SEALING ELEMENTS

eusga
European Seals and Gaskets Association

SPECIAL PRODUCTS FROM THE PROFESSIONAL

Our service consists of a large standard range, personal advice and customer-specific solutions. High delivery capability, express manufacture for repairs and quality assurance are self-evident for us.

ADVICE

Do you have technical questions about standard or special products? Would you like information about material or installation conditions?

Do you need competent application advice for a new development or a repair?

Our application engineers find an individual solution for your requirements.

O-RING DESIGN RANGE

We provide a calculation program on our website (www.reiff-tp.de/services-tools/tools/o-ring-berechnungsprogramm.html) which you can use to constructively design an O-ring seal. You can easily calculate dimensions, installation spaces and tolerances according to ISO 3601-1.

The result: A technically exactly designed construction solution.

QUALITY ASSURANCE

Our sealing elements are subject to strict quality standards from the material procurement to the production to the final inspection. We perform material and failure analyses in addition to the quality checks in the product development.

The analysis and documentation of the results contribute to constant quality improvement.

DELIVERY SERVICE

In addition to the products from our own logistics centre, we can also access large stocks of our collaboration partners nationally and abroad. We have direct access via IT connections and provide high availability and fast delivery service.

1 *Exact measurement and perfect quality. Cord thickness and quality can be determined precisely using an optical measuring instrument.*

2 *We guarantee high availability due to ample stock.*

3 *The O-ring calculation program from Trelleborg provides information about O-ring dimensions and calculates the required O-ring sizes and installation conditions.*

PRODUCT RANGE ON THE NEXT PAGES

Static Seals

- O-rings
- X-rings
- Thrust rings
- Screw seals (U-Seal)
- Edge seals

Rotary seals

- Shaft sealing rings radial / axial
- V-rings
- Gamma rings
- Shaft protection sleeves
- End caps

Mechanical seals

Stuffing box packing

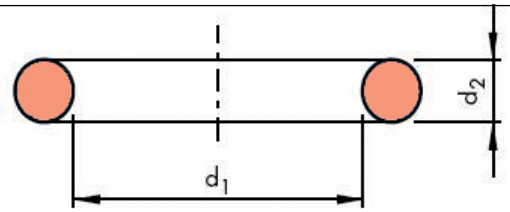
TAB OVERVIEW SEALING ELEMENTS

The range on the following pages:

O-RINGS

TRELLEBORG
SEALING SOLUTIONS

Technical Data for the O-ring



The O-ring is an endless manufactured round ring with circular cross section made of rubber-elastic materials.

Use:
O-rings are used both for static as well as for dynamic sealing in pneumatics and hydraulics.

Dimension tolerances for internal diameter d_1 according to DIN 3771, Part 1 or ISO 3601/I

∅ d_1	Tol.	∅ d_1	Tol.	∅ d_1	Tol.	∅ d_1	Tol.
1.8 ... 2.79	± 0.13	50.0...51.49	± 0.46	122...124.9	± 1.00	300...306.9	± 2.21%
2.8 ... 4.86	± 0.14	51.5...52.99	± 0.47	125...127.9	± 1.03	307...314.9	± 2.25%
4.87 ... 6.69	± 0.15	53.0...54.49	± 0.48	128...131.9	± 1.05	315...324.9	± 2.30%
6.7 ... 8.75	± 0.16	54.5...55.99	± 0.50	132...135.9	± 1.08	325...334.9	± 2.37%
8.76 ...10.59	± 0.17	56.0...57.99	± 0.51	136...139.9	± 1.10	335...344.9	± 2.43%
10.6 ...11.79	± 0.18	58.0...59.99	± 0.52	140...144.9	± 1.13	345...354.9	± 2.49%
11.8 ...14.99	± 0.19	60.0...61.49	± 0.54	145...149.9	± 1.17	355...364.9	± 2.56%
15.0 ...16.99	± 0.20	61.5...62.99	± 0.55	150...154.9	± 1.20	365...374.9	± 2.62%
17.0 ...18.99	± 0.21	63.0...64.99	± 0.56	155...159.9	± 1.24	375...386.9	± 2.68%
19.0 ...21.19	± 0.22	65.0...66.99	± 0.58	160...164.9	± 1.27	387...399.9	± 2.76%
21.2 ...22.39	± 0.23	67.0...68.99	± 0.59	165...169.9	± 1.31	400...411.9	± 2.84%
22.4 ...24.99	± 0.24	69.0...70.99	± 0.61	170...174.9	± 1.34	412...424.9	± 2.91%
25.0 ...25.79	± 0.25	71.0...72.99	± 0.63	175...179.9	± 1.38	425...436.9	± 2.99%
25.8 ...27.99	± 0.26	73.0...74.99	± 0.64	180...184.9	± 1.41	437...449.9	± 3.07%
28.0 ...29.99	± 0.28	75.0...77.49	± 0.66	185...189.9	± 1.44	450...461.9	± 3.15%
30.0 ...31.49	± 0.29	77.5...79.99	± 0.67	190...194.9	± 1.48	462...474.9	± 3.22%
31.5 ...32.49	± 0.31	80.0...82.49	± 0.69	195...199.9	± 1.51	475...486.9	± 3.30%
32.5 ...34.49	± 0.32	82.5...84.99	± 0.71	200...205.9	± 1.55	487...499.9	± 3.37%
34.5 ...35.49	± 0.33	85.0...87.49	± 0.73	206...211.9	± 1.59	500...514.9	± 3.45%
35.5 ...36.49	± 0.34	87.5...89.99	± 0.75	212...217.9	± 1.63	515...529.9	± 3.54%
36.5 ...37.49	± 0.35	90.0...92.49	± 0.77	218...223.9	± 1.67	530...544.9	± 3.63%
37.5 ...38.69	± 0.36	92.5...94.99	± 0.79	224...229.9	± 1.71	545...559.9	± 3.72%
38.7 ...39.99	± 0.37	95.0...97.49	± 0.81	230...235.9	± 1.75	560...579.9	± 3.81%
40.0 ...41.19	± 0.38	97.5...99.99	± 0.83	236...242.9	± 1.79	580...599.9	± 3.93%
41.2 ...42.49	± 0.39	100...102.9	± 0.84	243...249.9	± 1.83	600...614.9	± 4.05%
42.5 ...43.69	± 0.40	103...105.9	± 0.87	250...257.9	± 1.88	615...629.9	± 4.13%
43.7 ...44.99	± 0.41	106...108.9	± 0.89	258...264.9	± 1.93	630...649.9	± 4.22%
45.0 ...46.19	± 0.42	109...111.9	± 0.91	265...271.9	± 1.98	650...669.9	± 4.34%
46.2 ...47.49	± 0.43	112...114.9	± 0.93	272...279.9	± 2.02	670...689.9	± 4.46%
47.5 ...48.69	± 0.44	115...117.9	± 0.95	280...289.9	± 2.08	≧690	± 0.65%
48.7 ...49.99	± 0.45	118...121.9	± 0.97	290...299.9	± 2.14		

Dimension tolerances for cord diameter d_2 according to DIN 3771, Part 1 or ISO 3601/I

∅ d_2	Tol.	∅ d_2	Tol.	∅ d_2	Tol.
≤2.62...	± 0.08	>4.50...5.5	± 0.13	>7.50... 8.5	± 0.18
>2.62...3.0	± 0.09	>5.50...7.5	± 0.15	>8.50...10.0	± 0.20
>3.00...4.5	± 0.10				

O-RINGS

Selection of the correct O-ring dimensions

O-rings are subject to lasting deformation (compression set) caused by the load and the associated material fatigue. As O-rings with small cord diameter (∅ d_2) show a relatively high compression set, the use of O-rings with the greatest possible cord diameter must be aimed for. The table shows the recommended cord diameter d_2 depending on the diameter d or D of the installation spaces.

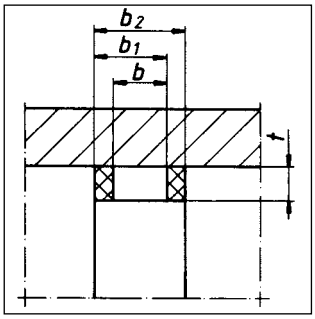
Selection of the appropriate o-ring size
In addition, the internal diameter must be selected so that neither expansion of 6% nor compression of 3% is exceeded. Otherwise too large a cross section reduction and too large internal flattening occur.

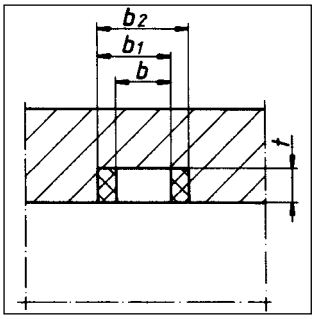
	Cord ∅ d_2														
∅ d_1	1.5	1.78	2	2.5	2.62	3	3.5/3.53	4	5	5.33	5.7	6	6.99/7	8	10
< 18	+	•	+	+	+	+	+								
> 18... 30	+	+	+	+	•	+	+								
> 30... 35		+	+	+	•	+	+								
> 35... 45			+	+	•	+	+								
> 45... 50				+	•	+	+								
> 50... 63				+	+	+	•								
> 63... 80						+	•	+							
> 80...100						+	+	+	+	•					
>100...200							+	+	+	•	+	+			
>200...250								+	+	•	+	+	+	+	+
>250...300									+	+	+	+	•	+	+
>300...400										+	+	+	•	+	+
>400...500												+	•	+	+
>500												+	+	+	•

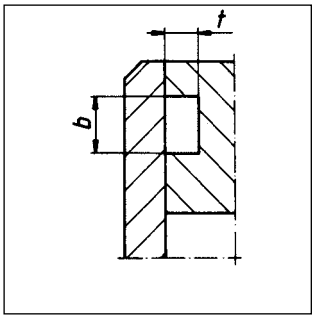
There is the danger of ring distortion in the case of too great flattening.

+ = recommended range
• = possible range

Installation Space Dimensions







The groove dimensions t and b are dependent on the cord diameter d_2.
If additional thrust rings are installed, the groove width b must be increased accordingly.

	Installation type 1–2				Installation type 3		R_1		
∅ d_2	t + 0.05	b + 0.25	b_1 + 0.25	b_2 + 0.25	t + 0.05	b + 0.25	R'_1	R''_2	a
1.5	1.2	2.1	3.5	4.9	1.1	2.3	0.3	0.3	1.5
1.78	1.4	2.4	3.8	5.2	1.3	2.6	0.3	0.3	1.5
2	1.6	2.6	4	6	1.5	2.8	0.3	0.3	2
2.5	2	3.4	4.8	6.2	1.9	3.6	0.3	0.3	2
2.62	2.1	3.6	5	6.4	2	3.8	0.3	0.3	2
3	2.4	4	5.4	6.8	2.3	4.2	0.6	0.4	2.5
3.5	2.8	4.7	6.1	7.5	2.7	4.9	0.6	0.4	2.5
3.53	2.8	4.8	6.2	7.6	2.7	5	0.6	0.4	2.5
4	3.2	5.4	6.8	8.2	3.1	5.6	0.6	0.4	3
5	4.1	6.6	8.5	10.4	4	6.8	0.6	0.4	3
5.33	4.3	7.1	9	10.9	4.2	7.3	1	0.6	4
5.7	4.6	7.7	9.6	11.5	4.5	7.9	1	0.6	4
6	4.9	8	10.8	13.6	4.7	8.2	1	0.6	4
6.99	5.8	9.5			5.7	9.7	1		4
7	5.8	9.5			5.7	9.7	1		4
8	6.7	10.8			6.5	11	1		5
10	8.5	13.5			8.3	13.7	1		5

R'_1 = without thrust ring
R''_2 = with one thrust ring
a = installation slope

O-RINGS

TRELLEBORG
SEALING SOLUTIONS

Gap Widths

Pressure (bar)	Gap widths (mm) 70 Shore	80 Shore	90 Shore
≤ 60	0.2	–	–
> 60...100	0.1	0.2	–
>100...160	–	0.1	0.2
>160	–	–	0.1

The hardness to be selected is dependent on system pressure, the construction-dependent tolerances and the associated gap widths. It must be taken into account that the gap width can increase due to elastic expansion of the metallic components.
Thrust rings should be used for radial gap widths greater than those shown in the table.

Surface Treatment

Surface Roughness		Ra	Rt
Groove base sealing surface	pulsating pressure	≤1.6 µm	≤ 6 µm
Groove base sealing surface	non-pulsating pressure	≤3.2 µm	≤12 µm
Groove flanks		≤6.3 µm	≤20 µm
Installation slope		≤0.6 µm	≤ 5 µm

In order to guarantee a good sealing effect and a long service life of the O-rings, it is necessary to take account of the surface quality of the mounting frame and the dimensions and permitted tolerances. The surface quality must then be improved if pulsating pressures can occur so that no appreciable wear is produced in the event of relative movement of the O-ring.

O-RINGS

Material Overview

Name	Nitrile rubber	Fluoro rubber	Ethylene propylene diene rubber	Silicone	Hydrogenated Nitrile rubber
International abbreviation	**NBR**	**FPM**	**EPDM**	**MVQ (SI)**	**HNBR**
Trade Name® e.g.	Perbunan N® Hycar®	Viton®/Fluorel®	Buna® Keltan® Nordel®	Silopren®/Silastic®	Therabal®/Zetpal®
Hardness Shore A	50/-90	50	50/-90	90	70/-90
Wear resistance / abrasion resistance	good	good	satisfactory	satisfactory	good
Compression set	good	very good	good	good	sufficient
general weathering resistance	satisfactory	excellent	excellent	very good	good
Ozone resistance	low	excellent	excellent	excellent	good
Mineral oils and greases	excellent	excellent	not suitable	good	good
Fuel resistance	good	excellent	not suitable	low	satisfactory
Resistance to solvents	partly good	very good	low to satisfactory	satisfactory to good	partly good
general resistance to acids	satisfactory	very good	good	satisfactory	good
Temperature range	-30 °C to +100 °C	-20 °C to +200 °C	-40 °C to +130 °C	-55 °C to +200 °C	-30 °C to +140 °C
Resistance to steam	good	good	very good	good	good
Characteristics / Main Application Areas	**Nitrile butadiene rubber (NBR)** Trade names: Perbunan®: Bayer AG Buna®: I.G. Farben Hycar®: B.F. Goodrich Chem. Co Nitrile rubber (NBR) is the general designation for the specified copolymer. The acrylic nitrile content for technical products varies between 18 % and 50 % and significantly influences the elastomer properties. With high acrylic nitrile content, the resistance to oil and fuel improves with simultaneous reduction of the cold flexibility, the elasticity and worsening of the compression set. NBR has good mechanical properties and higher abrasion resistance in comparison with other elastomers. Chemical resistance: • Aliphatic hydrocarbons (propane, butane, benzine, mineral oils and greases, diesel fuel, heating oil) • Vegetable and animal oils and fats • Many diluted acids, bases and saline solutions, at low temperature • Water Not resistant: • Fuels with high aromatic content ("super" petroleum) • Aromatic hydrocarbons (benzene) • Chlorinated hydrocarbons (trichloroethylene) • Polar solvents (ketones, acetone, acetic acid ethylene ester) • Strong acids • Glycol-based brake fluid • Ozone, weathering, ageing	**Fluororubber (FPM)** Trade names: Viton®: Du Pont Fluorel®: 3M Company Tecnoflon®: Montecatini Dai-e®l: Daikon Kagyo Co. Fluororubber has excellent resistance to high temperatures, ozone, oxygen, mineral oils, synthetic hydraulic fluids, fuels, aromatic compounds, many organic solvents and chemicals. The low temperature range is not favourable and for dynamic loading is approx. –15 °C to –20 °C. The gas permeability is low and similar to that of butyl rubber. Special FPM mixtures have higher resistance to acids, fuels, water and steam. Chemical resistance: • Mineral oils and greases, low swelling for ASTM Oil No. 1 to 3 • Fire-retardant hydraulic fluids in the group HFD • Silicone oils and greases • Vegetable and animal oils and fats • Aliphatic hydrocarbons (benzine, butane, propane, natural gas) • Aromatic hydrocarbons (benzene, toluene) • Chlorinated hydrocarbons (trichloroethylene and carbon tetrachloride) • Fuels, fuels containing methanol • High vacuum • Very good resistance to ozone, weather and ageing Not resistant: • Polar solvents(acetone, methylethylketone, ethyl acetate, diethyl ether, dioxane) • Skydrol 500 and 7000 • Glycol-based brake fluids • Ammonia gas, amines, alkalis • Superheated steam • Low molecular weight organic acids (formic acid and acetic acid) DIN/ISO: FPM; ASTM: FKM	**Ethylene propylene rubber (EPM, EPDM)** Trade names: Buna AP®: Chem. Werke Hüls Keltan®: DSM Dutral®: Montecatini Nordel®: Du Pont Vistalon®: Enjay Chemical Royalene®: Uniroyal Chemical Epcar®: B.F. Goodrich Chem. Co. EPDM is a rubber which is manufactured by copolymerisation of ethylene and propylene. Due to the use of a third monomer, Ethylene Propylene Diene Rubber (EPDM) is produced which shows particularly good properties for seals in phosphate ester hydraulic fluids and is widely used in glycol-based brake systems. Chemical resistance: • Hot water and hot steam up to +150 °C Special grades +200 °C • Glycol-based brake fluids up to +150 °C • Many organic and inorganic acids • Detergents, sodium hydroxide and potassium hydroxide solutions • Phosphoric acid ester based hydraulic fluids (HFD-R) • Silicone oils and greases • Many polar solvents (alcohols, ketones, esters) • Resistant to ozone, ageing and weather Not resistant: • Mineral oil products (oils, greases, fuels)	**Silicone rubbers (Q, MQ, MVQ)** Trade names: Silopren®: Bayer AG Silastic®: Dow Corning SE, Blensil®: General Electric Silicone rubbers comprise a group of materials in which methyl vinyl silicone (MVQ) is used most frequently. The group of silicone elastomers has relatively bad tensile strength, tear propagation resistance and abrasion resistance; however it has excellent special properties: Hot air resistance up to +230 °C and cold flexibility down to –60 °C, resistance to weathering, good insulation properties, good physiological properties, good to medium media resistance. Chemical resistance: • Aliphatic engine and gear oils (e.g. ASTM Oil No. 1) • Animal and vegetable oils and fats • Glycol-based brake fluids • Fire-retardant hydraulic fluids HFD-R and HFD-S • High molecular weight chlorinated aromatic hydrocarbons (e.g. Clophen), chlordiphenyl (and other flame-retardant insulation, coolants for transformers) • Water up to +100 °C • Diluted saline solutions • Resistant to ozone, ageing and weather Not resistant: • Superheated steam above +120 °C • Acids, alkalis, silicone oils and greases • Low molecular weight chlorinated hydrocarbons (e.g. trichloroethylene) • Aromatic mineral oils, fuels • Aromatic hydrocarbons DIN/ISO: MVQ; ASTM: VMQ	**Hydrogenated nitrile rubber (HNBR)** Materials with excellent resistance to heat and ozone are produced by hydrogenation of NBR elastomers. Peroxide cross-linked HNBR have the lowest compression set and the best heat resistance. HNBR elastomers with high acrylonitrile (ACN) content have better resistance to mineral oils. HNBR materials combine outstanding resistance with good low temperature flexibility; however they are more expensive than NBR. HNBR are beneficial where good resistance to ozone and weathering, ageing in hot air, industrial lubricants, hot water / steam up to 150 °C, amine-based corrosion inhibitors and acidic gases (H2S) and high energy radiation are required. HNBR materials close the gap between NBR and FPM in many application areas in which heat resistance and resistance to aggressive media are required simultaneously and can therefore be an inexpensive alternative to FPM elastomers.

O-RINGS

Perfluoro rubber	Perfluorethylenepro-pylene	Polytetrafluoroethylene PTFE	Urethane rubber	Chloroprene rubber	Fluorosilicone rubber
FFKM	**FEP**	**PTFE**	**PU**	**CR**	**MFQ**
Isolast®/Kalrez®	FEP-covered	Teflon®	Urepan®	Neopren® Baypren®	Wacker® R 900/40 – R 900/60
65/-90	85/-95	95	65/-95	50/-90	40/-60
good	satisfactory	low	excellent	good	satisfactory
very good	good	low	satisfactory	good	good
excellent	excellent	excellent	very good	very good	very good
excellent	excellent	excellent	very good	very good	excellent
excellent	excellent	excellent	very good	good	very good
excellent	excellent	excellent	good	low	good
very good	very good	very good	satisfactory	partially	satisfactory to good
very good	very good	very good	low	good	satisfactory
-25 °C to +325 °C	-60 °C to +200 °C	-200 °C to +260 °C	-25 °C to +100 °C	-20 °C to +150 °C -20 °C to +100 °C	-60 °C to +250 °C -60 °C to +200 °C
very good	good	very good	not suitable	good	approx. +140 °C Saturated steam

Perfluoro rubber (FFKM/FFPM)

Trade names:
Isolast®: Trelleborg
Kalrez®: Du Pont
Chemraz®: Greene Tweed
Simriz®: Freudenberg

FFKM combines the elasticity and sealing force of a genuine elastomer with the chemical resistance and thermal stability which otherwise only PTFE can demonstrate.
Under difficult operating conditions, there are no other elastomers which achieve the overall operational behaviour of FFKM parts. Main application areas of FFKM parts are the chemical / petrochemical industry as well as the semiconductor industry and measurement and control technology.
Best sealing performance also in long-term operation at temperatures of +325 °C even in contact with corrosive chemicals.

FEP

FEP-covered sealing elements, mainly O-rings, consist of an elastomer core and a seamless FEP covering. The elastic behaviour of an elastomer O-ring and the chemical resistance of FEP are thus ideally merged. A distinction is made between types with full core and those with hollow core. These sealing elements are preferably used in static applications.

PTFE

The material polytetrafluorethylene (PTFE) represents a special case in connection with mechanical seals. In contrast to the previously described materials, this is a sintered thermosetting plastic. PTFE is resistant to almost all chemicals; however it has the cold flow property. The significant stiffness as well as the neglected elasticity make "dynamic" use possible. PTFE or FEP covered elastomer rings are also used for the combination of several positive properties. However, particular mounting instructions for these must be observed.

PU

Polyurethane (PU) elastomers are known for their remarkably good mechanical properties.
In this respect, they fill the gap between the normal rubber types and the tough plastics.
The first things to mention are the extreme tear resistance and wear resistance, with very good resistance to weathering, oil and ozone in a sufficient temperature range.
Not recommended for steam and acid loading; not available below approx. 65 Shore A. Mainly used for mechanically highly loaded wear parts, e.g. spring elements, shock absorbers (crane construction), drive gears and clutch elements in engine and transmission construction, bearings, dampers, plates, flat seals etc.

Chloroprene rubber (CR)

Trade names:
Neoprene®: Du Pont
Bayprene®: Bayer AG
Butaclor®: Distergil
Petro-Tex
Neoprene®: Petro-Tex
Chem. Co
Denka®: Denka
Chem. Co.

Chloroprene was one of the first synthetic rubbers and generally shows good resistance to ozone, weather, chemicals and ageing, medium oil resistance, good mechanical properties and an extended temperature range.

Chemical resistance:
- Paraffinic mineral oils with low compression set
- Silicone oils and greases
- Water and aqueous solutions (at moderate temperatures)
- Refrigerants (ammonia, carbon dioxide, freon)
- Better resistance to ozone, weather and ageing as compared with NBR

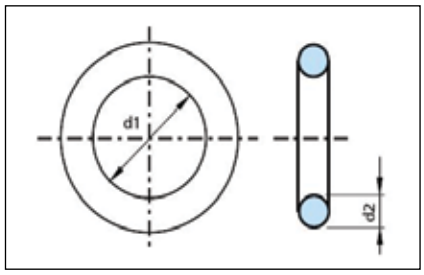
Not resistant:
- Aromatic hydrocarbons (benzene)
- Chlorinated hydrocarbons (trichloroethylene)
- Polar solvents (ketones, esters, ether, acetone)

Fluoride silicone rubber (MFQ)

In addition to the methyl, MFQ has trifluoropropyl groups in the molecule. The mechanical and physical properties are comparable with those of MVQ. On the other hand, fluorosilicone (MFQ), in comparison with silicone (MVQ), shows significantly improved media resistance with somewhat worse resistance to fuels and mineral oils.

O-RINGS STANDARD RANGE

O-rings, NBR 70



The O-ring is an endless pressed round ring with circular cross section made of rubber-elastic materials.
O-rings are used both for static as well as for dynamic sealing in pneumatics and hydraulics.

Type: Standard O-ring
Material: NBR
Hardness: 70 Shore A
Colour: black

Item No.	d1 mm	d2 mm	Minimum quantity
95570	1.50	1.00	**100**
95580	2.00	1.00	**100**
95650	3.00	1.00	**100**
945440	3.30	1.00	**100**
772630	3.50	1.00	**100**
95890	4.50	1.00	**100**
1034300	5.00	1.00	**100**
96040	6.00	1.00	**100**
96140	7.00	1.00	**100**
96250	8.00	1.00	**100**
94160	8.50	1.00	**100**
1034290	9.00	1.00	**100**
96540	10.00	1.00	**100**
96730	11.00	1.00	**100**
96830	12.00	1.00	**100**
96970	13.00	1.00	**100**
97090	14.00	1.00	**100**
97200	15.00	1.00	**100**
97340	16.00	1.00	**100**
773390	17.00	1.00	**100**
97530	18.00	1.00	**100**
97780	20.00	1.00	**100**
739540	22.00	1.00	**100**
934740	26.00	1.00	**100**
522700	30.00	1.00	**100**
873750	32.00	1.00	**100**
99610	40.00	1.00	**100**
1095920	42.00	1.00	**100**
4221640	50.00	1.00	**100**
10006106	62.00	1.00	**50**
10021368	68.00	1.00	**50**
93990	1.50	1.50	**100**
625580	2.00	1.50	**100**
994830	2.57	1.50	**100**
95660	3.00	1.50	**100**
95770	4.00	1.50	**100**
95970	5.00	1.50	**100**
94090	5.50	1.50	**100**
96060	6.00	1.50	**100**
884980	6.50	1.50	**100**
96150	7.00	1.50	**100**
96370	8.50	1.50	**100**
96410	9.00	1.50	**100**
1046180	9.50	1.50	**100**
96560	10.00	1.50	**100**
96740	11.00	1.50	**100**
96810	11.50	1.50	**100**

O-RINGS STANDARD RANGE

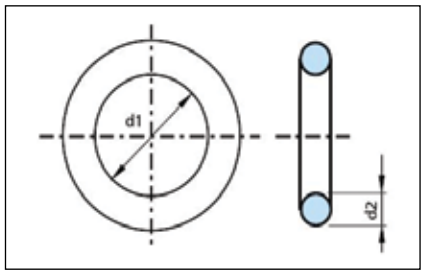
O-rings, NBR 70

Item No.	d1 mm	d2 mm	Minimum quantity
96840	12.00	1.50	**10**
96980	13.00	1.50	**10**
97100	14.00	1.50	**10**
97210	15.00	1.50	**10**
97360	16.00	1.50	**10**
97450	17.00	1.50	**10**
97540	18.00	1.50	**10**
97680	19.00	1.50	**10**
97800	20.00	1.50	**10**
97960	21.00	1.50	**10**
98060	22.00	1.50	**10**
522620	23.00	1.50	**10**
522630	24.00	1.50	**10**
98340	25.00	1.50	**10**
98430	26.00	1.50	**10**
522660	27.00	1.50	**10**
98600	28.00	1.50	**10**
98790	30.00	1.50	**10**
522730	32.00	1.50	**10**
99250	35.00	1.50	**10**
4226230	38.00	1.50	**10**
99620	40.00	1.50	**10**
637950	42.00	1.50	**10**
99920	45.00	1.50	**10**
1011800	48.00	1.50	**10**
969670	49.00	1.50	**10**
100250	50.00	1.50	**10**
522930	57.00	1.50	**50**
522880	60.00	1.50	**50**
629120	65.00	1.50	**50**
522920	67.00	1.50	**50**
1086580	78.00	1.50	**50**
797610	80.00	1.50	**50**
828630	100.00	1.50	**10**
93950	1.78	1.78	**100**
739020	2.57	1.78	**100**
95640	2.90	1.78	**100**
95740	3.68	1.78	**100**
95880	4.47	1.78	**100**
94070	5.28	1.78	**100**
96100	6.07	1.78	**100**
94140	6.75	1.78	**100**
4716190	6.86	1.78	**100**
96240	7.65	1.78	**100**
96470	9.25	1.78	**100**
691510	10.82	1.78	**100**
739310	11.11	1.78	**100**
94380	12.42	1.78	**100**
712100	14.00	1.78	**100**
522400	15.60	1.78	**100**
97510	17.17	1.78	**100**
97940	20.35	1.78	**100**
638630	21.95	1.78	**100**
739580	23.52	1.78	**100**

Continued ➡

O-RINGS STANDARD RANGE

Continued: O-rings, NBR 70



Type: Standard O-ring
Material: NBR
Hardness: 70 Shore A
Colour: black

Item No.	d1 mm	d2 mm	Minimum quantity
98420	25.12	1.78	**100**
522650	26.70	1.78	**100**
98690	28.30	1.78	**100**
747650	29.87	1.78	**100**
739770	31.47	1.78	**100**
1026970	33.05	1.78	**100**
739880	34.65	1.78	**100**
1003660	37.82	1.78	**100**
740000	41.00	1.78	**100**
601620	44.17	1.78	**100**
1108800	47.35	1.78	**100**
712130	50.52	1.78	**50**
1107660	53.70	1.78	**50**
1047640	56.87	1.78	**50**
4114910	66.40	1.78	**50**
10011735	72.76	1.78	**50**
4114920	75.92	1.78	**50**
718660	82.27	1.78	**50**
765800	94.97	1.78	**50**
996970	107.67	1.78	**10**
4108110	123.42	1.78	**10**
523020	133.07	1.78	**10**
95680	3.00	2.00	**100**
711920	4.00	2.00	**100**
4179280	4.50	2.00	**100**
95990	5.00	2.00	**100**
96070	6.00	2.00	**100**
96160	7.00	2.00	**100**
1119320	7.50	2.00	**100**
96290	8.00	2.00	**100**
96420	9.00	2.00	**100**
96580	10.00	2.00	**100**
96750	11.00	2.00	**100**
96850	12.00	2.00	**100**
874310	12.50	2.00	**100**
96990	13.00	2.00	**100**
97120	14.00	2.00	**100**
97230	15.00	2.00	**100**
97460	17.00	2.00	**100**
97560	18.00	2.00	**100**
97690	19.00	2.00	**100**
97810	20.00	2.00	**100**
97970	21.00	2.00	**100**
936600	22.00	2.00	**100**
98150	23.00	2.00	**100**
98270	24.00	2.00	**100**
98360	25.00	2.00	**100**

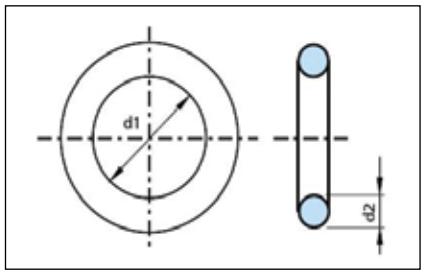
O-RINGS STANDARD RANGE

O-rings, NBR 70

Item No.	d1 mm	d2 mm	Minimum quantity
98440	26.00	2.00	**100**
523200	27.00	2.00	**100**
98610	28.00	2.00	**100**
795090	29.00	2.00	**100**
98800	30.00	2.00	**100**
98880	31.00	2.00	**100**
523270	33.00	2.00	**100**
99140	34.00	2.00	**100**
99260	35.00	2.00	**100**
99330	36.00	2.00	**100**
99410	37.00	2.00	**100**
99480	38.00	2.00	**100**
99550	39.00	2.00	**100**
99630	40.00	2.00	**100**
523330	41.00	2.00	**100**
99770	42.00	2.00	**100**
99830	43.00	2.00	**100**
523360	44.00	2.00	**100**
99930	45.00	2.00	**100**
100020	46.00	2.00	**100**
100060	47.00	2.00	**100**
100150	48.00	2.00	**100**
100260	50.00	2.00	**100**
523380	52.00	2.00	**50**
100520	53.00	2.00	**50**
523390	55.00	2.00	**50**
100740	56.00	2.00	**50**
100870	58.00	2.00	**50**
100950	60.00	2.00	**50**
101020	62.00	2.00	**50**
1063910	63.00	2.00	**50**
816600	64.00	2.00	**50**
101180	65.00	2.00	**50**
101250	66.00	2.00	**50**
4252710	67.00	2.00	**50**
101310	68.00	2.00	**50**
101420	70.00	2.00	**50**
523530	72.00	2.00	**50**
101560	74.00	2.00	**50**
101610	75.00	2.00	**50**
101680	76.00	2.00	**50**
523570	78.00	2.00	**50**
101850	80.00	2.00	**50**
604260	93.00	2.00	**50**
96530	100.00	2.00	**10**
102610	105.00	2.00	**10**
102690	110.00	2.00	**10**
628380	120.00	2.00	**10**
4108120	132.00	2.00	**10**
772610	140.00	2.00	**10**
10020251	154.00	2.00	**10**
95820	4.00	2.50	**100**
96000	5.00	2.50	**100**
96080	6.00	2.50	**100**

O-RINGS STANDARD RANGE

Continued: O-rings, NBR 70



Type: Standard O-ring
Material: NBR
Hardness: 70 Shore A
Colour: black

Item No.	d1 mm	d2 mm	Minimum quantity
96170	7.00	2.50	**100**
96220	7.50	2.50	**100**
96310	8.00	2.50	**100**
96430	9.00	2.50	**100**
94260	10.00	2.50	**100**
96760	11.00	2.50	**100**
624420	11.50	2.50	**100**
96860	12.00	2.50	**100**
97000	13.00	2.50	**100**
97130	14.00	2.50	**100**
97240	15.00	2.50	**100**
97380	16.00	2.50	**100**
97470	17.00	2.50	**100**
97590	18.00	2.50	**100**
97710	19.00	2.50	**100**
97830	20.00	2.50	**100**
823640	21.00	2.50	**100**
98080	22.00	2.50	**100**
98160	23.00	2.50	**100**
98280	24.00	2.50	**100**
98370	25.00	2.50	**100**
98510	27.00	2.50	**100**
98620	28.00	2.50	**100**
98720	29.00	2.50	**100**
98810	30.00	2.50	**100**
98960	32.00	2.50	**100**
523230	33.00	2.50	**100**
523280	34.00	2.50	**100**
99350	36.00	2.50	**100**
99490	38.00	2.50	**100**
99640	40.00	2.50	**100**
99780	42.00	2.50	**100**
99940	45.00	2.50	**100**
792630	46.00	2.50	**100**
100270	50.00	2.50	**100**
100600	54.00	2.50	**50**
100680	55.00	2.50	**50**
4250870	58.00	2.50	**50**
100960	60.00	2.50	**50**
101190	65.00	2.50	**50**
101620	75.00	2.50	**50**
4119630	84.00	2.50	**50**
102240	90.00	2.50	**50**
523700	95.00	2.50	**50**
523710	96.00	2.50	**50**
523790	107.00	2.50	**10**
102820	115.00	2.50	**10**

O-RINGS STANDARD RANGE

O-rings, NBR 70

Item No.	d1 mm	d2 mm	Minimum quantity
102910	120.00	2.50	**10**
4114960	1.24	2.62	**100**
628070	6.02	2.62	**100**
94230	9.19	2.62	**100**
96700	10.77	2.62	**100**
96820	11.91	2.62	**100**
96920	12.37	2.62	**100**
669930	13.94	2.62	**100**
97320	15.54	2.62	**100**
772670	17.12	2.62	**100**
629010	18.72	2.62	**100**
523060	20.29	2.62	**100**
950900	21.89	2.62	**100**
523170	25.07	2.62	**100**
858510	26.64	2.62	**100**
739730	29.82	2.62	**100**
523250	32.99	2.62	**100**
99240	34.59	2.62	**100**
625590	37.77	2.62	**100**
740150	42.52	2.62	**100**
100010	45.69	2.62	**100**
4115010	48.90	2.62	**100**
844590	55.25	2.62	**50**
740390	56.82	2.62	**50**
4115020	58.42	2.62	**50**
4115060	71.12	2.62	**50**
4115070	72.69	2.62	**50**
713760	82.22	2.62	**50**
523640	88.57	2.62	**50**
4301300	94.92	2.62	**50**
4115090	113.97	2.62	**10**
524010	132.94	2.62	**10**
4115110	133.02	2.62	**10**
4115120	139.37	2.62	**10**
524050	145.72	2.62	**10**
4115130	158.42	2.62	**10**
844260	183.82	2.62	**10**

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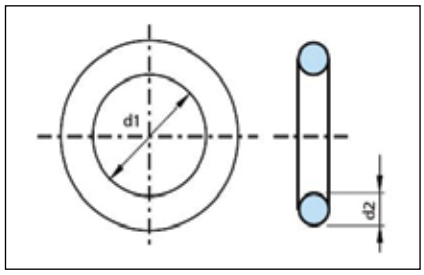
O-RINGS STANDARD RANGE

O-rings, NBR 70



Type: Standard O-ring
Material: NBR
Hardness: 70 Shore A
Colour: black

Item No.	d1 mm	d2 mm	Minimum quantity
95830	4.00	3.00	**100**
96010	5.00	3.00	**100**
96180	7.00	3.00	**100**
96320	8.00	3.00	**100**
96440	9.00	3.00	**100**
96620	10.00	3.00	**100**
94310	11.00	3.00	**100**
96870	12.00	3.00	**100**
97010	13.00	3.00	**100**
97150	14.00	3.00	**100**
97250	15.00	3.00	**100**
97390	16.00	3.00	**100**
97480	17.00	3.00	**100**
97600	18.00	3.00	**100**
97720	19.00	3.00	**100**
97850	20.00	3.00	**100**
97990	21.00	3.00	**100**
739550	22.20	3.00	**100**
98170	23.00	3.00	**100**
98290	24.00	3.00	**100**
98380	25.00	3.00	**100**
98460	26.00	3.00	**100**
98730	29.00	3.00	**100**
98890	31.00	3.00	**100**
98970	32.00	3.00	**100**
99070	33.00	3.00	**100**
99150	34.00	3.00	**100**
99280	35.00	3.00	**100**
99360	36.00	3.00	**100**
99500	38.00	3.00	**100**
99570	39.00	3.00	**100**
99650	40.00	3.00	**100**
99790	42.00	3.00	**100**
99840	43.00	3.00	**100**
99880	44.00	3.00	**100**
99950	45.00	3.00	**100**
100030	46.00	3.00	**100**
100170	48.00	3.00	**100**
100280	50.00	3.00	**100**
524450	54.00	3.00	**50**
740370	55.00	3.00	**50**
524460	56.00	3.00	**50**
100800	57.00	3.00	**50**
100890	58.00	3.00	**50**
100920	59.00	3.00	**50**
712510	60.00	3.00	**50**
101040	62.00	3.00	**50**

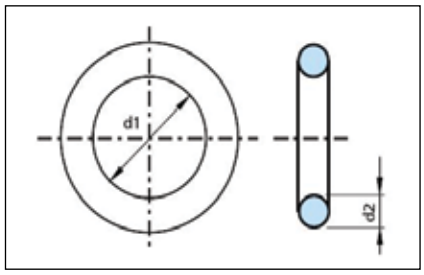
O-RINGS STANDARD RANGE

O-rings, NBR 70

Item No.	d1 mm	d2 mm	Minimum quantity
625600	63.00	3.00	**50**
101130	64.00	3.00	**50**
740610	67.00	3.00	**50**
101360	69.00	3.00	**50**
101440	70.00	3.00	**50**
525680	72.00	3.00	**50**
101630	75.00	3.00	**50**
101700	76.00	3.00	**50**
101870	80.00	3.00	**50**
101970	83.00	3.00	**50**
101990	84.00	3.00	**50**
102040	85.00	3.00	**50**
102110	86.00	3.00	**50**
102160	88.00	3.00	**50**
102250	90.00	3.00	**50**
1065530	93.00	3.00	**50**
102310	94.00	3.00	**50**
102340	95.00	3.00	**50**
102390	96.00	3.00	**50**
10015494	96.00	3.00	**50**
102450	98.00	3.00	**50**
102500	100.00	3.00	**10**
102620	105.00	3.00	**10**
741190	106.00	3.00	**10**
525810	110.00	3.00	**10**
525890	115.00	3.00	**10**
102920	120.00	3.00	**10**
103100	130.00	3.00	**10**
4027140	135.00	3.00	**10**
103190	140.00	3.00	**10**
1185710	144.00	3.00	**10**
526010	146.00	3.00	**10**
103520	175.00	3.00	**10**
526080	180.00	3.00	**10**
103600	190.00	3.00	**10**
103690	200.00	3.00	**10**
526160	240.00	3.00	**10**
526250	280.00	3.00	**10**
528310	320.00	3.00	**10**
10009224	455.00	3.00	**10**
885150	5.00	3.50	**100**
848030	6.00	3.50	**100**
96330	8.00	3.50	**100**
97270	15.00	3.50	**100**
97610	18.00	3.50	**100**
97860	20.00	3.50	**100**
98000	21.00	3.50	**100**
524130	22.00	3.50	**100**
524140	25.00	3.50	**100**
98640	28.00	3.50	**100**
98830	30.00	3.50	**100**
98980	32.00	3.50	**100**
99300	35.00	3.50	**100**

O-RINGS STANDARD RANGE

Continued: O-rings, NBR 70



Type: Standard O-ring
Material: NBR
Hardness: 70 Shore A
Colour: black

Item No.	d1 mm	d2 mm	Minimum quantity
524350	38.00	3.50	**100**
99660	40.00	3.50	**100**
100290	50.00	3.50	**100**
100700	55.00	3.50	**50**
524480	60.00	3.50	**50**
101450	70.00	3.50	**50**
1009310	76.00	3.50	**50**
4115220	15.47	3.53	**100**
97910	20.22	3.53	**100**
624490	23.39	3.53	**100**
711490	24.99	3.53	**100**
98490	26.57	3.53	**100**
524210	27.40	3.53	**100**
738500	28.17	3.53	**100**
98770	29.74	3.53	**100**
711580	32.92	3.53	**100**
823090	34.52	3.53	**100**
691520	37.69	3.53	**100**
783680	44.04	3.53	**100**
712570	47.22	3.53	**100**
607800	50.39	3.53	**50**
524430	53.57	3.53	**50**
721990	56.74	3.53	**50**
524500	63.09	3.53	**50**
740750	72.62	3.53	**50**
10028839	79.79	3.53	**50**
10015514	82.14	3.53	**50**
621110	82.14	3.53	**50**
4115290	85.32	3.53	**50**
712610	91.67	3.53	**50**
712620	94.84	3.53	**50**
4115310	104.37	3.53	**10**
712650	110.72	3.53	**10**
525910	117.07	3.53	**10**
741480	126.59	3.53	**10**
772600	135.70	3.53	**10**
741730	139.29	3.53	**10**
4115340	145.64	3.53	**10**
4115350	164.69	3.53	**10**
918780	190.09	3.53	**10**
742370	209.14	3.53	**10**
4115370	228.19	3.53	**10**
4115390	253.59	3.53	**10**
4115400	266.29	3.53	**10**
96340	8.00	4.00	**100**
96880	12.00	4.00	**100**
97160	14.00	4.00	**100**

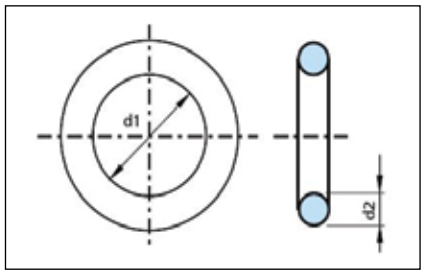
O-RINGS STANDARD RANGE

O-rings, NBR 70

Item No.	d1 mm	d2 mm	Minimum quantity
97400	16.00	4.00	**100**
97490	17.00	4.00	**100**
97740	19.00	4.00	**100**
97870	20.00	4.00	**100**
98010	21.00	4.00	**100**
98100	22.00	4.00	**100**
98310	24.00	4.00	**100**
1046920	25.00	4.00	**100**
98470	26.00	4.00	**100**
98650	28.00	4.00	**100**
98840	30.00	4.00	**100**
98990	32.00	4.00	**100**
526370	35.00	4.00	**100**
99380	36.00	4.00	**100**
526390	37.00	4.00	**100**
99510	38.00	4.00	**100**
99670	40.00	4.00	**100**
526440	42.00	4.00	**100**
526460	44.00	4.00	**100**
100180	48.00	4.00	**100**
100470	52.00	4.00	**50**
526700	54.00	4.00	**50**
100710	55.00	4.00	**50**
526710	58.00	4.00	**50**
101050	62.00	4.00	**50**
101140	64.00	4.00	**50**
101340	68.00	4.00	**50**
101460	70.00	4.00	**50**
101530	72.00	4.00	**50**
101890	80.00	4.00	**50**
101950	82.00	4.00	**50**
102520	100.00	4.00	**10**
102710	110.00	4.00	**10**
4219910	115.00	4.00	**10**
102880	118.00	4.00	**10**
102940	120.00	4.00	**10**
103110	130.00	4.00	**10**
526920	135.00	4.00	**10**
950240	145.00	4.00	**10**
103320	150.00	4.00	**10**
742000	160.00	4.00	**10**
527180	170.00	4.00	**10**
103490	172.00	4.00	**10**
103540	180.00	4.00	**10**
4219950	200.00	4.00	**10**
527150	210.00	4.00	**10**
601560	220.00	4.00	**10**
526990	240.00	4.00	**10**
103790	250.00	4.00	**10**
10014519	6.50	5.00	**100**
94270	10.00	5.00	**100**
94430	13.00	5.00	**100**
97290	15.00	5.00	**100**

O-RINGS STANDARD RANGE

Continued: O-rings, NBR 70



Type: Standard O-ring
Material: NBR
Hardness: 70 Shore A
Colour: black

Item No.	d1 mm	d2 mm	Minimum quantity
97630	18.00	5.00	**100**
97890	20.00	5.00	**100**
98400	25.00	5.00	**100**
98850	30.00	5.00	**100**
99000	32.00	5.00	**100**
527240	38.00	5.00	**100**
99680	40.00	5.00	**100**
99810	42.00	5.00	**100**
100310	50.00	5.00	**100**
100480	52.00	5.00	**50**
100990	60.00	5.00	**50**
101230	65.00	5.00	**50**
527460	70.00	5.00	**50**
101650	75.00	5.00	**100**
101910	80.00	5.00	**50**
102080	85.00	5.00	**50**
102270	90.00	5.00	**50**
1084720	95.00	5.00	**50**
102540	100.00	5.00	**10**
102640	105.00	5.00	**10**
102720	110.00	5.00	**10**
102950	120.00	5.00	**10**
103040	125.00	5.00	**10**
103120	130.00	5.00	**10**
103210	140.00	5.00	**10**
103270	145.00	5.00	**10**
103420	160.00	5.00	**10**
528180	165.00	5.00	**10**
528210	170.00	5.00	**10**
528220	180.00	5.00	**10**
103610	190.00	5.00	**10**
528240	200.00	5.00	**10**
644440	205.00	5.00	**10**
103770	230.00	5.00	**10**
527360	250.00	5.00	**10**
4115450	15.24	5.33	**100**
4115470	18.42	5.33	**100**
4115490	21.59	5.33	**100**
4115510	26.34	5.33	**100**
4226550	32.69	5.33	**100**
4115540	37.47	5.33	**100**
99710	40.64	5.33	**100**
740280	50.17	5.33	**50**
4115560	53.34	5.33	**50**
996940	56.52	5.33	**50**
1106640	62.87	5.33	**50**
4115610	69.22	5.33	**50**

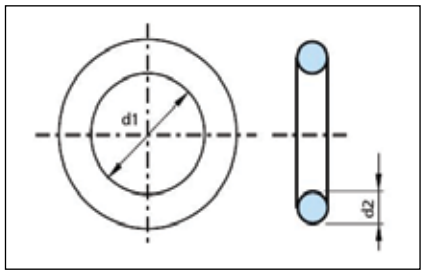
O-RINGS STANDARD RANGE

O-rings, NBR 70

Item No.	d1 mm	d2 mm	Minimum quantity
740890	79.73	5.33	**50**
527200	85.09	5.33	**50**
712860	88.27	5.33	**50**
741030	94.62	5.33	**50**
10029145	97.79	5.33	**50**
4115660	100.97	5.33	**10**
730880	104.14	5.33	**10**
1095930	110.49	5.33	**10**
4115690	123.19	5.33	**10**
4115700	126.37	5.33	**10**
4115710	142.24	5.33	**10**
4115730	151.77	5.33	**10**
4115760	177.17	5.33	**10**
4115780	189.87	5.33	**10**
4115820	227.97	5.33	**10**
4273780	266.07	5.33	**10**
4699390	278.77	5.33	**10**
4115850	329.57	5.33	**10**
4115860	380.37	5.33	**10**
101930	80.00	6.00	**50**
769840	90.00	6.00	**50**
102960	120.00	6.00	**10**
527610	180.00	6.00	**10**
4271490	230.00	6.00	**10**
10020010	275.00	6.00	**10**
4115890	113.67	6.99	**10**
4115900	116.84	6.99	**10**
4115920	123.19	6.99	**10**
4115930	126.37	6.99	**10**
4115950	142.24	6.99	**10**
4115960	148.59	6.99	**10**
4115970	164.47	6.99	**10**
4115980	177.17	6.99	**10**
4115990	183.52	6.99	**10**
4116000	196.22	6.99	**10**
4116020	202.57	6.99	**10**
4116030	215.27	6.99	**10**
734190	227.97	6.99	**10**
4116060	253.37	6.99	**10**
4277050	278.77	6.99	**10**
1105530	291.47	6.99	**10**
4277060	304.17	6.99	**10**
4116080	380.37	6.99	**10**

O-RINGS STANDARD RANGE

O-rings, NBR 90



The O-ring is an endless pressed round ring with circular cross section made of rubber-elastic materials.
O-rings are used both for static as well as for dynamic sealing in pneumatics and hydraulics.

Type: Standard O-ring
Material: NBR
Hardness: 90 Shore A
Colour: black

Item No.	d1 mm	d2 mm	Minimum quantity
10007645	2.00	1.00	**50**
10007647	4.00	1.00	**50**
10007648	7.00	1.00	**50**
10007691	9.00	1.00	**50**
10006349	10.00	1.00	**50**
10006352	12.00	1.00	**50**
10007606	14.00	1.00	**50**
10007607	16.00	1.00	**50**
10007644	18.00	1.00	**50**
10007692	20.00	1.00	**50**
10007694	21.00	1.00	**50**
10006803	28.00	1.00	**50**
10006802	30.00	1.00	**50**
10018548	40.00	1.00	**50**
921820	6.00	1.50	**50**
832050	8.00	1.50	**50**
4425950	10.00	1.50	**50**
10006356	18.00	1.50	**50**
10026753	35.00	1.50	**50**
4426010	3.68	1.78	**50**
10017850	5.28	1.78	**50**
907070	6.07	1.78	**50**
4426040	6.75	1.78	**50**
1149450	9.25	1.78	**50**
947860	10.82	1.78	**50**
1149510	12.42	1.78	**50**
1190690	15.60	1.78	**50**
10011389	18.94	1.78	**50**
4426130	20.35	1.78	**50**
4426140	21.95	1.78	**50**
4426160	25.12	1.78	**50**
1200320	29.87	1.78	**50**
4426170	31.47	1.78	**50**
4699630	37.82	1.78	**50**
10009358	66.40	1.78	**10**
10014907	75.92	1.78	**10**
10012323	94.97	1.78	**10**
10034264	3.00	2.00	**50**
10011391	6.00	2.00	**50**
884590	10.00	2.00	**50**
929860	12.00	2.00	**50**
883470	16.00	2.00	**50**
4039230	18.00	2.00	**50**
10012251	19.00	2.00	**50**
10006769	21.00	2.00	**50**
10006776	24.00	2.00	**50**
10006782	25.00	2.00	**50**

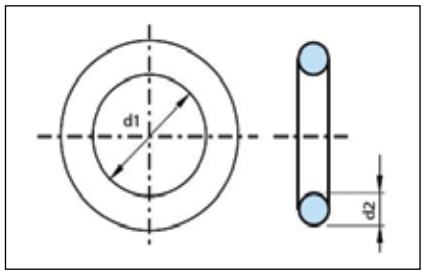
O-RINGS STANDARD RANGE

O-rings, NBR 90

Item No.	d1 mm	d2 mm	Minimum quantity
841230	26.00	2.00	**50**
10007600	29.00	2.00	**50**
10032585	37.00	2.00	**50**
10008398	40.00	2.00	**50**
10017789	48.00	2.00	**50**
10014620	51.00	2.00	**10**
10008393	60.00	2.00	**10**
10008394	64.00	2.00	**10**
10005595	140.00	2.00	**10**
10015214	5.00	2.50	**50**
10013962	7.00	2.50	**50**
4426300	15.00	2.50	**50**
10006768	20.00	2.50	**50**
4503780	23.00	2.50	**50**
10006777	24.00	2.50	**50**
10006785	26.00	2.50	**50**
10007599	27.00	2.50	**50**
10004922	28.00	2.50	**50**
10007601	29.00	2.50	**50**
10007604	30.00	2.50	**50**
10019045	38.00	2.50	**50**
10004913	40.00	2.50	**50**
10010340	42.00	2.50	**50**
10011769	5.23	2.62	**50**
4426310	7.59	2.62	**50**
4426320	10.77	2.62	**50**
4426350	13.94	2.62	**50**
896210	15.54	2.62	**50**
4426380	17.12	2.62	**50**
4426390	17.86	2.62	**50**
4426400	20.29	2.62	**50**
4426410	28.24	2.62	**50**
858500	32.99	2.62	**50**
4426630	34.59	2.62	**50**
4426640	36.17	2.62	**50**
4426650	55.25	2.62	**10**
4426680	59.99	2.62	**10**
4426690	64.77	2.62	**10**
10002308	92.71	2.62	**10**
4539750	126.67	2.62	**10**
10010351	221.93	2.62	**10**
10005312	6.00	3.00	**50**
10006032	12.00	3.00	**50**
10006033	14.00	3.00	**50**
4426870	18.00	3.00	**50**
10001103	20.00	3.00	**50**
10006832	26.00	3.00	**50**
10007602	29.00	3.00	**50**
10005897	30.00	3.00	**50**
10001091	32.00	3.00	**50**
4426970	40.00	3.00	**50**
4427010	44.00	3.00	**50**
4427020	48.00	3.00	**50**
10008674	50.00	3.00	**10**

O-RINGS STANDARD RANGE

Continued: O-rings, NBR 90



Type: Standard O-ring
Material: NBR
Hardness: 90 Shore A
Colour: black

Item No.	d1 mm	d2 mm	Minimum quantity
10017788	55.00	3.00	**10**
10005053	74.00	3.00	**10**
10004906	76.00	3.00	**10**
10017776	110.00	3.00	**10**
10024397	180.00	3.00	**10**
10007005	23.00	3.50	**50**
10009946	29.00	3.50	**50**
10004912	46.00	3.50	**50**
10011712	100.00	3.50	**50**
4427140	7.52	3.53	**50**
4427160	21.82	3.53	**50**
4427190	23.39	3.53	**50**
828620	28.17	3.53	**50**
4427240	29.74	3.53	**50**
4427290	36.09	3.53	**50**
4427430	40.87	3.53	**50**
4427440	42.86	3.53	**50**
4158640	47.22	3.53	**50**
4329410	56.74	3.53	**10**
858570	59.92	3.53	**10**
4427530	66.27	3.53	**10**
4427550	69.44	3.53	**10**
4427590	75.79	3.53	**10**
4427610	82.14	3.53	**10**
4427620	88.49	3.53	**10**
4427650	94.84	3.53	**10**
4427670	107.54	3.53	**10**
4427690	110.72	3.53	**10**
4427710	117.07	3.53	**10**
4427730	129.77	3.53	**10**
4503890	142.47	3.53	**10**
4427770	151.99	3.53	**10**
10017980	158.34	3.53	**10**
10026560	190.10	3.53	**10**
10005825	253.59	3.53	**10**
10004773	291.70	3.53	**10**
10006031	18.00	4.00	**50**
10034263	25.00	4.00	**50**
4693680	32.00	4.00	**50**
10003626	34.00	4.00	**50**
10003625	40.00	4.00	**50**
10015699	45.00	4.00	**50**
10001933	52.00	4.00	**10**
10002329	55.00	4.00	**10**
10005321	56.00	4.00	**10**
10009687	68.00	4.00	**10**
10001929	75.00	4.00	**10**

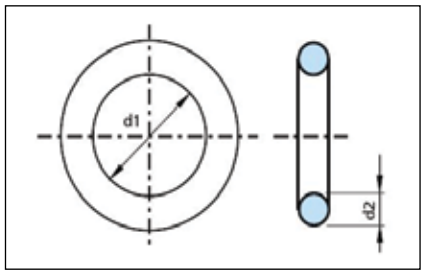
O-RINGS STANDARD RANGE

O-rings, NBR 90

Item No.	d1 mm	d2 mm	Minimum quantity
10003526	78.00	4.00	**10**
10016373	85.00	4.00	**10**
10015204	92.00	4.00	**10**
10033452	30.00	5.00	**10**
10006035	33.00	5.00	**10**
10027140	35.00	5.00	**10**
10025844	40.00	5.00	**10**
10034262	65.00	5.00	**10**
10015724	70.00	5.00	**10**
4503860	80.00	5.00	**10**
10008023	85.00	5.00	**10**
10009303	100.00	5.00	**10**
10013835	105.00	5.00	**10**
10013482	114.00	5.00	**10**
10017007	150.00	5.00	**10**
4427820	190.00	5.00	**10**
4427830	40.64	5.33	**50**
10011150	40.65	5.33	**50**
4427870	50.17	5.33	**10**
10013069	53.34	5.33	**10**
4427890	59.69	5.33	**10**
4427940	81.92	5.33	**10**
10005230	85.09	5.33	**10**
10019697	100.97	5.33	**10**
10017570	107.32	5.33	**10**
890160	113.67	5.33	**10**
4428010	120.02	5.33	**10**
4503880	123.19	5.33	**10**
4428060	151.77	5.33	**10**
10032784	177.17	5.33	**10**
1169440	183.52	5.33	**10**
4428090	196.20	5.33	**10**
4428100	215.27	5.33	**10**
1185720	240.67	5.33	**10**
4428160	135.00	6.00	**10**
10008790	150.00	6.00	**10**
4428180	155.00	6.00	**10**
4428190	175.00	6.00	**10**
4428210	200.00	6.00	**10**
4428270	126.37	6.99	**10**
4428290	139.07	6.99	**10**
4428300	145.42	6.99	**10**
4428350	227.97	6.99	**10**
4428360	240.67	6.99	**10**
4428380	304.17	6.99	**10**
4428390	316.87	6.99	**10**

O-RINGS STANDARD RANGE

O-rings, FPM 80 black



The O-ring is an endless pressed round ring with circular cross section made of rubber-elastic materials.
O-rings are used both for static as well as for dynamic sealing in pneumatics and hydraulics.

Type: Standard O-ring
Material: FPM
Hardness: 80 Shore A
Colour: black

Item No.	d1 mm	d2 mm	Minimum quantity
10005801	4.00	1.00	**25**
666330	5.00	1.00	**25**
10012657	6.00	1.00	**25**
10007820	6.50	1.00	**25**
612660	9.00	1.00	**25**
1093830	10.00	1.00	**25**
914220	12.00	1.00	**25**
10028563	15.00	1.00	**25**
10013817	17.00	1.00	**25**
10015145	30.00	1.00	**10**
10016863	37.00	1.00	**10**
10016739	78.60	1.00	**10**
10014628	2.80	1.50	**25**
879360	3.00	1.50	**25**
772850	5.00	1.50	**25**
10011456	6.00	1.50	**25**
628710	7.00	1.50	**25**
1077980	8.00	1.50	**25**
4140700	9.00	1.50	**25**
1093840	10.00	1.50	**25**
4140810	12.00	1.50	**25**
942030	12.50	1.50	**25**
947570	14.00	1.50	**25**
4140890	16.00	1.50	**25**
1108100	19.00	1.50	**25**
603350	22.00	1.50	**25**
879380	25.00	1.50	**25**
10029014	28.00	1.50	**10**
10007831	36.00	1.50	**10**
10004186	42.00	1.50	**10**
10008972	44.00	1.50	**10**
10016771	47.00	1.50	**10**
1007700	60.00	1.50	**10**
10002184	1.78	1.78	**25**
746040	2.90	1.78	**25**
10031777	4.47	1.78	**25**
10003109	6.07	1.78	**25**
4113620	7.65	1.78	**25**
4108450	9.25	1.78	**25**
746580	10.82	1.78	**25**
10012884	11.20	1.78	**25**
10003105	15.60	1.78	**25**
747200	18.77	1.78	**25**
10010590	25.12	1.78	**25**
10025654	29.87	1.78	**10**
10008569	34.65	1.78	**10**
4116500	47.35	1.78	**10**

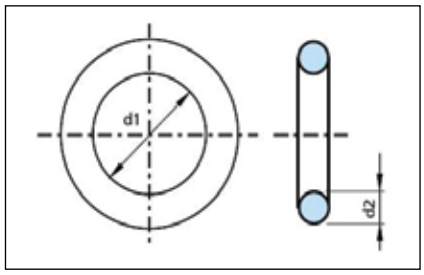
O-RINGS STANDARD RANGE

O-rings, FPM 80 black

Item No.	d1 mm	d2 mm	Minimum quantity
10008782	53.67	1.78	**10**
10003825	60.04	1.78	**10**
4119780	69.57	1.78	**10**
4119800	82.27	1.78	**10**
4116560	94.97	1.78	**10**
10017979	104.40	1.78	**10**
4119820	120.37	1.78	**10**
10033359	1.00	2.00	**25**
778780	3.00	2.00	**25**
4140600	5.00	2.00	**25**
4140620	6.00	2.00	**25**
4140650	7.00	2.00	**25**
1094770	8.00	2.00	**25**
4140740	10.00	2.00	**25**
4140820	12.00	2.00	**25**
528660	14.00	2.00	**25**
746740	15.00	2.00	**25**
10016756	16.00	2.00	**25**
1042780	24.00	2.00	**25**
4594830	30.00	2.00	**10**
10011455	32.00	2.00	**10**
879470	34.00	2.00	**10**
4285810	36.00	2.00	**10**
10011657	46.00	2.00	**10**
10009109	51.00	2.00	**10**
627870	53.00	2.00	**10**
4190430	56.00	2.00	**10**
10003783	64.00	2.00	**10**
10033847	80.00	2.00	**10**
10018349	104.00	2.00	**10**
10030202	120.00	2.00	**10**
10017287	170.00	2.00	**10**
10013361	220.00	2.00	**10**
1036650	236.00	2.00	**10**
10007675	260.00	2.00	**10**
714080	5.00	2.50	**25**
918890	7.00	2.50	**25**
4140680	8.00	2.50	**25**
4140760	10.00	2.50	**25**
4140790	11.00	2.50	**25**
4140830	12.00	2.50	**25**
955350	14.00	2.50	**25**
4140910	16.00	2.50	**25**
4140950	18.00	2.50	**25**
851380	26.00	2.50	**10**
4141040	27.00	2.50	**10**
10005140	30.00	2.50	**10**
10010272	48.00	2.50	**10**
1080380	60.00	2.50	**10**
10025883	62.00	2.50	**10**
10006995	90.00	2.50	**10**
10005671	94.00	2.50	**10**
10024246	100.00	2.50	**10**

O-RINGS STANDARD RANGE

Continued: O-rings, FPM 80 black



Type: Standard O-ring
Material: FPM
Hardness: 80 Shore A
Colour: black

Item No.	d1 mm	d2 mm	Minimum quantity
10013211	115.00	2.50	**10**
878280	135.00	2.50	**10**
10008668	165.00	2.50	**10**
10016899	175.00	2.50	**10**
10019136	7.65	2.62	**25**
4119940	12.37	2.62	**25**
4698450	13.94	2.62	**25**
10003322	17.86	2.62	**25**
10011347	18.72	2.62	**25**
4119950	20.29	2.62	**25**
4116630	28.24	2.62	**10**
4109400	29.82	2.62	**10**
4116670	40.94	2.62	**10**
4116690	44.12	2.62	**10**
4116710	48.90	2.62	**10**
4116720	56.82	2.62	**10**
4120040	63.17	2.62	**10**
4227160	64.77	2.62	**10**
4116750	72.69	2.62	**10**
4116760	88.57	2.62	**10**
4116770	101.27	2.62	**10**
4116810	126.67	2.62	**10**
4116960	158.42	2.62	**10**
4117040	209.22	2.62	**10**
4140770	10.00	3.00	**25**
4140920	16.00	3.00	**25**
4140880	15.00	3.00	**25**
4190970	14.00	3.00	**25**
529030	20.00	3.00	**25**
4140980	21.00	3.00	**25**
629910	25.00	3.00	**25**
4141080	30.00	3.00	**10**
832290	34.20	3.00	**10**
972070	36.00	3.00	**10**
4141120	38.00	3.00	**10**
4141140	40.00	3.00	**10**
4141190	45.00	3.00	**10**
4141240	50.00	3.00	**10**
748680	58.00	3.00	**10**
4141260	60.00	3.00	**10**
4141290	80.00	3.00	**10**
942400	83.00	3.00	**10**
4697670	87.00	3.00	**10**
4141310	90.00	3.00	**10**
4108130	100.00	3.00	**10**
10033519	104.00	3.00	**10**
874240	110.00	3.00	**10**

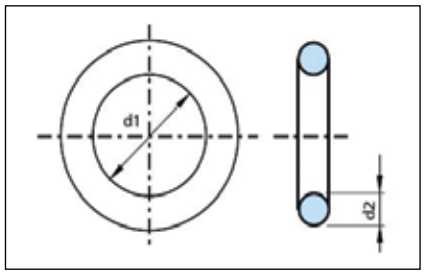
O-RINGS STANDARD RANGE

O-rings, FPM 80 black

Item No.	d1 mm	d2 mm	Minimum quantity
10002684	130.00	3.00	**10**
10009911	148.00	3.00	**10**
4141400	150.00	3.00	**10**
10033152	154.00	3.00	**10**
751380	160.00	3.00	**10**
10010334	182.00	3.00	**10**
10018993	190.00	3.00	**10**
10009084	205.00	3.00	**10**
529240	240.00	3.00	**10**
10005917	245.00	3.00	**10**
10009690	300.00	3.00	**10**
10029500	5.00	3.50	**25**
10006262	8.00	3.50	**25**
10011406	12.00	3.50	**25**
768210	18.00	3.50	**25**
10009901	26.00	3.50	**25**
761520	28.00	3.50	**10**
528990	30.00	3.50	**10**
10019789	40.00	3.50	**10**
10019315	65.00	3.50	**10**
4546550	20.22	3.53	**10**
10009398	23.39	3.53	**10**
891600	24.99	3.53	**10**
4117110	29.74	3.53	**10**
4711140	32.15	3.53	**10**
4699480	32.92	3.53	**10**
4120160	36.09	3.53	**10**
4120170	37.69	3.53	**10**
4120180	44.04	3.53	**10**
4117130	50.39	3.53	**10**
4117150	56.74	3.53	**10**
10033252	61.90	3.53	**10**
4117170	66.27	3.53	**10**
4120190	69.44	3.53	**10**
4117190	78.97	3.53	**10**
4117200	85.32	3.53	**10**
10002682	104.37	3.53	**10**
4117240	117.07	3.53	**10**
4117260	129.77	3.53	**10**
4143710	132.94	3.53	**10**
4117300	142.47	3.53	**10**
4117350	164.69	3.53	**10**
4117360	177.39	3.53	**10**
4117380	196.44	3.53	**10**
4117390	202.79	3.53	**10**
4117410	228.19	3.53	**10**
4117450	253.59	3.53	**10**
10001254	8.00	4.00	**25**
4003610	13.00	4.00	**25**
747170	18.00	4.00	**25**
10002737	20.00	4.00	**25**
10008923	21.00	4.00	**25**
10008944	26.00	4.00	**25**

O-RINGS STANDARD RANGE

Continued: O-rings, FPM 80 black



Type: Standard O-ring
Material: FPM
Hardness: 80 Shore A
Colour: black

Item No.	d1 mm	d2 mm	Minimum quantity
4692060	45.00	4.00	**10**
713400	50.00	4.00	**10**
10002840	60.00	4.00	**10**
798170	68.00	4.00	**10**
10009912	70.00	4.00	**10**
4141340	100.00	4.00	**10**
10013848	124.00	4.00	**10**
10007998	145.00	4.00	**10**
10002680	165.00	4.00	**10**
10013836	168.00	4.00	**10**
10019763	188.00	4.00	**10**
10010137	220.00	4.00	**10**
10029652	410.00	4.00	**10**
10009218	10.00	5.00	**25**
10010259	14.00	5.00	**25**
10007640	19.00	5.00	**25**
747260	20.00	5.00	**25**
10016901	25.00	5.00	**25**
10003674	35.00	5.00	**10**
10013496	40.00	5.00	**10**
4711160	45.00	5.00	**10**
10013497	55.00	5.00	**10**
10025751	70.00	5.00	**10**
749380	85.00	5.00	**10**
4044930	100.00	5.00	**10**
10013490	125.00	5.00	**10**
10007378	130.00	5.00	**10**
10004866	140.00	5.00	**10**
10007614	150.00	5.00	**10**
4117560	13.64	5.33	**25**
4117600	19.99	5.33	**25**
4120280	34.29	5.33	**10**
4117710	46.99	5.33	**10**
10029454	50.16	5.33	**10**
10029668	56.52	5.33	**10**
4120290	66.04	5.33	**10**
10015518	69.22	5.33	**10**
4117770	81.92	5.33	**10**
10023121	89.69	5.33	**10**
4701220	91.44	5.33	**10**
4120300	97.79	5.33	**10**
4117810	104.14	5.33	**10**
10008387	113.67	5.33	**10**
4120320	139.07	5.33	**10**
4117920	145.42	5.33	**10**
10030052	164.47	5.33	**10**
10024395	185.40	5.33	**10**

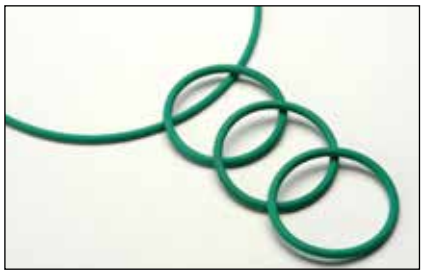
O-RINGS STANDARD RANGE

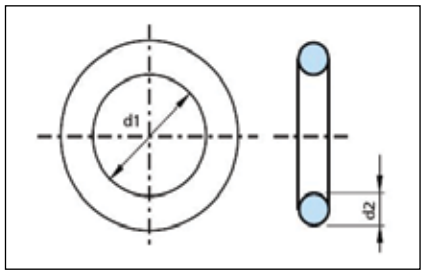
O-rings, FPM 80 black

Item No.	d1 mm	d2 mm	Minimum quantity
4118000	196.22	5.33	**10**
4118020	208.92	5.33	**10**
4118080	253.37	5.33	**10**
4120420	582.68	5.33	**10**
10008546	15.00	6.00	**25**
10031718	32.00	6.00	**10**
10016367	48.00	6.00	**10**
10031158	58.00	6.00	**10**
10010581	85.00	6.00	**10**
10008050	90.00	6.00	**10**
10028333	110.00	6.00	**10**
10007308	160.00	6.00	**10**
4118150	113.67	6.99	**10**
4118160	116.84	6.99	**10**
4118170	120.02	6.99	**10**
4118200	132.72	6.99	**10**
4120480	139.07	6.99	**10**
4118240	148.59	6.99	**10**
10032508	148.60	6.99	**10**
4118290	177.17	6.99	**10**
10003366	183.52	6.99	**10**
4118330	202.57	6.99	**10**
4118340	215.27	6.99	**10**
4116840	253.37	6.99	**10**
4120490	266.07	6.99	**10**

O-RINGS STANDARD RANGE

O-rings, FPM 80 green





The O-ring is an endless pressed round ring with circular cross section made of rubber-elastic materials.
O-rings are used both for static as well as for dynamic sealing in pneumatics and hydraulics.

Type: Standard O-ring
Material: FPM
Hardness: 80 Shore A
Colour: Green

Item No.	d1 mm	d2 mm	Minimum quantity
4421370	2.00	1.00	**25**
4421380	3.00	1.00	**25**
4111330	4.00	1.00	**25**
4700440	4.50	1.00	**25**
4421410	6.00	1.00	**25**
4421440	8.00	1.00	**25**
4421460	10.00	1.00	**25**
4396370	12.00	1.00	**25**
4421470	14.00	1.00	**25**
4421500	16.00	1.00	**25**
4421520	18.00	1.00	**25**
4421530	20.00	1.00	**25**
10018973	24.00	1.00	**25**
4420980	2.00	1.50	**25**
4421010	4.00	1.50	**25**
4421030	5.00	1.50	**25**
4140610	6.00	1.50	**25**
4125310	7.00	1.50	**25**
4421060	8.00	1.50	**25**
4421080	9.00	1.50	**25**
4421140	15.00	1.50	**25**
4421180	19.00	1.50	**25**
4421210	21.00	1.50	**25**
10019272	25.00	1.50	**25**
4421250	27.00	1.50	**10**
4421280	30.00	1.50	**10**
4421300	35.00	1.50	**10**
4298300	40.00	1.50	**10**
4421320	45.00	1.50	**10**
4422520	3.68	1.78	**25**
4420750	4.47	1.78	**25**
4420760	5.28	1.78	**25**
4422550	6.07	1.78	**25**
4424630	7.65	1.78	**25**
4420800	9.25	1.78	**25**
4420810	10.82	1.78	**25**
4420830	12.42	1.78	**25**
4420840	14.00	1.78	**25**
4422600	16.56	1.78	**25**
4422640	18.77	1.78	**25**
4420850	20.35	1.78	**25**
4116440	25.12	1.78	**25**
4647400	28.30	1.78	**10**
4422660	44.17	1.78	**10**
4420860	53.70	1.78	**10**
4116520	63.22	1.78	**10**
4420880	75.92	1.78	**10**

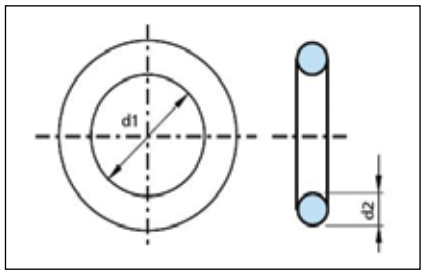
O-RINGS STANDARD RANGE

O-rings, FPM 80 green

Item No.	d1 mm	d2 mm	Minimum quantity
4422680	82.27	1.78	**10**
4420900	94.97	1.78	**10**
4420920	126.72	1.78	**10**
4420220	4.00	2.00	**25**
4420240	6.00	2.00	**25**
4420270	8.00	2.00	**25**
4420280	9.00	2.00	**25**
4420290	10.00	2.00	**25**
4197820	12.00	2.00	**25**
4420330	15.00	2.00	**25**
4140900	16.00	2.00	**25**
4298410	19.00	2.00	**25**
4420350	20.00	2.00	**25**
620670	22.00	2.00	**25**
4112060	26.00	2.00	**25**
4420430	30.00	2.00	**10**
529050	32.00	2.00	**10**
4420480	36.00	2.00	**10**
4420520	42.00	2.00	**10**
4420580	50.00	2.00	**10**
4420600	55.00	2.00	**10**
4700850	57.00	2.00	**10**
4420650	68.00	2.00	**10**
10019137	74.00	2.00	**10**
4420670	80.00	2.00	**10**
10008883	96.00	2.00	**10**
4420710	110.00	2.00	**10**
4420730	150.00	2.00	**10**
4716470	5.00	2.50	**25**
10002176	6.00	2.50	**25**
10005550	8.50	2.50	**25**
4419790	10.00	2.50	**25**
4260650	11.00	2.50	**25**
4419820	15.00	2.50	**25**
4419840	17.00	2.50	**25**
4419860	19.00	2.50	**25**
4419870	21.00	2.50	**25**
4419910	25.00	2.50	**25**
4419930	27.00	2.50	**10**
4419940	30.00	2.50	**10**
4419970	38.00	2.50	**10**
10021892	47.00	2.50	**10**
4420000	50.00	2.50	**10**
4298490	55.00	2.50	**10**
4420020	65.00	2.50	**10**
4672610	72.00	2.50	**10**
4297080	85.00	2.50	**10**
4297010	95.00	2.50	**10**
4420040	115.00	2.50	**10**
4116610	6.02	2.62	**25**
4419600	10.77	2.62	**25**
4422390	12.37	2.62	**25**
4419620	18.72	2.62	**25**

O-RINGS STANDARD RANGE

Continued: O-rings, FPM 80 green



Type: Standard O-ring
Material: FPM
Hardness: 80 Shore A
Colour: Green

Item No.	d1 mm	d2 mm	Minimum quantity
4422420	21.89	2.62	**25**
4419630	23.47	2.62	**25**
4419650	28.24	2.62	**10**
4422450	34.59	2.62	**10**
4419660	36.17	2.62	**10**
4424560	42.52	2.62	**10**
4419680	45.69	2.62	**10**
4419690	48.90	2.62	**10**
4700540	52.07	2.62	**10**
4424570	75.87	2.62	**10**
4419700	88.57	2.62	**10**
4424580	94.92	2.62	**10**
4419710	113.97	2.62	**10**
4419720	120.32	2.62	**10**
4419730	133.20	2.62	**10**
4417800	6.00	3.00	**25**
4417820	9.00	3.00	**25**
4417840	11.00	3.00	**25**
4417890	17.00	3.00	**25**
4417930	19.20	3.00	**25**
4417940	21.00	3.00	**25**
4140990	22.00	3.00	**25**
4417970	24.00	3.00	**25**
4418010	28.00	3.00	**10**
4418030	30.00	3.00	**10**
4418080	35.00	3.00	**10**
4418100	38.00	3.00	**10**
4418170	45.00	3.00	**10**
4418190	48.00	3.00	**10**
4418210	50.00	3.00	**10**
4418220	52.00	3.00	**10**
4418240	55.00	3.00	**10**
4418320	65.00	3.00	**10**
4297100	70.00	3.00	**10**
4418370	82.00	3.00	**10**
4297050	90.00	3.00	**10**
10032174	92.00	3.00	**10**
4418480	116.00	3.00	**10**
4418490	125.00	3.00	**10**
4418540	142.00	3.00	**10**
4419470	150.00	3.00	**10**
4713210	155.00	3.00	**10**
4419500	170.00	3.00	**10**
4419570	250.00	3.00	**10**
4117090	12.29	3.53	**25**
4417650	18.64	3.53	**25**
4417660	24.99	3.53	**25**

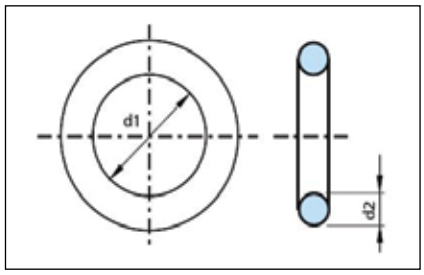
O-RINGS STANDARD RANGE

O-rings, FPM 80 green

Item No.	d1 mm	d2 mm	Minimum quantity
4417670	28.17	3.53	**10**
4417680	32.92	3.53	**10**
4422170	36.09	3.53	**10**
4417690	40.87	3.53	**10**
4422200	44.04	3.53	**10**
4422220	47.22	3.53	**10**
4417720	56.74	3.53	**10**
4417730	63.09	3.53	**10**
4424540	69.44	3.53	**10**
4417750	78.97	3.53	**10**
10017073	88.49	3.53	**10**
10004337	104.37	3.53	**10**
4417770	113.89	3.53	**10**
4417780	120.24	3.53	**10**
4417790	221.84	3.53	**10**
4417450	16.00	4.00	**25**
10014292	24.00	4.00	**25**
4116140	28.00	4.00	**10**
10009277	34.00	4.00	**10**
4417490	38.00	4.00	**10**
4298470	42.00	4.00	**10**
4417510	50.00	4.00	**10**
4417520	55.00	4.00	**10**
10015222	63.00	4.00	**10**
4417550	75.00	4.00	**10**
4417580	117.00	4.00	**10**
4417600	130.00	4.00	**10**
4417620	170.00	4.00	**10**
4417630	265.00	4.00	**10**
4417640	380.00	4.00	**10**
4698150	12.00	5.00	**25**
4157870	15.00	5.00	**25**
4157880	18.00	5.00	**25**
10003669	26.00	5.00	**25**
4157900	28.00	5.00	**10**
4157910	40.00	5.00	**10**
4157920	42.00	5.00	**10**
4417310	50.00	5.00	**10**
4417330	70.00	5.00	**10**
4417350	80.00	5.00	**10**
4417370	95.00	5.00	**10**
4417390	110.00	5.00	**10**
4579470	120.00	5.00	**10**
4417410	190.00	5.00	**10**
4417430	210.00	5.00	**10**
4157940	75.57	5.33	**10**
4157950	107.32	5.33	**10**
4157960	158.12	5.33	**10**
4157970	208.92	5.33	**10**
4157980	253.37	5.33	**10**

O-RINGS STANDARD RANGE

O-rings, MVQ 70 red



The O-ring is an endless pressed round ring with circular cross section made of rubber-elastic materials.
O-rings are used both for static as well as for dynamic sealing in pneumatics and hydraulics.

Type: Standard O-ring
Material: MVQ
Hardness: 70 Shore A
Colour: red

Item No.	d1 mm	d2 mm	Minimum quantity
10002177	2.00	1.00	**100**
802050	3.00	1.00	**100**
4363680	8.00	1.00	**100**
4363910	10.00	1.00	**100**
4364610	16.00	1.00	**100**
4379690	2.50	1.50	**100**
10017528	3.00	1.50	**100**
4363370	4.50	1.50	**100**
10000471	6.50	1.50	**100**
4364020	11.00	1.50	**100**
4364950	19.00	1.50	**100**
10017806	30.00	1.50	**25**
10025369	43.00	1.50	**25**
4308260	1.78	1.78	**100**
4363150	2.57	1.78	**100**
4363270	3.68	1.78	**100**
10010967	4.48	1.78	**100**
4363420	5.28	1.78	**100**
1105610	6.07	1.78	**100**
4363880	9.25	1.78	**100**
10001563	9.75	1.78	**100**
4364010	10.82	1.78	**100**
4364260	12.42	1.78	**100**
4364590	15.60	1.78	**100**
4364940	18.77	1.78	**100**
4351380	20.35	1.78	**100**
4365320	21.95	1.78	**100**
10029243	23.52	1.78	**100**
4365660	25.12	1.78	**25**
4365720	26.70	1.78	**25**
4365820	28.30	1.78	**25**
4365860	29.87	1.78	**25**
4365960	31.47	1.78	**25**
4366060	33.05	1.78	**25**
4366120	34.65	1.78	**25**
4366300	37.82	1.78	**25**
4366450	41.00	1.78	**25**
4366590	44.17	1.78	**25**
4366930	50.52	1.78	**10**
4367150	56.87	1.78	**10**
4398110	88.62	1.78	**10**
10004109	253.59	1.78	**10**
818330	8.00	2.00	**100**
4327910	9.00	2.00	**100**
4364420	14.00	2.00	**100**
4364640	16.00	2.00	**100**
4364850	18.00	2.00	**100**

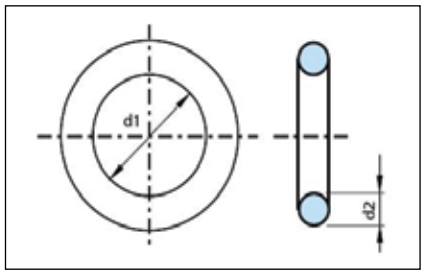
O-RINGS STANDARD RANGE

O-rings, MVQ 70 red

Item No.	d1 mm	d2 mm	Minimum quantity
4365340	22.00	2.00	**100**
4393180	28.00	2.00	**25**
10006371	33.00	2.00	**25**
10003639	40.00	2.00	**25**
10012490	58.00	2.00	**10**
10017795	95.00	2.00	**10**
4363350	4.42	2.62	**100**
4363870	9.19	2.62	**100**
4364250	12.37	2.62	**100**
4364580	15.54	2.62	**100**
4350920	20.29	2.62	**100**
911370	21.89	2.62	**100**
4365440	23.47	2.62	**100**
4365710	26.64	2.62	**25**
4365850	29.82	2.62	**25**
4365950	31.42	2.62	**25**
4366110	34.59	2.62	**25**
4366210	36.17	2.62	**25**
4295350	37.77	2.62	**25**
4366510	42.52	2.62	**25**
4366570	44.12	2.62	**25**
4366660	45.69	2.62	**25**
4366820	48.90	2.62	**25**
4366920	50.47	2.62	**10**
4367000	52.07	2.62	**10**
4367140	56.82	2.62	**10**
4367320	61.60	2.62	**10**
4367390	63.17	2.62	**10**
4367570	67.95	2.62	**10**
4367630	69.52	2.62	**10**
4367750	72.69	2.62	**10**
4367990	82.22	2.62	**10**
4368120	88.57	2.62	**10**
4368440	101.27	2.62	**10**
10001959	8.50	3.00	**100**
10003950	26.00	3.00	**25**
10023124	52.00	3.00	**10**
10015166	60.00	3.00	**10**
10013563	68.00	3.00	**10**
10019276	72.00	3.00	**10**
10014622	108.00	3.00	**10**
10016307	140.00	3.00	**10**
4389140	10.00	3.50	**100**
10003924	23.00	3.50	**100**
10008907	26.00	3.50	**25**
10000213	28.00	3.50	**25**
4389150	47.00	3.50	**25**
10003932	67.00	3.50	**10**
10019376	14.00	3.50	**10**
4364230	12.29	3.53	**100**
4364780	17.04	3.53	**100**
4351010	20.22	3.53	**100**
4365310	21.82	3.53	**100**

O-RINGS STANDARD RANGE

Continued: O-rings, MVQ 70 red



Type: Standard O-ring
Material: MVQ
Hardness: 70 Shore A
Colour: red

Item No.	d1 mm	d2 mm	Minimum quantity
4365570	24.99	3.53	**100**
10005090	31.34	3.53	**25**
4327940	34.52	3.53	**25**
4366290	37.69	3.53	**25**
4243480	40.87	3.53	**25**
4367050	53.57	3.53	**10**
4367270	59.92	3.53	**10**
4367520	66.27	3.53	**10**
4367730	72.62	3.53	**10**
4367980	82.14	3.53	**10**
4433090	88.49	3.53	**10**
4368240	94.84	3.53	**10**
4368490	104.37	3.53	**10**
4368610	110.72	3.53	**10**
10033333	120.25	3.53	**10**
4368950	129.77	3.53	**10**
4369040	136.12	3.53	**10**
4369200	148.82	3.53	**10**
10010977	158.35	3.53	**10**
10013738	10.00	4.00	**100**
10032753	18.00	4.00	**100**
10010993	26.00	4.00	**25**
4365790	28.00	4.00	**25**
4366080	34.00	4.00	**25**
10020686	49.00	4.00	**25**
10018136	68.00	4.00	**10**
10002473	72.00	4.00	**10**
10030939	80.00	4.00	**10**
10002475	92.00	4.00	**10**
10008909	35.00	5.00	**10**
10018594	42.00	5.00	**10**
10019010	69.00	5.00	**10**
10008911	130.00	5.00	**10**
10020722	200.00	5.00	**10**
4366270	37.47	5.33	**25**
4366520	43.82	5.33	**25**
4367130	56.52	5.33	**10**
4367360	62.87	5.33	**10**
4367610	69.22	5.33	**10**
815310	75.57	5.33	**10**
4367950	81.92	5.33	**10**
4368050	85.09	5.33	**10**
4368180	91.44	5.33	**10**
4368230	94.62	5.33	**10**
4368470	104.14	5.33	**10**
4368540	107.32	5.33	**10**
4368640	113.67	5.33	**10**

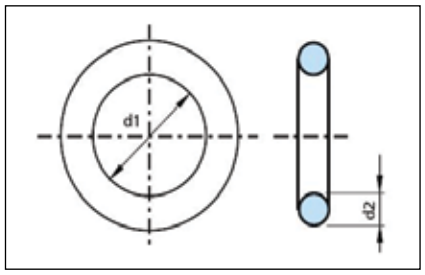
O-RINGS STANDARD RANGE

O-rings, MVQ 70 red

Item No.	d1 mm	d2 mm	Minimum quantity
4368910	126.37	5.33	**10**
4369440	170.82	5.33	**10**
4369560	183.52	5.33	**10**
10013067	208.92	5.33	**10**
10004339	278.77	5.33	**10**
4370180	291.47	5.33	**10**
4368650	113.67	6.99	**10**
4368690	116.84	6.99	**10**
4368980	132.72	6.99	**10**
4369070	139.07	6.99	**10**
4369160	145.42	6.99	**10**
4369250	151.77	6.99	**10**
4369300	158.12	6.99	**10**
4369380	164.47	6.99	**10**
4369450	170.82	6.99	**10**
4369510	177.17	6.99	**10**
4369570	183.52	6.99	**10**
4369620	189.87	6.99	**10**
4369670	196.22	6.99	**10**
4369740	202.57	6.99	**10**
4369820	215.27	6.99	**10**
4369900	227.97	6.99	**10**
4370090	266.07	6.99	**10**
4370130	278.77	6.99	**10**

O-RINGS STANDARD RANGE

O-rings, EPDM 70



The O-ring is an endless pressed round ring with circular cross section made of rubber-elastic materials.
O-rings are used both for static as well as for dynamic sealing in pneumatics and hydraulics.

Type: Standard O-ring
Material: EPDM 70
Hardness: 70 Shore A
Colour: black

Item No.	d1 mm	d2 mm	Minimum quantity
816370	4.00	1.00	**50**
10002521	4.50	1.00	**50**
4023110	5.00	1.00	**50**
4330570	7.00	1.00	**50**
4352180	10.00	1.00	**50**
4585420	12.50	1.00	**50**
10013007	44.00	1.00	**50**
10015465	2.70	1.50	**50**
4351170	4.00	1.50	**50**
1190630	7.00	1.50	**50**
1169520	8.00	1.50	**50**
4153800	10.50	1.50	**50**
4352490	11.00	1.50	**50**
10025305	38.00	1.50	**50**
10011869	40.00	1.50	**50**
10009283	57.00	1.50	**25**
4351750	6.07	1.78	**50**
4597300	7.65	1.78	**50**
4012550	9.25	1.78	**50**
1078560	14.00	1.78	**50**
4353020	15.60	1.78	**50**
10011980	17.17	1.78	**50**
4353600	18.77	1.78	**50**
10029764	25.12	1.78	**50**
4354400	26.70	1.78	**50**
4354670	31.47	1.78	**50**
4354860	33.05	1.78	**50**
4354920	34.65	1.78	**50**
4355870	41.00	1.78	**50**
4358680	88.62	1.78	**25**
776980	6.00	2.00	**50**
1096700	8.00	2.00	**50**
4352150	9.50	2.00	**50**
714400	10.00	2.00	**50**
4332240	11.00	2.00	**50**
4352660	12.00	2.00	**50**
4073420	16.00	2.00	**50**
4353400	17.00	2.00	**50**
4353680	20.00	2.00	**50**
1204230	24.00	2.00	**50**
4354200	25.00	2.00	**50**
4354310	26.00	2.00	**50**
810580	30.00	2.00	**50**
4355680	38.00	2.00	**50**
10015083	44.00	2.00	**50**
4356300	45.00	2.00	**50**
10013834	54.00	2.00	**25**

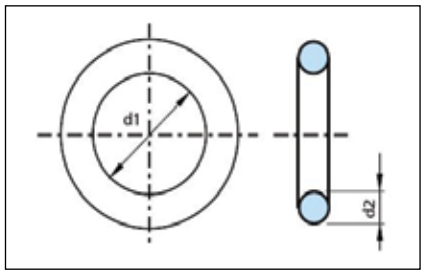
O-RINGS STANDARD RANGE

O-rings, EPDM 70

Item No.	d1 mm	d2 mm	Minimum quantity
10015147	86.00	2.00	**25**
10012883	115.00	2.00	**10**
10017187	18.50	2.50	**50**
4353690	20.00	2.50	**50**
4354410	27.00	2.50	**50**
10001454	29.00	2.50	**50**
10013914	30.00	2.50	**50**
10011912	36.00	2.50	**50**
10028173	67.00	2.50	**25**
10019271	68.00	2.50	**25**
4352720	12.37	2.62	**50**
4352940	15.08	2.62	**50**
10023421	15.54	2.62	**50**
4064920	18.72	2.62	**50**
4353720	20.29	2.62	**50**
4354250	25.07	2.62	**50**
4354390	26.64	2.62	**50**
4354560	29.82	2.62	**50**
10026646	32.99	2.62	**50**
4354910	34.59	2.62	**50**
4355650	37.77	2.62	**50**
4355760	39.34	2.62	**50**
4356230	44.12	2.62	**50**
4356460	45.69	2.62	**50**
4356600	47.29	2.62	**50**
4356670	48.90	2.62	**50**
4357140	55.25	2.62	**25**
4357350	58.42	2.62	**25**
4357500	61.60	2.62	**25**
4357900	69.52	2.62	**25**
4358240	75.87	2.62	**25**
4358520	82.22	2.62	**25**
4358670	88.57	2.62	**25**
4359060	101.27	2.62	**10**
4352920	15.00	3.00	**50**
990870	16.00	3.00	**50**
4353780	21.00	3.00	**50**
4354360	26.20	3.00	**50**
4356920	52.00	3.00	**25**
4357040	54.00	3.00	**25**
4358040	72.00	3.00	**25**
1087920	75.00	3.00	**25**
10029843	84.00	3.00	**25**
4358720	90.00	3.00	**25**
10025577	93.00	3.00	**25**
10021528	140.00	3.00	**10**
4360650	174.00	3.00	**10**
10006677	200.00	3.00	**10**
10010447	285.00	3.00	**10**
10006679	290.00	3.00	**10**
10008265	18.00	3.50	**50**
10009282	26.00	3.50	**50**
10012361	38.00	3.50	**50**
10026612	98.00	3.50	**25**

O-RINGS STANDARD RANGE

Continued: O-rings, EPDM 70



Type: Standard O-ring
Material: EPDM 70
Hardness: 70 Shore A
Colour: black

Item No.	d1 mm	d2 mm	Minimum quantity
10028933	160.00	3.50	**10**
10017856	220.00	3.50	**10**
4136560	10.69	3.53	**50**
1093440	20.22	3.53	**50**
4354180	24.99	3.53	**50**
4354480	28.17	3.53	**50**
4355640	37.69	3.53	**50**
867420	44.00	3.53	**50**
4356770	49.21	3.53	**50**
4357030	53.57	3.53	**25**
4357560	63.09	3.53	**25**
4357850	68.26	3.53	**25**
4358360	78.97	3.53	**25**
4358770	91.67	3.53	**25**
4358940	98.02	3.53	**25**
4359410	110.72	3.53	**10**
4359880	129.77	3.53	**10**
4360130	142.47	3.53	**10**
4360220	148.82	3.53	**10**
4361200	209.14	3.53	**10**
4361360	221.84	3.53	**10**
4361660	253.59	3.53	**10**
898150	15.00	4.00	**50**
4596850	16.00	4.00	**50**
10002908	23.00	4.00	**50**
10010780	28.00	4.00	**50**
4354590	30.00	4.00	**50**
10010482	41.00	4.00	**50**
4356120	42.00	4.00	**50**
4356830	50.00	4.00	**25**
10027377	52.00	4.00	**25**
10008917	63.00	4.00	**25**
4701030	74.00	4.00	**25**
4358790	92.00	4.00	**25**
10016673	94.00	4.00	**25**
10007097	118.00	4.00	**10**
10025573	153.00	4.00	**10**
10019246	139.00	4.00	**10**
10023411	192.00	4.00	**10**
10008983	228.00	4.00	**10**
10007096	255.00	4.00	**10**
10008054	280.00	4.00	**10**
4353700	20.00	5.00	**50**
4354330	26.00	5.00	**50**
10025847	28.00	5.00	**50**
10009281	43.00	5.00	**50**
10027636	46.00	5.00	**50**

O-RINGS STANDARD RANGE

O-rings, EPDM 70

Item No.	d1 mm	d2 mm	Minimum quantity
10007002	52.00	5.00	**25**
10012855	54.00	5.00	**25**
4358430	80.00	5.00	**25**
10023412	86.00	5.00	**25**
10017295	95.00	5.00	**25**
10023410	105.00	5.00	**10**
10007095	115.00	5.00	**10**
10017387	135.00	5.00	**10**
10010114	155.00	5.00	**10**
10011345	160.00	5.00	**10**
10007094	255.00	5.00	**10**
4354380	26.34	5.33	**50**
4355530	37.47	5.33	**50**
4357540	62.87	5.33	**25**
4357740	66.04	5.33	**25**
4358220	75.57	5.33	**25**
4358350	78.74	5.33	**25**
4358590	85.09	5.33	**25**
4359040	100.97	5.33	**10**
4359400	110.49	5.33	**10**
4359870	129.54	5.33	**10**
1027590	177.17	5.33	**10**
4361180	208.92	5.33	**10**
4361850	278.77	5.33	**10**
4359460	113.67	6.99	**10**
4359540	116.84	6.99	**10**
4359790	126.37	6.99	**10**
4360320	151.77	6.99	**10**
4360510	164.47	6.99	**10**
4360630	170.82	6.99	**10**
4360790	183.52	6.99	**10**
4361020	202.57	6.99	**10**
4361270	215.27	6.99	**10**
4361400	227.97	6.99	**10**
4362100	316.87	6.99	**10**
4362370	342.27	6.99	**10**

FEP-COVERED O-RINGS

Description
The FEP-covered O-ring consists of a rubber-elastic inner ring and a FEP cover which seamlessly encloses the O-ring.

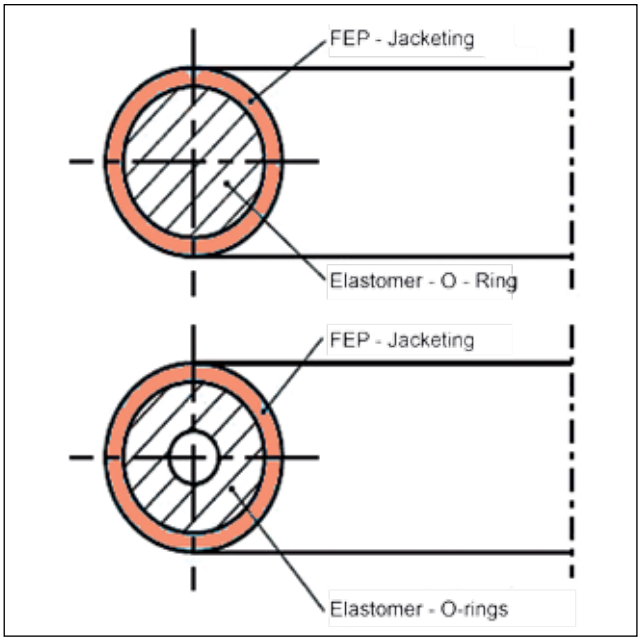
Similarly to PTFE rings, FEP-covered O-rings are used everywhere where the chemical resistance of the normal elastomer O-ring is no longer sufficient.

The required elasticity is provided by the inner ring and the chemical resistance is achieved by the seamless FEP covering.

Advantages
- very good chemical resistance to most liquids and chemicals except liquid alkaline metals and some fluorine compounds
- operating temperature range of approx. –60 °C to +200 °C (depending on material of the inner ring)
- no contamination with foods, pharmaceutical or medical products
- physiologically compatible, can be sterilised
- low friction, no "slip-stick" effect, no adhesion tendency
- sufficiently elastic behaviour.

Designs

Standard version:	Elastomer O-ring with FEP covering
Special designs:	Elastomer tube ring with FEP covering



Design of FEP-covered O-rings

Technical data
Operating pressure: up to 25 MPa
Temperature: –60 °C to 200 °C, depending on O-ring material
Medium: almost all liquids, gases and chemicals

Design information
FEP O-rings are completely interchangeable with standard O-ring seals. No change of the groove dimensions has to be made.
The FEP cover has relatively thin walls.
Therefore, all the installation dimensions of elastomer O-rings stated in this catalogue are valid.
Due to the FEP covering, the O-rings are less flexible than elastomer O-rings. They have limited stretching and lower elasticity or higher permanent deformation.
In order to prevent unacceptable deformation, split grooves are recommended for the installation of FEP-covered O-rings.

Applications

Application Areas
FEP-covered O-rings are ideally suitable for the chemical industry, petrochemicals, medical technology, food industry, water and waste water technology and similar industrial areas. A typical use for FEP-covered O-rings is the sealing of valve spindles and are suitable as secondary sealing element for slow switching and rotary movements.

Properties
- maximum chemical resistance thanks to TEFLO FEP covering
- operating temperature range of –60 °C (213 K) to +205 °C (478 K)
- pressure resistance up to 700 bar, can also be used in a vacuum
- good recovery (low compression set)
- anti-adhesive properties (no "slip-stick" effect)
- physiologically compatible

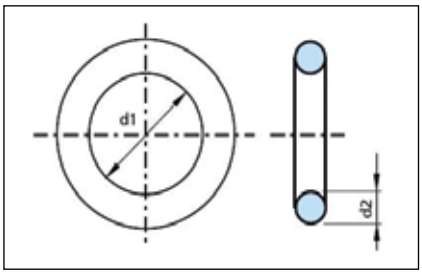
Installation instructions
The same recommendations as for standard elastomer O-rings are applicable for the installation of FEP O-rings. It must be noted that the O-rings can only be stretched to a limited extent due to the FEP covering. If no split groove can be applied for design reasons, auxiliary tools must be used for the mounting.

FEP-COVERED O-RINGS

O-ring FEP/FPM

The FEP-covered O-ring consists of a rubber-elastic inner ring and a FEP cover which seamlessly encloses the O-ring.

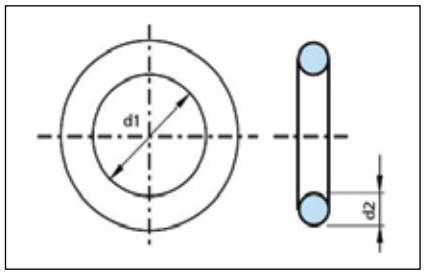
Type: seamlessly covered
Material: FEP/FPM
Hardness: 90-95 Shore A
Colour: transparent/black



Item No.	d1 mm	d2 mm	AS Norm
4214660	12.37	2.62	112
4214670	13.94	2.62	113
4214680	15.54	2.62	114
4214690	17.12	2.62	115
4214700	18.72	2.62	116
4214710	20.29	2.62	117
4214720	21.89	2.62	118
4214730	23.47	2.62	119
4214740	25.07	2.62	120
4214750	26.64	2.62	121
4214760	28.24	2.62	122
4214770	29.82	2.62	123
4214780	31.42	2.62	124
4214790	32.99	2.62	125
4214800	34.59	2.62	126
4214810	36.17	2.62	127
4214820	37.77	2.62	128
4214840	40.94	2.62	130
4214850	42.52	2.62	131
994240	44.12	2.62	132
4214860	45.69	2.62	133
4214870	47.29	2.62	134
4214880	48.90	2.62	135
4215730	50.39	3.53	226
4215740	53.57	3.53	227
946740	56.74	3.53	228
4215750	59.92	3.53	229
4215760	63.09	3.53	230
4215770	66.27	3.53	231
4215780	69.44	3.53	232
4215790	72.62	3.53	233
4215810	75.79	3.53	234
4215820	78.97	3.53	235
4215850	88.49	3.53	238
4216600	81.92	5.33	339
4216690	85.09	5.33	340
4216700	88.27	5.33	341
4216720	91.44	5.33	342
4216730	94.62	5.33	343
4216740	97.79	5.33	344
4216760	100.97	5.33	345
4216770	104.14	5.33	346
4216780	107.32	5.33	347
4138210	110.49	5.33	348
4216800	113.67	5.33	349
4216820	116.84	5.33	350
4216830	120.02	5.33	351

FEP-COVERED O-RINGS

Continued: O-ring FEP/FPM



Type: seamlessly covered
Material: FEP/FPM
Hardness: 90-95 Shore A
Colour: transparent/black

Item No.	d1 mm	d2 mm	AS Norm
4216850	123.19	5.33	352
4216860	126.37	5.33	353
946770	129.54	5.33	354
4216870	132.72	5.33	355
4216880	135.89	5.33	356
4216890	139.07	5.33	357
4216910	142.24	5.33	358
4216920	145.42	5.33	359
4216940	148.59	5.33	360
4216950	151.77	5.33	361
4216960	158.12	5.33	362
4216970	164.47	5.33	363
4216980	170.82	5.33	364
4217020	177.17	5.33	365
4217030	183.52	5.33	366
4217040	189.87	5.33	367
4217060	196.22	5.33	368
4217070	202.57	5.33	369
4217080	208.92	5.33	370
4217090	215.27	5.33	371
4217120	221.62	5.33	372
4217130	227.97	5.33	373
4217140	234.32	5.33	374
4217160	240.67	5.33	375
4217180	247.02	5.33	376
4217800	253.37	6.99	449
4217810	266.07	6.99	450
4217820	278.77	6.99	451
4217830	291.47	6.99	452
4217840	304.17	6.99	453
4217850	316.87	6.99	454
4217860	329.57	6.99	455
4217870	342.27	6.99	456
4217880	354.97	6.99	457
4217890	367.67	6.99	458
4217900	380.37	6.99	459
4217910	393.07	6.99	460
4217920	405.26	6.99	461
4217940	430.66	6.99	463
4217950	443.36	6.99	464
4217960	456.06	6.99	465
4217970	468.76	6.99	466
4217980	481.46	6.99	467
4217990	494.16	6.99	468
4218000	506.86	6.99	469

FEP-COVERED O-RINGS

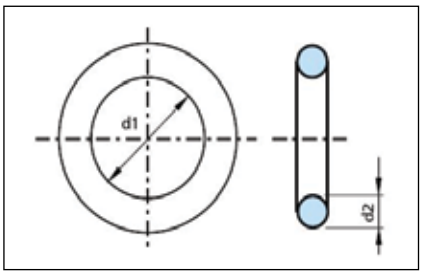
O-ring FEP/FPM

Item No.	d1 mm	d2 mm	AS Norm
4218020	532.26	6.99	470
4218030	557.66	6.99	471
4218040	582.68	6.99	472
4218050	608.08	6.99	473
4218060	633.48	6.99	474
4218070	658.88	6.99	475

O-ring FEP/MVQ

The FEP-covered O-ring consists of a rubber-elastic inner ring and a FEP cover which seamlessly encloses the O-ring.

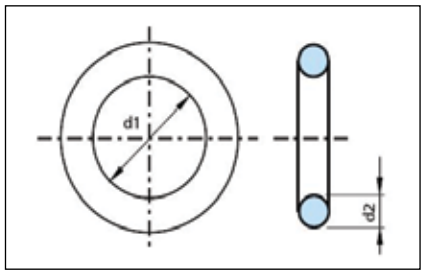
Type: seamlessly covered
Material: FEP/MVQ
Hardness: 85-90 Shore A
Colour: transparent/red



Item No.	d1 mm	d2 mm	Norm
4425440	12.37	2.62	112
4421860	13.94	2.62	113
4421870	15.54	2.62	114
4425560	17.12	2.62	115
4421890	18.72	2.62	116
4425450	20.29	2.62	117
4425460	21.89	2.62	118
4421910	23.47	2.62	119
4425470	25.07	2.62	120
4426440	26.64	2.62	121
4426450	28.24	2.62	122
4421930	29.82	2.62	123
4425480	31.42	2.62	124
4425490	32.99	2.62	125
4426460	34.59	2.62	126
4426480	36.17	2.62	127
4421960	37.77	2.62	128
4421980	39.34	2.62	129
4426490	40.94	2.62	130
4425510	42.52	2.62	131
4422000	44.12	2.62	132
4422020	45.69	2.62	133
4426500	47.29	2.62	134
4426510	48.90	2.62	135
4423250	50.39	3.53	226
4423270	53.57	3.53	227
4423300	56.74	3.53	228
4426750	59.92	3.53	229
4426760	63.09	3.53	230
4423340	66.27	3.53	231
4426780	69.44	3.53	232
4423380	72.62	3.53	233
4423410	75.79	3.53	234
4423430	78.97	3.53	235

FEP-COVERED O-RINGS

Continued: O-ring FEP/MVQ



Type: seamlessly covered
Material: FEP/MVQ
Hardness: 85-90 Shore A
Colour: transparent/red

Item No.	d1 mm	d2 mm	Norm
4426790	88.49	3.53	238
4424160	81.92	5.33	339
4427280	85.09	5.33	340
4424170	88.27	5.33	341
4424190	91.44	5.33	342
4424210	94.62	5.33	343
4427300	97.79	5.33	344
4424240	100.97	5.33	345
4427310	104.14	5.33	346
4427320	107.32	5.33	347
4424270	110.49	5.33	348
4427330	113.67	5.33	349
4424290	116.84	5.33	350
4427340	120.02	5.33	351
4424320	123.19	5.33	352
4424350	126.37	5.33	353
4427350	129.54	5.33	354
4424450	132.72	5.33	355
4424470	135.89	5.33	356
4427360	139.07	5.33	357
4424490	142.24	5.33	358
4424520	145.42	5.33	359
4427460	148.59	5.33	360
4425130	151.77	5.33	361
4427510	158.12	5.33	362
4427540	164.47	5.33	363
4425140	170.82	5.33	364
4427570	177.17	5.33	365
4427630	183.52	5.33	366
4427720	189.87	5.33	367
4428340	196.22	5.33	368
4427840	202.57	5.33	369
4429370	208.92	5.33	370
4429380	215.27	5.33	371
4429390	221.62	5.33	372
4429400	227.97	5.33	373
4429410	234.32	5.33	374
4429430	247.02	5.33	376
4428240	253.37	6.99	449
4425240	266.07	6.99	450
4425250	278.77	6.99	451
4425260	291.47	6.99	452
4425270	304.17	6.99	453
4425280	316.87	6.99	454
4428250	329.57	6.99	455
4425290	342.27	6.99	456
4425300	354.97	6.99	457

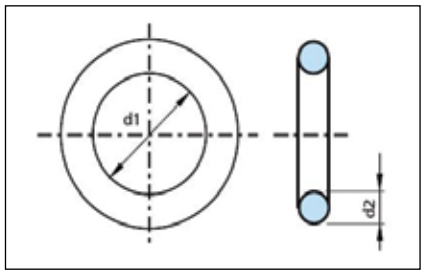
FEP-COVERED O-RINGS

O-ring FEP/MVQ

Item No.	d1 mm	d2 mm	Norm
4428260	367.67	6.99	458
4428280	380.37	6.99	459
4428310	393.07	6.99	460
4425310	405.26	6.99	461
4429450	430.66	6.99	463
4429460	443.36	6.99	464
4429470	456.06	6.99	465
4429480	468.76	6.99	466
4429490	481.46	6.99	467
4429500	494.16	6.99	468
4429510	506.86	6.99	469
4429520	532.26	6.99	470
4429530	557.66	6.99	471
4429540	582.68	6.99	472
4429550	608.08	6.99	473
4429560	633.48	6.99	474

O-RINGS SPECIAL RANGE

O-rings, Isolast 9503



The O-ring is an endless pressed round ring with circular cross section made of rubber-elastic materials.
O-rings are used both for static as well as for dynamic sealing in pneumatics and hydraulics.

Material: Isolast-J9503, FFKM
Hardness: 75 Shore A
Colour: black
Norm: AS 568
Manufacturer: Trelleborg

Item No.	d1 mm	d2 mm	AS standard
4207190	1.78	1.78	004
4207560	3.68	1.78	007
4207580	5.28	1.78	009
4207590	6.07	1.78	010
4207620	10.82	1.78	013
4207700	18.77	1.78	018
4207720	21.95	1.78	020
4207740	25.12	1.78	022
4207820	31.47	1.78	026
4207850	34.65	1.78	028
4207890	47.35	1.78	032
4207910	53.70	1.78	034
4207930	60.05	1.78	036
4207970	72.75	1.78	040
4207990	82.27	1.78	042
4208010	94.97	1.78	044
4208040	107.67	1.78	046
4208070	120.37	1.78	048
4208180	2.06	2.62	103
4208220	3.63	2.62	105
4208250	5.23	2.62	107
4208290	7.59	2.62	109
4208500	13.94	2.62	113
4208520	17.12	2.62	115
4208540	18.72	2.62	116
4208620	25.07	2.62	120
4208640	28.24	2.62	122
4208820	31.42	2.62	124
4209010	37.77	2.62	128
4209030	40.94	2.62	130
4209080	44.12	2.62	132
4209150	50.47	2.62	136
4209190	56.82	2.62	140
4209210	59.99	2.62	142
4209250	66.34	2.62	146
4209310	72.69	2.62	150
4209330	82.22	2.62	152
4209430	120.32	2.62	158
4209470	145.72	2.62	162
4209490	158.42	2.62	164
4209530	183.82	2.62	168
4209550	196.52	2.62	170

O-RINGS SPECIAL RANGE

TRELLEBORG
SEALING SOLUTIONS

O-rings, Isolast 9503

Item No.	d1 mm	d2 mm	AS standard
4209760	12.29	3.53	206
4209780	15.47	3.53	208
4209800	18.64	3.53	210
4209830	21.82	3.53	212
4209890	31.34	3.53	218
4209910	34.52	3.53	220
4209960	44.04	3.53	224
4210000	56.74	3.53	228
4210050	69.44	3.53	232
4210070	75.79	3.53	234
4210090	82.14	3.53	236
4210140	98.02	3.53	241
4210160	104.37	3.53	243
4210180	110.72	3.53	245
4210220	123.42	3.53	249
4210240	129.77	3.53	251
4210260	136.12	3.53	253
4210300	148.82	3.53	257
4210320	158.34	3.53	259
4210340	171.04	3.53	261
4210360	183.74	3.53	263
4210380	196.44	3.53	265
4210640	12.07	5.33	310
4210660	15.24	5.33	312
4210680	18.42	5.33	314
4210720	24.77	5.33	318
4210750	27.94	5.33	320
4210800	37.47	5.33	325
4210830	43.82	5.33	327
4210870	56.52	5.33	331
4210910	62.87	5.33	333
4210980	75.57	5.33	337
4211000	81.92	5.33	339
4211060	94.62	5.33	343
4211090	104.14	5.33	346
4211140	116.84	5.33	350
4211160	123.19	5.33	352
4211380	135.89	5.33	356
4211400	142.24	5.33	358
4211440	158.12	5.33	362
4211460	170.82	5.33	364
4211540	196.22	5.33	368
4211560	208.92	5.33	370
4211600	234.32	5.33	374
4211620	247.02	5.33	376
4211650	266.07	5.33	378
4212650	113.67	6.99	425
4212670	120.02	6.99	427
4212690	126.37	6.99	429
4212720	132.72	6.99	431
4212750	139.07	6.99	433
4212780	145.42	6.99	435
4212820	151.77	6.99	437
4212870	164.47	6.99	439
4212910	177.17	6.99	441
4212940	189.87	6.99	443

SURFACE-TREATED O-RINGS

In many cases, standard elastomer O-rings cannot be used without modification of the surface. Reduction of the friction or breakaway forces is often required. Soiling of the systems due to so-called exudation or liberation of constituent parts are also not acceptable. Deep pore cleansing of the rings is essential here.

The surface of the O-ring can be improved by immersion, spraying or coating for the purpose, among other things, friction reduction, easier mounting, lifetime lubrication, anti-adhesion effects or ease of movement.

Depending on the purpose, different, high quality surface treatments or coatings are available for this.

Advantages
depending on application area of the coating variants
- they prevent sticking together of the parts in the packaging or during handling
- they improve the automatic feeding or separation of sealing elements
- they simplify the seal mounting and removal manually or automatically
- they reduce the occurring insertion forces
- they optimise the dynamic use of elastomer seals with regard to the friction behaviour
- they reduce the tendency of sticking together of elastomer seals during longer shutdown times
- they reduce "slip-stick" effects
- they reduce the abrasion of elastomer seals in dynamic use

Benefits
depending on application area of the coating variants
- time saving and more reliability for the mounting
- clean processes as additional lubricants can be dispensed with, whereby cleaning times and costs are also saved
- shorter cycle times
- extended application possibilities for simple and low-cost elastomer sealing elements
- longer service life due to more mounting reliability and improve abrasion characteristics of elastomer seals
- more reliability when using elastomer seals in valves due to reduced tendency for sticking together

O-rings free of paint wetting impairment substances "PWIS-free"
"PWIS-free" O-rings are particularly suitable in the compressed air provision for highly automated painting technology, mainly in the automotive supplier industry. The "silicone-free" seal property is frequently no longer sufficient there. The systems must be free of all paint wetting impairment substances.

Various test specifications are fulfilled with one high-tech cleaning process. No subsequent "exudation" of constituent parts takes place. "PWIS-free" O-rings are therefore also used in medical technology. Due to the special packaging in "PWIS-free" bags and appropriate labelling, the storage is also easy.

This absolutely environmentally-compatible process does not change the physical properties of the O-rings. These cleaned parts can also be mounted automatically very well due to the dry design. O-rings made of the material FPM are particularly well suited for this design.

Treatment Options
- Siliconisation
- Molykote treatment
- Talc powdering
- PTFE coating for static or dynamic applications

O-RING BOXES

O-rings in assortment boxes

Various O-ring sizes in the most used metric and inch dimensions in practical assortment boxes. Space saving. Easy to handle. Always ready for maintenance, repair and service.

The O-ring assortments contain a selection of the most used sizes, both with metric as well as with inch dimensions.
In an emergency, the correct O-ring is always at hand with these.
The material is NBR 70 Shore A.

- long service life
- good physical properties
- high temperature resistance
- good chemical resistance

BOX Z1, American standard, inch
Item No. 1093870 **€/100 pcs. 2,980.00**

Size	Dimension	Unit teeth	Size	Dimension	Unit teeth
006	2.90 x 1.78	20	211	20.22 x 3.53	10
008	4.47 x 1.78	20	212	21.82 x 3.53	10
010	6.07 x 1.78	20	213	23.39 x 3.53	10
011	7.65 x 1.78	20	214	24.99 x 3.53	10
012	9.25 x 1.78	20	215	26.57 x 3.53	10
014	12.42 x 1.78	20	216	28.17 x 3.53	10
110	9.19 x 2.62	13	217	29.74 x 3.53	10
111	10.77 x 2.62	13	218	31.34 x 3.53	10
112	12.37 x 2.62	13	219	32.92 x 3.53	10
113	13.94 x 2.62	13	220	34.52 x 3.53	10
114	15.54 x 2.62	13	221	36.09 x 3.53	10
115	17.12 x 2.62	13	222	37.69 x 3.53	10
116	18.72 x 2.62	13	223	40.87 x 3.53	10
117	20.30 x 2.62	13	224	44.04 x 3.53	10
118	21.89 x 2.62	13	225	47.22 x 3.53	10
210	18.64 x 3.53	10	226	50.39 x 3.53	10

BOX Z2, American standard, inch
Item No. 1093890 **€/100 pcs. 2,980.00**

Size	Dimension	Unit teeth	Size	Dimension	Unit teeth
006	2.90 x 1.78	20	211	20.22 x 3.53	10
007	3.68 x 1.78	20	212	21.82 x 3.53	10
008	4.47 x 1.78	20	213	23.39 x 3.53	10
009	5.28 x 1.78	20	214	24.99 x 3.53	10
010	6.07 x 1.78	20	215	26.57 x 3.53	10
011	7.65 x 1.78	20	216	28.17 x 3.53	10
012	9.25 x 1.78	20	217	29.74 x 3.53	10
110	9.19 x 2.62	13	218	31.34 x 3.53	10
111	10.77 x 2.62	13	219	32.92 x 3.53	10
112	12.37 x 2.62	13	220	34.52 x 3.53	10
113	13.94 x 2.62	13	221	36.09 x 3.53	10
114	15.54 x 2.62	13	222	37.69 x 3.53	10
115	17.12 x 2.62	13	325	37.47 x 5.34	7
116	18.72 x 2.62	13	326	40.64 x 5.34	7
210	18.64 x 3.53	10	327	43.82 x 5.34	7

BOX Z3, American standard, inch
Item No. 1093910 **€/100 pcs. 2,373.00**

Size	Dimension	Unit teeth	Size	Dimension	Unit teeth
006	2.90 x 1.78	20	110	9.19 x 2.62	10
007	3.68 x 1.78	20	111	10.77 x 2.62	10
008	4.47 x 1.78	20	112	12.37 x 2.62	10
009	5.28 x 1.78	15	113	13.94 x 2.62	10
010	6.07 x 1.78	15	114	15.54 x 2.62	10
011	7.65 x 1.78	15	115	17.12 x 2.62	10
012	9.25 x 1.78	10	116	18.72 x 2.62	10
014	12.42 x 1.78	10	210	18.64 x 3.53	10
016	15.60 x 1.78	10	211	20.22 x 3.53	10

BOX M2, Swedish/German standard, metric
Item No. 1093860 **€/100 pcs. 3,590.00**

Dimension	Unit teeth	Dimension	Unit teeth
3 x 2,0	16	20 x 3.0	12
4 x 2.0	16	22 x 3.0	12
5 x 2.0	16	24 x 3.0	12
6 x 2.0	16	25 x 3.0	12
7 x 2.0	16	27 x 3.0	12
8 x 2.0	16	28 x 3.0	12
10 x 2.0	16	30 x 3.0	12
10 x 2.5	13	32 x 3.0	12
11 x 2.5	13	33 x 3.0	12
12 x 2.5	13	35 x 3.0	12
14 x 2.5	13	36 x 3.0	12
16 x 2.5	13	38 x 3.0	12
17 x 2.5	13	38 x 4.0	9
19 x 2.5	13	41 x 4.0	9
19 x 3.0	12	44 x 4.0	9

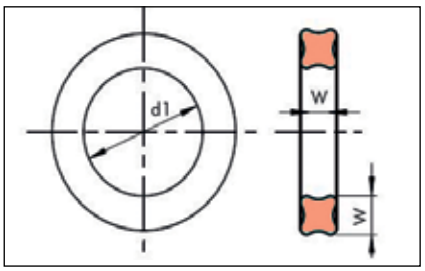
BOX M3, Swedish/German standard, metric
Item No. 1093900 **€/100 pcs. 3,590.00**

Dimension	Unit teeth	Dimension	Unit teeth
3 x 2,0	16	20 x 3.0	12
5 x 2.0	16	22 x 3.0	12
7 x 2.0	16	24 x 3.0	12
8 x 2.0	16	25 x 3.0	12
10 x 2.0	16	27 x 3.0	12
12 x 2.0	16	28 x 3.0	12
10 x 2.5	14	30 x 3.0	12
11 x 2.5	14	32 x 3.0	12
12 x 2.5	14	33 x 3.0	12
14 x 2.5	14	35 x 3.0	12
16 x 2.5	14	36 x 3.0	12
17 x 2.5	14	38 x 3.0	12
19 x 2.5	14	41 x 3.0	12
20 x 2.5	14	45 x 3.0	12
22 x 2.5	14	48 x 3.0	12
19 x 3.0	12	51 x 3.0	12

X-RINGS (QUAD-RINGS®)

Technical Description

Description
X-rings (QUAD-Rings®) are four-lip seals with a specially developed sealing profile. A large selection of elastomer materials for standard and special applications enables the sealing of almost all liquid and gaseous media. X-rings are endlessly vulcanised in moulds. They are distinguished by the ring form with an almost square profile.



X-rings (QUAD-Rings®), dimensioning

X-rings are supplied in accordance with the American standard AS 568A.

Materials
Refer to the material list on page 58 for the available elastomer materials.
If there are no particular specifications for the material, NBR (acrylonitrile butadiene rubber) with 70 Shore A hardness is supplied.

Mode of action
X-rings are automatic double action sealing elements. The contact forces in the radial or axial direction caused by the installation achieve the initial seal. They are overlaid by the system pressure.

A total sealing pressure is produced which increases with increasing system pressure. Under pressure, the seal behaves similarly to a liquid with high surface tension. As a result, the pressure is transferred evenly to all sides.

General Information
*Max. and min. values for the radial pre-compression taking account of the permitted tolerances of cord thickness and groove depth. The max. radial pre-compression produces a good sealing effect; however it increases the friction. The min. radial pre-compression reduces the sealing effect and improves the friction.

** The specifications of the groove depth are average values and apply for medium loading in hydraulics. In the case of eccentric position of the piston or deflection of the rod and in the vacuum and low pressure range, the groove depth must be reduced and the pre-compression increased.

*** If high swelling of the seal material is expected, the groove depth can be increased by up to approx. 20 %.

Advantages
In comparison with the O-ring, the four-lip ring has a doubled sealing function. It needs lower pre-compression. This results in reduced friction for dynamic use. Furthermore, it also has other advantages in comparison with the O-ring:
- Security against twisting. Due to its particular profile, the seal does not tend to rolling in the groove (in the case of to and fro movement).
- low friction. For a comparable O-ring seal, the X-rings are preloaded less radially. Smaller contact forces produce less friction, lower wear and thus a long service life.
- very good sealing behaviour. High leak tightness is achieved due to a more favourable compression distribution over the cross section.
- a lubricant reservoir can form between the sealing lips.
- no interfering flash rubber. The often interfering burr on the inner or outer diameter of the O-ring (caused by the manufacture) is between the sealing lips for the four-lip ring.

Technical data
X-ring seals can be used in a wide range of applications. Temperature, pressure and media determine the selection of the suitable material. In order to be able to assess the suitability of the X-ring seal as sealing element for a given application, the interaction of all operating parameters must be taken into account.

Operating pressure:
dynamic use:
moves back and forth
up to 5 MPa (50 bar) without thrust ring
up to 30 MPa (300 bar) with thrust ring

rotating
up to 15 MPa (150 bar) with thrust ring

static use:
up to 5 MPa (50 bar) without thrust ring
up to 40 MPa (400 bar) with thrust ring
Observe the permitted gap dimensions on page 57.

Speed:
moves back and forth up to 0.5 m/s
rotating: short-term up to 2 m/s

Application Areas
X-rings can be used for many different applications. X-rings are mainly used for dynamic seals. The use is limited in each case by the pressure to be sealed and the speed.

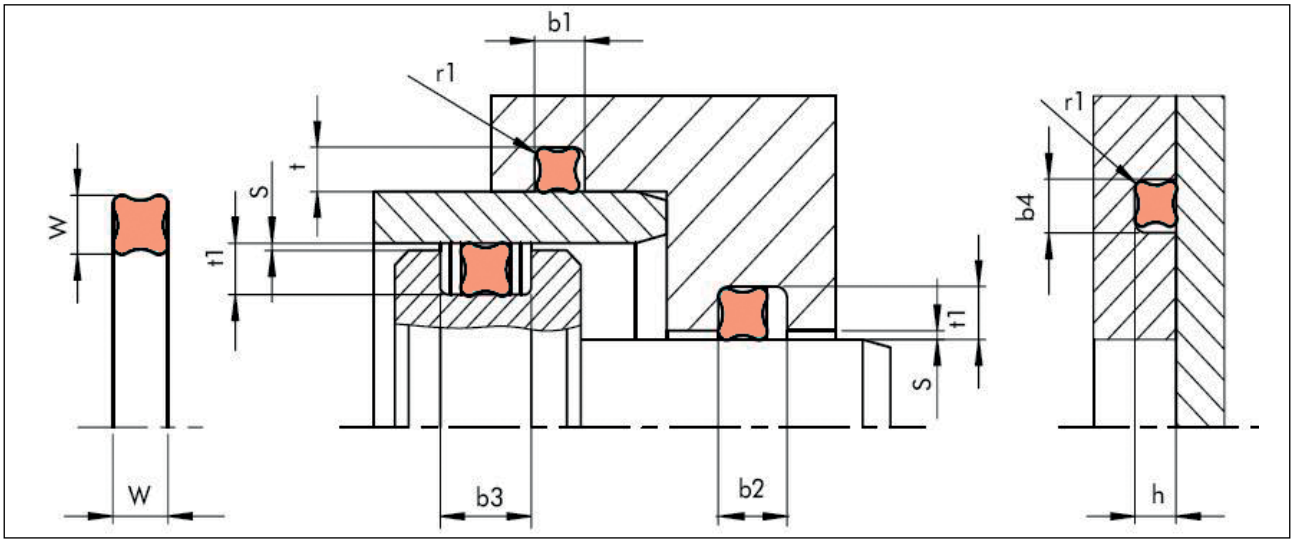
Dynamic Use
- for sealing pistons and rods moving back and forth
- for sealing pivoting, rotating or helical movements on shafts, spindles, rotary feedthroughs etc.

Static Use
- as radial static seal, e.g. for bushings, covers, pipes, etc.
- as axial static seal, e.g. for flanges, covers, closures, etc.
- as preload element for rubber preloaded hydraulic seals if there is a danger of twisting of the O-ring

X-RINGS (QUAD-RINGS®)

Technical Description

Installation recommendation



Installation drawing

Installation dimensions

cord thickness W	Radial Pre-compression* dynamic max. / min.	static max. / min.	Groove dimensions Groove depth**[1] dynamic t_1 +0.05	static t/h +0.05	Groove width*** b_1, b_4 +0.2	b_2 +0.2	b_3 +0.2	Radius r_1	rad. Gap $S_{max.}$
1.02	0.300 / 0.115	0.350 / 0.165	0.80	0.75	1.20	–	–	0.10	0.03
1.27	0.330 / 0.145	0.430 / 0.245	1.00	0.90	1.40	–	–	0.10	0.03
1.52	0.350 / 0.165	0.450 / 0.265	1.25	1.15	1.70	–	–	0.22	0.04
1.78	0.360 / 0.175	0.460 / 0.275	1.50	1.40	2.00	3.40	4.80	0.22	0.05
2.62	0.400 / 0.215	0.450 / 0.265	2.30	2.25	3.00	4.40	5.80	0.30	0.08
3.53	0.430 / 0.205	0.530 / 0.305	3.20	3.10	4.00	5.40	6.80	0.40	0.08
5.33	0.560 / 0.250	0.710 / 0.400	4.90	4.75	6.00	7.70	9.40	0.40	0.10
7.00	0.700 / 0.350	0.950 / 0.600	6.40	6.20	8.00	10.50	13.00	0.60	0.10

Explanation for *, **, ***, see page 56.

[1] The use of O-ring grooves is permitted. Friction can increase for dynamic use. Thrust rings must be adapted.

X-RINGS (QUAD-RINGS®)

Selection Criteria for Materials

Material list for X-rings (QUAD-Rings®)

Basic elastomer	Hardness * Shore A IRHD Tol. ±/5	Colour	Temperature range °C **	Use / Application Area Special features
NBR Acrylonitrile Butadiene Rubber	70	black	-30 / +110	Standard quality for hydraulics and pneumatics. Mineral oil based pressurised fluids, animal and vegetable fats, aliphatic hydrocarbons (propane, butane, benzine), silicone oils and greases, water up to +80° C.
	80	black	-30 / +110	
NBR Low-temperature	70	black	-50 / +100	Low temperature resistant, use as for standard NBR, lower heat resistance
HNBR Hydrogenated Acrylonitrile Butadiene Rubber	70	black	-35 / +150	Mineral oil based pressurised fluids, vegetable and animal fats, aliphatic hydrocarbons , diesel fuels, ozone, acid gas, diluted acids and bases. Suitable for high dynamic loads, abrasion-resistant.
CR Chlorobutadiene Rubber	70	black	-40 / +120	Refrigerant-resistant, ammonia, carbon dioxide, freon refrigerants (12, R13, R21, R22, R113, R114, R115). Silicone oils, oxygen, ozone, sodium hydroxide, weak mineral oil resistance.
EPDM Ethylene-propylene Rubber	70	black	-50 / +130	Peroxide cross-linked, hot water, steam, detergents, alcohols, ketones, esters, motor vehicle cooling water, organic and inorganic acids and bases, not resistant to mineral oils.
	70	black	-45 / +140	Brake fluids
MVQ Silicone	70	red	-70 / +230	Hot air, oxygen, ozone, inert gases, aliphatic engine and transmission oils, UV radiation, good dielectric properties. Only for static applications!
FVMQ Fluorosilicone	70	black	-70 / +230	Similar properties to MVQ, lower resistance to cold. Mineral oils, fuels, di-ester based lubricants, hot air.
FPM Fluororubber	70	black	-20 / +200	Mineral oils and greases, fire-retardant liquids, aliphatic, aromatic and chlorinated hydrocarbons, benzine, "Super" petroleum, diesel fuels, silicone oils and greases.
	90	black	-20 / +200	
	90	black	-20 / +200	Suitable for high vacuum!

* The listed hardness ranges of the elastomer types are shown in Shore A hardness units according to DIN 53505. The hardness specification refers to the test item described in the DIN standard.

** The stated temperatures are limit values which must always be considered in connection with the medium to be sealed and the operating pressure. The permitted continuous temperatures are always lower than the limit values.

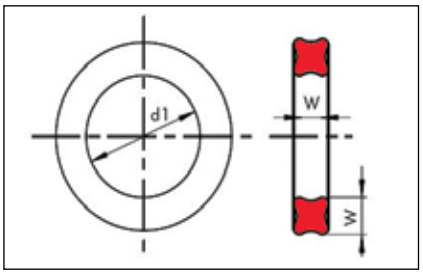
X-RINGS

TRELLEBORG
SEALING SOLUTIONS

X-ring, NBR 70

The X-ring is vulcanised in endless form. It is distinguished by the ring form with an almost square profile.

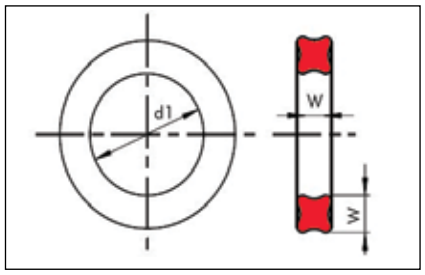
Type: Standard X-ring
Material: NBR
Hardness: 70 Shore A



Item No.	d1 mm	W mm	AS standard
4069610	0.74	1.02	001
4069620	1.78	1.02	
1181140	1.07	1.27	002
4069830	1.42	1.52	003
847030	1.78	1.78	004
4069630	2.57	1.78	005
4072950	2.90	1.78	006
813450	3.68	1.78	007
1181150	4.47	1.78	008
4072180	5.28	1.78	009
1135840	6.07	1.78	010
769350	7.65	1.78	011
847540	9.25	1.78	012
1181160	10.82	1.78	013
847590	12.42	1.78	014
4069660	14.00	1.78	015
4069670	15.60	1.78	016
4069680	17.17	1.78	017
1181330	18.77	1.78	018
4069690	20.35	1.78	019
1181350	21.95	1.78	020
4069700	23.52	1.78	021
4069710	25.12	1.78	022
10029661	26.70	1.78	023
4069730	28.30	1.78	024
4069740	29.87	1.78	025
1181390	31.47	1.78	026
4069750	33.05	1.78	027
1181420	34.65	1.78	028
850760	37.82	1.78	029
4069760	41.00	1.78	030
4069790	44.17	1.78	031
4069800	47.35	1.78	032
4069820	50.52	1.78	033
4069850	53.70	1.78	034
4069640	56.87	1.78	035
4069860	60.05	1.78	036
4069870	63.22	1.78	037
4069880	66.40	1.78	038
4069890	69.57	1.78	039
4069900	72.75	1.78	040
4069910	75.92	1.78	041
4069920	82.27	1.78	042
4069930	88.62	1.78	043
4069940	94.97	1.78	044
4069950	101.32	1.78	045
4069960	107.67	1.78	046

X-RINGS

Continued: X-ring, NBR 70



Type: Standard X-ring
Material: NBR
Hardness: 70 Shore A

Item No.	d1 mm	W mm	AS standard
4069970	114.02	1.78	047
4069980	120.37	1.78	048
4069990	126.72	1.78	049
4070000	133.07	1.78	050
4070060	1.24	2.62	102
4070070	2.06	2.62	103
4070080	2.84	2.62	104
4070090	3.63	2.62	105
4070100	4.42	2.62	106
4070110	5.23	2.62	107
4070120	6.02	2.62	108
4070130	7.59	2.62	109
847530	9.19	2.62	110
896090	10.2	2.62	111
847560	10.77	2.62	111
827300	12.37	2.62	112
1160390	13.94	2.62	113
4070140	14.70	2.62	114
827310	14.80	2.62	114B
1181170	15.54	2.62	114
1077270	16.20	2.62	115
1181320	17.12	2.62	115
847690	18.72	2.62	116
847740	20.29	2.62	117
4070150	21.89	2.62	118
4070160	23.47	2.62	119
848910	25.07	2.62	120
4070170	26.64	2.62	121
4070180	28.24	2.62	122
1181370	29.82	2.62	123
1181380	31.42	2.62	124
4070190	32.99	2.62	125
4070200	34.59	2.62	126
4070210	36.17	2.62	127
4070220	37.77	2.62	128
4070230	39.34	2.62	129
4070240	40.94	2.62	130
4070250	42.52	2.62	131
4070260	44.12	2.62	132
1181480	45.69	2.62	133
4070270	47.29	2.62	134
1181490	48.90	2.62	135
1181510	50.47	2.62	136

X-RINGS

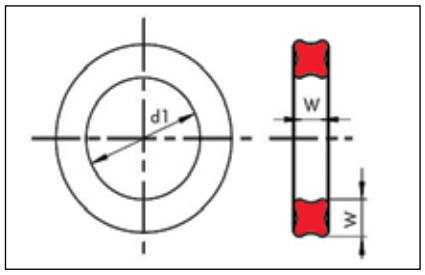
TRELLEBORG
SEALING SOLUTIONS

X-ring, NBR 70

Item No.	d1 mm	W mm	AS standard
4070280	52.07	2.62	137
4070290	53.64	2.62	138
4070300	55.25	2.62	139
4070310	56.82	2.62	140
4070320	58.42	2.62	141
4070330	59.99	2.62	142
4070340	61.60	2.62	143
4070350	63.17	2.62	144
4070360	64.77	2.62	145
4070370	66.34	2.62	146
851240	67.95	2.62	147
1181590	69.52	2.62	148
4070380	71.12	2.62	149
4070390	72.69	2.62	150
4070400	75.87	2.62	151
1181620	82.22	2.62	152
947850	88.57	2.62	153
4070410	94.92	2.62	154
4070420	101.27	2.62	155
851680	107.62	2.62	156
4070430	113.97	2.62	157
4070440	120.32	2.62	158
4070450	126.67	2.62	159
1181800	133.02	2.62	160
851980	139.37	2.62	161
4070460	145.72	2.62	162
4070470	152.07	2.62	163
4070480	158.42	2.62	164
4070490	164.77	2.62	165
4070500	171.12	2.62	166
4070510	177.47	2.62	167
4070520	183.82	2.62	168
4070530	190.17	2.62	169
4070540	196.52	2.62	170
4070550	202.87	2.62	171
4070560	209.22	2.62	172
4070570	215.57	2.62	173
4070580	221.92	2.62	174
4070590	228.27	2.62	175
4070600	234.62	2.62	176
4070610	240.97	2.62	177
4070620	247.32	2.62	178
4070630	4.34	3.53	201
4070640	5.94	3.53	202
4070650	7.52	3.53	203
4070660	9.12	3.53	204
4070670	10.69	3.53	205
4070680	12.29	3.53	206
4070690	13.87	3.53	207
4070700	15.47	3.53	208
4070710	17.04	3.53	209
990060	18.20	3.53	210
847680	18.64	3.53	210
830840	20.22	3.53	211
848770	21.82	3.53	212
848830	23.39	3.53	213
844760	24.99	3.53	214
1181360	28.17	3.53	216

X-RINGS

Continued: X-ring, NBR 70



Type: Standard X-ring
Material: NBR
Hardness: 70 Shore A

Item No.	d1 mm	W mm	AS standard
849020	29.74	3.53	217
850190	31.34	3.53	218
850260	32.92	3.53	219
1181410	34.52	3.53	220
1184750	36.09	3.53	221
850740	37.69	3.53	222
850790	40.87	3.53	223
1181460	44.04	3.53	224
850890	47.22	3.53	225
1181500	50.39	3.53	226
951720	53.57	3.53	227
4070720	56.74	3.53	228
4070730	59.92	3.53	229
4070740	63.09	3.53	230
4070750	66.27	3.53	231
4070760	69.44	3.53	232
4070770	72.62	3.53	233
4070780	75.79	3.53	234
4070790	78.97	3.53	235
1198170	82.14	3.53	236
1181630	85.32	3.53	237
1181640	88.49	3.53	238
4070800	91.67	3.53	239
1181670	94.84	3.53	240
1181680	98.02	3.53	241
1181690	101.19	3.53	242
1181740	104.37	3.53	243
1181750	107.54	3.53	244
1146640	110.72	3.53	245
4070810	113.89	3.53	246
4070820	117.07	3.53	247
1181790	120.24	3.53	248
4070830	123.42	3.53	249
4070840	126.59	3.53	250
4070850	129.77	3.53	251
4070860	132.94	3.53	252
4070870	136.12	3.53	253
4070880	139.29	3.53	254
4070890	142.47	3.53	255
4070900	145.64	3.53	256
4070910	148.82	3.53	257
4070930	158.34	3.53	259
4070940	164.69	3.53	260

X-RINGS

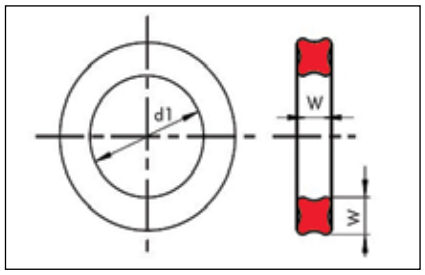
TRELLEBORG
SEALING SOLUTIONS

X-ring, NBR 70

Item No.	d1 mm	W mm	AS standard
1181850	171.04	3.53	261
4070950	177.39	3.53	262
4070960	183.74	3.53	263
4070970	190.09	3.53	264
4070980	196.44	3.53	265
4070990	202.79	3.53	266
4071000	209.14	3.53	267
4071010	215.49	3.53	268
1181910	221.84	3.53	269
4071020	228.19	3.53	270
4071030	234.54	3.53	271
4071050	240.89	3.53	272
4071060	247.24	3.53	273
4071070	253.59	3.53	274
4071080	266.29	3.53	275
1181950	278.99	3.53	276
1010200	291.69	3.53	277
1191660	304.39	3.53	278
4071090	329.79	3.53	279
4071100	355.19	3.53	280
4071110	380.59	3.53	281
4071120	405.26	3.53	282
4071130	430.66	3.53	283
4071140	456.06	3.53	284
4071150	10.46	5.33	309
4071170	12.07	5.33	310
4071180	13.64	5.33	311
4071200	15.24	5.33	312
4071210	16.81	5.33	313
4071230	18.42	5.33	314
4071260	21.59	5.33	316
4071280	23.16	5.33	317
4071290	24.77	5.33	318
4071300	26.34	5.33	319
4071310	27.94	5.33	320
4071320	29.51	5.33	321
850730	37.47	5.33	325
850780	40.64	5.33	326
1181450	43.82	5.33	327
4071370	45.20	5.33	328
850880	46.99	5.33	328
850910	50.17	5.33	329
850990	53.34	5.33	330
827290	56.52	5.33	331
1181540	59.69	5.33	332
1181560	62.87	5.33	333
1181570	66.04	5.33	334
1181580	69.22	5.33	335
1181610	72.39	5.33	336
851320	75.57	5.33	337
851430	78.74	5.33	338
10015781	78.74	5.33	338
10014485	80.50	5.33	042
4071380	81.92	5.33	339
851490	85.09	5.33	340
851510	88.27	5.33	341
851540	91.44	5.33	342
1181660	94.62	5.33	343

X-RINGS

Continued: X-ring, NBR 70



Type: Standard X-ring
Material: NBR
Hardness: 70 Shore A

Item No.	d1 mm	W mm	AS standard
4071390	97.79	5.33	344
851610	100.97	5.33	345
4071400	104.14	5.33	346
4071410	107.32	5.33	347
1181760	110.49	5.33	348
851710	113.67	5.33	349
4071430	116.84	5.33	350
4071450	120.02	5.33	351
4071460	123.19	5.33	352
4071470	126.37	5.33	353
851890	129.54	5.33	354
4071480	132.72	5.33	355
1181810	135.89	5.33	356
4071520	139.07	5.33	357
4071530	142.24	5.33	358
4071540	145.42	5.33	359
4071550	148.49	5.33	360
1155900	151.77	5.33	361
4071560	158.12	5.33	362
1181840	164.47	5.33	363
4071570	170.82	5.33	364
4071580	177.17	5.33	365
1181860	183.52	5.33	366
4071590	189.87	5.33	367
4071600	196.22	5.33	368
4071610	202.57	5.33	369
4071620	208.92	5.33	370
4071630	215.27	5.33	371
852370	221.62	5.33	372
4071640	227.97	5.33	373
4071650	234.32	5.33	374
4071660	240.67	5.33	375
4071670	247.02	5.33	376
852460	253.37	5.33	377
4071680	266.07	5.33	378
4071690	278.77	5.33	379
4071700	291.47	5.33	380
4071710	304.17	5.33	381
852580	329.57	5.33	382
4071720	354.97	5.33	383
4071730	380.37	5.33	384
852680	405.26	5.33	385
4071740	430.66	5.33	386

X-RINGS

TRELLEBORG
SEALING SOLUTIONS

X-ring, NBR 70

Item No.	d1 mm	W mm	AS standard
4071750	456.06	5.33	387
4071760	481.41	5.33	388
1181770	113.67	6.99	425
1181780	116.84	6.99	426
4013970	120.02	6.99	427
4071820	123.19	6.99	428
4071830	126.37	6.99	429
4071840	129.54	6.99	430
4071850	132.72	6.99	431
835870	135.89	6.99	432
4071860	139.07	6.99	433
1181820	142.24	6.99	434
4022210	145.42	6.99	435
4071870	148.59	6.99	436
835880	151.77	6.99	437
1181830	158.12	6.99	438
4071890	160.50	6.99	439
4071900	164.47	6.99	439
852140	170.82	6.99	440
4071910	177.17	6.99	441
4022220	183.52	6.99	442
4071920	189.87	6.99	443
4071930	196.22	6.99	444
4022230	202.57	6.99	445
1181880	215.27	6.99	446
1181920	227.97	6.99	447
1181930	240.67	6.99	448
4071940	253.37	6.99	449
1181940	266.07	6.99	450
4071950	278.77	6.99	451
4071960	291.47	6.99	452
4071970	304.17	6.99	453
1181970	316.87	6.99	454
1181980	329.57	6.99	455
4071980	342.27	6.99	456
4071990	354.97	6.99	457
1181990	367.67	6.99	458
4072000	380.37	6.99	459
4072010	393.07	6.99	460
4072020	405.26	6.99	461
4072030	417.96	6.99	462
4072040	430.66	6.99	463
4072050	443.36	6.99	464
4072060	456.06	6.99	465
4072070	468.76	6.99	466
4072090	481.46	6.99	467
4072100	494.16	6.99	468

THRUST RINGS

Technical Specification Thrust Rings ENDL, GESCH, SSP, SKE, SKG

Description
Thrust rings are protection and support elements made of extrusion-resistant materials; they are installed in a groove together with an elastomer seal — preferably with an O-ring or an X-ring seal. Due to the tight borehole cap, they prevent the extrusion of the pressurised elastomer sealing element into the sealing gap.

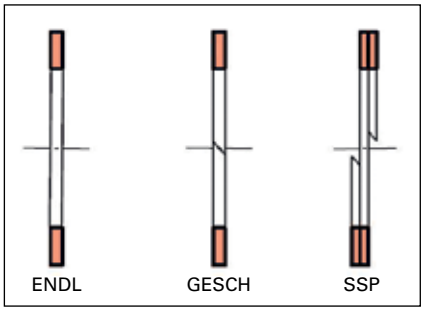
Thrust ring, design ENDL, endless
Closed thrust rings are used in static and dynamic applications. They are always used jointly with O-rings or X-rings if high pressures or temperatures unacceptably deform the elastomer seals.

Thrust ring, design GESCH, slotted
Slotted thrust rings are used in both static as well as dynamic applications. The diameter limit is approx. 300 mm.
The slotted thrust ring provides an alternative for inner sealing use if the unslotted version cannot be mounted or no split groove is possible.

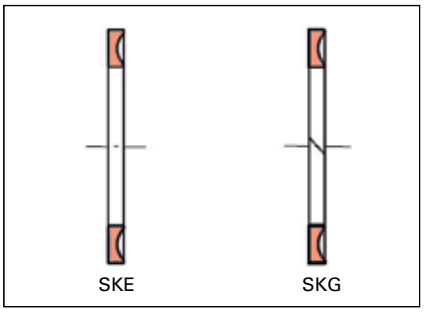
Thrust ring, design SSP, spiral
Spiral thrust rings are used in both static as well as dynamic applications.

The spiral thrust ring consists of two spiral windings as standard. The ends of the windings are cut at an angle. The design can be used both for outer as well as inner sealing use for radial dynamic (moving back and fort) and static O-ring seals.

The particular advantage of the spiral thrust ring is for applications where large temperature fluctuations occur. The spiral ring can easily compensate large tolerance changes by helically contracting or expanding. It is thus not sensitive to tolerance deviations and provides universal possible uses.



Thrust ring designs



Thrust rings with concave cross section on one side

Special Designs
Thrust rings, concave design

Thrust ring, design SKE, endless
Thrust ring, design SKG, slotted
Thrust rings with concave profile are used for dynamic (moving back and forth) and static O-ring seals. The special feature is the concave form on one side which provides a larger contact surface to the O-ring and thus ensures small deformation under pressure. As a result, the O-ring is better embedded and can be exposed to higher pressure loads.

Applications

Application Areas
Thrust rings can be manufactured for all types of elastomer sealing elements. The installation of thrust rings is required if at least one of the following operating conditions is present for a sealing application.

- higher pressures from approx. 5 MPa (50 bar)
- large tolerances between the components to be sealed or large diameter tolerances and radial gap dimensions
- high speed and frequencies
- strong pressure pulsation and pressure change
- higher temperatures and temperature fluctuations.

Mode of action

Under high pressure, elastomer O-rings on the non-pressure side attempt to enter available gaps (extrusion). In the case of pressure pulsation, there is the danger that material which has entered the gap will be "rubbed away".
The extrusion tendency increases for
- materials with low Shore hardness
- large gaps
- high pressures

If larger gaps cannot be avoided for design reasons, e.g. for prevention of metallic contact of the components, the gaps can be reduced or closed using thrust rings.

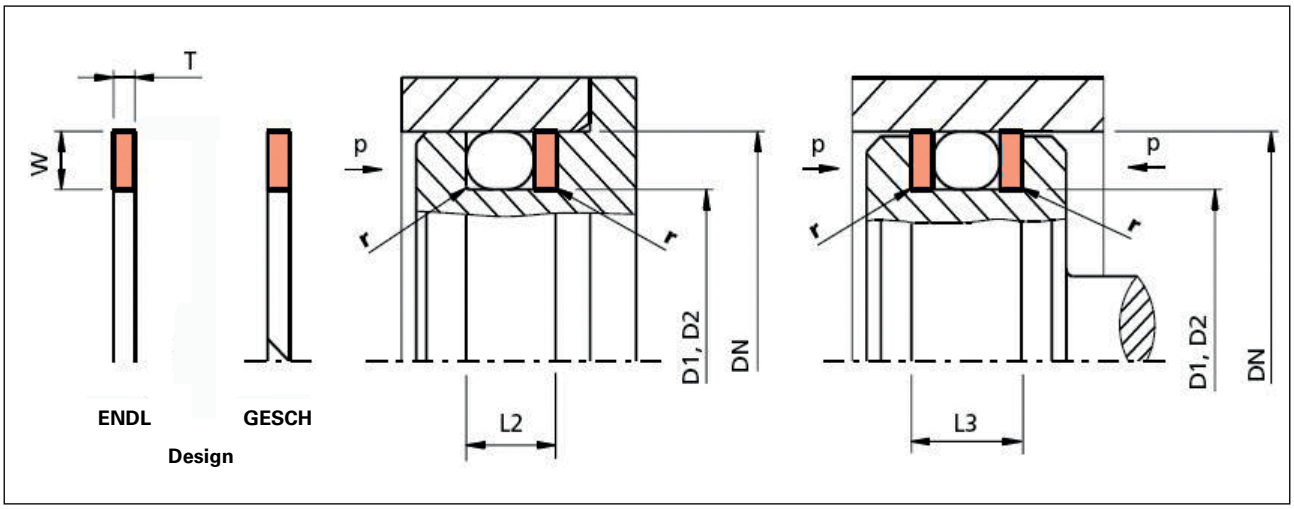
Technical data Operating pressure	
Dynamic Use	moves back and forth up to approx. 40 MPa (400 bar) rotating up to approx. 15 MPa (150 bar)
Static Use:	up to approx. 250 MPa (2500 bar) depending on thrust ring material
Speed	moves back and forth or rotating up to approx. 2 m/s depending on material
Temperature:	-150 °C to +200 °C depending on material

THRUST RINGS

Thrust Rings ENDL, GESCH

Installation recommendations

Thrust ring design ENDL (endless) and thrust ring GESCH (slotted) for radial-static and radial-dynamic use with O-ring.

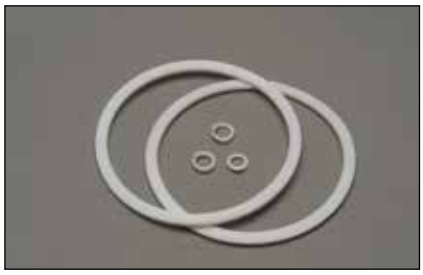


Installation dimensions

O-ring cord ∅	Thrust ring cross section			Groove dimensions				
	Web height W		Thickness	Groove base ∅		Groove width		Radius
	dynamic	static		dynamic	static			
			T	D_2 h9	D_1 h9	L_2 +0.2	L_3 +0.2	r ± 0.2
1.50	1.25	1.10	1.0	d4 – 2.5	d4 – 2.2	3.0	4.0	0.25
1.60	1.30	1.20	1.0	d4 – 2.6	d4 – 2.4	3.1	4.1	0.25
1.78 1.80	1.45	1.30	1.4	d4 – 2.9	d4 – 2.6	3.8	5.2	0.25
2.00	1.65	1.50	1.4	d4 – 3.3	d4 – 3.0	4.1	5.5	0.25
2.40	2.05	1.80	1.4	d4 – 4.1	d4 – 3.6	4.6	6.0	0.25
2.50	2.15	1.90	1.4	d4 – 4.3	d4 – 3.8	4.7	6.1	0.25
2.62 2.65	2.25	2.00	1.4	d4 – 4.5	d4 – 4.0	5.0	6.4	0.25
3.00	2.60	2.30	1.4	d4 – 5.2	d4 – 4.6	5.4	6.8	0.25
3.53 3.55	3.10	2.70	1.4	d4 – 6.2	d4 – 5.4	6.2	7.6	0.25
4.00	3.50	3.10	1.7	d4 – 7.0	d4 – 6.2	6.9	8.6	0.25
5.00	4.40	4.00	1.7	d4 – 8.8	d4 – 8.0	8.3	10.0	0.25
5.30 5.33	4.70	4.30	1.7	d4 – 9.4	d4 – 8.6	9.0	10.9	0.25
5.70	5.00	4.60	1.7	d4 – 10.0	d4 – 9.2	9.0	11.0	0.25
6.00	5.30	4.90	1.7	d4 – 10.6	d4 – 9.8	9.3	11.2	0.25
7.00	6.10	5.80	2.5	d4 – 12.2	d4 – 11.6	12.3	15.1	0.25
8.00	7.10	6.70	2.5	d4 – 14.2	d4 – 13.4	12.6	15.4	0.25
8.40	7.50	7.10	2.5	d4 – 15.0	d4 – 14.2	12.8	15.6	0.25

THRUST RINGS FOR O-RINGS AND X-RINGS

Thrust rings ENDL (endless)



Thrust rings are protection and support elements made of extrusion-resistant materials; thrust rings are installed in a groove together with an elastomer seal - preferably with an O-ring or an X-ring seal. Due to the tight borehole cap, thrust rings prevent the extrusion of the pressurised elastomer sealing element into the sealing gap.

Type: ENDL endless
Material: PTFE
Colour: white

Item No.	ID mm	AD mm	T mm
4584870	20.00	26.70	1.40
10014661	28.00	36.00	2.00
4584860	30.00	36.70	1.40
10024191	31.50	35.00	1.40
900780	35.00	39.80	1.40
4675070	46.20	55.90	1.40
1044950	60.00	64.20	1.40
4701620	60.00	69.00	1.70
4650150	60.00	69.90	1.70
4680630	63.00	73.50	1.50
842340	76.40	85.00	1.90
10033350	79.00	92.00	1.50
4703170	85.00	93.60	1.70
4712280	86.50	97.50	2.00
4712290	96.50	112.50	2.00
4124000	131.40	137.00	1.70
1030750	133.00	139.20	3.10
1030740	140.00	170.00	3.00
4710350	200.00	212.80	2.50
1030720	255.00	285.00	3.00
1030700	270.00	300.00	3.00
4689680	294.60	300.00	1.00
4689670	299.60	300.50	1.00
4698180	299.60	305.00	1.00

THRUST RINGS FOR O-RINGS AND X-RINGS

Thrust rings GESCH (slotted)

Thrust rings are protection and support elements made of extrusion-resistant materials; they are installed in a groove together with an elastomer seal – preferably with an O-ring or an X-ring seal. Due to the tight borehole cap, they prevent the extrusion of the pressurised elastomer sealing elements into the sealing gap.

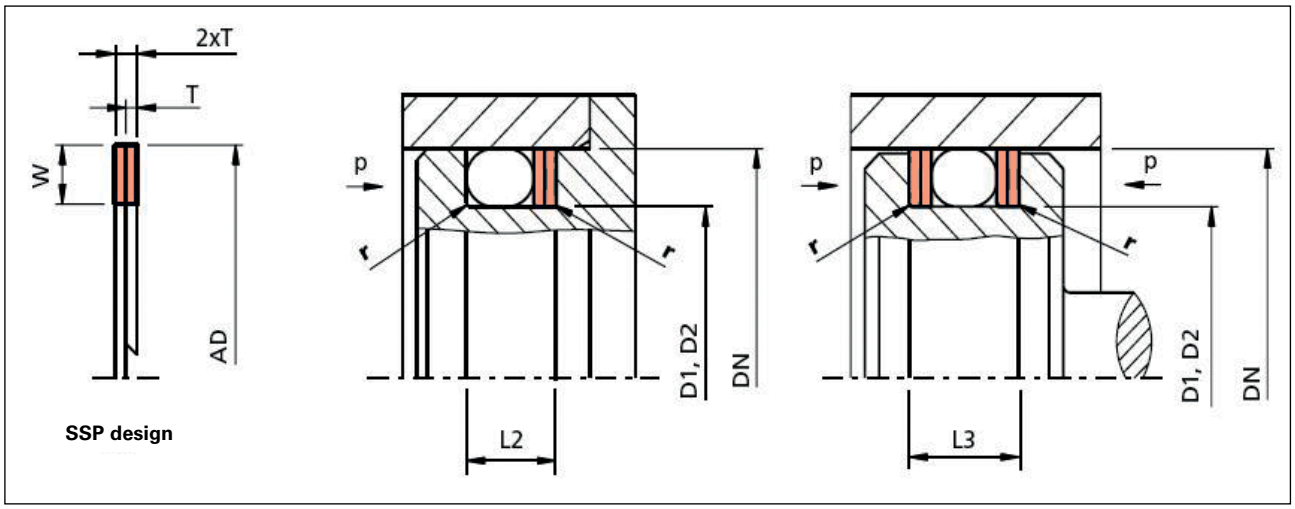
Type: GESCH slotted
Material: PTFE
Colour: white

Item No.	ID mm	AD mm	T mm
4668810	3.60	6.00	1.00
4149100	5.80	8.00	1.00
4645820	6.60	10.00	1.40
4571930	9.20	12.00	1.40
4686460	9.40	13.00	1.40
4571940	9.60	13.00	1.40
4571990	10.00	13.50	1.40
4572030	10.10	13.50	1.40
4571850	13.00	16.40	1.40
4571830	13.60	17.00	1.40
4571980	14.00	17.50	1.40
4572040	14.10	17.50	1.40
4586920	15.90	20.00	1.00
4571960	16.70	20.00	1.40
4704590	17.00	19.70	1.40
4587140	17.00	20.40	1.40
4714050	17.10	20.70	1.40
4605500	18.40	22.00	1.00
4586970	20.00	23.00	1.40
4709040	20.60	24.00	0.80
4571870	20.60	24.00	1.40
10005751	21.50	25.10	1.40
4571970	23.90	27.00	1.40
4571880	27.90	31.00	1.40
4654680	32.70	36.00	1.40
10008647	37.00	40.00	0.15
1032320	45.50	51.90	1.50

THRUST RINGS

Thrust rings SSP (spiral)

Installation recommendations
Thrust ring design SSP (spiral) for radial-dynamic and radial-static use with O-ring.



SSP design

Installation dimensions

O-ring cord ∅	Thrust ring cross section			Groove dimensions				
	Web height W		Thickness	Groove base ∅		Groove width		Radius
	dynamic	static		dynamic	static			
			T	D_2 h9	D_1 h9	L_2 +0.2	L_3 +0.2	r ± 0.2
1.50	1.25	1.10	0.05	d4 – 2.5	d4 – 2.2	3.0	4.0	0.25
1.60	1.30	1.20	0.05	d4 – 2.6	d4 – 2.4	3.1	4.1	0.25
1.78 1.80	1.45	1.30	0.70	d4 – 2.9	d4 – 2.6	3.8	5.2	0.25
2.00	1.65	1.50	0.70	d4 – 3.3	d4 – 3.0	4.1	5.5	0.25
2.40	2.05	1.80	0.70	d4 – 4.1	d4 – 3.6	4.6	6.0	0.25
2.50	2.15	1.90	0.70	d4 – 4.3	d4 – 3.8	4.7	6.1	0.25
2.62 2.65	2.25	2.00	0.70	d4 – 4.5	d4 – 4.0	5.0	6.4	0.25
3.00	2.60	2.30	0.70	d4 – 5.2	d4 – 4.6	5.4	6.8	0.25
3.53 3.55	3.10	2.70	0.70	d4 – 6.2	d4 – 5.4	6.2	7.6	0.25
4.00	3.50	3.10	0.85	d4 – 7.0	d4 – 6.2	6.9	8.6	0.25
5.00	4.40	4.00	0.85	d4 – 8.8	d4 – 8.0	8.3	10.0	0.25
5.30 5.33	4.70	4.30	0.85	d4 – 9.4	d4 – 8.6	9.0	10.9	0.25
5.70	5.00	4.60	0.85	d4 – 10.0	d4 – 9.2	9.0	11.0	0.25
6.00	5.30	4.90	0.85	d4 – 10.6	d4 – 9.8	9.3	11.2	0.25
7.00	6.10	5.80	1.25	d4 – 12.2	d4 – 11.6	12.3	15.1	0.25
8.00	7.10	6.70	1.25	d4 – 14.2	d4 – 13.4	12.6	15.4	0.25
8.40	7.50	7.10	1.25	d4 – 15.0	d4 – 14.2	12.8	15.6	0.25

THRUST RINGS FOR O-RINGS AND X-RINGS

Thrust rings SSP (spiral)

Thrust rings are protection and support elements made of extrusion-resistant materials; they are installed in a groove together with an elastomer seal - preferably with an O-ring or an X-ring seal. Due to the tight borehole cap, they prevent the extrusion of the pressurised elastomer sealing elements into the sealing gap.

Type: SSP spiral
Material: PTFE
Colour: white

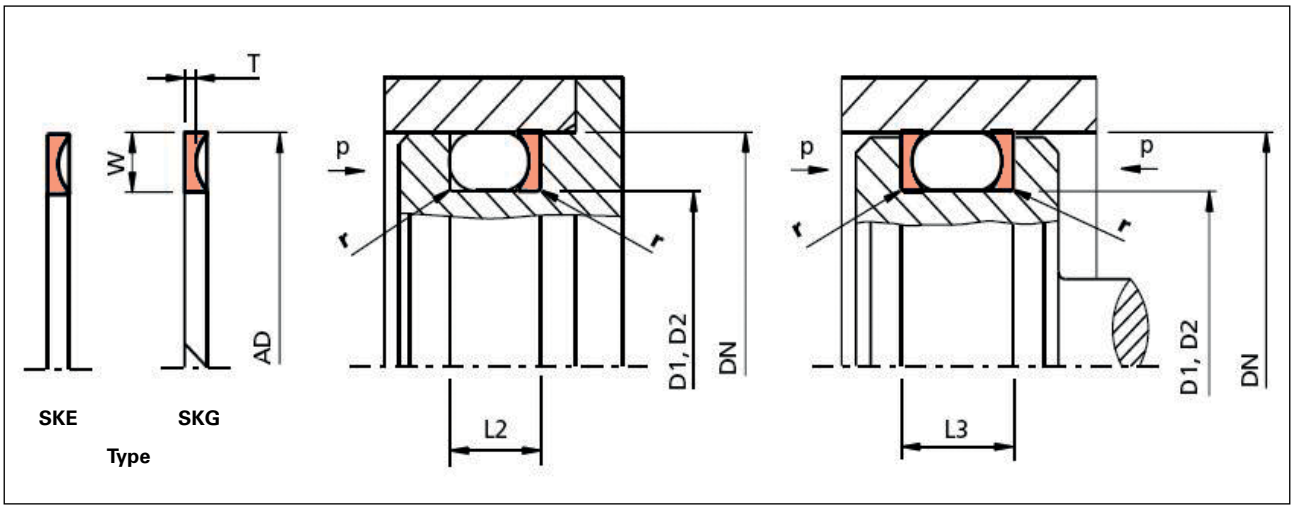
Item No.	ID mm	AD mm	T mm
10003628	6.00	9.00	0.70
4106620	6.30	9.10	0.70
4578610	8.00	11.00	0.70
10005795	9.00	12.00	0.70
10027854	10.00	14.50	0.70
4717710	11.00	14.00	0.70
10006265	12.00	17.00	0.70
4701590	14.00	18.60	0.70
10027449	15.00	19.50	0.70
10027853	15.50	20.00	0.70
10002557	16.00	20.60	0.70
10031023	18.00	24.40	0.70
4681380	18.50	23.00	0.70
4584880	25.00	31.40	0.70
10014841	26.00	30.60	0.70
10013952	30.00	36.40	0.70
10029849	32.00	37.20	0.70
10023627	33.00	39.40	0.70
10011410	35.00	41.40	0.70
4712690	40.00	49.80	0.85
4714790	50.00	56.20	0.70
10001554	50.00	59.80	0.85
10027148	55.00	61.20	0.70
4714830	56.00	62.20	0.70
10022536	56.00	65.80	0.85
10025434	88.00	97.80	0.85
10001555	90.00	99.80	0.85
10011840	100.00	109.80	0.85
10001557	110.00	119.80	0.85
10023028	145.00	154.80	0.85

THRUST RINGS

Thrust rings SKE, SKG (not slotted, slotted)

Installation recommendations

Thrust ring - concave Type SKE (not slotted) and type SKG (slotted) for radial-static and radial-dynamic use with O-ring.



Installation dimensions

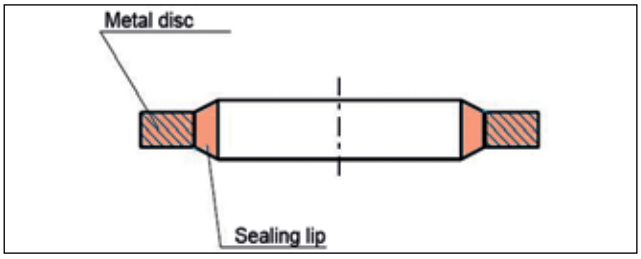
O-ring cord ∅	Thrust ring cross section			Groove dimensions				
	Web height W		Thickness	Groove base ∅		Groove width		Radius
	dynamic	static	T	dynamic D_2 h9	static D_1 h9	L_2 +0.2	L_3 +0.2	r ± 0.2
1.50	1.25	1.10	1.0	d4 – 2.5	d4 – 2.2	3.0	4.0	0.25
1.60	1.30	1.20	1.0	d4 – 2.6	d4 – 2.4	3.1	4.1	0.25
1.78 1.80	1.45	1.30	1.4	d4 – 2.9	d4 – 2.6	3.8	5.2	0.25
2.00	1.65	1.50	1.4	d4 – 3.3	d4 – 3.0	4.1	5.5	0.25
2.40	2.05	1.80	1.4	d4 – 4.1	d4 – 3.6	4.6	6.0	0.25
2.50	2.15	1.90	1.4	d4 – 4.3	d4 – 3.8	4.7	6.1	0.25
2.62 2.65	2.25	2.00	1.4	d4 – 4.5	d4 – 4.0	5.0	6.4	0.25
3.00	2.60	2.30	1.4	d4 – 5.2	d4 – 4.6	5.4	6.8	0.25
3.53 3.55	3.10	2.70	1.4	d4 – 6.2	d4 – 5.4	6.2	7.6	0.25
4.00	3.50	3.10	1.7	d4 – 7.0	d4 – 6.2	6.9	8.6	0.25
5.00	4.40	4.00	1.7	d4 – 8.8	d4 – 8.0	8.3	10.0	0.25
5.30 5.33	4.70	4.30	1.7	d4 – 9.4	d4 – 8.6	9.0	10.9	0.25
5.70	5.00	4.60	1.7	d4 – 10.0	d4 – 9.2	9.0	11.0	0.25
6.00	5.30	4.90	1.7	d4 – 10.6	d4 – 9.8	9.3	11.2	0.25
7.00	6.10	5.80	2.5	d4 – 12.2	d4 – 11.6	12.3	15.1	0.25
8.00	7.10	6.70	2.5	d4 – 14.2	d4 – 13.4	12.6	15.4	0.25
8.40	7.50	7.10	2.5	d4 – 15.0	d4 – 14.2	12.8	15.6	0.25

SCREW SEALS

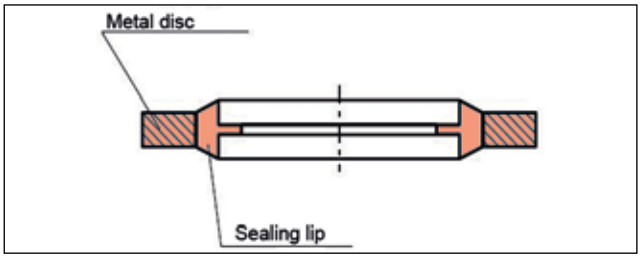
U-Seal

Description
U-Seals are gaskets which are used for sealing screw connections and fastening elements.

Versions
The gasket consists of a metallic flat ring and a trapezoidal rubber elastic sealing lip which is vulcanised on the inner diameter of the metal ring.
Versions for metric and Whitworth threads are available.
U-Seals with a sealing lip on the outer diameter of the metal ring for external pressure are available on request.



U-Seal sealing ring Standard SDS



U-Seal sealing ring self-centring SDZ

U-Seal self-centring – SDZ
- self-centring bolt head seal
- captive pre-mounting
- easy reliable automatic mounting
- available for metric and Whitworth threads
- suitable for most European bolt types

Surfaces
The contact surfaces for sealing are free of scores and machined smooth. The permitted surface roughness is:
R_{max} < 15 µm, R_a < 3.2 µm

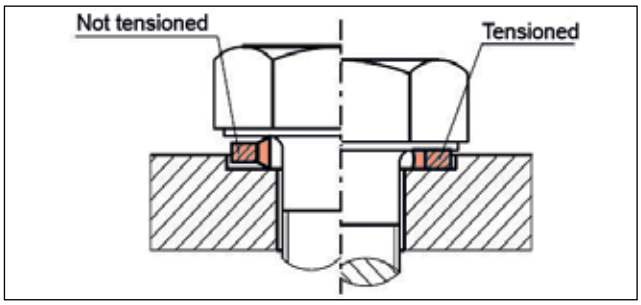
Applications

Application Areas
U-Seals can be used for sealing through holes or thread bores in general mechanical engineering. In doing so, various types of bolts can be selected. U-Seals can be used on smooth flanges or in countersinks.

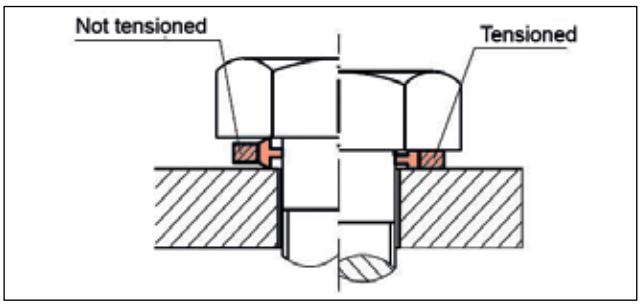
U-Seals can be used for sealing oils, water, gases and other things.

The U-Seal is not effective in the usual sense as a screw locking device. This must be particularly noted for dynamically loaded connections.

Mode of action
By tightening the screw connection, the sealing lip is pressed onto the contact surfaces to be sealed and thus seals them. A secure frictional connection of the components to be joined is achieved using the metal ring.
The thickness of the flat ring limits the compression of the rubber elastic sealing lip and guarantees a reliable seal. Flexible adjustment of the sealing lip is performed due to the internal pressure.



U-Seal sealing ring Standard SDS



U-Seal sealing ring self-centring SDZ

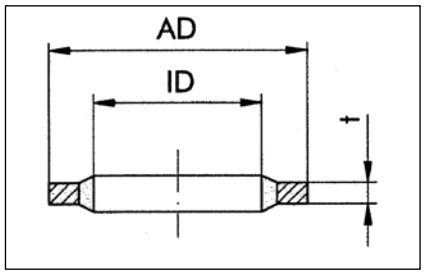
Advantages
- easy to use
- reliable sealing
- easy mounting
- can be used in a wide variety of applications
- standard stock item
- suitable for commercially available DIN screws.

Technical data
Operating pressure:
For installation in a counterbore up to approx. 100 MPa (1,000 bar),
without counterbore up to approx. 40 MPa (400 bar)
where d2 < 40 mm,
without counterbore up to approx. 25 MPa (250 bar)
where d2 > 40 mm,

Temperature:	NBR: -30 °C to +110 °C FPM: -20 °C to +200 °C
Media:	mineral oils, water, water/oil emulsion, gases, fire-retardant liquids.

SCREW SEALS

U-Seal SDS



Screw seals are gaskets – a washer with vulcanised sealing lip.
They are used for static sealing of screw connections and fastening elements. The screw seal is distinguished by easy to use and an inexpensive solution in operation.

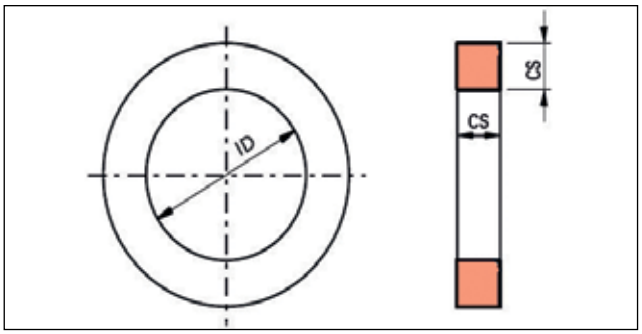
Type: SDS Standard
Material: NBR

Item No.	ID mm	AD mm	t mm
1119330	4.10	7.20	1.00
4124420	4.50	7.00	1.00
4424370	4.60	9.00	1.00
4424430	5.60	10.00	1.00
1119820	5.70	9.00	1.00
4424590	5.70	9.20	1.00
1010490	5.70	10.00	1.00
1120200	6.20	9.20	1.00
4424740	6.60	11.00	1.00
1103600	6.70	10.00	1.00
4424760	6.70	11.00	1.00
4424790	7.10	12.00	1.00
1083040	7.30	10.20	1.00
4112660	8.50	13.40	1.00
4400570	8.70	13.00	1.00
1083050	8.70	14.00	1.00
1046090	9.30	13.30	1.00
4424910	10.70	17.00	1.50
1083060	10.70	18.00	1.50
4029600	11.40	16.30	1.50
4424920	11.80	18.50	1.50
1103620	12.70	18.00	1.50
4424940	12.70	20.00	1.50
1181730	13.70	20.00	1.50
4424960	13.80	20.10	1.50
1103740	14.00	18.70	1.50
4424970	14.70	21.00	1.50
1083070	14.70	22.00	1.50
10034058	16.00	22.70	1.50
4424980	16.70	23.00	1.50
960270	16.70	24.00	1.50
4424990	17.40	23.70	1.50
1029870	17.40	24.00	1.50
4425000	18.00	24.70	1.50
4425020	18.70	27.00	2.00
4425030	20.70	29.00	2.00
4425040	21.70	30.00	2.00
4020990	22.70	30.00	2.00
4425050	22.70	31.00	2.00
1197200	24.70	31.00	2.00
4021000	24.70	32.00	2.00
4425060	24.70	33.00	2.00
4298350	26.70	35.00	2.00

EDGE SEAL

Edge seal

Description
Supplementing O-rings and X-ring seals, the edge seal is a good alternative in many cases for static seals which have special requirements.
In contrast to the O-ring, the edge seal has a square cross section. The dimensions of the edge seal are identified by the inner diameter ID and the cord thickness CS (picture below).



Edge Seal Dimensioning

Applications
The use and handling are comparable with an O-ring. The edge seal is used as static seal. The rectangular shape produced by the pre-compression also remains almost constant at high pressures. The high form stability results in very good resistance to gap extrusion. In comparison with an O-ring with thrust ring, improved sealing with longer service life are achieved by the edge seal as a result.

Characteristics
Edge seals can be used in DIN/ISO O-ring grooves.
Higher sealing pressure is achieved due to the cross section form of the edge seal.
In this way, significantly better pressure distribution is produced. Therefore, the CS dimension of the edge seal can be reduced for the same groove dimensions. As a result, the pre-compression is reduced to 8 to 14% as compared with 12 to 30% for the O-ring.

Materials
Edge seals in the standard NBR and FPM materials with various Shore hardnesses are available. If there are no particular specifications for the material, NBR with 90 Shore A hardness is supplied.

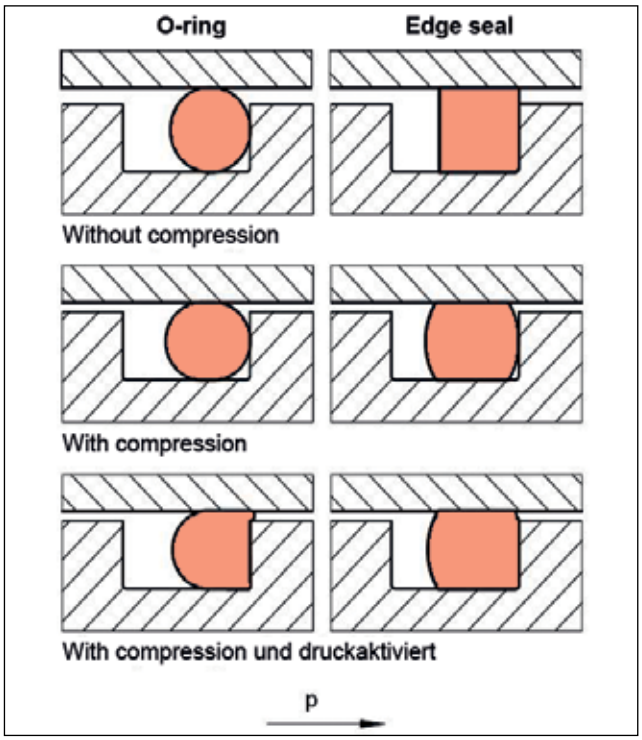
Design information

Axial-static Installation
The following must be observed for the design of seals and installation spaces:
For internal pressure, the seal should be selected approx. 1 to 2% larger than the groove outer diameter.
For external pressure, the seal should be selected approx. 1 to 3% smaller than the groove inner diameter.

Radial-static Installation
Inner-sealing:
The size must be selected so that the inner diameter has the smallest difference from the rod diameter.

Outer-sealing:
Select the size so that the inner diameter is less than or equal to the groove base diameter.

Installation instructions
The following points must be checked before starting the installation:
- inner holes deburred and rounded.
- remove machining residues such as chips, dirt and foreign bodies.
- grease or oil seals and components. Pay attention to media compatibility with the elastomer.
- Do not use any lubricants with solid additives such as molybdenum sulphide or zinc sulphide.
- In comparison with the O-ring, increased mounting forces can be expected for radial-static installation.



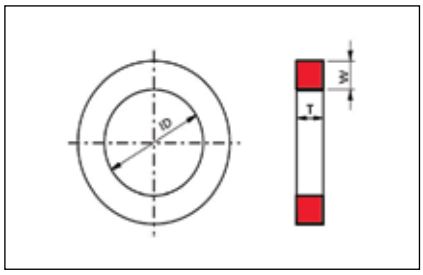
O-ring / edge seal installation comparison

Table Comparison of cord thicknesses

O-ring – d_2	Edge seal – CS
1.78	1.68
2.62	2.51
3.53	3.40
5.33	5.16
7.00	6.73

EDGE SEAL

Edge seal



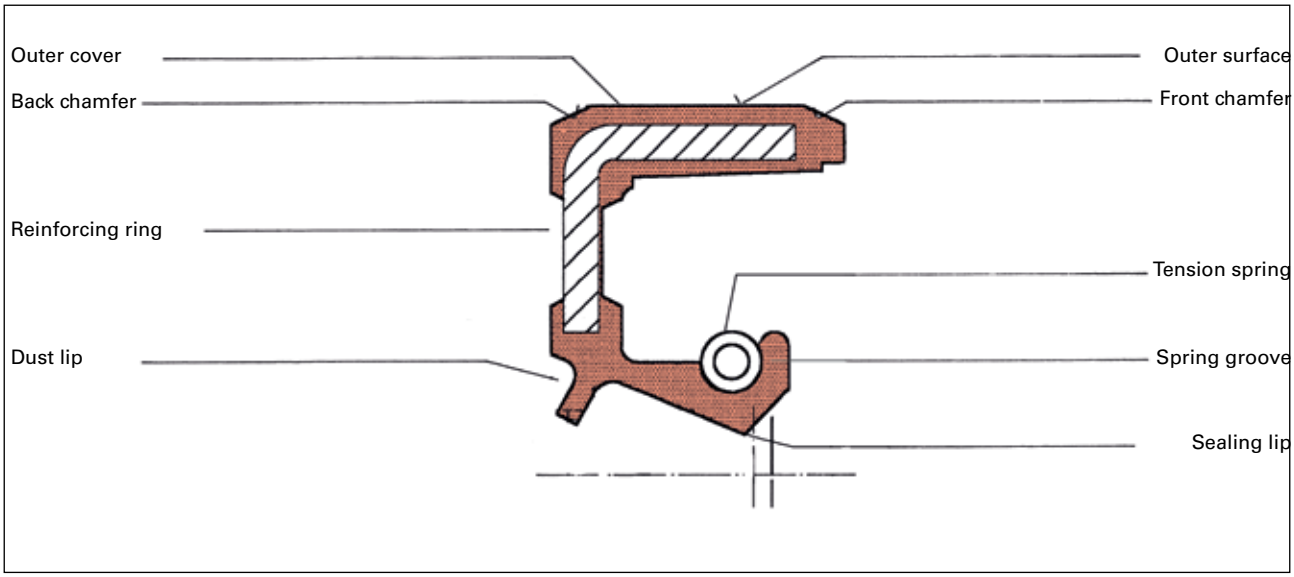
Supplementing O-rings and X-rings, the edge seal is a good alternative in many cases for static seals which have special requirements.
In contrast to the O-ring, the edge seal has a square cross section.

Material: NBR
Hardness: 90 Shore A
Colour: black

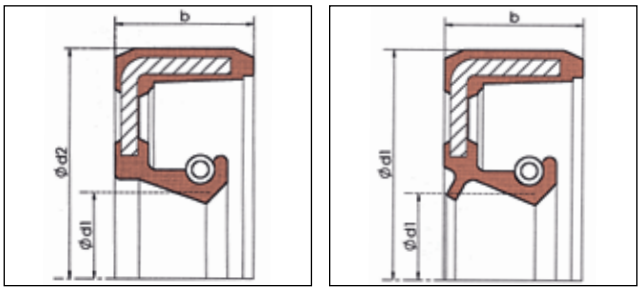
Item No.	ID mm	W mm
4403750	4.47	1.68
4407380	5.28	1.68
4407690	6.07	1.68
4407700	7.65	1.68
4407710	9.25	1.68
4407770	10.82	1.68
4407830	12.42	1.68
4407870	14.00	1.68
4407880	15.60	1.68
4407890	17.17	1.68
4407900	18.77	1.68
4407920	21.95	1.68
4407930	23.52	1.68
4407940	25.12	1.68
4407950	12.37	2.51
4407960	15.54	2.51
4407970	17.12	2.51
4407980	18.72	2.51
4407990	21.89	2.51
4408000	23.47	2.51
4408020	25.07	2.51
10009029	28.24	2.51
4408040	36.17	2.51
4408050	23.39	3.40
4408070	24.99	3.40
4408090	31.34	3.40
4408100	32.92	3.40
4408110	37.69	3.40
4408120	44.04	3.40
4408130	47.22	3.40
4408140	53.57	3.40
4408150	56.74	3.40
4408160	34.29	5.16

RADIAL SHAFT SEALING RINGS

Terms for radial shaft sealing ring WDR

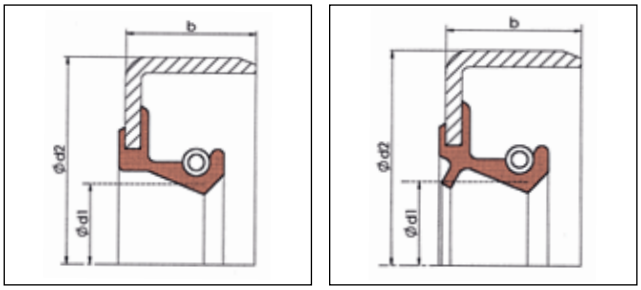


Basic types A and AS



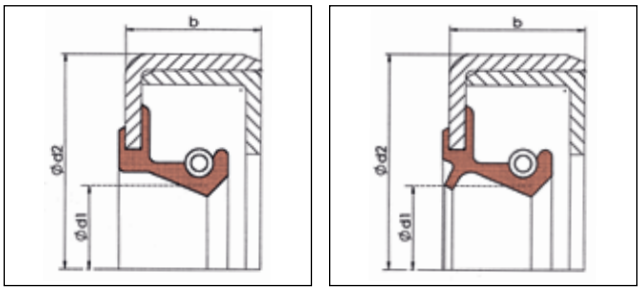
The outer surface of the types A and AS reinforcing ring has an elastomer cover which guarantees faultless leak tightness between the radial shaft sealing ring and the accommodating case hole, even for split cases and those made of materials with greater thermal expansion.

Types B and BS



The outer surface of the case for types B and BS is metallic. Due to the lower elastomer content, the type B is particularly suitable for expensive materials; or for installation conditions which do not rule out damage to the soft rubber outer cover of the type A or AS.

Types C and CS



The types C and CS with metallic case and cap on the front side are manufactured on the outer surface like the types B and BS. The advantage of the large radial stiffness is mainly utilised for harsh installation conditions.

Dimensions and Materials

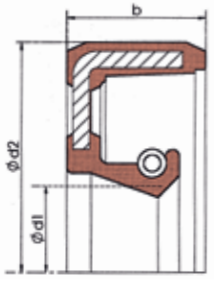
Our standard range includes all dimensions, materials and types according to DIN 3760. Request our technical documents.
For specific applications, we develop and supply dimensions and material combinations which go beyond DIN 3760. In these cases, talk to our advisers.

RADIAL SHAFT SEALING RINGS DIN 3760

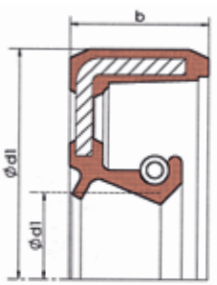
Dimensions according to DIN 3760

Shaft ∅ d_1	d_2	b ± 0.2	$c_{1)}$ min.
6	16	7	0.3
	22		
7	22	7	0.3
8	22	7	0.3
	24		
9	22	7	0.3
	24		
	26		
10	22	7	0.3
	24		
	26		
11	22	7	0.3
	26		
12	22	7	0.3
	24		
	28		
	30		
14	24	7	0.3
	28		
	30		
	35		
15	26	7	0.3
	30		
	32		
	35		
16	28	7	0.3
	30		
	32		
	35		
17	28	7	0.3
	30		
	32		
	35		
	40		
18	30	7	0.3
	32		
	35		
	40		
20	30	7	0.3
	32		
	35		
	40		
	47		
22	32	7	0.3
	35		
	40		
	47		
24	35	7	0.3
	37		
	40		
	47		
25	35	7	0.3
	40		
	42		
	47		
	52		
26	37	7	0.3
	42		
	47		
28	40	7	0.4
	47		
	52		
30	40	7	0.4
	42		
	47		
	52		
	62		
32	45	7	0.4
	47		
	52		
35	47	7	0.4
	50		
	52		
	62		
36	47	7	0.4
	50		
	52		
	62		
38	52	7	0.4
	55		
	62		
40	52	7	0.4
	55		
	62		
	72		
42	55	8	0.4
	62		
	72		
45	60	8	0.4
	62		
	65		
	72		
48	62	8	0.4
	72		
50	65	8	0.4
	68		
	72		
	80		
52	68	8	0.4
	72		
55	70	8	0.4
	72		
	80		
	85		
56	70	8	0.4
	72		
	80		
	85		
58	72	8	0.4
	80		
60	75	8	0.4
	80		
	85		
	90		
62	85	10	0.5
	90		
63	85	10	0.5
	90		
65	85	10	0.5
	90		
	100		
68	90	10	0.5
	100		
70	90	10	0.5
	100		
72	95	10	0.5
	100		
75	95	10	0.5
	100		
78	100	10	0.5
80	100	10	0.5
	110		
85	110	12	0.8
	120		
90	110	12	0.8
	120		
95	120	12	0.8
	125		
100	120	12	0.8
	125		
	130		
105	130	12	0.8
	140		
110	130	12	0.8
	140		
115	140	12	0.8
	150		
120	150	12	0.8
	160		
125	150	12	0.8
	160		
130	160	12	0.8
	170		
135	170	12	0.8
140	170	15	1
145	175		
150	180	15	1
160	190		
170	200		
180	210	15	1
190	220		
200	230		
210	240	15	1
220	250		
230	260		
240	270	15	1
250	280		
260	300	20	1
280	320		
300	340		
320	360	20	1
340	380		
360	400		
380	420	20	1
400	440		
420	460		
440	480	20	1
460	500		
480	520		
500	540		

Footnote:
d_1 = shaft diameter b = width
d_2 = outer diameter c = minimum radius
Edges chamfered or rounded according to manufacturer's discretion.



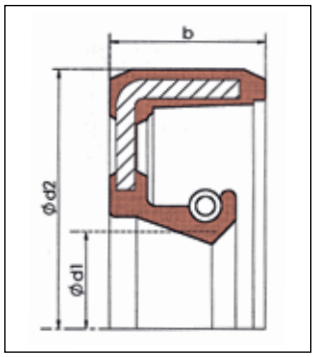
$d_1 \times d_2 \times b$



$d_1 \times d_2 \times b/b_1$

RADIAL SHAFT SEALING RINGS

Standard Types



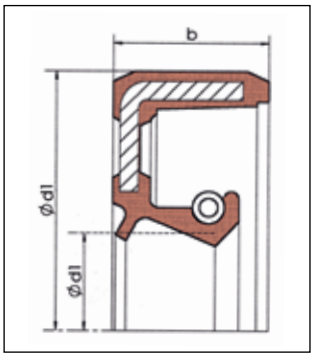
Type A

Material: NBR/FPM
- NBR: –30 to +100 °C
- FPM: –20 to +200 °C

Circumferential speed
- NBR: max. 14 m/s
- FPM: max. 37 m/s

Operating pressure:
max. 0.5 bar

With vulcanised metal reinforcing ring



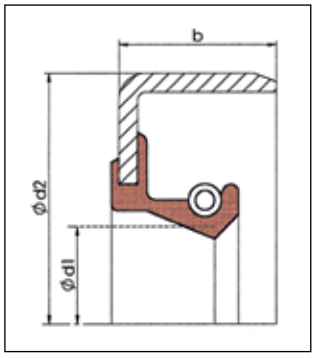
Type AS

Material: NBR/FPM
- NBR: –30 to +100 °C
- FPM: –20 to +200 °C

Circumferential speed
- NBR: max. 14 m/s
- FPM: max. 37 m/s

Operating pressure:
max. 0.5 bar

With vulcanised metal reinforcing ring and **dust lip**



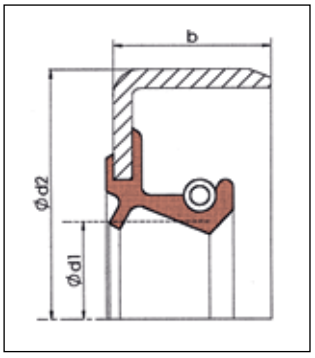
Type B

Material: NBR/FPM
- NBR: –30 to +100 °C
- FPM: –20 to +200 °C

Circumferential speed
- NBR: max. 14 m/s
- FPM: max. 37 m/s

Operating pressure:
max. 0.5 bar

With single-part metal case



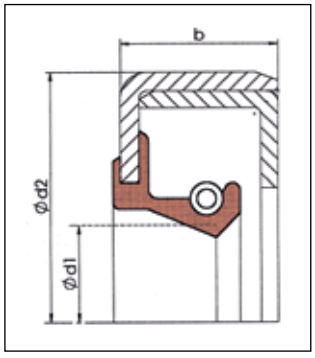
Type BS

Material: NBR/FPM
- NBR: –30 to +100 °C
- FPM: –20 to +200 °C

Circumferential speed
- NBR: max. 14 m/s
- FPM: max. 37 m/s

Operating pressure:
max. 0.5 bar

With single-part metal case and **dust lip**



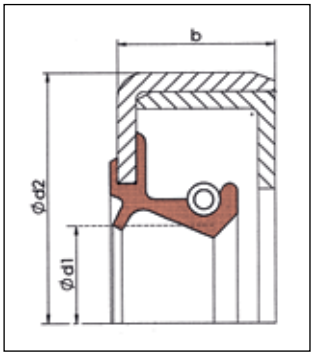
Type C

Material: NBR/FPM
- NBR: –30 to +100°C
- FPM: –20 to +200 °C

Circumferential speed
- NBR: max. 14 m/s
- FPM: max. 37 m/s

Operating pressure:
max. 0.5 bar

With two-part metal case



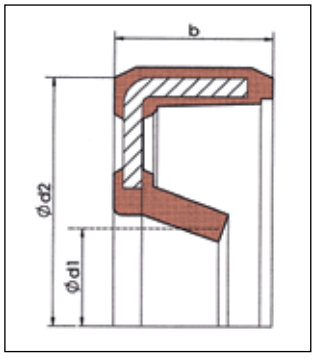
Type CS

Material: NBR/FPM
- NBR: –30 to +100 °C
- FPM: –20 to +200 °C

Circumferential speed
- NBR: max. 14 m/s
- FPM: max. 37 m/s

Operating pressure:
max. 0.5 bar

With two-part metal case and **dust lip**



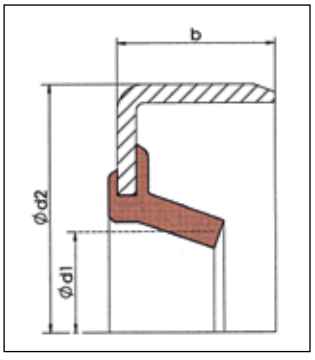
Type AOF

Material: NBR/FPM
- NBR: –30 to +100 °C
- FPM: –20 to +200 °C

Circumferential speed
- NBR: max. 6 m/s

Operating pressure:
max. 0.5 bar

Without spring



Type BOF

Material: NBR/FPM
- NBR: –30 to +100 °C
- FPM: –20 to +200 °C

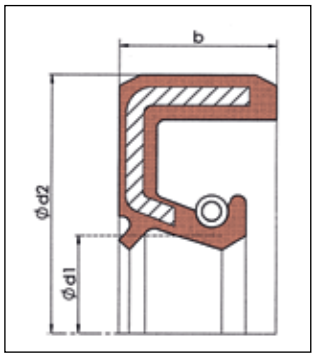
Circumferential speed
max. 14 m/s

Operating pressure:
max. 0.5 bar

Without spring

RADIAL SHAFT SEALING RINGS

Other types

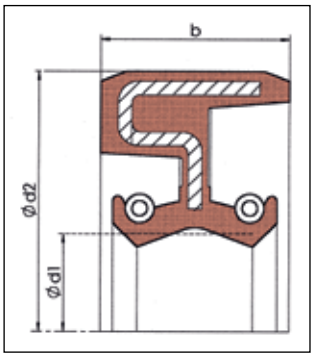


Type ASP

Material: NBR/FPM
- NBR: –30 to +100 °C
- FPM: –20 to +200 °C

For pressurisation + dust lip

Operating pressure: max. 10 bar (dependent on the other operating conditions)



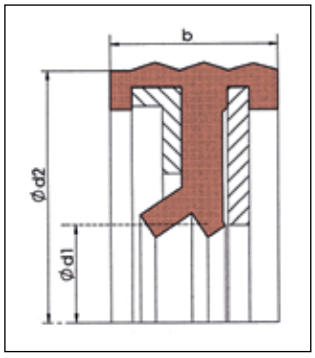
Type A-DUO

Material: NBR/FPM
- NBR: –30 to +100 °C
- FPM: –20 to +200 °C

Circumferential speed
max. 15 m/s

Operating pressure:
max. 0.5 bar

Double lip seal for the separation of two media
Space saving design



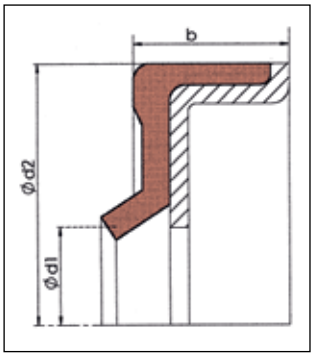
Type BSB

Material: NBR/FPM
- NBR: –30 to +100 °C
- FPM: –20 to +200 °C

Circumferential speed
max. 40 m/s

Operating pressure: max. 15 bar

Single lip seal with steel thrust ring and support / dust lip.
Low friction, low wear.



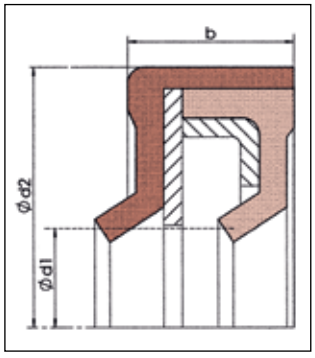
Type OOA

Material: NBR/FPM
- NBR: –30 to +100 °C
- FPM: –20 to +200 °C

Circumferential speed
max. 40 m/s (depending on material)

Operating pressure: max. 15 bar

Single-lip seal with steel thrust ring, low friction, low wear.
No radial springs.



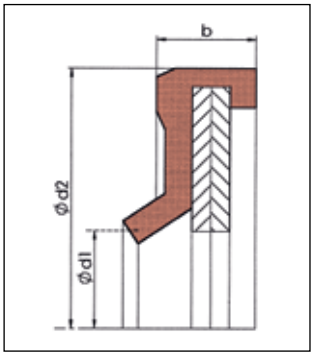
Type OAB

Material: NBR/FPM
- NBR: –30 to +100 °C
- FPM: –20 to +200 °C

Circumferential speed
max. 40 m/s (depending on material)

Operating pressure:
max. 15 bar

Double lip seal with steel thrust ring, low friction, low wear.
No radial springs.



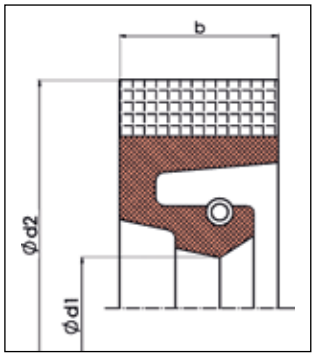
Type DOA

Material: NBR/FPM
- NBR: –30 to +100 °C
- FPM: –20 to +200 °C

Circumferential speed
max. 40 m/s (depending on material)

Operating pressure: max. 15 bar

Single-lip seal with steel thrust ring, low friction, low wear.
No radial springs.



Type GWA 1

Material: NBR fabric
–30 to +200 °C
other materials on request.

Circumferential speed
max. 25 m/s

Operating pressure: max. 0.5 bar

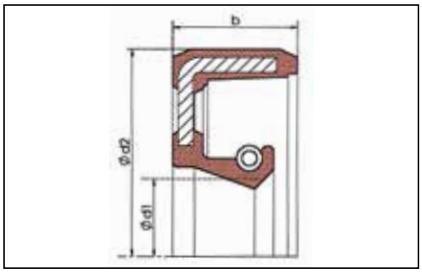
Radial shaft sealing ring with fabric-reinforced clamping part which is permanently connected to the elastomer sealing lip.
Note that these are standard values.

RADIAL SHAFT SEALING RINGS NBR

Shaft sealing ring A

Radial shaft sealing rings are used for sealing rotating or pivoting shafts and axes.

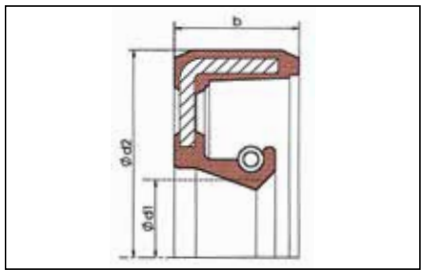
Type: A
Material: NBR



Item No.	d1 mm	d2 mm	b mm
4013620	4	12	6
4408170	5	15	6
4013610	6	12	5.5
10002502	6	15	6
558230	6	16	7
1106800	6	19	6
487520	6	22	7
487560	7	16	7
982090	8	15	5
958290	8	16	7
82960	8	18	5
958300	8	22	7
868750	8	24	7
10016601	9	18	6
536530	9	22	7
4408230	10	18	5
4012700	10	19	7
966620	10	22	7
949260	10	22	8
968390	10	24	7
558420	10	26	7
10034288	10	28	7
10015305	11	22	7
532460	11	26	7
974090	12	19	5
913650	12	20	5
571310	12	22	5
968330	12	22	7
968380	12	24	7
913390	12	25	5
4295320	12	25	7
533110	12	25	8
794280	12	28	7
967340	12	30	7
83080	12	30	10
967980	12	32	7
10019494	12	37	10
4408290	13	22	5
10010772	13	22	6
10009459	13	24	7
4408310	13	30	7
4408320	13	30	8
4408980	14	22	5
967350	14	24	7
4408980	14	22	5
967350	14	24	7
539000	14	25	5

RADIAL SHAFT SEALING RINGS NBR

Continued: Shaft sealing ring A



Type: A
Material: NBR

Item No.	d1 mm	d2 mm	b mm
4408990	14	25	7
83110	14	26	7
539170	14	28	7
558770	14	30	7
4409000	14	30	8
4409020	14	35	8
4409040	15	22	7
966650	15	24	5
967390	15	24	7
967300	15	25	5
4409050	15	25	6
966360	15	26	7
4409080	15	27	7
4012710	15	28	7
4409120	15	30	5
966060	15	30	7
4409140	15	30	8
845130	15	30	10
558900	15	32	7
4409170	15	33	7
956380	15	35	7
4409180	15	35	8
539710	15	35	10
4409190	15	37	10
4409200	15	40	10
532520	15	42	10
1026890	16	24	5
4126330	16	24	7
1011760	16	26	7
966440	16	28	7
560170	16	30	7
539900	16	30	10
88620	16	35	7
4409280	16	35	10
4409290	16	40	10
968930	17	26	6
4409320	17	26	7
4409330	17	27	6
976760	17	28	6
910820	17	28	7
966870	17	30	7
4409370	17	30	8
1026980	17	32	7

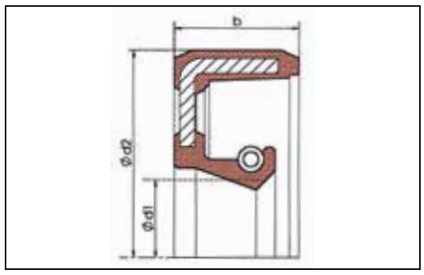
RADIAL SHAFT SEALING RINGS NBR

Shaft sealing ring A

Item No.	d1 mm	d2 mm	b mm
10013839	17	32	8
4409380	17	32	10
4409400	17	35	5
4409410	17	35	6
968340	17	35	7
83610	17	35	8
4295240	17	37	7
4409420	17	40	6
913640	17	40	7
4409430	17	40	8
376020	17	40	10
4409480	18	28	6
968450	18	28	7
560520	18	30	7
968470	18	32	7
4022380	18	35	7
4409510	18	35	8
84500	18	35	10
4409520	18	40	10
1210370	19	27	6
1208590	19	30	5
84540	19	32	7
1210360	19	35	8
83220	19	35	10
4409570	19	40	10
967060	20	28	4
10030115	20	28	5
913680	20	28	6
968490	20	30	5
966030	20	32	7
940090	20	35	6
934140	20	35	7
4409650	20	35	8
542230	20	35	10
4409660	20	36	7
1126610	20	37	8
10010515	20	38	5
542340	20	38	8
966700	20	40	7
10019126	20	40	8
845110	20	40	10
10014392	20	40	11
4293900	20	42	5
1010860	20	42	7
966720	20	47	7
10030299	20	47	8
893100	20	52	7
968530	20	52	10
10013363	21	35	7
10008715	22	32	6
10031069	22	34	7
968550	22	35	7
374670	22	35	10
89150	22	37	7
543020	22	40	7
543050	22	40	10
4409710	22	42	7
543120	23	40	10

RADIAL SHAFT SEALING RINGS NBR

Continued: Shaft sealing ring A



Type: A
Material: NBR

Item No.	d1 mm	d2 mm	b mm
10016065	24	32	5
559070	24	35	7
543170	24	40	7
4409760	24	40	10
4409770	24	42	10
10006930	24	47	10
10029658	25	32	5
995420	25	32	7
543230	25	33	6
4210880	25	35	5
768800	25	35	7
543250	25	36	7
874660	25	37	5
897020	25	37	7
559150	25	38	7
913670	25	40	7
872680	25	40	8
375130	25	40	10
1027810	25	42	6
572270	25	42	7
4409800	25	42	8
543530	25	42	10
4290850	25	45	7
845090	25	45	10
559200	25	46	7
968650	25	47	7
559220	25	47	10
4409810	25	50	12
966380	25	52	7
968680	25	52	8
559270	25	52	10
4046820	25	62	7
85120	25	62	8
543600	25	62	10
4409870	26	35	7
559280	26	36	7
543620	26	37	7
906070	26	40	6
907590	26	42	7
543650	26	47	7
844180	27	37	7
10034144	27	45	7
4409900	27	47	8

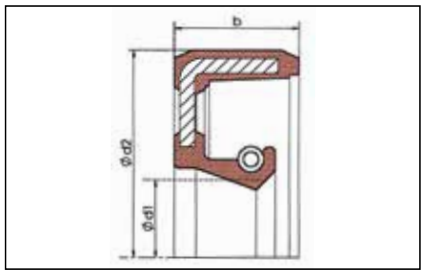
RADIAL SHAFT SEALING RINGS NBR

Shaft sealing ring A

Item No.	d1 mm	d2 mm	b mm
968710	28	38	7
10003693	28	40	5
967320	28	40	7
4409910	28	40	10
4409920	28	42	7
543710	28	42	8
10004090	28	47	5
559350	28	47	7
543740	28	47	10
559370	28	52	7
867040	28	52	10
4409940	28	62	10
10016051	29	43	7
10029714	30	40	5
886930	30	40	7
4603820	30	40	7
4409970	30	40	8
85260	30	40	10
10010764	30	42	6
907600	30	42	7
4409980	30	42	8
4409990	30	44	10
10011215	30	45	6
487550	30	45	7
543800	30	45	8
535250	30	45	10
966010	30	47	7
543820	30	47	8
559420	30	47	10
374820	30	50	7
4410000	30	50	8
10002350	30	50	12
966760	30	52	7
4410010	30	52	8
845100	30	52	10
4410020	30	52	12
85360	30	55	10
4410030	30	55	12
4410040	30	56	12
571890	30	60	10
4410060	30	62	7
968270	30	62	10
4410070	30	65	10
4336950	30	72	10
884090	32	40	7
10004938	32	42	5
374880	32	42	7
845140	32	44	10
4410130	32	45	10
543910	32	47	10
968630	32	50	8
4410140	32	50	12
571840	32	52	7
535300	32	52	10
4410150	32	55	10
4410160	32	56	10
4410180	32	62	8
532820	32	62	10

RADIAL SHAFT SEALING RINGS NBR

Continued: Shaft sealing ring A



Type: A
Material: NBR

Item No.	d1 mm	d2 mm	b mm
4410190	33	52	10
10031341	34	46	10
10005764	34	48	8
374950	34	50	10
543980	34	52	8
862130	34	52	10
532880	34	62	10
10002483	35	45	5
85610	35	45	7
880570	35	47	7
966790	35	50	7
4410300	35	50	8
946520	35	52	7
650260	35	52	8
966770	35	52	10
4410310	35	52	12
1043240	35	55	8
874560	35	55	10
4410330	35	55	12
544260	35	56	10
4410340	35	56	12
532990	35	58	10
4410350	35	58	12
85710	35	60	10
968040	35	62	7
10003088	35	62	8
559640	35	62	10
4410360	35	62	12
544270	35	65	10
4410380	35	68	10
1003720	35	72	10
909880	35	72	12
4410390	35	80	10
4410400	35	80	12
559660	36	47	7
4410420	36	50	10
559680	36	52	7
820860	36	58	10
559690	36	62	7
84440	37	52	8
533180	38	50	7
10012563	38	50	8
559700	38	52	7

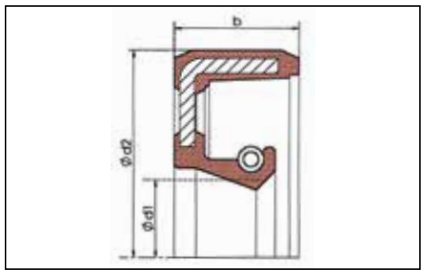
RADIAL SHAFT SEALING RINGS NBR

Shaft sealing ring A

Item No.	d1 mm	d2 mm	b mm
484090	38	52	8
4410480	38	52	10
4410500	38	54	10
850250	38	55	7
375080	38	55	10
85870	38	56	10
4410520	38	58	10
10014393	38	58	11
375090	38	60	10
4410530	38	62	7
956770	38	62	10
4410540	38	62	12
973180	38	65	10
4410560	38	72	10
976540	40	50	5
571790	40	50	8
10002656	40	52	5
1038100	40	52	6
966330	40	52	7
4119540	40	52	8
514730	40	52	10
965990	40	55	7
544500	40	55	8
973230	40	55	10
4410650	40	56	7
4410660	40	56	8
544510	40	56	10
4410670	40	56	12
559790	40	58	10
10011409	40	58	12
4410680	40	60	8
559800	40	60	10
4410690	40	60	12
4196980	40	62	6
967330	40	62	7
4410700	40	62	8
559820	40	62	10
4410710	40	62	12
536010	40	65	10
4410720	40	65	12
10012705	40	68	8
1106880	40	68	10
4410730	40	70	12
919890	40	72	7
966230	40	72	10
544610	40	72	12
4410740	40	78	10
4410750	40	80	8
972850	40	80	10
4410770	40	85	10
514460	42	55	7
911900	42	55	8
544680	42	56	7
4410840	42	58	10
4410850	42	60	8
82070	42	60	10
4410860	42	60	12
559900	42	62	7

RADIAL SHAFT SEALING RINGS NBR

Continued: Shaft sealing ring A



Type: A
Material: NBR

Item No.	d1 mm	d2 mm	b mm
876710	42	62	8
86130	42	62	10
4410870	42	62	12
4410880	42	65	8
82280	42	65	10
877290	42	72	8
967710	42	72	10
4410890	42	72	12
534300	44	60	10
544770	44	62	10
1108860	44	72	8
544820	44	72	10
10007527	45	52	7
559930	45	55	7
4411010	45	55	8
966820	45	60	7
875760	45	60	8
544860	45	60	10
877340	45	62	7
972990	45	62	8
926850	45	62	10
536130	45	62	12
559980	45	65	8
966340	45	65	10
4411020	45	65	12
82380	45	68	10
4295330	45	70	10
4411040	45	70	12
966660	45	72	8
1003710	45	72	10
82410	45	72	12
973090	45	75	10
1163640	45	80	10
4411050	45	80	13
86320	45	85	10
10006980	45	90	10
560050	48	62	8
877020	48	65	10
545200	48	70	10
86370	48	72	8
973020	48	72	10
82460	48	72	12
1031340	48	80	10

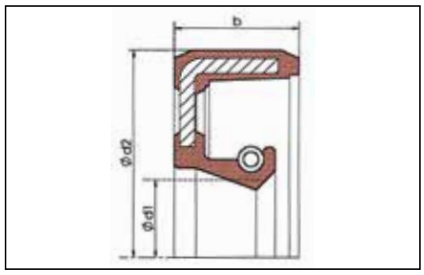
RADIAL SHAFT SEALING RINGS NBR

Shaft sealing ring A

Item No.	d1 mm	d2 mm	b mm
894790	50	62	7
966430	50	65	8
973060	50	65	10
945800	50	68	8
86440	50	68	10
1016220	50	70	8
545300	50	70	10
534440	50	70	12
822670	50	72	8
973120	50	72	10
571440	50	72	12
515400	50	75	10
4411250	50	75	12
966840	50	80	8
560190	50	80	10
4411320	50	85	10
877260	50	90	10
929930	52	68	7
945520	52	68	8
10029720	52	68	10
560210	52	72	8
86530	52	72	10
775460	52	72	12
531180	52	80	10
4411480	53	68	10
4411650	54	90	13
912510	55	68	8
967700	55	70	8
958400	55	70	10

RADIAL SHAFT SEALING RINGS NBR

Shaft sealing ring A



Type: A
Material: NBR

Item No.	d1 mm	d2 mm	b mm
1195190	55	72	6
973340	55	72	8
874130	55	72	10
1012760	55	75	10
531260	55	75	12
978520	55	80	8
802680	55	80	10
775470	55	80	13
560870	55	85	8
973370	55	85	10
1065570	55	100	10
547360	56	70	8
86720	56	72	8
848580	56	80	8
86730	56	85	8
841250	58	72	8
10029776	58	75	10
514430	58	80	8
547510	58	80	10
4412040	58	90	10
4013170	60	70	7
907820	60	72	8
572120	60	75	8
4412090	60	75	10
802690	60	80	8
10028616	60	80	8
86780	60	80	10
536640	60	80	13
877360	60	85	8
866930	60	85	10
547660	60	85	13
973420	60	90	8
561230	60	90	10
86840	60	90	13
4019530	60	95	10
10002292	60	110	12
862150	60	110	13
10028171	62	80	9
4412190	62	80	10
86890	62	85	10
561280	62	90	10
1041290	62	90	13
561390	63	85	10

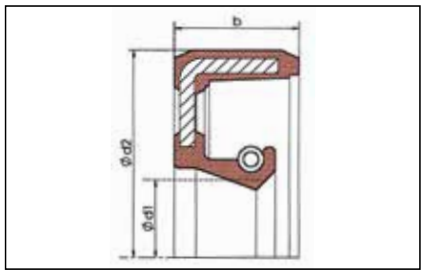
RADIAL SHAFT SEALING RINGS NBR

Shaft sealing ring A

Item No.	d1 mm	d2 mm	b mm
86900	63	90	10
4412270	64	80	8
967240	65	80	8
10028316	65	85	8
967120	65	85	10
4412310	65	85	12
4412320	65	85	13
4196990	65	90	7
973460	65	90	10
4412330	65	90	12
86960	65	90	13
4412340	65	95	10
571710	65	100	10
966860	68	90	10
515310	68	100	10
1047780	70	85	6
973500	70	85	7
1039300	70	85	8
10012156	70	85	10
10017886	70	90	7
967140	70	90	10
912790	70	90	12
87040	70	90	13
10006671	70	92	12
4412480	70	95	13
10015793	70	100	8
572250	70	100	10
548120	70	110	8
4012960	70	110	13
560450	72	95	10
4412560	72	95	12
560470	72	100	10
966880	75	90	8
571760	75	90	10
966500	75	95	10
863080	75	95	12
967410	75	100	10
87180	75	100	13
10009453	75	120	12
531460	78	100	10
4412660	78	110	12
967150	80	100	10
10015478	80	105	10
973640	80	105	13
966890	80	110	10
883890	80	120	13
10008940	80	140	13
877310	85	105	13
967420	85	110	12
571780	85	110	13
973650	85	120	12
10028856	88	110	10
4412830	88	110	12
4013010	90	110	10
967310	90	110	12
1059510	90	110	13
4412870	90	115	9
560760	90	120	12

RADIAL SHAFT SEALING RINGS NBR

Continued: Shaft sealing ring A



Type: A
Material: NBR

Item No.	d1 mm	d2 mm	b mm
514480	90	120	13
10016302	90	130	12
4012920	90	140	13
973670	95	120	12
548660	95	125	12
4412900	95	130	12
10030111	95	136	13
793240	100	120	12
925260	100	125	12
548710	100	125	13
973680	100	130	12
1106940	100	150	12
4413020	100	150	13
4413050	105	125	13
793460	105	130	12
856830	105	140	12
967360	110	130	12
561000	110	130	13
967690	110	140	12
973700	110	140	13
973710	115	140	12
1131800	115	150	12
4013160	120	140	13
825970	120	150	12
561270	120	160	12
561290	120	160	15
10032037	125	140	10
794590	125	150	12
908270	125	150	13
973730	125	160	12
973740	125	160	13
1195180	128	150	9
4413290	128	150	13
4012860	130	160	12
531750	130	160	13
561410	130	160	15
561430	130	170	12
912460	135	160	12
973750	135	170	12
731470	140	160	13
4042770	140	170	12
775230	140	170	13
973760	140	170	15

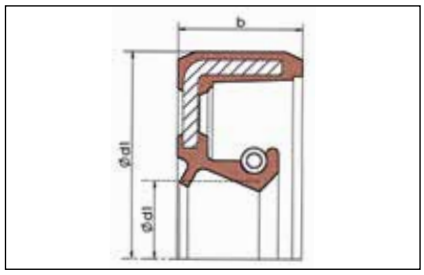
RADIAL SHAFT SEALING RINGS NBR

Shaft sealing ring A

Item No.	d1 mm	d2 mm	b mm
4413360	140	180	12
4024290	140	180	15
4015460	145	180	12
966050	150	170	15
1074090	150	180	13
973780	150	180	15
973790	155	174	12
4159170	155	180	15
774950	155	190	13
973810	160	185	10
973820	160	190	15
1122320	162	190	12
4463750	165	190	13
561630	170	200	12
967190	170	200	15
10001937	180	215	15
10008680	185	210	13
10019053	190	220	12
967200	190	220	15
967210	200	230	15
973840	210	240	15
10031265	210	250	15
1122330	230	280	16
843380	240	270	15
1122340	250	280	16
10002022	265	290	16

RADIAL SHAFT SEALING RINGS NBR

Shaft sealing ring AS



Radial shaft sealing rings are used for sealing rotating or pivoting shafts and axes.

Standard Type AS: Design with vulcanised metal reinforcing ring and dust lip according to DIN 3760.

Type: AS
Material: NBR

Item No.	d1 mm	d2 mm	b mm
10008847	6	16	7
4422570	6	22	7
825950	8	22	6
4422700	8	22	7
4005790	10	19	7
4414850	10	20	7
1105840	10	24	7
10005676	10	25	7
530310	10	26	7
4422710	11	22	7
4556590	12	19	5
847380	12	22	7
633500	12	24	7
4414860	12	25	7
4422740	12	26	7
1010620	12	28	7
4422770	12	32	7
4422790	14	24	7
4422810	14	30	7
943340	15	24	7
774730	15	26	7
1088060	15	30	7
4422830	16	30	7
1030350	17	32	7
1106130	17	35	7
1026470	18	28	7
847960	18	30	7
847970	18	32	7
1131240	20	28	6
825940	20	30	7
10014413	20	32	8
10008196	20	37	7
1106840	20	40	7
4422900	20	40	10
4013000	20	42	7
10015705	20	42	10
573730	20	47	7
10013267	20	52	7
4009830	22	30	7
848110	22	32	7
4422970	22	40	7
10019283	22	42	7
848140	22	47	7

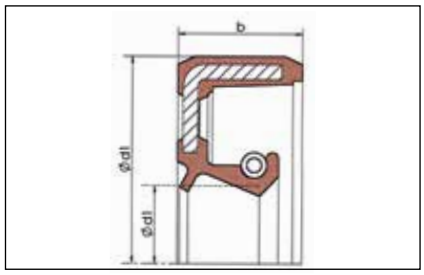
RADIAL SHAFT SEALING RINGS NBR

Shaft sealing ring AS

Item No.	d1 mm	d2 mm	b mm
530180	24	36	7
10009305	24	37	7
1015260	24	47	10
956450	25	35	7
844420	25	37	7
941850	25	40	7
4423070	25	40	10
1182140	25	42	7
876310	25	42	10
4423100	25	46	7
848310	25	47	7
4423140	25	50	10
562930	25	52	7
4414890	25	52	10
4414900	25	62	10
10034578	26	37	7
10026412	28	35	7
4423200	28	42	7
956500	28	47	7
10023084	28	47	9
914750	28	52	7
956520	30	40	7
956570	30	42	7
4423210	30	42	10
10020613	30	44	7
574730	30	47	7
956660	30	47	8
4414950	30	50	7
544060	30	50	10
4015080	30	52	7
87870	30	52	10
4012750	30	55	10
4159160	30	62	7
4414970	30	62	10
941460	32	45	7
802720	32	52	7
544070	32	56	10
10009820	34	47	7
956740	35	47	7
4414980	35	47	10
956750	35	50	7
1041510	35	50	10
883070	35	52	7
956780	35	52	10
4414990	35	55	9
921890	35	56	10
4423440	35	56	12
83690	35	62	7
965340	35	62	10
965350	35	62	12
4423480	35	65	10
10021486	35	76	9
10031321	35	80	8
4415010	35	80	10
4423500	35	80	12
573840	38	52	7
4415030	38	55	10
4423530	38	62	7

RADIAL SHAFT SEALING RINGS NBR

Continued: Shaft sealing ring AS



Type: AS
Material: NBR

Item No.	d1 mm	d2 mm	b mm
4423540	38	72	10
4423560	40	50	7
4015100	40	52	7
4423600	40	58	10
10019488	40	60	8
879670	40	60	10
973950	40	62	7
825960	40	65	10
10004876	40	68	7
10013089	40	68	8
941170	40	72	7
10015321	40	72	7
87940	40	72	10
563110	40	80	10
4415050	40	80	13
4423620	42	52	8
4415060	42	56	7
10030184	42	60	10
4015070	42	62	7
10004324	42	65	12
4423680	44	62	10
973970	45	60	7
965420	45	60	8
4415070	45	60	10
10027558	45	62	7
83720	45	62	8
965430	45	62	10
10007867	45	62	12
810030	45	65	8
10004582	45	68	10
10019718	45	68	12
10017653	45	75	7
1012640	45	75	8
4013560	45	75	10
10008324	45	75	12
920400	45	80	10
1042880	45	85	10
10014317	46	62	8
888130	48	62	8
1145560	48	65	10
544120	48	68	10
10012717	50	60	8
973980	50	65	8

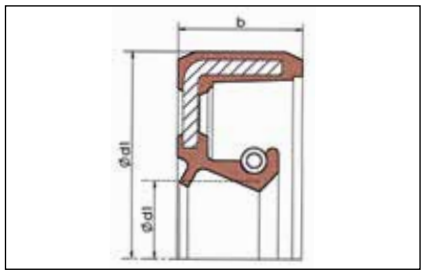
RADIAL SHAFT SEALING RINGS NBR

Shaft sealing ring AS

Item No.	d1 mm	d2 mm	b mm
965450	50	68	8
4415080	50	68	10
10009954	50	72	7
1030360	50	72	8
88020	50	72	10
529860	50	72	12
573760	50	80	8
4415090	50	80	10
563180	50	90	10
4440180	52	72	8
965470	55	68	8
88040	55	70	8
10003067	55	70	10
563200	55	72	8
4015090	55	75	8
10007374	55	75	10
848530	55	80	8
10015019	55	85	10
4415100	55	90	8
4415110	55	100	10
848560	56	72	8
10032830	56	85	8
4423720	58	80	9
774970	58	80	10
950530	60	75	8
4423750	60	80	7
1033280	60	80	8
965500	60	80	10
4415120	60	85	10
10014318	62	110	10
965510	65	85	10
965520	65	85	12
530280	65	85	13
10020725	65	90	7
88120	65	90	10
849120	65	100	10
944530	70	85	8
840370	70	90	10
10023478	70	92	12
1043300	70	100	10
1065430	70	110	10
965550	70	120	10
88150	75	95	8
537160	75	100	10
10025560	78	100	13
965570	80	100	10
4415130	80	100	13
967160	80	110	10
947910	85	105	13
965590	85	110	12
912650	85	130	12
965600	90	110	12
10025825	90	120	12
530060	90	120	13
997390	95	120	12
965610	95	125	12
563470	100	120	12
544200	100	130	13

RADIAL SHAFT SEALING RINGS NBR

Continued: Shaft sealing ring AS



Type: AS
Material: NBR

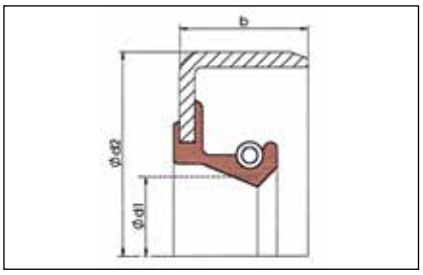
Item No.	d1 mm	d2 mm	b mm
954080	110	130	12
836680	110	140	12
10016831	110	140	13
965620	115	140	12
562540	120	150	12
562600	120	150	15
1040600	125	150	12
979720	125	160	12
774790	130	160	12
537490	130	160	15
4423820	140	170	12
10030605	140	170	13
925300	140	170	14
849830	140	170	15
4415140	150	180	13
912540	180	210	15
10013131	190	220	12
912550	190	220	15
10016497	190	230	16
4020640	200	230	15
825980	210	240	15
4415150	220	250	15
4160380	250	280	15

RADIAL SHAFT SEALING RINGS NBR

Shaft sealing ring B

Radial shaft sealing rings are used for sealing rotating or pivoting shafts and axes.

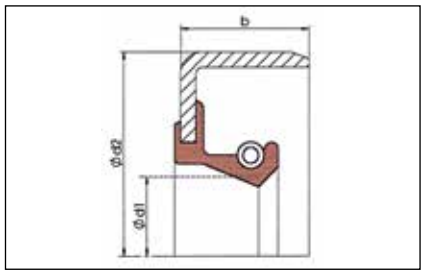
Type: B
Material: NBR



Item No.	d1 mm	d2 mm	b mm
530110	5	16	7
1106810	7	16	7
10036258	8	22	7
970890	11	17	4
945540	12	22	7
4303290	12	24	7
954250	15	24	7
544470	15	30	7
4204660	16	24	5
571600	16	24	7
544760	17	28	7
544780	17	30	7
772440	18	35	7
10006921	18	35	10
545090	20	32	7
4510190	20	33	10
514260	20	47	7
530010	20	47	10
89120	20	52	7
4674600	25	40	6
89240	25	42	7
545430	25	45	7
545450	25	47	10
545480	25	52	7
545540	26	35	7
89350	28	40	10
545610	28	42	7
896370	30	42	7
4400040	30	50	7
4294090	30	55	12
919120	30	56	8
89490	30	62	7
512070	30	62	10
912690	30	72	10
89510	32	42	7
530050	32	52	7
774990	32	52	8
4702080	32	52	10
89580	34	45	7
530190	34	47	9
966220	34	52	8
1128690	35	47	7
530200	35	47	10
995830	35	50	7
966640	35	52	7
546660	35	55	12
511910	35	56	12

RADIAL SHAFT SEALING RINGS NBR

Continued: Shaft sealing ring B



Type: B
Material: NBR

Item No.	d1 mm	d2 mm	b mm
10012849	35	62	10
4550780	35	72	10
4509040	36	52	9
897710	38	50	7
896360	40	52	7
4509130	40	55	9
89820	40	55	10
546950	40	58	9
546960	40	60	10
10021646	40	62	12
547000	40	65	10
547020	40	68	7
10007437	42	55	8
10021992	42	62	10
966310	42	62	12
10034579	42	65	12
976860	45	60	7
547330	45	60	8
10006793	45	72	10
574720	45	72	12
547580	48	62	8
90060	48	62	10
1031620	48	65	10
976890	50	62	7
966490	50	65	8
90120	50	68	8
547740	50	68	10
547840	50	72	10
1181210	50	72	12
976920	52	68	7
976930	52	68	8
987250	54	70	10
1080400	55	72	8
10033794	55	72	10
548160	55	80	8
966160	55	80	10
903930	56	72	8
549080	60	75	8
4714530	60	78	10
513060	60	80	8
549110	60	80	10
10002500	60	85	8
90490	60	90	8

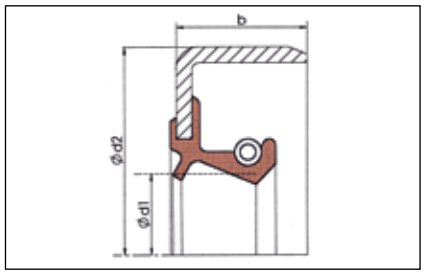
RADIAL SHAFT SEALING RINGS NBR

Shaft sealing ring B

Item No.	d1 mm	d2 mm	b mm
549190	60	90	10
90510	62	75	10
90520	62	85	10
872260	65	75	8
90530	65	80	8
513130	68	85	10
976990	70	90	10
549390	70	110	13
10023040	72	95	10
549440	75	95	10
549460	75	100	10
4702090	75	105	13
977000	80	100	10
977010	85	100	9
10006269	85	105	10
550840	85	110	12
4679300	85	105	13
10006724	85	120	12
991940	85	125	12
90760	90	110	8
10035030	90	110	10
10009941	90	110	12
901120	90	120	13
572680	95	110	9
4314430	95	115	10
4283140	95	115	13
551020	100	120	10
551070	100	125	12
966190	100	130	12
90910	100	130	13
4666440	105	125	13
894190	105	130	12
90950	110	128	9
1191340	110	130	12
551350	110	140	12
10016510	110	140	13
4158770	115	135	13
552310	120	150	12
552510	120	160	12
531240	130	160	12
552920	140	160	13
552970	140	170	15
912680	160	185	10
553500	180	210	15
572860	190	220	15
1058070	200	230	15
992990	210	240	15

RADIAL SHAFT SEALING RINGS NBR

Shaft sealing ring BS



Type: BS
Material: NBR

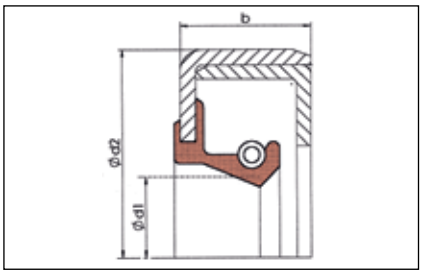
Item No.	d1 mm	d2 mm	b mm
1106820	20	35	10
977060	25	47	7
4132960	35	62	12
1087450	38	50	7
4020650	48	72	7
1090490	60	90	13
4015060	65	100	13
4714320	72	95	13
4020620	110	130	13
966260	120	140	13
1030220	130	150	14

RADIAL SHAFT SEALING RINGS NBR

Shaft sealing ring C

Radial shaft sealing rings are used for sealing rotating or pivoting shafts and axes.

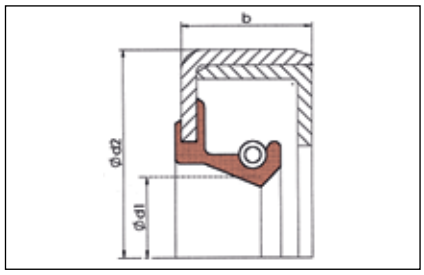
Type: C
Material: NBR



Item No.	d1 mm	d2 mm	b mm
10033998	20	35	10
531930	20	40	10
10030121	20	42	10
4414610	20	47	10
975830	24	47	9
10026932	25	42	9
551470	25	42	10
962210	28	40	10
4204640	30	38	7
4414620	30	50	10
4424200	30	52	9
92130	30	62	10
4424220	30	62	12
532000	30	72	10
10012965	32	52	10
4424230	35	52	10
10007509	35	55	10
4424250	35	55	12
4424260	35	62	9
4414640	35	62	10
553200	35	62	12
553390	35	72	12
4424280	35	80	12
553410	35	80	13
92470	37	62	9
1145600	40	56	10
4424300	40	56	12
10019353	40	60	8
4424330	40	62	10
553970	40	62	12
92670	40	65	10
4424340	40	68	10
4424360	40	72	12
4424380	40	78	10
4424400	40	90	12
4424410	42	60	10
4424420	42	62	10
555580	42	62	12
4424440	42	65	12
4414650	42	72	10
10006543	43	72	10
555920	45	60	10
4424460	45	60	12
532020	45	62	12
10011830	45	70	10
556090	45	70	12
1106910	45	72	10

RADIAL SHAFT SEALING RINGS NBR

Continued: Shaft sealing ring C



Type: C
Material: NBR

Item No.	d1 mm	d2 mm	b mm	€/100 units beginning at 1 unit
4424480	45	72	12	**1,459.70**
92890	45	75	12	**1,459.70**
4424500	45	80	13	**1,571.52**
4414660	48	68	10	**1,406.16**
4424530	48	70	10	**1,406.16**
554010	50	65	10	**1,261.03**
966730	50	68	10	**1,406.16**
4424550	50	70	8	**1,406.16**
93040	50	70	10	**1,406.16**
554040	50	70	12	**1,406.16**
554060	50	72	12	**1,459.70**
4008930	50	80	10	**1,571.52**
4414670	50	80	12	**1,571.52**
554100	50	80	13	**1,571.52**
4414680	50	85	13	**1,779.72**
554120	50	90	13	**1,865.37**
554150	52	72	10	**1,459.70**
10020053	52	80	10	**1,571.52**
4414700	52	85	13	**1,779.72**
514050	55	72	10	**1,459.70**
4424620	55	78	12	**1,571.52**
554380	55	80	10	**1,571.52**
4424640	55	80	12	**1,571.52**
1031330	55	90	13	**1,865.37**
554510	55	100	13	**2,067.61**
93390	58	85	10	**1,779.72**
980540	60	80	10	**1,571.52**
10015140	60	80	12	**1,571.52**
4424670	60	90	12	**1,865.37**
4424680	62	80	10	**1,571.52**
4424690	62	80	12	**1,571.52**
10031529	62	85	13	**1,779.72**
4414710	63	85	10	**1,779.72**
555590	65	85	10	**1,779.72**
555610	65	85	12	**1,779.72**
10011463	65	85	13	**1,779.72**
10018882	65	90	13	**1,865.37**
10010223	65	95	13	**1,955.78**
4424700	67	85	10	**1,779.72**
4009160	68	100	12	**2,067.61**
93750	70	90	10	**1,865.37**
556080	70	100	10	**2,067.61**
556180	70	110	13	**2,194.90**

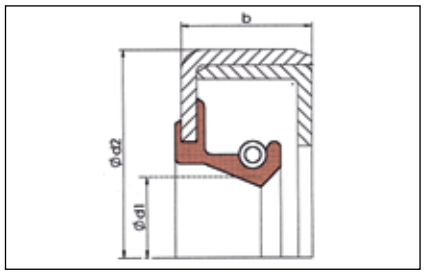
RADIAL SHAFT SEALING RINGS NBR

Shaft sealing ring C

Item No.	d1 mm	d2 mm	b mm
556360	75	95	10
556370	75	95	12
556410	75	100	10
556430	75	100	12
1065150	75	100	13
4424710	75	110	13
4424720	75	115	13
515450	78	95	13
4414720	78	100	10
4424730	78	105	13
556530	80	100	10
966240	80	100	12
4424750	80	105	13
4424770	80	110	10
557680	80	110	13
10029074	80	120	13
515520	82	110	13
4424780	85	105	10
10004691	85	105	13
4424800	85	110	12
1064180	85	110	13
557800	85	125	13
557840	90	110	8
557850	90	110	12
4424810	90	110	15
557880	90	115	9
515580	90	120	13
4414730	90	130	13
557970	95	115	13
10005516	95	125	13
557760	98	125	13
4414740	100	120	10
1046620	100	120	13
1061860	100	125	13
10030691	105	125	13
4703240	105	130	13
10025601	107	140	13
4424820	108	140	13
558350	110	130	13
10019629	110	130	15
966630	110	140	13
1061850	120	140	13
4414760	120	170	15
4414770	125	150	12
375630	125	150	15
558930	125	160	15
375650	130	160	13
979200	130	160	15
4414780	130	170	13
4424830	130	170	15
4003930	135	160	13
557000	135	160	15
557040	135	170	15
4414800	138	160	15
4414810	140	160	13
4414820	140	165	12
94930	140	170	13
4414830	145	165	13

RADIAL SHAFT SEALING RINGS NBR

Continued: Shaft sealing ring C

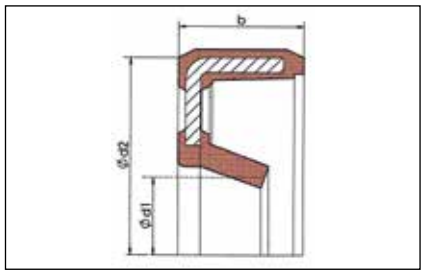


Type: C
Material: NBR

Item No.	d1 mm	d2 mm	b mm
95000	145	170	15
4424840	145	175	13
4424850	145	180	15
1106980	150	170	15
10010782	155	180	15
1203910	160	180	15
375800	160	190	15
10018139	170	200	13
884140	172	200	15
556850	175	200	15
557220	180	210	15
4424860	190	220	16
4424870	200	250	15
4414840	218	250	16
1043390	220	250	15
10029254	225	250	16
4424880	235	270	16
1075450	240	270	15
10018600	245	270	16
10032286	250	290	16
10002430	260	280	16
1107000	260	290	16
1104470	280	320	20

RADIAL SHAFT SEALING RINGS NBR

Shaft sealing ring AOF



Radial shaft sealing rings are used for sealing rotating or pivoting shafts and axes.

Type: AOF
Material: NBR

Item No.	d1 mm	d2 mm	b mm
10009914	6	10	2
4017450	8	12	3
4394950	8	15	3
4507500	9	16	3
4413690	10	14	3
10018893	10	22	3
778950	12	16	3
4292590	12	18	3
1094680	12	19	3
10009461	14	18	3
4413700	14	20	3
4024170	14	20	5
4413710	14	22	3
1210350	15	21	3
4147150	15	23	3
4413720	16	22	3
4413730	16	24	3
4467720	16	25	3
10008499	17	23	3
4413740	17	25	3
4413750	18	24	3
10028172	18	24	4
4413760	18	26	4
870440	20	26	4
986230	20	28	4
4038990	22	28	4
4413770	24	32	4
4413780	25	32	4
4413790	25	33	4
836060	25	35	4
4413800	26	34	4
4413810	28	37	4
922590	30	37	4
4674610	30	40	4
1133140	32	42	4
10025752	32	45	4
4413820	35	42	4
4413830	35	45	4
4413840	38	48	4
4701980	40	50	4
10006996	45	52	4
4160790	45	55	4
919610	55	63	5
4191200	60	72	4

RADIAL SHAFT SEALING RINGS PTFE

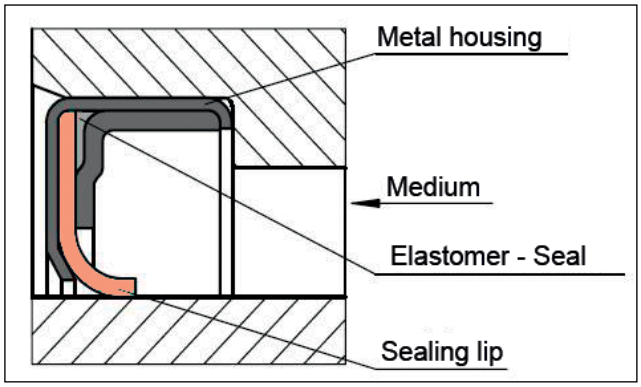
Selection criteria for Varilip® TP

Seal Design	Application	Application light	Application medium	Application heavy	Function	Material designation	Material Mating area Hardness	Installation Dimension range mm ∅	Installation Type of notch	Norm DIN/ISO
Varilip® **A** 	Pumps Separators Compressors Crankshafts Axes Fans Centrifuges	•	•	–	single acting	Turcon® T 25 Turcon® T 78	> 55 HRC > 170 HRC	6 – 170	open casing	DIN 3760 ISO 6194/1
Varilip® **B** 	Machine tools Transmis-sions Mixers Crankshafts	•	•	–	single acting	Turcon® T 25 Turcon® T 78	> 55 HRC > 170 HRC	6 – 170	open casing	DIN 3760 ISO 6194/1
Varilip® **C** 	Pumps Machine tools Compressors	–	–	•	single acting	Turcon® T 25 Turcon® T 78	> 55 HRC > 170 HRC	6 – 170	open casing	DIN 3760 ISO 6194/1
Varilip® **D** 	Separators Axes Anti-friction bearing seals Mixers	•	–	–	dual-acting	Turcon® T 25 Turcon® T 78	> 55 HRC > 170 HRC	6 – 170	open casing	DIN 3760 ISO 6194/1

Important Selection Criteria

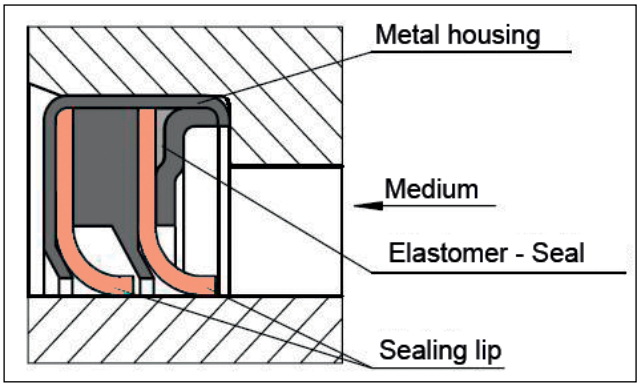
Varilip®, Type A

The type A is a single-lip seal which can be used for industrial standard applications up to pmax = 0.5 MPa (5 bar) where a radial shaft sealing ring is overwhelmed by the temperature, the friction or by the medium and on account of insufficient lubrication. The type A enables sealing of fast rotating shafts with circumferential speeds up to 40 m/s.



Varilip®, Type B

For applications where high leak tightness is required or contaminated media are present, the type B should preferably be used. In comparison with the type A, this double-lipped design provides higher security. It is recommended to insert a grease filling between the sealing lips.



RADIAL SHAFT SEALING RINGS PTFE

TRELLEBORG
SEALING SOLUTIONS

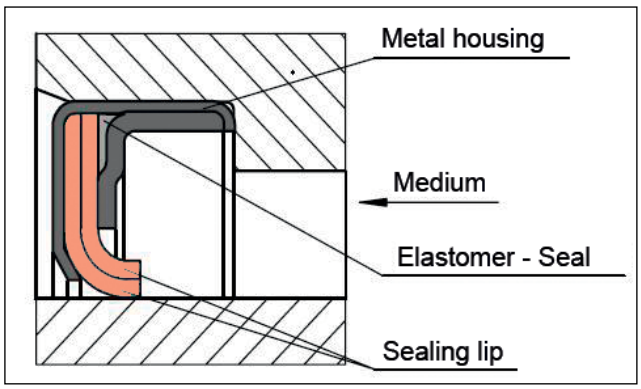
Pressure	Technical data Media Temperature	Speed	Friction	Technical behaviour Media compatibility	Dyn. sealing capability	Life-span	Seal Design
MPa (bar)	°C	m/s					
0.5 (5)	– 60 to +200	40	A	A	B	B	Varilip® **A** 
0.5 (5)	– 60 to +200	20	B	A	A	A	Varilip® **B** 
2.0 (20)	– 60 to +200	20	C	A	B	A	Varilip® **C** 
0.1 (1)	– 60 to +200	20	B	A	B	B	Varilip® **D** 

Contact us for special applications such as vacuum operation, gas applications etc.

A = very good, B = good, C = satisfactory

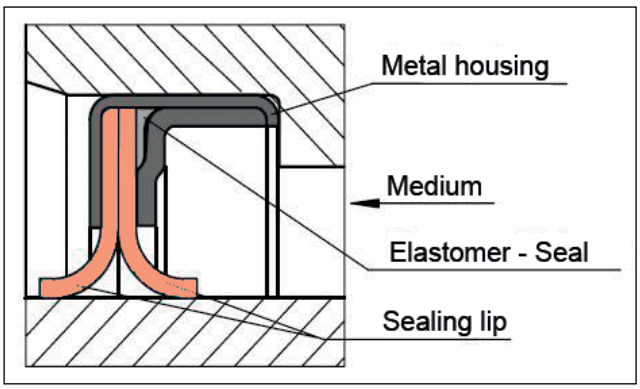
Varilip®, Type C

The Varilip®, Type C, can be used for applications in the higher pressure range for which a simple elastomer radial shaft sealing ring can no longer be considered. Due to reinforcement of the sealing lip, pressures up to 2 MPa (20 bar) are possible, e.g. as pump, shaft or rotor seals.



Varilip®, Type D

While the types A to C are single direction, the type D can be pressurised on both sides. Pressures up to 0.1 MPa (1 bar) are permitted. As a result, the application, e.g. for the separation of two different media, is possible with a single seal. The second lip can also function as a scraper or dust lip. It is recommended to insert a grease filling between the sealing lips.

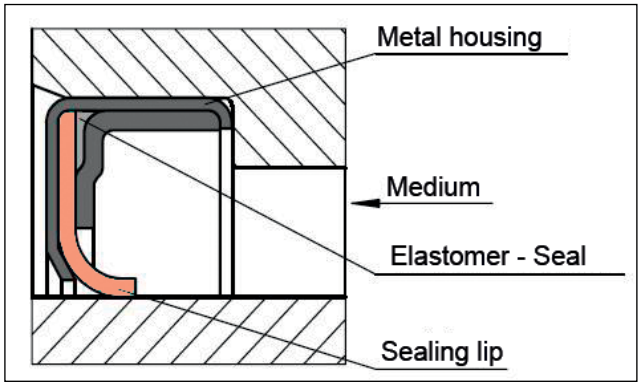


RADIAL SHAFT SEALING RINGS PTFE

Varilip® TP

Description
Varilip® shaft sealing rings, due to their PTFE sealing lip, are distinguished by a wide range of applications in general mechanical engineering and in the chemical industry. Particularly for applications where low friction, pressure, high circumferential

speeds, running free of "slip-stick", high thermal and chemical resistance are required
The Varilip® shaft sealing ring is dimensionally interchangeable with the shaft sealing rings according to DIN 3760/ISO 6194/1.



Materials for Varilip® seals

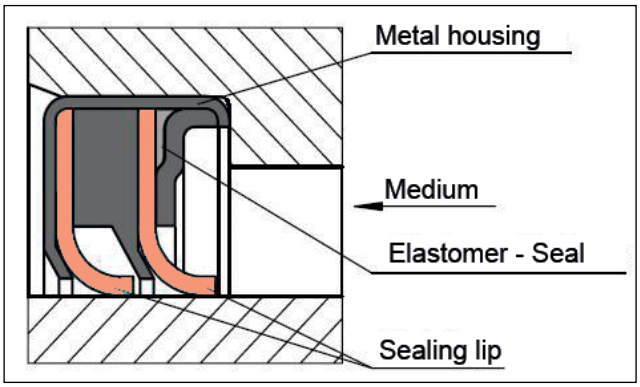
Materials
Two standard materials are available for the sealing lip:

Turcon® T 25
This standard material with extraordinary wear and friction properties is suitable for a wide temperature range and is resistant to most media. Good results are achieved if the mating surface shows a minimum hardness of 55 HRC. All oxide ceramic surfaces produced by plasma coating are generally well suitable.

At low pressures and sliding speeds up to 4 m/s, mating surface hardness of 45 HRC is sufficient.

Turcon® T 78
This material is distinguished by particularly good running behaviour. This enables use for dry running and insufficient lubrication and in combination with soft shaft surfaces, e.g. for chemical applications if stainless steel must be used as shaft material. The hardness of the mating surface should not be less than HB 170.

Refer to the tables at the side for further material information about case materials and secondary seals.



Material selection for sealing lip

Mating surfaces	Operating limits	Material
> 55 HRC	Pressure < 2 MPa	**Turcon® T 25**
		Turcon® T 28
> 170 HB	Pressure < 0.2 MPa	Turcon® T 28

Case materials

Medium	Material	Material code
Oils, fats Air / gases Water, steam Solvents Food	Stainless steel Material No. 1.4301 AISI 304	1
Acids Alkalis Sea water	acid-resistant stainless steel Material No. 1.4436 AISI 316	2
	acid-resistant stainless steel Material No. 1.4571	3*)

*) Only for types A, C and D up to max. 90 mm outer diameter

Case materials

Medium	Temperature	Material	Code
Air, water Oils, fats	Nitrile rubber – 0 to +110 °C	NBR	N
Air, water Steam Food Alcohols	Ethylene-propylene Rubber –60 to +150 °C	EPDM	E
Air, water Oils, fats Solvents Acids, alkalis	Fluororubber –20 to +200 °C	FKM	V

RADIAL SHAFT SEALING RINGS PTFE

TRELLEBORG
SEALING SOLUTIONS

Varilip® TP-A, T251

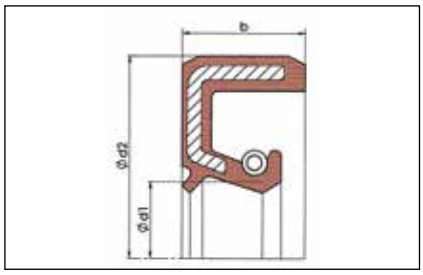
Varilip® shaft sealing rings, due to their PTFE sealing lip, are distinguished by a wide range of applications in general mechanical engineering and in the chemical industry. Particularly for applications where low friction, pressure, high circumferential speeds, running free of stick-slip, high thermal and chemical resistance are required.

Type: Varilip® TP-A
Material: T251V
Manufacturer: Trelleborg

Item No.	d1 mm	d2 mm	b mm	Manufacturer Part number
4090670	10	22	7	TPA100100-T251V
4090700	10	25	7	TPA300100-T251V
4090710	12	25	7	TPA300120-T251V
4091070	15	26	7	TPA100150-T251V
4090730	15	30	7	TPA200150-T251V
4090740	18	30	7	TPA100180-T251V
4090750	20	30	7	TPA100200-T251V
4090760	20	35	7	TPA300200-T251V
4090780	22	35	7	TPA200220-T251V
10010413	25	40	7	TPA200250-T251V
4090790	25	47	7	TPA400250-T251V
4090800	28	47	7	TPA200280-T251V
10010642	30	42	7	TPA200300-T251V
4090810	30	47	7	TPA300300-T251V
4090830	32	47	7	TPA300320-T251V
4090840	35	47	7	TPA100350-T251V
4090860	40	62	7	TPA400400-T251V
10009338	42	62	8	TPA200420-T251V
4090870	45	62	8	TPA200450-T251V
4090880	50	65	8	TPA100500-T251V
4090890	50	72	8	TPA300500-T251V
4090910	55	72	8	TPA200550-T251V
4090930	60	80	8	TPA200600-T251V
4090940	65	85	10	TPA100650-T251V
4090950	70	90	10	TPA100700-T251V
4090960	75	95	10	TPA100750-T251V
4090970	80	100	10	TPA100800-T251V
4090990	90	120	12	TPA200900-T251V
4091000	100	130	12	TPA301000-T251V
4091020	105	130	12	TPA101050-T251V
4091030	110	140	12	TPA201100-T251V
4091040	120	150	12	TPA101200-T251V
4091050	130	160	12	TPA101300-T251V
4091060	150	180	15	TPA101500-T251V

RADIAL SHAFT SEALING RINGS SPECIAL DESIGNS

Shaft sealing ring ASP, NBR



Radial shaft sealing rings are used for sealing rotating or pivoting shafts and axes.

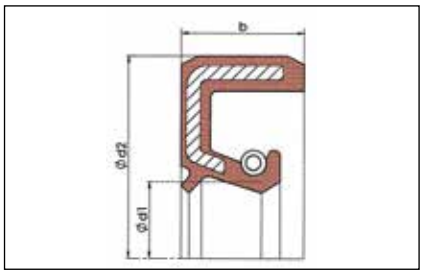
Type: ASP
Material: NBR

Item No.	d1 mm	d2 mm	b mm
4406680	8	22	6
4418500	9	20	6
902220	10	22	6
10030192	11	22	7
4013540	12	22	6
4418510	12	24	6
4455030	12	24	7
4418520	12	32	7
4020210	15	25	6
4418550	15	32	7
604470	15	35	6
4418580	17	30	6
4418590	18	30	6
10017862	18	32	6
4418600	18	35	6
4418620	20	32	7
603460	20	35	6
10015018	20	35	7
4418630	22	32	6
4418640	22	32	7
4418650	22	35	6
4418660	24	40	7
609370	25	35	6
4418670	25	36	6
4418690	25	40	7
4418700	25	42	6
4418710	25	47	6
4418720	28	40	6
4418730	28	40	8
4419460	30	42	6
4418750	30	52	7
10018452	32	44	8
4418760	32	47	6
4418770	35	47	6
4418790	35	50	7
604390	35	52	6
1023590	35	52	7
4418810	40	52	7
4418820	40	55	6
4145550	40	56	6
4418830	40	58	8
4418840	42	62	7
4418850	45	58	7
604430	45	62	7
4418860	45	65	7
4418870	47	62	7
4418880	50	65	7

RADIAL SHAFT SEALING RINGS SPECIAL DESIGNS

Continued: Shaft sealing ring ASP, NBR

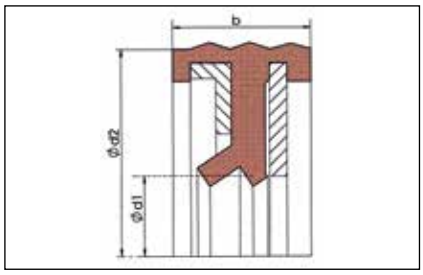
Type: ASP
Material: NBR



Item No.	d1 mm	d2 mm	b mm
632150	50	68	7
4418890	50	70	10
4044230	50	72	7
10009928	50	72	10
4418900	55	72	7
4418910	60	72	7
4418920	60	75	8
633990	60	80	7
4418930	60	85	8
4418940	62	85	7
4013110	65	85	10
1025200	65	90	7
1023610	68	80	7
1023600	68	90	10
4251270	70	90	7
4418950	75	95	7
651160	80	100	7
1023620	85	110	12
1023630	85	110	13
4418970	85	120	8
4418980	90	110	12
10004057	90	125	12
4418990	95	120	12
4419020	110	150	8
4419040	120	140	10
4419060	140	160	10
4419070	140	170	15
4419120	200	230	13
4419140	260	280	10
4419120	200	230	13
4419140	260	280	10

RADIAL SHAFT SEALING RINGS SPECIAL DESIGNS

Shaft sealing ring BSB, NBR



Radial shaft sealing rings are used for sealing rotating or pivoting shafts and axes.
Type BSB
Single lip seal with steel thrust ring and support / dust lip.

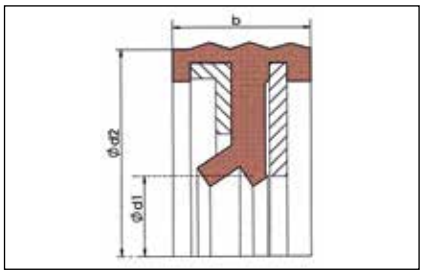
Type: BSB
Material: NBR

Item No.	d1 mm	d2 mm	b mm
4416480	6	16	7
4416490	6	22	7
4416500	8	22	7
4416510	10	22	7
4416520	10	24	7
4416530	12	22	7
4416540	12	28	7
4416550	14	24	7
4416560	14	28	7
4416570	15	30	7
4416580	15	32	7
4416590	15	35	7
4416600	16	28	7
4416610	16	30	7
4416620	18	30	7
4416630	20	30	7
4416640	20	32	7
4416650	20	35	7
4416660	20	40	7
4416670	22	32	7
4416680	22	40	7
4416690	24	40	7
4416700	25	35	7
4416710	25	40	7
4416720	25	42	7
4416730	25	52	7
4416740	26	47	7
4416750	28	40	7
4416760	28	47	7
4416770	28	52	7
4416780	30	40	7
4416790	30	42	7
4416800	30	47	7
4416810	30	52	7
4416820	32	45	7
4416830	32	47	7
4416840	35	47	7
4416850	35	50	7
4416860	35	52	7
4416870	35	62	7
4416880	36	50	7
4416890	38	52	7
4416900	40	52	7
4416910	40	55	7
4416920	40	62	7
4416930	40	72	7
4416940	42	55	8

RADIAL SHAFT SEALING RINGS SPECIAL DESIGNS

Continued: Shaft sealing ring BSB, NBR

Type: BSB
Material: NBR

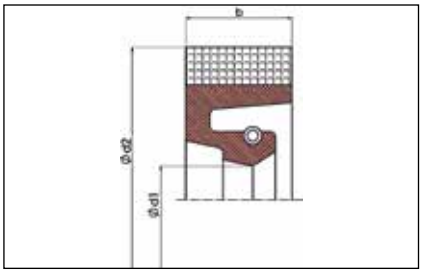


Item No.	d1 mm	d2 mm	b mm
4416940	42	55	8
4416950	42	62	8
4416960	45	62	8
4416970	45	65	8
4416990	48	62	8
4417000	48	72	8
4417010	50	68	8
4417020	50	72	8
4417030	50	80	8
4417040	52	68	8
4417050	55	70	8
4417060	55	80	8
4417070	60	75	8
4417080	60	80	8
4417090	60	90	8
4417100	65	85	10
4417110	65	90	10
4417120	68	90	10
4417130	70	90	10

Shaft sealing ring GWA1

Radial shaft sealing rings are used for sealing rotating or pivoting shafts and axes.
Type GWA1
With fabric-reinforced clamping part.

Type: GWA1
Material: NBR / fabric



Item No.	d1 mm	d2 mm	b mm
10035102	100	125	10.0
10035104	105	145	16.0
10035106	110	140	16.0
10035107	100	130	16.0
10035108	120	150	16.0
10035109	125	155	12.0
10035110	130	160	15.0
10035112	140	180	16.0
10035114	150	190	16.0
10035115	170	200	16.0
10035120	170	210	16.0
10035121	180	215	18.0

V-RINGS

Technical Description

Description
The easy handling and the reliable function of the V-ring – combined with the low constructive complexity – enable a wide range of applications in all of mechanical engineering, water treatment plants, rolling mills etc.

One particular application area – mainly for small seal dimensions – is domestic and electrical appliances as well as electric motors.

V-rings can be used for sealing against dust, dirt, grease, splash oil, water and other media.

Advantages
- effective, low cost shaft seal
- no metal parts, pure rubber elastic material
- low construction complexity, small installation spaces
- no high requirements for machining and surface quality of the shaft
- easy to install
- no shaft wear
- no hardened mating surface required
- low friction, low friction losses, long service life
- simultaneous action as seal and dirt repellent
- suitable for high speeds
- inclined position of the shaft up to max. 1° possible!

Friction
The low contact pressure of the sealing lip guarantees low friction. It can be influenced by strong preloading or relief. The installation dimensions shown in our table relate to the standard applications. The starting torque is also significantly lower in comparison with the radial shaft seal.

Friction is influenced by the circumferential speed. Friction increases up to approx. 12 m/s as the circumferential speed increases. Then there is relief of the sealing lip due to the high centrifugal forces. Refer to the diagram for the power loss.

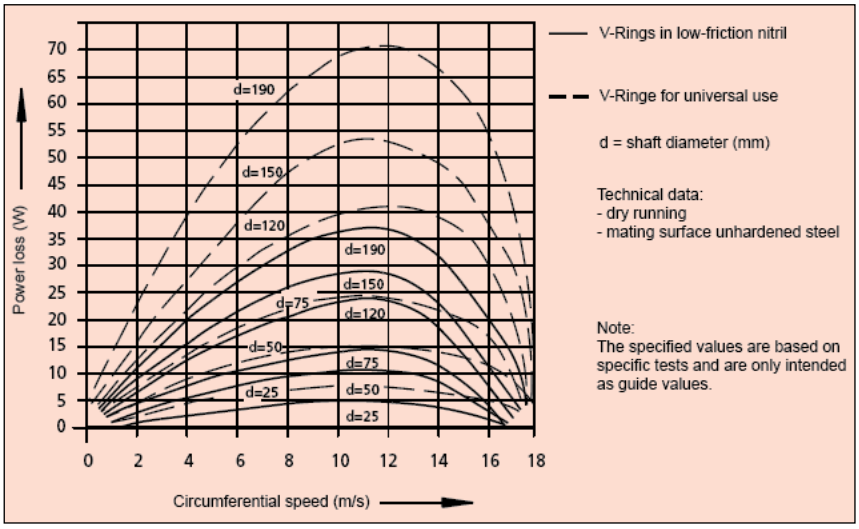
Technical data

Operating pressure: unpressurised

Speed:

Normal use:	<8 m/s
axially secured	8 m/s
axially and radially secured	12 m/s
Temperature:	-40 °C to +180 °C depending on elastomer material
Media:	see Materials

Protection classes
Sealing by elastomers with V-ring corresponds to protection class IP55



Design of the mating surface
All components which should be sealed against can be used as mating surface, for example
- the front side of a roller bearing
- a shaft collar
- a thrust washer

The mating surface does not have to be hardened. However, a hard mating surface is beneficial for strongly abrasive substances such as sand, dirt or scale.

It can be manufactured by precision turning. There must not be any radial, spiral machining scores present. For critical uses such as high speeds, radial deflection, low friction or high levels of dirt, the surface quality should be approx.
$R_{max.}$ = 10.0 – 16.0 µm
R_z = 6.3 – 10.0 µm
R_a = 1.6 – 3.2 µm
.

Materials
As standard, V-rings are supplied in three material qualities:

Acrylonitrile butadiene rubber (NBR)
Temperature: -40 °C to +100 °C
Media: mineral oils, air, water, emulsions, greases

Fluororubber (FPM)
Temperature: -20 °C to +180 °C
Media: mineral and synthetic oils and greases, acids, alkalis

Ethylene-Propylene-Diene Rubber (EPDM)
Temperature: -40°C to +100 °C
Media: ozone-resistant, not resistant to mineral oils

Other materials available on request!

Selection of the sealing ring
One V-ring size can always be selected for a diameter range.
If the nominal diameter of the shaft is in the limit area of two recommendations, the next largest V-ring must be selected.

The transfer of the torque is performed by the elastomer intrinsic preload of the ring on the shaft.

V-RINGS

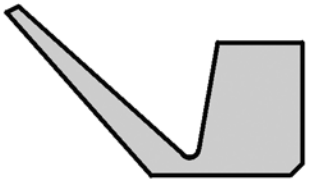
Types and dimensional ranges

Types
The product range includes four standard types and one special type for large diameters. The standard types are illustrated. In order to make the correct application-related selection, the types are described below:

Design VA

Design VS

Design VL



Design VF

Type VA
This most frequently used profile is available as standard for shaft diameters of 2 to 2000 mm. The diameter range is divided into nine profile sizes. Larger diameters can be supplied by butt joint vulcanisation of several ring segments.

Type VS
The lip geometry of this type corresponds to that of the VA type. The seal body is lengthened by a diagonal on the rear side and strengthened in this way. The installation width is lengthened by approx. 50 %.

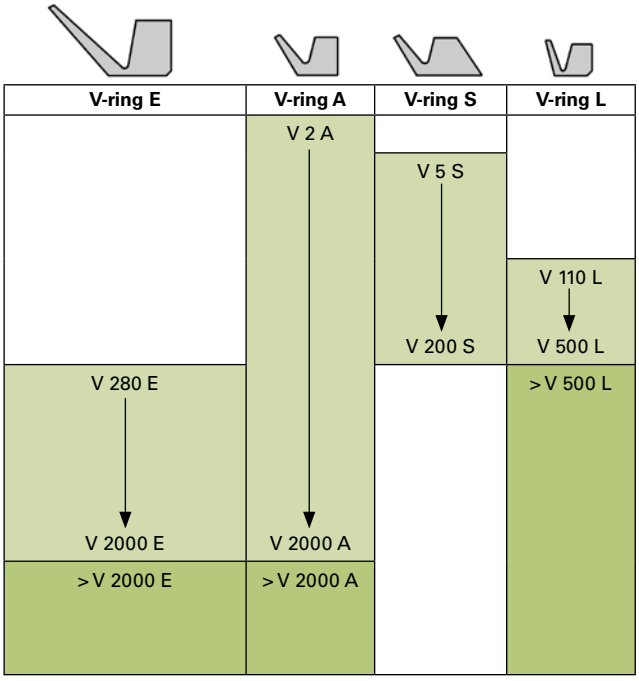
The reinforcement increases the self-adhesion on the shaft at high circumferential speeds or due to external influences. At the same time, the back geometry provides a low-cost design solution for axial and radial security at high speeds.

Available for shaft diameters from 5 to 200 mm in seven graduated profile sizes.

Type VL
The VL type is distinguished by particularly small profile geometry.

It is therefore suitable for constructions in which only limited installation space is available, e.g. for installation in labyrinth seals. Available for shaft diameters from 110 to 500 mm with one profile size.

Type VE
A particularly stiff design with reinforced profile for strong loads. Only one profile size is also used here, for the diameter range from 280 to 2000 mm.

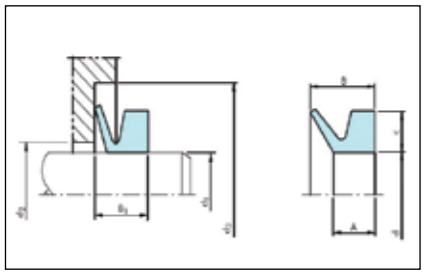


Data in mm

Standard range
Available on request!
Not included in the product range.

V-RINGS

V-ring A, NBR



The V-ring is an axial lip seal for shafts and bearing sealing. The V-ring is mounted directly on the shaft and lies against a mating surface, e.g. the machine case. The V-ring provides reliable protection with low friction.
Standard version.
Available diameters: 2 – 2000 mm

Type: A
Material: NBR

Item No.	Name	d(min-max) mm	W mm	B mm	d1 mm
585920	V-002		1.5	3	
463530	V-003	2.7/-3.4	1.5	3	2.5
41600	V-004	3.5/-4.4	2	3.7	3.2
41610	V-005	4.5/-5.4	2	3.7	4
41620	V-006	5.5/-6.4	2	3.7	5
41630	V-007	6.5/-7.5	2	3.7	6
41640	V-008	8.0/-9.0	2	3.7	7
41650	V-010	9.5/-11.0	3	5.5	9
41660	V-012	11.5/-12.0	3	5.5	10
41670	V-014	13.5/-15.0	3	5.5	12.5
449770	V-016	15.5/-17.0	3	5.5	14
41680	V-018	17.5/-18.5	3	5.5	16
41690	V-020	19.0/-20.5	4	7.5	18
41700	V-022	21.0/-23.5	4	7.5	20
41710	V-025	24.0/-26.5	4	7.5	22
41720	V-028	27.0/-28.5	4	7.5	25
41730	V-030	29.0/-30.5	4	7.5	27
41740	V-032	31.0/-32.5	4	7.5	29
41750	V-035	33.0/-35.5	4	7.5	31
41760	V-038	36.0/-37.5	4	7.5	34
41770	V-040	38.0/-42.0	5	9	36
41780	V-045	43.0/-47.0	5	9	40
41790	V-050	48.0/-52.0	5	9	45
41800	V-055	53.0/-57.0	5	9	49
41810	V-060	58.0/-62.0	5	9	54
41820	V-065	63.0/-67.0	5	9	58
41830	V-070	68.0/-72.0	6	11	63
41840	V-075	73.0/-77.0	6	11	67
41850	V-080	78.0/-82.0	6	11	72
41860	V-085	83.0/-87.0	6	11	76
41880	V-095	93.0/-97.0	6	11	85
41890	V-100	98.0/-104.0	6	11	90
41900	V-110	105.0/-114.0	7	12.8	99
41910	V-120	115.0/-124.0	7	12.8	108
41920	V-130	125.0/-134.0	7	12.8	117
41930	V-140	135.0/-144.0	7	12.8	126
41940	V-150	145.0/-154.0	7	12.8	135
41950	V-160	155.0/-164.0	8	14.5	144
5110	V-170	165.0/-174.0	8	14.5	153
41960	V-180	175.0/-184.0	8	14.5	162
41970	V-190	185.0/-194.0	8	14.5	171
41980	V-199	195.0/-189.0	8	14.5	180
41990	V-200	190.0/-209.0	15	25	180
42000	V-220	210.0/-234.0	15	25	198
42010	V-250	235.0/-264.0	15	25	225
42020	V-275	265.0/-289.0	15	25	247
41990	V-200	190.0/-209.0	15	25	180

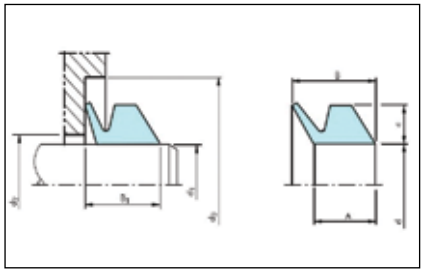
V-RINGS

V-ring A, NBR

Item No.	Name	d(min-max) mm	W mm	B mm	d1 mm
42000	V-220	210.0/-234.0	15	25	198
42010	V-250	235.0/-264.0	15	25	225
42020	V-275	265.0/-289.0	15	25	247
42030	V-300	290.0/-309.0	15	25	270
463550	V-325	310.0/-334.0	15	25	292
4110150	V-350	335.0/-364.0	15	25	315
42050	V-375	365.0/-389.0	15	25	337
42060	V-400	390.0/-429.0	15	25	360
42070	V-450	430.0/-479.0	15	25	405
4110160	V-500	480.0/-529.0	15	25	450
950600	V-550	530.0/-579.0	15	25	495
5120	V-600	580.0/-629.0	15	25	540
974960	V-650	630.0/-664.0	15	25	600
974750	V-700	665.0/-704.0	15	25	630
919300	V-725	705.0/-744.0	15	25	670
4110170	V-750	745.0/-784.0	15	25	705
1038820	V-800	785.0/-829.0	15	25	745
777340	V-850	830.0/-874.0	15	25	785
4460610	V-900	875.0/-919.0	15	25	825
4110180	V-950	920.0/-964.0	15	25	865
4460620	V-1000	965.0/-1015.0	15	25	910

V-RINGS

V-ring S, NBR



The V-ring is an axial lip seal for shafts and bearing sealing. The V-ring is mounted directly on the shaft and lies against a mating surface, e.g. the machine case. The V-ring provides reliable protection with low friction.
Design with a diagonal on the back side.

Type: %s
Material: NBR

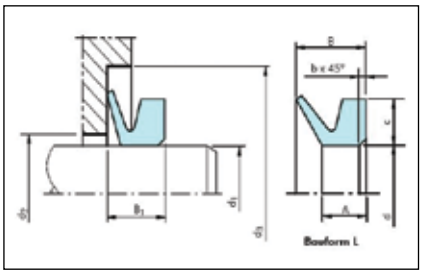
Item No.	Name	d(min-max) mm	W mm	B mm	d1 mm
41210	V-005	4.5/-5.4	2	5.2	4.0
41220	V-006	5.5/-6.4	2	5.2	5.0
463540	V-007	6.5/-7.5	2	5.2	6.0
41230	V-008	8.0/-9.0	2	5.2	7.0
41240	V-010	9.5/-11.0	3	7.7	9.0
41250	V-012	11.5/-12.0	3	7.7	10.5
41260	V-014	13.5/-15.0	3	7.7	12.5
41270	V-016	15.5/-17.0	3	7.7	14.0
41280	V-018	17.5/-18.5	3	7.7	16.0
41290	V-020	19.0/-20.5	4	10.5	18.0
41300	V-022	21.0/-23.5	4	10.5	20.0
41310	V-025	24.0/-26.5	4	10.5	22.0
41320	V-028	27.0/-28.5	4	10.5	25.0
41330	V-030	29.0/-30.5	4	10.5	27.0
41340	V-032	31.0/-32.5	4	10.5	29.0
41350	V-035	33.0/-35.5	4	10.5	31.0
41360	V-038	36.0/-37.5	4	10.5	34.0
41370	V-040	38.0/-43.0	5	13	36.0
41380	V-045	43.0/-48.0	5	13	40.0
41390	V-050	48.0/-52.0	5	13	45.0
41400	V-055	53.0/-58.0	5	13	49.0
41410	V-060	58.0/-63.0	5	13	54.0
41420	V-065	63.0/-67.0	5	13	58.0
41430	V-070	68.0/-72.0	6	15.5	63.0
41440	V-075	73.0/-77.0	6	15.5	67.0
41450	V-080	78.0/-83.0	6	15.5	72.0
41460	V-085	83.0/-87.0	6	15.5	76.0
41470	V-090	88.0/-93.0	6	15.5	81.0
41480	V-095	93.0/-97.0	6	15.5	85.0
41490	V-100	98.0/-105.0	6	15.5	90.0
41500	V-110	105.0/-114.0	7	18	99.0
41510	V-120	115.0/-125.0	7	18	108.0
41520	V-130	125.0/-135.0	7	18	117.0
41530	V-140	135.0/-144.0	7	18	126.0
41540	V-150	145.0/-154.0	7	18	135.0
41550	V-160	155.0/-164.0	8	20.5	144.0
41560	V-170	165.0/-174.0	8	20.5	153.0
41570	V-180	175.0/-184.0	8	20.5	162.0
41580	V-190	185.0/-194.0	8	20.5	171.0

V-RINGS

V-ring L, NBR

The V-ring is an axial lip seal for shafts and bearing sealing. The V-ring is mounted directly on the shaft and lies against a mating surface, e.g. the machine case. The V-ring provides reliable protection with low friction.
Special design for small installation spaces.
Available diameters: 110 – 500 mm.

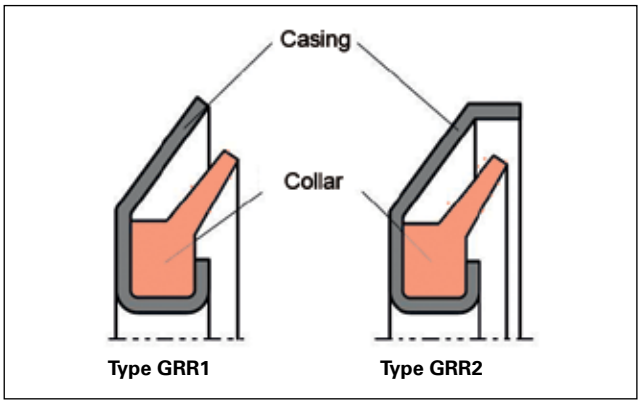
Type: L
Material: NBR



Item No.	Name	d(min-max) mm	W mm	B mm	d1 mm
955470	V-110	105.0/-114.0	6.5	10.5	99
943060	V-120	115.0/-124.0	6.5	10.5	108
4419110	V-130	125.0/-134.0	6.5	10.5	117
42090	V-140	135.0/-144.0	6.5	10.5	126
42100	V-150	145.0/-154.0	6.5	10.5	135
35990	V-160	155.0/-164.0	6.5	10.5	144
42110	V-170	165.0/-174.0	6.5	10.5	153
42120	V-180	175.0/-184.0	6.5	10.5	162
4470	V-190	185.0/-194.0	6.5	10.5	171
42130	V-200	195.0/-189.0	6.5	10.5	182
42140	V-220	210.0/-234.0	6.5	10.5	198
42150	V-250	233.0/-260.0	6.5	10.5	225
42160	V-275	260.0/-285.0	6.5	10.5	247
4490	V-300	285.0/-310.0	6.5	10.5	270
463590	V-325	310.0/-334.0	6.5	10.5	292
4419130	V-350	335.0/-364.0	6.5	10.5	315
42170	V-375	365.0/-389.0	6.5	10.5	337
488360	V-400	385.0/-410.0	6.5	10.5	360
488350	V-425	410.0/-440.0	6.5	10.5	382

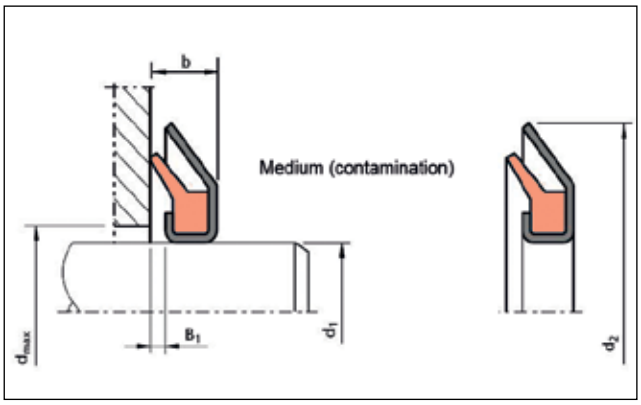
GAMMA RINGS

Technical description and types

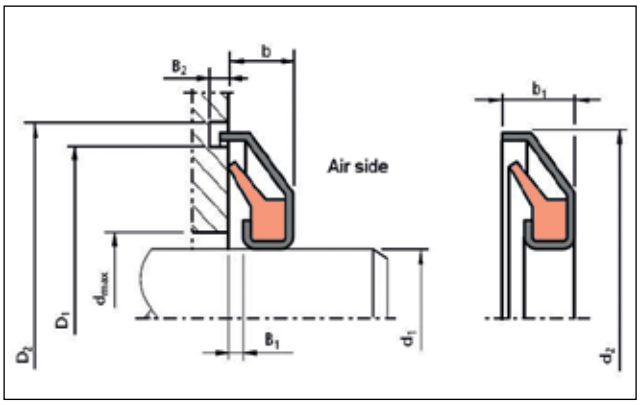


Axial seal

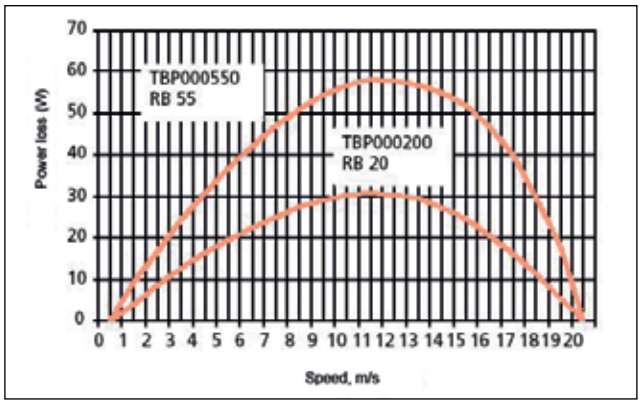
Description
The axial seal consists of an elastic collar and a metal case. It is permanently mounted on the shaft using press fitting. The seal collar runs against a mating surface at right angles to the shaft (e.g. bearing case). The distance to this case is precisely defined. External soiling, liquid sprays and grease should preferably be sealed against.



Installation drawing Type GRR1



Installation drawing Type GRR2



Power loss dependent on the circumferential speed, running surface made of steel, surface roughness 1.5–2.0 µm Ra. Axial seal without lubrication.

Technical data

Materials:
- collar NBR
- metal case galvanised steel

Shaft tolerance:
h9, (g6 to n6 also possible)

Application areas:
e.g. engine manufacture, transmission systems, transport rollers of conveyors, washing systems etc.

Advantages
- high circumferential speed
- very small installation width
- reduced friction during increasing circumferential speed
- only simple construction measures are necessary

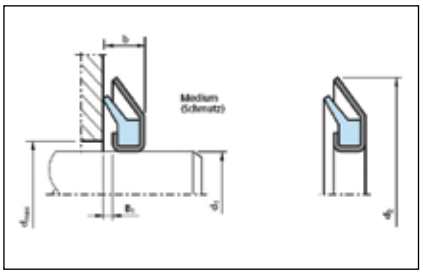
Due to the centrifugal force, the friction and thus the power loss reduce during increasing circumferential speed. The reduction of the friction loss starts from approx. 12 m/s and is completely removed at approx. 20 m/s (see adjacent diagram).

GAMMA RINGS

Gamma ring RB, NBR / steel sheet metal

The Gamma ring consists of an elastic sealing collar and a metal case.
It is mainly used for sealing from external contaminants, liquid sprayers, grease etc.

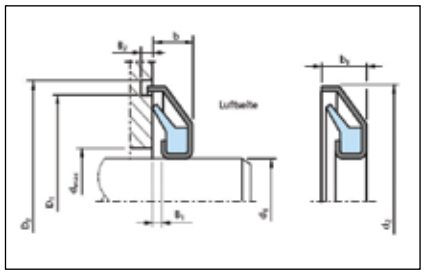
Type: TBP/RB
Material: NBR/steel sheet metal



Item No.	d1 mm	d2 mm	B mm
930690	10	24	3.5
4098190	12	26	3.5
931840	15	30	4.0
4104720	16	32	4.0
10033843	17	32	4.0
4104440	18	33	4.0
4104120	22	40	4.0
4109640	24	40	4.0
4109650	26	40	4.0
4109660	28	43	4.0
4109670	32	49	4.5
984570	35	52	4.5
4109680	45	62	4.5
951060	48	65	4.5
873770	50	70	5.5
4109690	52	72	5.5
4109700	53	73	5.5
4109710	55	75	5.5
4109720	58	78	5.5
4109730	60	80	5.5
4109740	62	82	5.5
4109750	65	85	5.5
4109760	68	88	5.5
4109770	70	90	5.5
4109780	72	92	5.5
4109790	75	95	5.5
4109800	78	98	5.5
4109810	80	100	5.5
4109820	85	105	5.5
4109830	90	110	5.5
4109840	95	115	5.5
4109850	100	120	5.5

GAMMA RINGS

Gamma ring 9RB, NBR / steel sheet metal



The Gamma ring consists of an elastic sealing collar and a metal case.
It is mainly used for sealing from external contaminants, liquid sprayers, grease etc.

Type: TBR/9RB
Material: NBR/steel sheet metal

Item No.	d1 mm	d2 mm	B mm	B2 mm	D1 mm
4109890	15	32	4.0	3	29
4109900	17	34	4.0	3	31
4109910	20	37	4.0	3	34
4109920	30	48	4.5	3	45
900370	35	53	4.5	3	50
900380	40	58	4.5	3	55
4109930	45	63	4.5	3	60
4109940	50	72	5.5	3	68.5
4109950	55	77	5.5	3	73.5
930810	60	82	5.5	3	78.5
4109960	65	87	5.5	3	83.5
4109970	70	92	5.5	3	88.5
961970	80	102	5.5	3	98.5
4109980	85	107	5.5	3	103.5
4109990	90	112	5.5	3	108.5
4110000	95	117	5.5	3	113.5
4110010	100	122	5.5	3	118.5

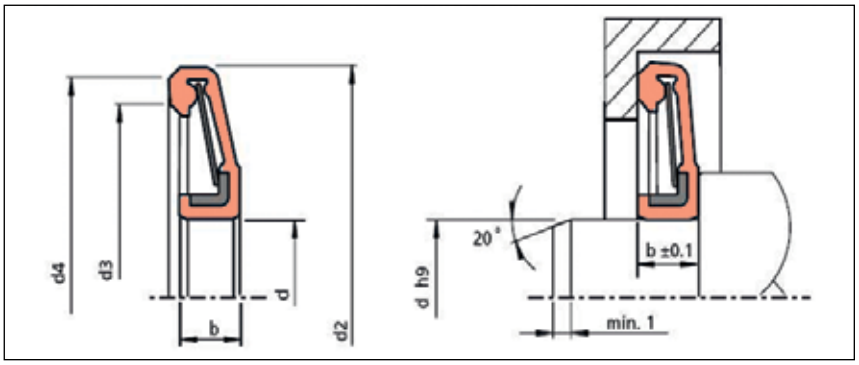
AXIAL SHAFT SEALING RINGS

Technical description and types

Description
Axial shaft sealing rings are mainly used as protection seals for anti-friction bearings. Their dimensions have been adapted to the bearing dimensions for this reason. A type with inner sealing lip should be selected for sealing against liquid discharge. The design with outer sealing lip is suitable for sealing grease and for protection against ingress of dirt.

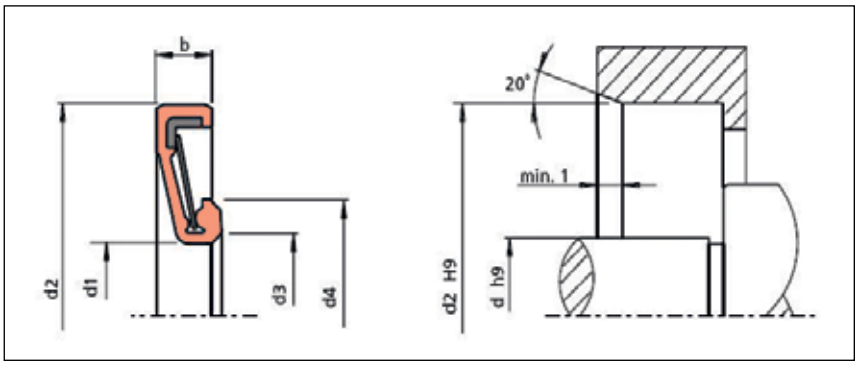
Advantages
- low friction, low heating
- no shaft wear
- small installation space, easy mounting
- high heat resistance
- high sliding speed
- suitable for many roller bearing series
- long service life

Type A
Axial shaft seal with outer sealing lip for sealing grease. Liquids can also be sealed against at low circumferential speeds and very good, if possible polished or lapped mating surface.



Installation recommendation, Type A

Type I
Axial shaft seal with inner sealing lip, mainly for sealing liquids. The seal is mainly used statically installed in the case with the sealing lip for the turning shaft. Thereby, the seal should always be installed in contact with liquid. Dry running must be prevented.



Installation recommendation, Type I

Standard material

Collar and sealing lip	NBR 75 Shore A
Colour:	black / anthracite
Temperature range:	-30 °C to +120 °C
Metal parts	
Reinforcing ring:	steel 1.0338/St 14.03
Star spring:	spring steel 1.0605/C75

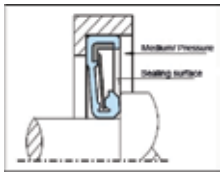
Technical data

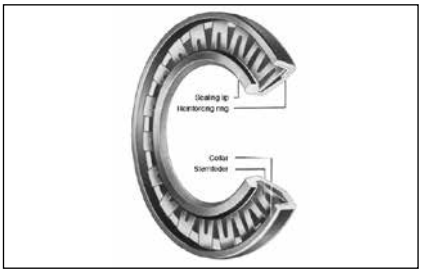
Operating pressure:	unpressurised
Speed:	up to 30.0 m/s, depending on type and elastomer material
Temperature:	-30 °C to +200 °C depending on elastomer material

Note: The application areas of the individual types are very different and basically dependent on the type of lubricant and the operating conditions. Ask our Technical Department.

AXIAL SHAFT SEALING RINGS

Axial shaft sealing ring VA



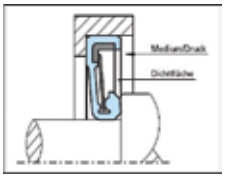


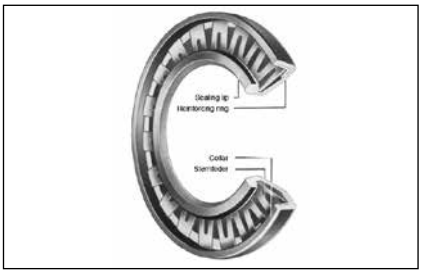
Axial shaft sealing rings are mainly used as protection seals for anti-friction bearings. The design with outer sealing lip is suitable for sealing grease and for protection against ingress of dirt.

Type: VA
Material: NBR

Item No.	Inner diameter ID mm	Outer diameter AD mm	Width B mm
10001572	36	60.0	5.5
10011053	40	61.0	4.5
1025880	45	66.5	5.0
10034336	47	77.0	6.0
10016225	61	87.0	6.0
10028143	66	93.0	6.0
10033959	80	120.5	8.5
10025579	97	145.0	9.0
10022449	103	142.0	7.5
10010268	160	252.0	10.0

Axial shaft sealing ring VI





Axial shaft sealing rings are mainly used as protection seals for anti-friction bearings. A design with inner sealing lip should be selected for sealing against liquid discharge.

Type: VI
Material: NBR

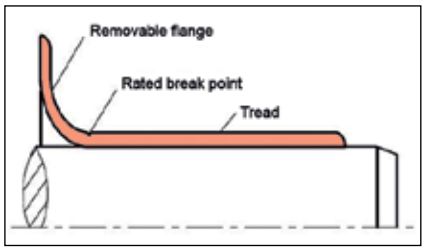
Item No.	Inner diameter ID mm	Outer diameter AD mm	Width B mm
10026451	13	26.0	4.0
4712310	16	31.0	4.5
10009506	18	36.0	5.0
10008278	22	39.0	4.5
10004999	27	44.0	4.5
10020753	37	56.0	5.0
10003341	42	62.0	5.5
4458520	47	66.5	5.5
10005272	52	75.0	6.0
10029889	58	83.0	6.0
10001535	67	97.0	7.0
4715490	73	104.0	7.5
4716170	78	109.0	7.5
10014908	78	120.0	8.5
10010265	226	328.0	13.0

SHAFT PROTECTION SLEEVES

Technical Description

The shaft protection sleeve is mounted on the shaft with the supplied mounting bush or a tube section.

Description
The shaft protection sleeve is used as running surface for radial shaft sealing rings. It consists of a thin-walled, cylindrical pipe with a mounting flange. The flange has a predetermined breaking point and can be detached if it is obstructive.



Design of the shaft protection sleeve

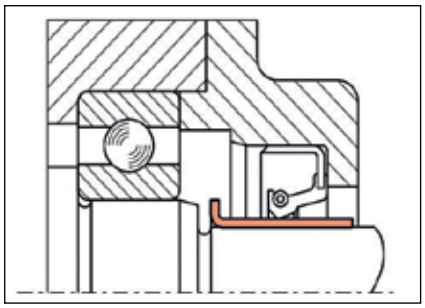
Characteristics
The shaft protection sleeve has a wall thickness of approx. 0.254 mm and a spiral-free ground surface. It is ideally suitable as mating surface for radial shaft sealing rings.

Due to the extremely thin wall thickness, the effective diameter at the sealing lip of the radial shaft sealing ring is only increased by approx. 0.5 mm.

Therefore, seals of the original size can be used in the case of repairs.

Advantages
- low cost renewal of worn shaft surfaces
- easy mounting using supplied mounting tool
- short repair times
- no change of the seal dimensions
- wear-resistant surface for long service life
- secure seating due to press-fit

Application Areas
Shaft protection sleeves are used for inexpensive repair of worn shaft surfaces. However, they can also be used in new installations if complicated and expensive shafts in the area of the running surface are too difficult to machine.



Running surface with shaft protection sleeve

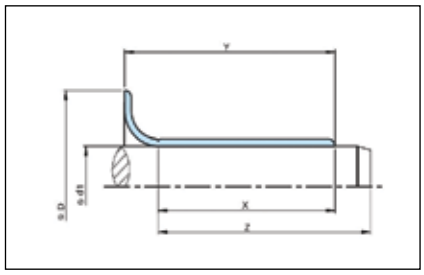
Technical data

Material:	stainless steel 1.4301 (AISI 304)
Wall thickness	0.254 mm
Surface:	ground spiral-free R_a = 0.25 ... 0.5 µm
Hardness:	95 HRB
Dimensions:	for many shaft diameters in metric sizes and inch dimensions

Installation Sequence
- Check nominal diameter of the shaft. The overlap for the nominal dimension of the shaft is taken into account for the sleeve.
- place shaft protection sleeve with mounting flange on the shaft first.
- Put on mounting tool.
- Draw on shaft protection sleeve with hammer blows or using a press.
- If require, cut mounting flange with sidecutters as far as the predetermined breaking point and detach at the marked line.
- Grease shaft protection sleeve for the seal mounting.

SHAFT PROTECTION SLEEVES

Shaft protection sleeve TS 900V



The shaft protection sleeve is used as running surface for radial shaft sealing rings.
It consists of a thin-walled, cylindrical pipe with a mounting flange.

Type: TS
Material: 900V

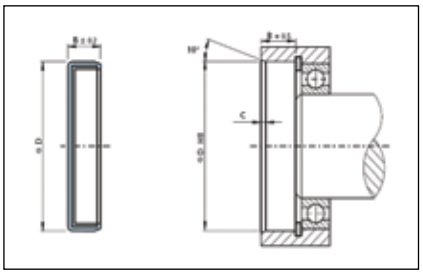
Item No.	d1 mm	D mm	Y mm	X mm	Z mm	
874370	12	20.0	8.4	6.0	12.0	0099049
849520	15	19.1	9.0	5.0	11.0	0099059
991130	17	22.2	11.0	8.0	51.0	0099068
849540	18	27.0	11.0	8.0	46.0	0099082
849560	20	23.6	11.0	8.0	51.0	0099078
849570	22	30.2	12.0	8.0	46.0	0099085
849600	25	33.0	11.0	8.0	51.0	0099098
4089960	26	33.3	12.0	8.0	46.0	0099103
849630	28	34.9	12.7	9.5	71.0	0099111
849640	30	35.6	11.0	8.0	17.0	0099114
849670	32	38.0	11.1	8.0	18.0	0099128
849710	35	41.6	16.0	13.0	20.0	0099139
849730	36	42.9	17.0	13.0	25.0	0099146
849750	38	45.2	17.0	13.0	25.0	0099147
856280	40	47.0	16.0	13.0	26.0	0099157
4089970	42	53.0	17.5	14.3	21.0	0099169
849820	45	53.0	17.0	14.0	21.0	0099177
849860	50	57.0	17.0	14.0	25.0	0099196
849900	55	62.0	23.0	20.0	32.0	0099215
4089980	60	70.7	23.0	20.0	35.0	0099235
849970	62	71.8	15.9	12.7	36.0	0099242
849990	65	72.4	23.0	20.0	35.0	0099254
933680	70	79.4	24.0	20.0	32.0	0099276
965670	75	84.0	26.0	22.0	33.0	0099294
850110	80	90.0	24.0	21.0	35.0	0099315
850130	85	94.0	25.0	21.0	35.0	0099333
4090010	90	101.6	28.0	23.0	44.0	0099354
4090020	95	102.2	24.0	21.0	44.0	0099369
850170	100	110.0	25.4	20.6	52.0	0099393
4090030	105	113.5	23.0	20.0	35.0	0099413
850230	110	125.0	16.5	12.9	31.0	0099435
4090040	115	127.0	23.8	20.6	32.0	0099452
4090050	120	129.8	25.0	20.0	32.0	0099473
4090060	125	137.2	32.0	26.0	37.0	0099492
850470	130	139.5	25.3	22.0	33.0	0099491
4090070	135	149.2	25.4	20.5	32.0	0099533
850490	140	151.0	25.5	20.5	32.0	0099552
4090080	150	159.0	30.0	26.0	34.0	0099595
4090090	155	167.0	30.0	26.0	33.0	0099606
4090100	160	177.8	31.8	25.4	46.0	0099630
4090110	165	177.8	31.8	25.4	44.0	0099650
4090120	170	182.6	38.0	31.8	55.0	0099640
4090130	175	187.0	32.0	28.0	35.0	0099687

HOUSING SEALS

End cap VK NBR

End caps are inserted in holes at shaft inlets and outlets. Service openings can also be reliably sealed with these.

Type: VK
Material: NBR



Item No.	AD mm	B mm	C mm
10005114	16.00	4.0	1.3
4110020	19.00	6.0	1.3
10005112	21.00	4.0	1.3
826550	22.00	7.0	1.3
1123520	26.00	6.5	1.3
4110030	28.00	7.0	1.3
4110040	30.00	6.0	1.5
1124030	30.00	8.0	1.5
4110050	32.00	9.5	1.5
1124050	35.00	8.0	1.5
1124710	37.00	10.0	1.8
1124060	40.00	7.0	1.3
887400	42.00	9.5	1.5
1124080	47.00	6.5	1.8
4110060	47.00	10.0	1.8
1124170	52.00	6.5	1.8
1207000	52.00	10.0	1.8
1124180	55.00	10.0	1.8
1124190	62.00	8.0	1.5
10010236	62.00	10.0	1.5
4110070	65.00	10.0	1.5
1124200	68.00	8.0	1.5
1124340	72.00	9.0	1.5
1124350	75.00	7.0	2.0
10009408	75.00	8.0	2.0
10026966	75.00	10.0	2.0
939960	75.00	12.0	2.0
10005599	80.00	8.0	2.0
968400	80.00	10.0	2.0
4499550	85.00	10.0	2.0
1124680	85.00	12.0	2.0
990310	90.00	8.0	2.0
1124540	90.00	12.0	2.0
968410	95.00	10.0	2.0
4110080	95.00	12.0	2.0
4110090	100.00	10.0	2.0
1124550	100.00	12.0	2.0
1124560	110.00	12.0	2.0
1124580	120.00	12.0	2.0
1124690	125.00	12.0	2.0
1124590	130.00	12.0	2.0
1124600	140.00	15.0	2.5
1124610	150.00	15.0	2.5
4110100	160.00	15.0	2.5
4110110	168.00	12.0	2.5
1124620	170.00	15.0	2.5

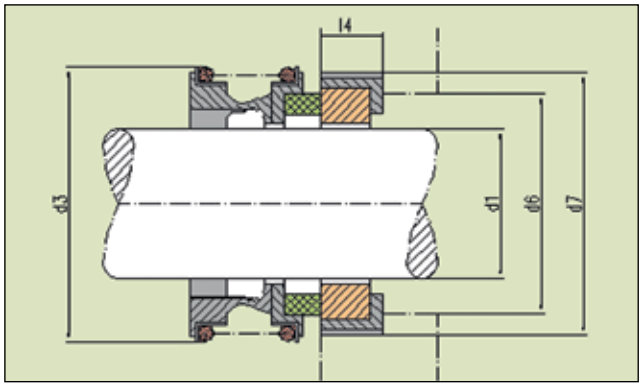
MECHANICAL SEALS

PumpSeal GB (rubber bellows)

Description
Mechanical seals in the GB series are among those mostly used. Due to its particular geometry, the bellows, which is not subject to any torsion, takes over several tasks: It is sliding ring holder, secondary sealing element and carrier. However, the actual application of force on the sliding ring is performed via the angular rings and the cylinder spring. Also very well suited for media containing solids such as in the waste water area.

General Information
Single Mechanical Seal
- independent of rotation direction
- not released
- bellows seal
- according to DIN 24960

Installation recommendation



Technical data

Operating limits	
P	12 bar
V	10 ms
t	-30 to +200 °C

Materials (mechanical seals)
Sliding materials:
B: Carbon
S: Cast chromium
Q: Silicon carbide
V: Aluminium oxide

Secondary seals
V: FPM
P: NBR
E: EDPM
M: FEP, not covered

Spring and construction materials:
G: 1.4571 CrNiMo steel
G: 1.4401 CrNiMo steel

Order example:
GB 48 BP 1.4571

Type	$d_1 \pm 0.1$	d_2	d_3	d_4	l_3	d_6	d_7	l_4
GB 10	10	22.5	22.5	24	14.5	17	21	6.6
GB 12	12	22.5	22	26	8	19	23	6.6
GB 14	14	26.5	28	30	17	21	25	6.6
GB 15	15	26.5	28	30	17	21	25	6.6
GB 16	16	26.5	28	30	17	23	27	6.6
GB 18	18	29	32	33	19.5	27	33	7.5
GB 20	20	33	36	38	21.5	29	35	7.5
GB 22	22	33	36	38	21.5	31	37	7.5
GB 24	24	38	41	44	22.5	33	39	7.5
GB 25	25	38	41	44	23	34	40	7.5
GB 28	28	44	49	50	26.5	37	43	7.5
GB 30	30	44	49	50	26.5	39	45	7.5
GB 32	32	46	53.5	55	27.5	42	48	7.5
GB 33	33	46	53.5	55	27.5	42	48	7.5
GB 35	35	50	57	59	28.5	44	50	7.5
GB 38	38	53	59	61	30	49	56	9
GB 40	40	55	62	64	30	51	58	9
GB 43	43	58	65.5	67	30	54	61	9
GB 45	45	60	68	70	30	56	63	9
GB 48	48	63	70.5	74	30.5	59	66	9
GB 50	50	65	74	77	30.5	62	70	9.5
GB 53	53	70	78.5	81	33	65	73	11
GB 55	55	72	81	83	35	67	75	11
GB 58	58	75	85.5	88	37	70	78	11
GB 60	60	79	88.5	91	38	72	80	11
GB 65	65	84	93.5	96	40	77	85	11
GB 68	68	88	96.5	100	40	81	90	11.3
GB 70	70	90	99.5	103	40	83	92	11.3

MECHANICAL SEALS

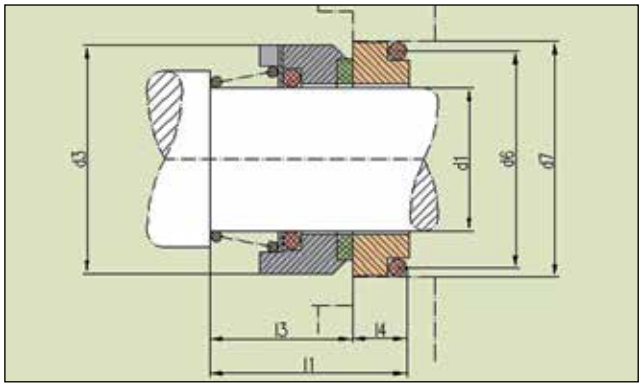
PumpSeal KF (conical spring)

Description
Mechanical seals in the series KF are frequently used and proven machine sealing elements. They are extremely robust and reliable.

Can be used for many applications: water, waste water, submersible, chemical pumps etc.

General Information
- single mechanical seal
- rotation-dependent
- not released
- with conical spring
- according to DIN 24960

Installation recommendation



Technical data

Operating limits	
P	12 bar
V	10 ms
t	-30 to +200 °C

Materials (mechanical seals)
Sliding materials:
B: Carbon
S: Cast chromium
Q: Silicon carbide
V: Aluminium oxide

Secondary seals
V: FPM
P: NBR
E: EDPM
M: FEP, not covered

Spring and construction materials:
G: 1.4571 CrNiMo steel
G: 1.4401 CrNiMo steel

Order example:
KF 48 BP 1.4571

Type	d_1	d_3	l_3	d_7	l_4	d_6	l_1
KF 10	10	20	15	21	7	17	22
KF 12	12	22	18	23	7	19	25
KF 14	14	24	22	25	7	21	29
KF 16	16	26	23	27	7	23	30
KF 18	18	32	24	33	10	27	34
KF 20	20	34	25	35	10	29	35
KF 22	22	36	25	37	10	31	35
KF 24	24	38	27	39	10	33	37
KF 25	25	39	27	40	10	34	37
KF 28	28	42	29	43	10	37	39
KF 30	30	44	30	45	10	39	40
KF 32	32	46	30	48	10	42	40
KF 35	35	49	39	50	10	44	49
KF 38	38	53	31	55	10	49	41
KF 40	40	56	42	58	13	51	55
KF 43	43	59	47	61	13	54	60
KF 45	45	61	47	63	13	56	60
KF 48	48	64	47	66	13	59	60
KF 50	50	66	46	70	14	62	60
KF 53	53	69	56	73	14	65	70
KF 55	55	71	56	75	14	67	70
KF 58	58	78	56	78	14	70	70
KF 60	60	80	56	80	14	72	70
KF 63	63	83	56	83	14	75	70
KF 65	65	85	66	85	14	77	80
KF 68	68	88	64	90	16	81	80
KF 70	70	90	64	92	16	83	80

MECHANICAL SEALS

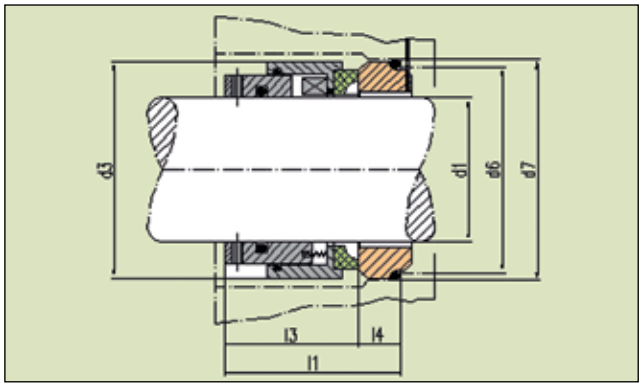
PumpSeal GF (group: spring seals)

Description
Mechanical seals in the GF series, due to their protected spring arrangement, are ideal for media containing solids and with high viscosity such as occur in the sugar and paper industry or waste water technology.

Robust, reliable, no sticking together or clogging of the springs.

General Information
- single mechanical seal
- independent of rotation direction
- released
- multiple springs
- encapsulated spring
- according to DIN 24960

Installation recommendation



Technical data

Operating limits	
P	12 bar
V	10 ms
t	-30 to +200 °C

Materials (mechanical seals)
Sliding materials:
B: Carbon
S: Cast chromium
Q: Silicon carbide
V: Aluminium oxide

Secondary seals
V: FPM
P: NBR
E: EDPM
M: FEP, not covered

Spring and construction materials:
G: 1.4571 CrNiMo steel
G: 1.4401 CrNiMo steel

Order example:
GF 48 BP 1.4571

					Installation lengths		
Type	d_1	d_3	d_4	d_7	L_1K	L_3	L_2
GF 18	18	32	34	33	45	35	25
GF 20	20	34	36	35	45	35	25
GF 22	22	36	38	37	45	35	25
GF 24	24	38	40	39	45	35	25
GF 25	25	39	41	40	45	35	25
GF 28	28	42	44	43	45	35	25
GF 30	30	44	46	45	45	35	25
GF 32	32	46	48	48	45	35	25
GF 33	33	47	49	48	45	35	25
GF 35	35	49	51	50	45	35	25
GF 38	38	54	56	56	51	40	29
GF 40	40	56	58	58	51	40	29
GF 42	42	58	60	61	51	40	29
GF 43	43	59	61	61	51	40	29
GF 45	45	61	63	63	51	40	29
GF 48	48	64	66	66	51	40	29
GF 50	50	66	68	70	53	40	29
GF 53	53	69	71	73	53	40	29
GF 55	55	71	73	75	53	40	29
GF 60	60	77	81	80	53	40	29
GF 65	65	83	87	85	53	40	29
GF 70	70	88	92	92	55.3	40	29
GF 75	75	94	99	97	55.3	40	29
GF 80	80	100	105	105	55.7	40	29
GF 85	85	104	109	110	55.7	40	29
GF 90	90	110	115	115	55.7	40	29
GF 95	95	113	118	120	55.7	40	29
GF100	100	120	125	125	55.7	40	29

STUFFING BOX PACKING

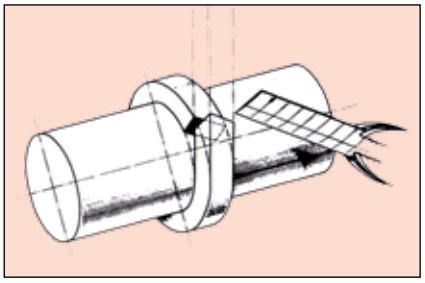
Standard Range Overview

Item	Design	Application area	Pressure (bar)			Speed (m/s)			Temperature in °C	pH value
			■	▲	•	■	▲	•		
REIFF – A2	High wear-resistant woven packing made of spun aramide yarn filled with creep-resistant PTFE, with running-in lubricant.	For dynamic use with grinding liquids and drying equipment. Best suited for water pumps.		80	30		2	20	-100 to +250	3 to 12
REIFF – C	Woven packing made of carbon yarn, high heat-resistant impregnated.	For general use in pumps and industrial valves.	200	100	40	1	2	20	–50 to +500*	2 to 12
REIFF – P1	Woven packing made of PTFE graphite compound yarn.	Valves and piston pumps, not suitable for oxidising liquids.	500	200	80	1	2	10	-200 to +280	0 to 14
REIFF – P3	Woven packing made of PTFE graphite compound yarn with running-in lubricant.	For all dynamic applications, particularly with simultaneous requirement of flexibility and resistance. Not suitable for strong oxidising agents.		200	50		2	25	-200 to +280	0 to 14
REIFF – PA2	Combination mesh made of PTFE graphite compound fibres and edge-reinforced aramide fibres, with running-in lubricant.	For dynamic applications with industrial liquids. Better mechanical resistance. Particularly suitable for use in piston pumps.		250	50		3	25	-100 to +250	3 to 12
REIFF – R	Wear-resistant, woven packing made of ramie natural fibres, impregnated with PTFE and lubricant	For dynamic uses with water and industrial liquids with pH average values		60	25		2	10	-50 to +120	4 to 11

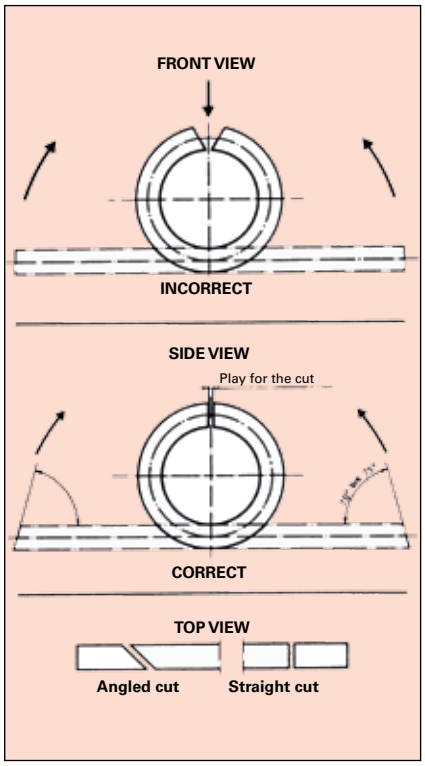
■ = valve ▲ = plunger pumps • = centrifugal pumps *Maximum value

STUFFING BOX PACKING

Installation of the stuffing box



Open the rings in the axial direction, insert base ring and tighten slightly to give the exact form to the packing ring. Insert the second ring so that the incision is offset by 90°. Tighten slightly in order to install the other rings using the same method. The gland is permitted to enter maximum 1/3 of its free length (otherwise install another ring). When the shaft is rotating, completely release the gland and tighten again slightly.
Check:
Turn the shaft by hand; in doing so, no jamming or resistance must be noticeable. Check the parallelism of the gland to the case.



A badly designed stuffing box:
- leaks despite tightening several times;
- heats up due to incorrect tightening;
- grinds the shaft and thus prevents the leak tightness;
- gets stuck, flows and breaks away.

The best packing only performs good service if:
- it is well adapted to its application;
- it has been correctly installed and put into operation.

Start-up

Put pump into operation whereby leakage must occur. No abnormal heating must occur. In the case of checking using the back of your hand, a maximum temperature of 30–40 °C is permitted to be sensed; if necessary, stop and allow to cool down sufficiently, then put into operation again.

After a certain running-in time, if necessary tighten the gland regularly and very progressively while always monitoring the temperature which should remain constant. If the packing mesh is not already treated with MoS2, we recommend applying a coat before each installation either by hand or by spraying. It goes without saying only do this if there is no reason not to use MoS2.

Important information:

Aramide fibre packing is softer than conventional asbestos packing. During the installation, it is required to only tighten the gland slightly and not too strongly. A slight leak - sometimes a few drops are sufficient - must always be present to guarantee minimum lubrication.

STUFFING BOX PACKING

Installation of the packing

Manufacture of the rings
Without pre-compression
- Determine length of the rings
- Cut off the packing mesh at right angles or at an angle of less than 45°.

Experience has shown that it is beneficial for certain packing meshes which stretch severely under pressure and for certain stuffing boxes which are badly cooled, to leave slight play, which depends on the diameter of the shaft, for the mounting on the interface.

Shaft diameter in mm	up to 30	31 to 60	61 to 100	101 and more
Approximate play in mm	0.5	1	1.5	2

The cut must be performed carefully.

Packing cutter

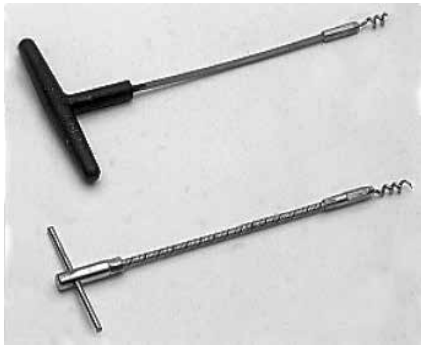
Packing cutter
Can be used everywhere. Allows exact butt joint, no waste, easy mounting and reduced maintenance.

Item No.:	737120
Shaft∅ mm	up to 120
Packing cross section Square/mm up to 30	up to 20

Installation of the packing

Packing puller
Packing pullers are mainly used for pulling stuffing box packing 4 mm to 25 mm out of the section and more in valves, pumps, agitators etc. They are very robust. Packing can be removed easily even in the most cramped conditions.

Item No.:	808620	808610	808600	935720
Size	3	2	1	0
Cross section Square/mm	beginning at 6 units	beginning at 10 units	beginning at 13 units	beginning at 16 units
Length	220	330	440	500



STUFFING BOX PACKING

Packing Reiff - A2

High wear-resistant woven packing made of spun aramide yarn filled with creep-resistant PTFE, with running-in lubricant.
For dynamic use with grinding liquids and drying equipment. Best suited for water pumps.

Type: Reiff - A2

Item No.	Diameter mm	kg/Box	m/kg
10037089	3 x 3	1.0	74.1
10037092	5 x 5	1.0	26.7
10037093	6 x 6	2.5	18.5
10037094	8 x 8	2.5	10.4
10037095	10 x 10	2.5	6.7
10037097	12 x 12	2.5	4.6
10037098	14 x 14	5.0	3.4
10037099	16 x 16	5.0	2.6
10037100	18 x 18	5.0	2.1
10037101	19 x 19	5.0	1.8
10037102	22 x 22	5.0	1.4

Packing Reiff - C

Woven packing made of carbon yarn, high heat-resistant impregnated.
For general use in pumps and industrial valves.

Type: Reiff - C

Item No.	Diameter mm	kg/Box	m/kg
10036844	3 x 3	1.0	101
10036845	4 x 4	1.0	56.8
10036846	6 x 6	2.5	25.3
10036847	8 x 8	2.5	14.2
10036848	12 x 12	2.5	6.3
10036849	14 x 14	5.0	4.6
10036850	16 x 16	5.0	3.6
10036851	18 x 18	5.0	2.8
10036852	19 x 19	5.0	2.5
10036853	22 x 22	5.0	1.9

Packing Reiff - P1

Woven packing made of PTFE graphite compound yarn.
Valves and piston pumps, not suitable for oxidising liquids.

Type: Reiff - P1

Item No.	Diameter mm	kg/Box	m/kg
10036971	4 x 4	1.0	48.1
10036974	5 x 5	1.0	30.8
10036975	6 x 6	2.5	21.4
10036976	8 x 8	2.5	12.0
10036977	10 x 10	2.5	7.7
10036978	12 x 12	2.5	5.3
10036980	14 x 14	5.0	3.9
10036983	16 x 16	5.0	3.0
10036985	19 x 19	5.0	2.1
10036987	22 x 22	5.0	1.6

STUFFING BOX PACKING

Packing Reiff - P3

Woven packing made of PTFE graphite compound yarn with running-in lubricant. For all dynamic applications, particularly with simultaneous requirement of flexibility and resistance. Not suitable for strong oxidising agents.

Type: Reiff - P3

Item No.	Diameter mm	kg/Box	m/kg
10037043	3 x 3	1.0	70.0
10037068	4 x 4	1.0	40.0
10037071	5 x 5	1.0	25.0
10037074	6 x 6	2.5	17.0
10011214	8 x 8	2.5	9.8
10011216	10 x 10	2.5	6.3
10037081	12 x 12	2.5	4.2
10037083	14 x 14	5.0	3.0
10037086	18 x 18	5.0	1.7
10037087	19 x 19	5.0	1.6
10037088	22 x 22	5.0	1.3

Packing Reiff - PA2

Combination mesh made of PTFE graphite compound fibres and edge-reinforced aramide fibres, with running-in lubricant. For dynamic applications with industrial liquids. Better mechanical resistance. Particularly suitable for use in piston pumps.

Type: Reiff PA2

Item No.	Diameter mm	kg/Box	m/kg
10037005	3 x 3	1.0	74.1
10037007	6 x 6	2.5	18.5
10037008	8 x 8	2.5	10.4
10037009	10 x 10	2.5	6.7
10037014	12 x 12	2.5	4.6
10037016	14 x 14	5.0	3.4
10037017	16 x 16	5.0	2.6
10037018	18 x 18	5.0	2.1
10037020	19 x 19	5.0	1.8
10037022	22 x 22	5.0	1.4

Packing Reiff - R

Wear-resistant, woven packing made of ramie natural fibres, impregnated with PTFE and lubricant
For dynamic uses with water and industrial liquids with pH average values

Type: Reiff - R

Item No.	Diameter mm	kg/Box	m/kg
10037029	12 x 12	2.5	5.0
10037032	14 x 14	5.0	3.6
10037034	16 x 16	5.0	2.8
10037035	18 x 18	5.0	2.2
10037037	19 x 19	5.0	2.0
10037038	22 x 22	5.0	1.5

[REIFF TECHNISCHE PRODUKTE]

Gleitringdichtungen

vom Sealprofi

REIFF Technische Produkte – Ihr strategischer Partner für die Dichtungstechnik

Seit über 100 Jahren ist REIFF Technische Produkte führender Partner in der Erstausrüstung. Mit mehr als 140.000 Produkten aus den Bereichen Antriebstechnik, Dichtungstechnik, Schlauchtechnik, Kunststofftechnik und Profiltechnik verfügen wir über eines der größten technischen Sortimente Deutschlands.
Im Bereich der Dichtelemente stehen Ihnen über 50.000 Standardprodukte zur Verfügung.

Sortiments-Profi

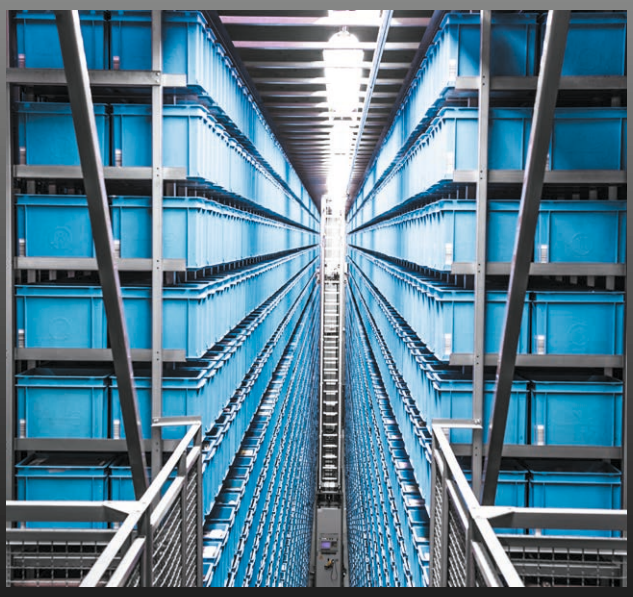
In Zusammenarbeit mit führenden Herstellern erweitert REIFF kontinuierlich sein umfangreiches Dichtungssortiment: im Bereich der statischen Dichtungen, Rotations-, Hydraulik-, Pneumatik- und Flachdichtungen sowie bei Gummi- bzw. Dichtungsplatten. Bei der Auswahl unserer Produkte gehen wir auf individuelle Kundenwünsche ein und setzen stets auf starke Marken!

Entwicklungs- und Beratungs-Profi

Unsere Anwendungsingenieure kennen sich bestens aus hinsichtlich Produkten, Materialien und Anwendungen.
Die erfahrenen Techniker unterstützen Sie gerne mit einer fundierten Beratung – bei Bedarf auch vor Ort – mit technischen Entwürfen, Prototyping für die Serienproduktion oder mit einer Fertigung nach Maß.
Die Sealprofis kennen die optimale Lösung, passend zu Ihrer Anwendung!

Logistik-Profi

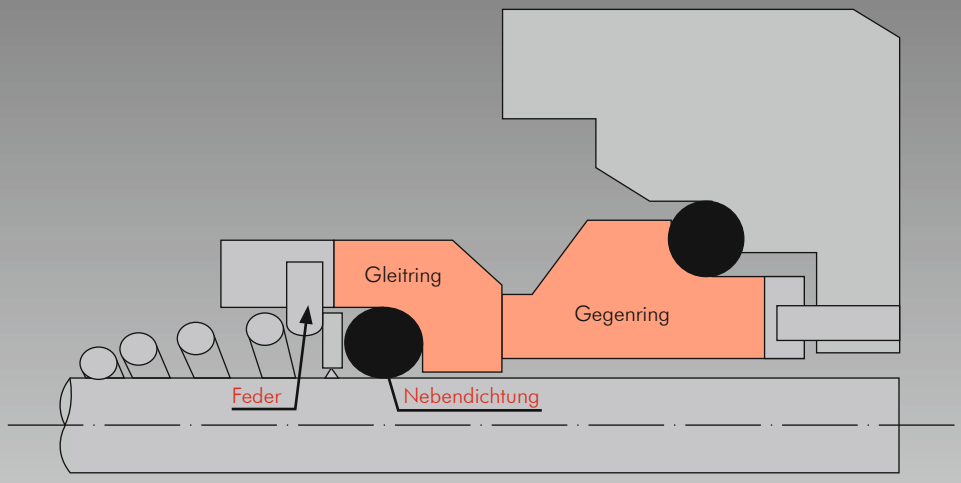
Ist die optimale Dichtungslösung gefunden und das geeignete Produkt ausgewählt, sorgt REIFF für die termingerechte Belieferung – auf Wunsch „just in time“. Eine schnelle Verfügbarkeit und effiziente Prozesse in der gesamten Logistikkette bieten wir durch eines der größten und modernsten Zentrallager des Technischen Handels: Mit 16.000 m² Lagerfläche, modernster Lagertechnik und über 80.000 Artikeln sorgen wir für Planungssicherheit und einen hohen Bestellkomfort. Unser Verkäuferteam berät Sie gern, organisiert und steuert den Auftragsablauf nach Ihren Anforderungen und Wünschen.



GLEITRINGDICHTUNGEN –

zuverlässig und hochpräzise

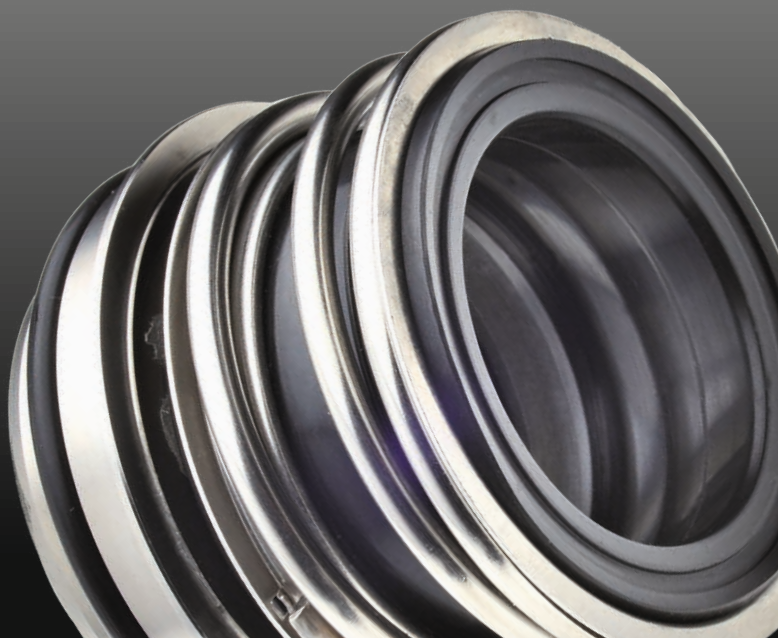
REIFF-Gleitringdichtungen kommen überall dort zum Einsatz, wo aufgrund aggressiver Medien in Verbindung mit großen Drücken und hohen Umfangsgeschwindigkeiten gängige Wellenabdichtungen nicht mehr ausreichen. Durch die Verwendung von Gleitringdichtungen können Leckagen ausgeschlossen und höhere Standzeiten gewährleistet werden.



Die gleitenden Bauteile – Gegenring & Gleitring – werden mit ihren Laufflächen gegeneinander im Maschinengehäuse eingebaut. Während der Gegenring statisch eingebaut ist, bewegt sich der Gleitring mit der rotierenden Welle. Abgestimmte Vorspannelemente wie z.B. Einzelfedern, Gruppenfedern oder der Metallfaltenbalg, stellen die Dichtwirkung zwischen den geläppten Gleitflächen zu jedem Betriebszeitpunkt sicher.

Diese Eigenschaften garantieren Erfolg:

- ideal bei abrasiven Medien und hohen Drücken
- hochwertige, korrosionsbeständige Gleitwerkstoffe
- gute Wärmeabführung
- für niedrige und hohe Umfangsgeschwindigkeiten
- höhere Standzeiten gegenüber Stopfbuchspackungen
- leichtgängig und verdrehsicher
- schnelle und einfache Austauschbarkeit, kein Nachstellen im Betrieb
- schnelle Sonderanfertigung



PRODUKT-KNOW-HOW

und Materialkompetenz

Die REIFF-Anwendungsingenieure wissen genau, welches Material bei welchen Medien einzusetzen ist und unterstützen Sie von der Materialauswahl bis hin zur konstruktiven Lösung.

Die Materialien – kompromisslos hochwertig

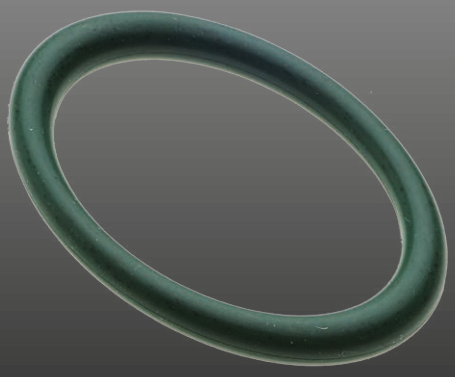
Nicht allein die unterschiedlichen Bauformen sind entscheidend für die sichere Abdichtung und Betriebssicherheit der REIFF-Gleitringdichtungen. Der Auswahl beziehungsweise der Kombination geeigneter Materialien in Abhängigkeit von den Betriebsparametern gilt ebenfalls unsere volle Aufmerksamkeit.

Gleitringe

Als Hauptmaterialien für Gleitflächen werden synthetische Kohle, spezielle Stähle und Gusswerkstoffe, sowie Karbide, Metalloxide und Kunststoffe verwendet. Diese Werkstoffe wurden speziell für verschiedene Anforderungen, wie z.B. den Einsatz in abrasiven Medien entwickelt und erfüllen zuverlässig die meisten Betriebsanforderungen. Die geläppten Laufflächen stehen für höchste Präzision und halten zuverlässig das Schmiermittel im System.

Elastomere

Für die hohen Ansprüche an Medien- und Temperaturbeständigkeit gibt es auch bei der Auswahl des Elastomers keine Kompromisse. Die für Gleitringdichtungen verwendeten Elastomere zeigen einen optimalen Druckverformungsrest und sind in Umgebungstemperaturen von -40°C bis +200°C einsatzfähig. Standardmäßig sind Materialien in Nitril-Kautschuk (NBR) und Fluor-Kautschuk (FKM) in Verwendung. Wenn Betriebsbedingungen höhere Temperaturbeständigkeit erfordern, können weitere Materialien wie z.B. Perflourkautschuk (FFPM) zum Einsatz kommen.



Bauformen

REIFF-Gleitringdichtungen sind durch die Vielzahl der Bauformen an die unterschiedlichsten Betriebsbedingungen angepasst. Durch Kombination hochwertiger Materialien von Gleit- und Gegenring sowie der Nebendichtung können individuelle Produktlösungen umgesetzt werden. Gleitringdichtungen werden nach DIN EN 12758 (24960) gefertigt.

Folgende Übersicht zeigt unsere Hauptvarianten.

		Materialien		
Gleitring-dichtungen	**Dichtungsart**	**Gleitflächen-paarung/ Gegenringe**	**Neben-dichtung**	**Einsatzparameter**
	Gummibalg-dichtung	Synthetische Kohlen, Stahl-legierungen, Gusseisen-metalle, Karbide (Wolfram-karbide, Siliciumkarbide), Metalloxide (Keramik), Kunststoffe (PTFE, sonstige)	NBR, EPDM, FPM, FEP, FFPM	Wellendurchmesser 10–100 mm, pmax 12bar, Temperatur -20 bis +120 °C, vmax 10m/s
	Einzelfeder, konisch			Wellendurchmesser 10–100 mm, pmax 10bar, Temperatur -20 bis +180°C, vmax 15m/s
	Metallfaltenbalg			Wellendurchmesser 18–100 mm, pmax 20bar, Temperatur -20 bis +220°C, vmax 20m/s
	Sinusfederdichtung			Wellendurchmesser 12–100 mm, pmax 16 bar, Temperatur -30 bis +220°C, vmax 20m/s
	Gruppenfeder-dichtung			Wellendurchmesser 18–100mm, pmax 25 bar, Temperatur -30 bis +220°C, vmax 20m/s
	Einzeldichtung mit Drainageanschluss, Doppeldichtung mit Anschlüssen, Sperrsystem erforderlich			Wellendurchmesser 25–100 mm, pmax 25 bar, Temperatur -40 bis +200°C, vmax 10–16 m/s

Wenn Standardabmessungen nicht ausreichen, bieten wir Ihnen individuelle Produkte entsprechend Ihrer konstruktiven Vorgaben.

REIFF MACHT DEN UNTERSCHIED!

Topaktuelles Fachwissen gepaart mit professionellem Support – die REIFF-Anwendungsingenieure sind mit den täglichen Herausforderungen ihrer Kunden bestens vertraut und stehen Ihnen gern als Ansprechpartner auf Augenhöhe zur Verfügung. Das macht uns zum idealen Partner in der Erstausrüstung!

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V-BELTS, FLAT BELTS, CONVEYOR BELTS

PROFILE TECHNOLOGY
PLASTICS
HYDRAULIC / PNEUMATIC SEALS
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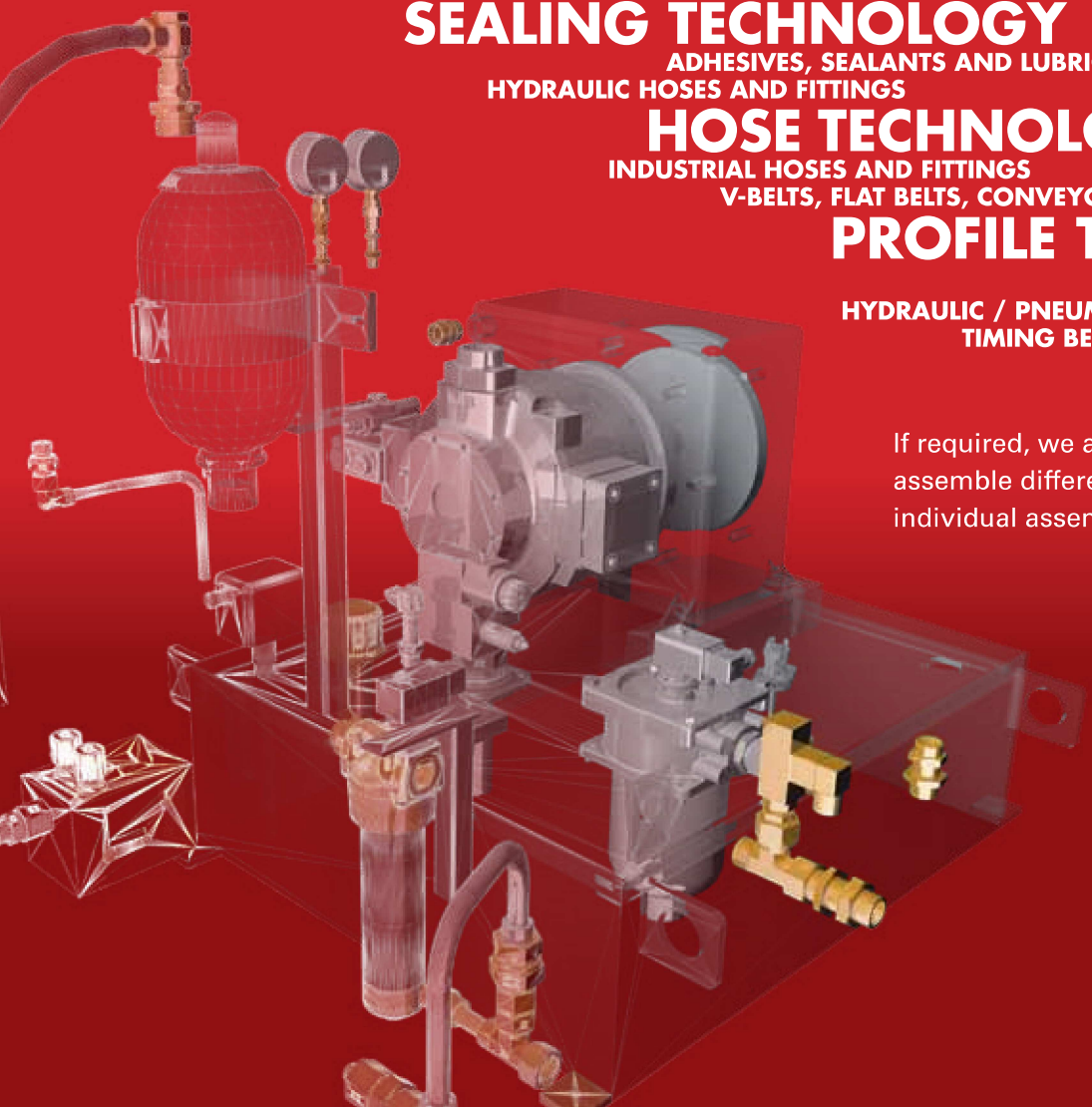

If required, we are also pleased to assemble different product elements into individual assemblies.