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TECHNICAL INFORMATION

O-Ring

Description

O-Rings offer the designer an efficient and economical sealing element for a wide range of static or dynamic applications. Inexpensive production methods and its ease of use have made the O-Ring the most widely used seal.
A wide choice of elastomer materials for both standard and special application allow the O-Ring to be used to seal practically all liquid and gaseous media.
O-Rings are vulcanized in molds and are characterized by their circular form with annular cross section. The dimensions of the O-Ring are defined by the inside diameter d_1 and cross section d_2.
Cross sections of approximately 1.0 to 10 mm and inside diameters up to 810 mm are available.
O-Rings are used as sealing elements or as energizing elements for hydraulic slipper seals and wipers and thus cover a large number of fields of application. There are no fields of industry where the O-Ring is not used. From an individual seal for repairs or maintenance to a quality assured applications in general engineering. The O-ring is used predominantly for static sealing applications:

- As a radial static seal, e.g. for bushings, covers, pipes, cylinders.
- As an axial static seal, e.g. for flanges, plates, caps.

O-Rings in dynamic applications are recommended only for moderate service conditions. They are limited by the speed and the pressure against which they are to seal:

- For low duty sealing of reciprocating pistons, rods, plungers etc.
- For sealing of slowly pivoting, rotating or spiral movements on shafts, spindles, rotary transmission leadthroughs, etc.

Advantages

- Simple, one piece groove design reduces hardware and design costs
- Compact design allows smaller hardware
- Easy, foolproof installation reduces risk
- Applicable to a wide range of sealing problems, static, dynamic, single or double acting
- Wide compound choice for compatibility with most fluids
- Ex stock availability of many sizes worldwide for easy maintenance and repair

Technical Data

Static Pressure	:	Up to 5 MPa for O-Rings with inside diameter > 50 mm without Back-up Ring Up to 10 MPa for O-Rings with inside diameter < 50 mm without Back-up Ring (depends on the material, the cross section and the clearance) Up to 40 MPa with Back-up Ring
Speed	:	0.5 m/s
Temperature	:	-30 °C to +200 °C (depending on the material)

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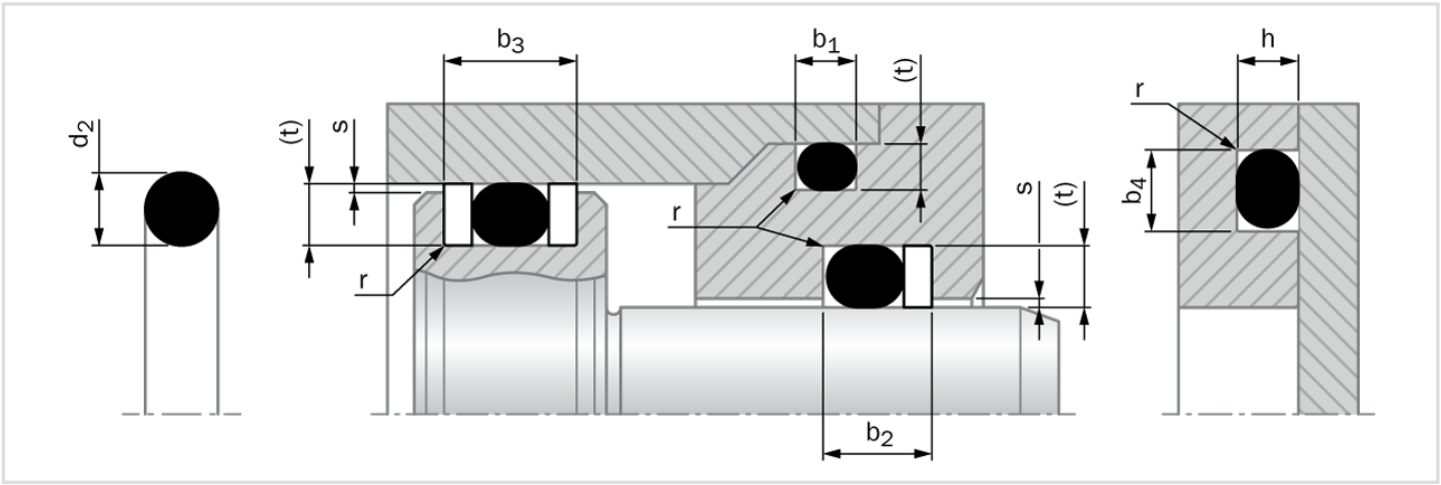

Installation dimensions - Standard recommendations

O-Ring Cross section d_2	Radial installation			Axial installation		Radius[1]
	Housing depth[2]		Groove width	Groove depth	Groove width	
	Dynamic (t)	Static (t)	b_1 +0.25	h +0.1	b_4 +0.2	r ± 0.2
0.50	-	0.35	0.80	0.35	0.80	0.20
0.74	-	0.50	1.00	0.50	1.00	0.20
1.00	-	0.70	1.40	0.70	1.40	0.20
1.02	-	0.70	1.40	0.70	1.40	0.20
1.20	-	0.85	1.70	0.85	1.70	0.20
1.25	-	0.90	1.70	0.90	1.80	0.20
1.27	-	0.90	1.70	0.90	1.80	0.20
1.30	-	0.95	1.80	0.95	1.80	0.20
1.42	-	1.05	1.90	1.05	2.00	0.30
1.50	1.25	1.10	2.00	1.10	2.10	0.30
1.52	1.25	1.10	2.00	1.10	2.10	0.30
1.60	1.30	1.20	2.10	1.20	2.20	0.30
1.63	1.30	1.20	2.10	1.20	2.20	0.30
1.78*	1.45	1.30	2.40	1.30	2.60	0.30
1.80	1.45	1.30	2.40	1.30	2.60	0.30
1.83	1.50	1.35	2.50	1.35	2.60	0.30
1.90	1.55	1.40	2.60	1.40	2.70	0.30
1.98	1.65	1.50	2.70	1.50	2.80	0.30
2.00	1.65	1.50	2.70	1.50	2.80	0.30
2.08	1.75	1.55	2.80	1.55	2.90	0.30
2.10	1.75	1.55	2.80	1.55	2.90	0.30
2.20	1.85	1.60	3.00	1.60	3.00	0.30
2.26	1.90	1.70	3.00	1.70	3.10	0.30
2.30	1.95	1.75	3.10	1.75	3.10	0.30

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	Dynamic (t)	Static (t)	b_1 +0.25	h +0.1	b_4+0.2	r ± 0.2
2.34	1.95	1.75	3.10	1.75	3.10	0.30
2.40	2.05	1.80	3.20	1.80	3.30	0.30
2.46	2.10	1.85	3.30	1.85	3.40	0.30
2.50	2.15	1.90	3.30	1.90	3.40	0.30
2.62*	2.25	2.00	3.60	2.00	3.80	0.30
2.65	2.25	2.00	3.60	2.00	3.80	0.30
2.70	2.30	2.05	3.60	2.05	3.80	0.30
2.80	2.40	2.10	3.70	2.10	3.90	0.60
2.92	2.50	2.20	3.90	2.20	4.00	0.60
2.95	2.50	2.20	3.90	2.20	4.00	0.60
3.00	2.60	2.30	4.00	2.30	4.00	0.60
3.10	2.70	2.40	4.10	2.40	4.10	0.60
3.50	3.05	2.65	4.60	2.65	4.70	0.60
3.53*	3.10	2.70	4.80	2.70	5.00	0.60
3.55	3.10	2.70	4.80	2.70	5.00	0.60
3.60	3.15	2.80	4.80	2.80	5.10	0.60
4.00	3.50	3.10	5.20	3.10	5.30	0.60
4.50	4.00	3.50	5.80	3.50	5.90	0.60
5.00	4.40	4.00	6.60	4.00	6.70	0.60
5.30	4.70	4.30	7.10	4.30	7.30	0.60
5.33*	4.70	4.30	7.10	4.30	7.30	0.60
5.50	4.80	4.50	7.10	4.50	7.30	0.60
5.70	5.00	4.60	7.20	4.60	7.40	0.60
6.00	5.30	4.90	7.40	4.90	7.60	0.60
6.50	5.70	5.40	8.00	5.40	8.20	1.00
6.99*	6.10	5.80	9.50	5.80	9.70	1.00
7.00	6.10	5.80	9.50	5.80	9.70	1.00
7.50	6.60	6.30	9.70	6.30	9.90	1.00
8.00	7.10	6.70	9.80	6.70	10.00	1.00
8.40	7.50	7.10	10.00	7.10	10.30	1.00
9.00	8.10	7.70	10.60	7.70	10.90	1.50
9.50	8.60	8.20	11.00	8.20	11.40	1.50
10.00	9.10	8.60	11.60	8.60	12.00	2.00
12.00	11.00	10.60	13.50	10.60	14.00	2.00

* Preferred sizes
[1] If a Back-up Ring is used the recommended radius r should always be r = 0.25 ±0.2mm (0.010 ±0.008 inch)
[2] The given values for the housing depth are based on the nominal O-Ring cross section dimensions. The O-Ring inside diameter and its stretch are not considered.
Groove width b_2 and b_3: When using Back-up Rings the groove is to be widened by the corresponding Back-up Ring thickness (b_2: one Back-up Ring, b_3: two Back-up Rings).

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Radial clearance S

O-Ring cross section d_2	up to 2	2 - 3	3 - 5	5 - 7	Above 7
O-Rings with hardness of 70 Shore A					
Pressure MPa	Radial clearance S mm				
≤ 3.50	0.08	0.09	0.10	0.13	0.15
≤ 7.00	0.05	0.07	0.08	0.09	0.10
≤ 10.50	0.03	0.04	0.05	0.07	0.08
O-Rings with hardness of 90 Shore A					
Pressure MPa	Radial clearance S mm				
≤ 3.50	0.13	0.15	0.20	0.23	0.25
≤ 7.00	0.10	0.13	0.15	0.18	0.20
≤ 10.50	0.07	0.09	0.10	0.13	0.15
≤ 14.00	0.05	0.07	0.08	0.09	0.10
≤ 17.50	0.04	0.05	0.07	0.08	0.09
≤ 21.00	0.03	0.04	0.05	0.07	0.08
≤ 35.00	0.02	0.03	0.03	0.04	0.04

Important Note

Installation suggestions, material recommendations, parameters and further data provided are always subject to the particular field of use and the application in which the seal is intended to be used, in particular the interaction of the seal with other components of the application. Therefore they neither constitute an agreement on the legal and factual nature nor a guarantee of quality. Technical changes and errors remain reserved.