	11.024 x 11.496 x 0.096	BBP80B451	ORAR00451	10.975 x 0.275
11.496	12.008	0.421	0.520	0.010	11.524 x 11.996 x 0.096	BBP80B452	ORAR00452	11.475 x 0.275
12.008	8.583	0.421	0.520	0.010	12.024 x 12.496 x 0.096	BBP80B453	ORAR00453	11.975 x 0.275
12.520	12.992	0.421	0.520	0.010	12.524 x 12.996 x 0.096	BBP80B454	ORAR00454	12.475 x 0.275
12.992	13.504	0.421	0.520	0.010	13.024 x 13.496 x 0.096	BBP80B455	ORAR00455	12.975 x 0.275
13.504	14.016	0.421	0.520	0.010	13.524 x 13.996 x 0.096	BBP80B456	ORAR00456	13.483 x 0.275
14.016	14.488	0.421	0.520	0.010	14.024 x 14.216 x 0.096	BBP80B457	ORAR00457	13.975 x 0.275
14.488	15.000	0.421	0.520	0.010	14.524 x 14.996 x 0.096	BBP80B458	ORAR00458	14.475 x 0.275
15.000	15.512	0.421	0.520	0.010	15.024 x 15.493 x 0.096	BBP80B459	ORAR00459	14.975 x 0.275
15.512	15.984	0.421	0.520	0.010	15.524 x 15.996 x 0.096	BBP80B460	ORAR00460	15.475 x 0.275
16.024	16.496	0.421	0.520	0.010	16.004 x 16.476 x 0.096	BBP80B461	ORAR00461	15.955 x 0.275
16.535	17.008	0.421	0.520	0.010	16.504 x 16.976 x 0.096	BBP80B462	ORAR00462	16.455 x 0.275
17.008	17.500	0.421	0.520	0.010	17.004 x 17.476 x 0.096	BBP80B463	ORAR00463	16.955 x 0.275



Rod Ø	Bore Ø	Groove width		Radius	Back-up Ring dimension	TSS Part No.	O-Ring TSS Part No.	O-Ring dimension
		$b_2 + 0.010$	$b_3 + 0.010$					
inch								
17.520	17.992	0.421	0.520	0.010	17.504 x 17.976 x 0.096	<a href="#">BBP80B464</a>	ORAR00464	17.455 x 0.275
18.031	18.504	0.421	0.520	0.010	18.004 x 18.476 x 0.096	<a href="#">BBP80B465</a>	ORAR00465	17.955 x 0.275
18.504	19.016	0.421	0.520	0.010	18.504 x 18.976 x 0.096	<a href="#">BBP80B466</a>	ORAR00466	18.455 x 0.275
19.016	19.488	0.421	0.520	0.010	19.004 x 19.476 x 0.096	<a href="#">BBP80B467</a>	ORAR00467	18.952 x 0.275
19.488	20.000	0.421	0.520	0.010	19.504 x 19.976 x 0.096	<a href="#">BBP80B468</a>	ORAR00468	19.455 x 0.275
20.000	20.512	0.421	0.520	0.010	20.004 x 20.476 x 0.096	<a href="#">BBP80B469</a>	ORAR00469	19.955 x 0.275
20.984	21.496	0.421	0.520	0.010	21.004 x 21.488 x 0.096	<a href="#">BBP80B470</a>	ORAR00470	20.955 x 0.275
22.008	22.520	0.421	0.520	0.010	22.004 x 22.476 x 0.096	<a href="#">BBP80B471</a>	ORAR00471	21.955 x 0.275
22.992	23.504	0.421	0.520	0.010	23.004 x 23.476 x 0.096	<a href="#">BBP80B472</a>	ORAR00472	22.940 x 0.275
24.016	24.488	0.421	0.520	0.010	24.004 x 24.476 x 0.096	<a href="#">BBP80B473</a>	ORAR00473	23.940 x 0.275
25.000	25.512	0.421	0.520	0.010	25.004 x 25.476 x 0.096	<a href="#">BBP80B474</a>	ORAR00474	24.940 x 0.275
25.984	26.496	0.421	0.520	0.010	26.004 x 26.476 x 0.096	<a href="#">BBP80B475</a>	ORAR00475	25.940 x 0.275