

O-rings

Back-up rings and
O-ring cords



Product catalogue

HOLM
SEALING SOLUTIONS



CARSTEN HOLM A/S

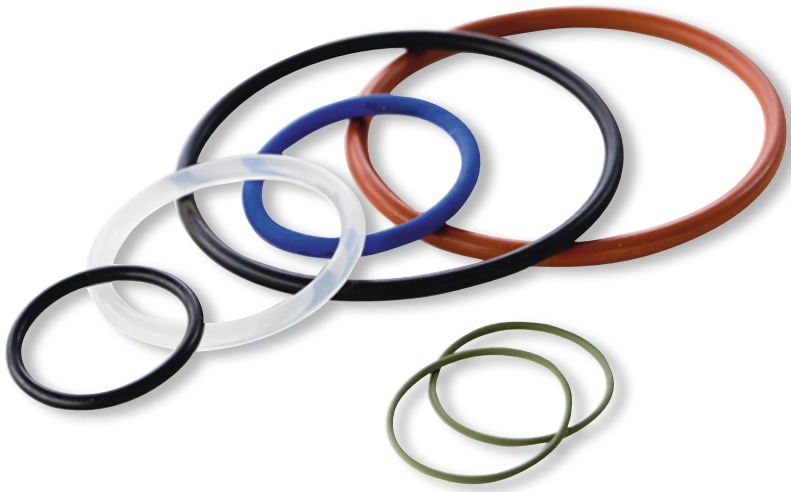
PROBABLY DENMARK'S LARGEST RANGE OF SEALS AND GASKETS

Carsten Holm A/S has manufactured and sold standard and special seals for hydraulic, pneumatic, static and rotary applications since 1979. We offer extremely competitive prices on high quality products for use in a wide range of industries in Denmark and abroad.

Carsten Holm A/S is a leading player in the gasket and seals market. We strive consistently to add value and provide outstanding solutions for our customers.

We probably have Denmark's largest stock of O-rings and rotary shaft seals. Our dedicated employees, fully documented processes and focus on quality make all the difference. We offer versatile solutions adapted to meet customer-specific requirements. Carsten Holm A/S guarantees:

- Rapid and reliable delivery
- Competitive prices
- Competent advisory services
- High-quality products



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EXPERTISE AND EXPERIENCE

MAKE ALL THE DIFFERENCE!

We have almost 40 years of sealing experience and Denmark's largest stock of seals and gaskets. Our product range includes more than 100,000 articles:

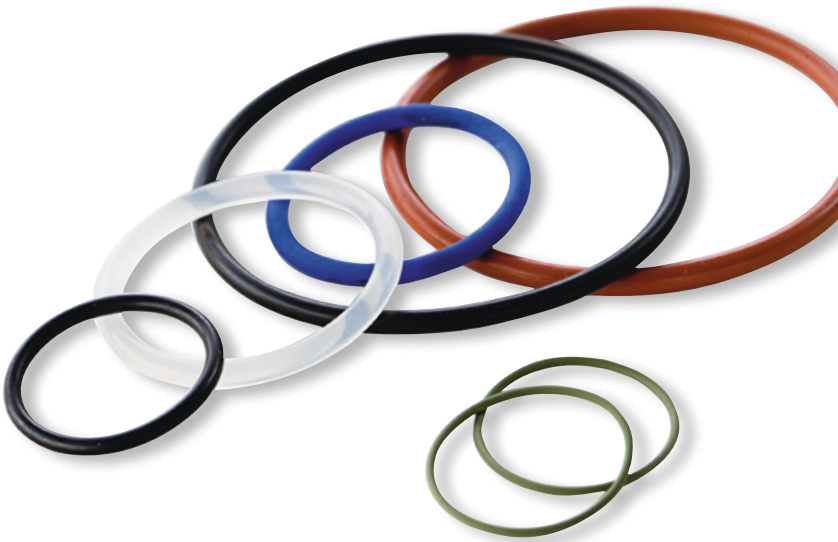
- Hydraulic seals
- Pneumatic seals
- Static seals
- Rotary seals

In this catalogue, we share our many years of experience of working with O-rings, back-up rings and O-ring cords. The catalogue also contains relevant technical product data.












At Carsten Holm A/S, we have a comprehensive range of high-quality O-rings, back-up rings and O-ring cords in special sizes and compounds for use in aggressive media and under hostile operating conditions.

The data provided in this catalogue is for guidance only. Carsten Holm A/S accepts no liability for it.

O-RINGS



O-rings – Profile list

Description	Material	Profiles	Temperature °C
O-RING NBR	NITRILE RUBBER		-30°C+105°C
O-RING FKM	FLUORO RUBBER		-15°C+200°C*
O-RING SI/VMQ	SILICONE		-25°C+200°C
O-RING EPDM	ETHYLENE PROPYLENE		Sulphur cured: -45/+130°C Peroxide cured: -50/+150°C
O-RING H-NBR	HYDROGENATED NITRILE		-20°C+150°C
O-RING VITON® EXTREME-ETP O-RING AFLAS®	TETRAFLUOROETHYLENE PROPYLENE FEPM		-10°C+230°C
O-RING FFKM	PERFLUOROELASTOM		-26°C+260°C(+326)
O-RING CR	CHLOROPRENE		-30°C+120°C
O-RING PU	POLYURETHANE		-30°C+125°C
O-RING PTFE	POLYTETRA- FLUOROETHYLENE		-200°C+260°C
O-RING – ENCAPSULATED	SILICONE / FEP encapsulated SILICONE / PFA encapsulated VITON® / FEP encapsulated VITON® / PFA encapsulated		-60°C+205°C -60°C+260°C -60°C+205°C -60°C+260°C

How an O-ring works

O-rings are the most common sealing element – a simple, cost-effective solution. An O-ring is a two-sided seal, which seals a fluid or gas from a metal surface. The seal acts as an extremely viscous liquid, which shifts compression to the points at which the seal is in contact with the groove and cylinder. Because they take up less space and provide two-sided sealing, O-rings make technical design work easier compared to other sealing elements.

PROFILE



PRODUCT BENEFITS

- ✓ Can be used both for static and low pressure dynamic applications
- ✓ Wide range of compounds
- ✓ Wide range of dimensions
- ✓ Easy installation and removal
- ✓ Cost-effective solution

ALWAYS IN STOCK

We stock O-rings in many different sizes and compounds. Special sizes are available on request.

APPLICATIONS

O-rings are used in the vast majority of sectors and industries. O-rings are used in almost every industry and type of machinery but especially in static sealing applications, such as flanges and cover seals. Under optimal operating conditions, O-rings can be used as dynamic seals, e.g. in cylinders. However, O-rings are not recommended for use in rotary applications.

Materials

O-rings are available in a wide range of materials and colours. Choose an O-ring to meet your specific requirements, e.g. temperature conditions, chemical resistance and application. The most common O-ring materials are listed in the table below.

List of materials – O-rings

Material		Temperature °C	Resistance	Application
NITRILE RUBBER	NBR	-30/+100°C	Hydraulic fluid Diesel oil Mineral oil and grease Aliphatic hydrocarbons Diluted acids and lye	NBR is used in almost every industry but especially in non-moving machinery and in static sealing applications, such as flange or cover seals. Not suitable for outdoor use because of poor resistance to ozone and UV rays.
HYDROGENATED NITRILE RUBBER	H-NBR	-20/+150°C	Hydraulic fluid Diesel oil Mineral oil and grease Lubricants Aliphatic hydrocarbons Lubricity additives Sour gas HS2 Acids & lye (diluted)	HNBR O-rings have good resistance to mineral oils and mechanical wear and improved resistance to heat, ozone, ageing and weathering. HNBR also has good resistance to some refrigerants.
FLUORO RUBBER (also known as Viton® rubber*)	FKM	-15/+200°C	Hot hydraulic oil Diesel oil Mineral oil Aliphatic hydrocarbons Aromatic hydrocarbons Chlorinated hydrocarbons Acids (concentrated) Diluted acids Chemicals (diluted)	FKM O-rings are known for their resistance to chemicals and heat. Good mechanical attributes and good ozone, ageing and weathering resistance.
ETHYLENE PROPYLENE RUBBER	EPDM	-45/+130°C (Sulphur cured) -50/+150°C (Peroxide cured)	Hot water Steam Organic fluids Brake fluids (dot4 and dot5) Ozone and UV light Acids (diluted) Lye	EPDM O-rings have excellent resistance to ozone, hot water and glycol-based brake fluids.
SILICONE RUBBER	SI/VMQ	-25/+200°C (-50/+200°C)	Heat and cold Acids (diluted) Animal and vegetable grease and oil Ozone and UV rays	Silicone O-rings are very hygienic and have excellent resistance to bacterial growth. They are often used in industries associated with food or medical products.
PERFLUOROELASTOMER (known as Kalrez®)**	FFKM	-26/+260°C(+326)	Heat Hot water Steam Acids (concentrated) Lye Hydraulic fluid Diesel oil Motor oil Mineral oil and grease Ammonia Brake fluids Gear oils Bleaching agents Sour gas HS2 Oxidised media	FFKM O-rings are known to have extremely good chemical resistance. These products are often found in applications in very hostile environments.
NEOPRENE RUBBER	NE/CR	-30/+100°C	Water Silicone oils Alcohol Ozone and UV rays Mineral grease Certain types of freon	CR O-rings are used in applications, which use refrigerants and in outdoor applications.

Material		Temperature °C	Resistance	Application
POLYURETHANE	PU	-30/+125°C	Petroleum-based oils Mineral oils Aliphatic hydrocarbons Silicone oils and grease O ₂ O ₃ Oxygen Ozone	PU O-rings are special sealing elements that are used when standard elastomer O-rings are inadequate. Under optimal working conditions, PU O-rings can be used in very wide areas of application in hydraulic and pneumatic systems, and in static and dynamic applications.
POLYTETRA-FLUOROETHYLENE	PTFE	-200/+260°C	Heat and cold Chemical resistance Ozone and UV rays Water Steam	PTFE O-rings are known to be suitable for application in chemical or thermal environments and are often used in the food, pharmaceutical and medical industries.
FLUORO RUBBER – TETRAFLUOROETHYLENE AND PROPYLENE (Also known as AFLAS[®]*** or Viton[®] Extreme*)	TFE/P FEPM	-10/+200°C	Hot water Steam Acids Bases Bleaching agents Oil	TFE/P and FEPM O-rings have the same excellent resistance to chemicals and heat as FKM but are also resistant to steam. TFE/P and FEPM are also resistant to HS2 sour gas and oils.

NB: The temperature ranges stated here are for guidance only. Values may vary.

* Viton[®] is a registered trademark of DuPont Performance Elastomers. ** Kalrez[®] is a registered trademark of DuPont Performance Elastomers.

*** AFLAS[®] is a registered trademark of Asahi Glass Co. Ltd.

The properties and other data listed in the table are of general character and therefore for guidance only. Values may vary depending on compound design and operating conditions.

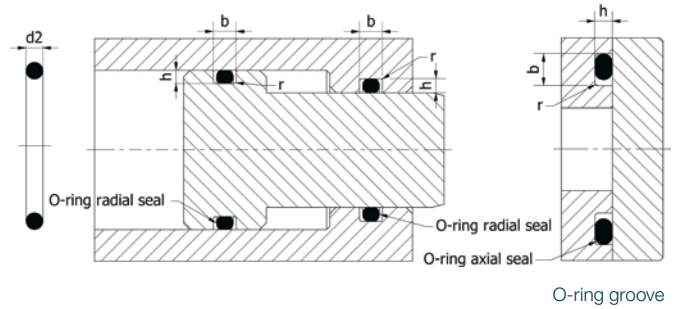


Static applications

Although the vast majority of O-rings sold are used in static applications, O-rings may also be used in dynamic applications. At Carsten Holm A/S, we recommend that you refrain from using O-rings in dynamic systems under very high pressure. There are four types of groove variants for use in static applications. Each of these is described in the following.

Radial and axial internal fitting

The table shows a selection of cross-section diameters depending on the depth/width of the groove for radial and axial internal fitting, respectively.



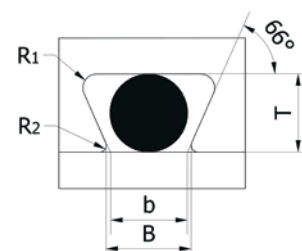
Groove dimensions for O-rings – all measurements in mm

O-ring cross-section diameter d2	Radial O-ring groove			Axial O-ring groove		Radius
	Groove depth		Groove width	Groove depth	Groove width	R
	Dynamic h +0,05/-0,00	Static h +0,05/-0,00	b +0,02/-0,00	h +0,05/-0,00	b +0,20/-0,00	R +/- 0,1
1.00	0.80	0.75	1.35	0.70	1.50	0.30
1.50	1.20	1.15	2.00	1.05	2.20	0.30
1.80*	1.45*	1.35*	2.40*	1.30*	2.60*	0.30*
2.00	1.65	1.55	2.70	1.45	2.85	0.30
2.50	2.10	1.95	3.35	1.90	3.55	0.30
2.65*	2.25*	2.05*	3.60*	2.00*	3.80*	0.30*
3.00	2.60	2.40	4.00	2.30	4.20	0.60
3.55	3.10*	2.80	4.80*	2.75*	5.00	0.60*
3.70	3.20	3.00	5.00	2.90	5.15	0.60
4.00	3.50	3.20	5.40	3.20	5.55	0.60
4.30	3.75	3.40	5.80	3.30	5.90	0.60
4.50	3.95	3.60	6.10	3.60	6.20	0.60
5.00	4.40	4.10	6.70	4.00	6.90	0.60
5.30*	4.70*	4.35*	7.10*	4.25*	7.30*	0.60*
5.50	4.85	4.50	7.40	4.50	7.50	1.00
6.00	5.30	4.90	8.10	4.90	8.20	1.00
6.50	5.75	5.35	8.70	5.45	8.90	1.00
7.00*	6.15*	5.80*	9.50*	5.70*	9.70*	1.00*
7.50	6.60	6.20	10.05	6.20	10.20	1.00
8.00	7.10	6.60	10.70	6.60	10.90	1.00
9.00	8.00	7.55	12.00	7.50	12.20	1.00
10.00	8.90	8.35	13.35	8.40	13.60	1.00
11.00	9.80	9.25	14.70	9.30	14.90	1.00

*According to DIN 3771, part 5 – recommended values. All other values stated in this table are derived from data recommended in DIN 3771, part 5. The calculated values apply for O-rings with Shore value (hardness) corresponding to 70A. For materials with other shrink values, the groove depth may vary. The figures are calculated based on 15% expansion. When using elastomer that has less than 15% expansion, the groove width is reduced accordingly.

Dovetail groove internal fitting

The dovetail groove is preferred if the O-ring has to be fixed/secured in the groove during maintenance and service, or if the machine/tool is repeatedly started/stopped. In a dovetail groove, the O-ring acts as a valve that prevents gases and liquids from escaping. The O-ring creates an efficient vacuum seal. A dovetail groove is only used in connection with an axial seal, e.g. a cover, which can be opened. This type of groove is costly and time-consuming.



Dovetail groove

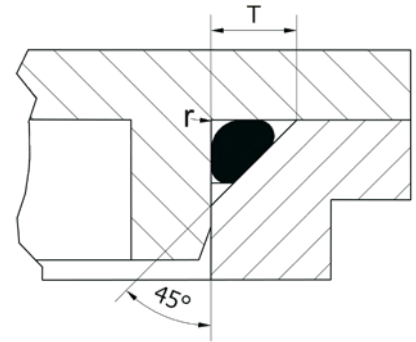
Dovetail groove at cross-section diameters from $d_2 > 3.0$ metric

Cross-section diameter d_2 mm	Groove depth T +/- 0,05	Groove width		Radius	
		b +/-0,05	b +/-0,05	R1	R2
3.00	2.40	2.45	2.60	0.4	0.25
3.53	2.80	2.80	3.05	0.8	0.25
4.00	3.20	3.10	3.40	0.8	0.25
5.00	4.15	3.85	4.10	0.8	0.25
5.33	4.40	4.10	4.35	0.8	0.25
5.50	4.60	4.20	4.60	0.8	0.40
5.70	4.80	4.35	4.75	0.8	0.40
6.00	5.05	4.55	4.95	0.8	0.40
8.00	6.85	6.00	6.50	1.5	0.50
8.40	7.25	6.25	6.80	1.5	0.50
8.50	7.35	6.35	6.90	1.5	0.50
9.00	7.80	6.70	7.25	1.5	0.50
10.00	8.70	7.40	7.95	1.5	0.50

All measurements are in mm.

Triangular groove internal fitting

The triangular O-ring groove is used in connection with bolted flange joints and end covers. The O-ring has contact on three sides and therefore holds the installation in place. The O-ring effectively fills the gap that has to be sealed. An effective seal requires very precise tolerances with respect to inner fitting measurements.



Triangular groove

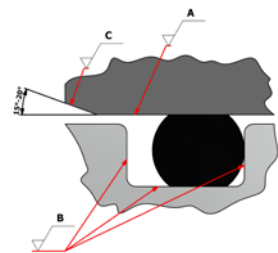
Triangular groove for flange seals and end covers at cross-section diameters from $d_2 \geq 1.8$ mm

d2	T	r
1.80	2.40+0.10	0.3
2.00	2.70+0.10	0.4
2.50	3.40+0.15	0.6
2.62	3.50+0.15	0.6
3.00	4.00+0.20	0.6
3.53	4.70+0.20	0.9
4.00	5.40+0.20	1.2
5.00	6.70+0.25	1.2
5.33	7.10+0.25	1.5
6.00	8.00+0.30	1.5
7.00	9.40+0.30	2.0
8.00	10.80+0.30	2.0
8.40	11.30+0.30	2.0
10.00	13.60+0.35	2.5

All measurements are in mm.

Surface finish requirements

The surface finish requirements depend on the purpose of the element in the application in question. The surface finish values stated here are therefore for guidance only. The table below shows values applicable to most sealing applications. The values are for guidance only.



Surface finish requirement values – for guidance only

Surface	Base (B)	Sides (B)	Sealing surface (A)	Base (B)	Sides (B)	Sealing surface (A)	Chamfering (C)
Pressure	Static	Static	Static	Dynamic	Dynamic	Dynamic	–
Rz (µm)	6.3	6.3	6.3	6.3	6.3	1.6	6.3
Ra (µm)	1.6	1.6	1.6	1.6	1.6	0.4	1.6

Dimensions and tolerances

An O-ring is described by the inside diameter (d1) and the diameter of the cord, also called the cross-sectional diameter (d2). The table (below) shows examples of tolerance thresholds for O-rings that meet DIN 3601-1 requirements:



Tolerance (d1)

d1 mm	Tolerance +/- mm	d1 mm	Tolerance +/- mm
0 - 3	0.14	120-150	1.16
3 - 6	0.16	150-180	1.36
6 - 10	0.19	180-250	1.82
10 - 18	0.25	250-300	2.14
18 - 30	0.34	300-350	2.46
30 - 50	0.48	350-400	2.78
50 - 80	0.69	400-500	3.41
80 - 100	0.82	500-650	4.22
100 - 120	0.96	650-800	4.96

If you need to know the precise tolerance for a given diameter (d1), this is calculated as follows:

$$\Delta d1 = \pm d1^{0.95} \times 0.009 + 0.11 \text{ (mm)}$$

US standard - sizes 001 - 475 (d2)

Cross-section diameter d ₂ mm	1.02	1.27	1.52	1.78	2.62	3.53	5.33	6.99
Permitted tolerances ± mm	0.08	0.08	0.08	0.08	0.09	0.10	0.13	0.15

All measurements are in mm

Non-standard sizes (d2)

Cross-section diameter d ₂ mm	0.80 ≤ 2.25	2.25 ≤ 3.15	3.15 ≤ 4.50	4.50 ≤ 6.30	6.30 ≤ 8.40
Permitted tolerances ± mm	0.08	0.09	0.10	0.13	0.15

All measurements are in mm.

For tolerances not stated in the table, calculate +/- 2 % of nominal cord thickness. Applicable for cross-sectional dimension (d2) above 8.4 mm.

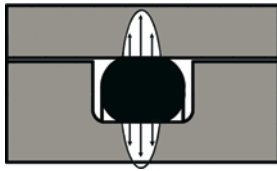
Compression

No matter which material is used, gaps (marked S) of various sizes will occur. Gaps must be as small as possible because, under high pressure (T), the material has the same effect as a high-viscosity fluid, i.e. the material tends to become compressed in the cavity between piston and cylinder.

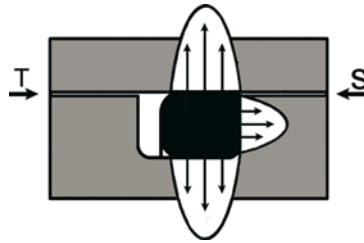
If the pressure on the medium is too high compared to the hardness of the elastomer and/or if there is too large a gap between the components that are to be sealed between them, there is a risk of seal extrusion – the result of which is a damaged O-ring.

Seal extrusion can be prevented in different ways:

- Small gap
- Use O-rings with a higher Shore value, e.g. NBR Shore 90, FKM Shore 90
- With back-up rings



Compressed O-ring fitted in groove – no pressure applied



Compressed O-ring fitted in groove – no pressure applied



Elastomer damaged due to extrusion.







Extruded O-ring

The permitted seal cavity depends on compression rate and medium. The higher the compression, the smaller the seal cavity.

BACK-UP RINGS



Back-up rings – profile list

Description	Material	Profile	Temperature °C
BACK-UP RING (CUT)	PTFE POM PUR NBR PEEK		-200°C+260°C -60°C+100°C -30°C+125°C -30°C+100°C -50°C+250°C
BACK-UP RING (UNCUT)	PTFE POM PUR NBR PEEK		-200°C+260°C -60°C+100°C -30°C+125°C -30°C+100°C -50°C+250°C
BACK-UP BU3 (SPIRAL)	PTFE		-30°C+125°C
BACK-UP RING BUU (CONCAVE)	PTFE POM PUR NBR PEEK HYTREL		-200°C+260°C -60°C+100°C -30°C+125°C -30°C+100°C -50°C+250°C -40°C+120°C

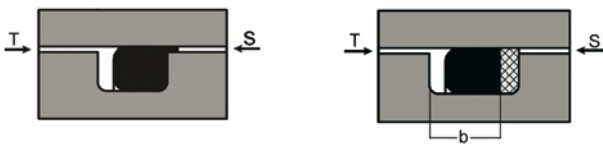
How a back-up ring works

Back-up rings are primarily used in combination with O-rings to protect the O-rings from extrusion and consequential damage. Back-up rings are cheap and simple sealing elements, which have a very wide area of application in hydraulic and pneumatic systems.

There are essentially 4 back-up ring models:

- Spiral back-up ring – used in inseparable designs
- Solid back-up ring with slit (cut) – used in inseparable designs
- Solid back-up ring (uncut) – in high pressure and high temperature applications
- Profiled back-up ring – used in critical applications to 400 bar (where the O-ring may become extremely deformed)

PROFILE



Without back-up ring

With back-up ring

PRODUCT BENEFITS

- ✓ Can be used both for static and dynamic applications
- ✓ Used with rod and piston
- ✓ Wide range of compounds
- ✓ Easy installation and removal

ALWAYS IN STOCK

Stock goods. Custom sizes can rapidly be produced to order.

APPLICATIONS

Back-up rings are used in more or less all branches of industry but particularly in static machinery and in static sealing applications, all types of hydraulic cylinders, injection moulding machines, mining equipment, marine hydraulics, loading platforms, cranes and other heavy-duty applications.

GENERAL GUIDELINES

The use of back-up rings depends on the hardness of the O-ring and compression, and whether the application is static or dynamic. The general guidelines are as follows:

STATIC

Up to 160 bar (16 MPa) without back-up ring with correct cavity

Up to 400 bar (40 MPa) with back-up ring

Up to 2,000 bar (200 MPa) with special back-up ring

DYNAMIC

Repeated movement up to 50 bar (5 MPa) – without back-up ring

Higher pressure with back-up ring

Materials

We supply back-up rings in a wide range of elastomers. You should choose a back-up ring to meet your specific requirements, e.g. temperature conditions, resistance and application. The most common back-up ring materials are listed in the table below:

List of materials – Back-up rings

Material	Temperature	Resistance	Application	
POLYTETRAFLUOROETHYLENE	PTFE	-200/+260°C	Heat and cold Chemical resistance Ozone, UV Water, steam Alcohol Oil and grease	All types of hydraulic cylinders, injection moulding machines, mining equipment, marine hydraulics, loading platforms, cranes and other heavy-duty applications.
POLYOXYMETHYLENE	POM	-60/+100°C	Diesel, petrol Mineral oil Vegetable oil Water up to 90°C	All types of hydraulic cylinders, injection moulding machines, mining equipment, marine hydraulics, loading platforms, cranes and other heavy-duty applications.
THERMOPLASTIC POLYESTER	PU	-30/+125°C	Petrol Lubricating oil Mineral oil Vegetable oil Motor oil	All types of hydraulic cylinders, injection moulding machines, mining equipment, marine hydraulics, loading platforms, cranes and other heavy-duty applications.
NITRILE RUBBER	NBR	-30°C+105°C	Hydraulic fluids Diesel oil Mineral oil and grease Aliphatic hydrocarbons Diluted acids and lye	All types of hydraulic cylinders, injection moulding machines, mining equipment, marine hydraulics, loading platforms, cranes and other heavy-duty applications.
POLYETHERETHERKETONE	PEEK	-50°C+260°C	Hydraulic fluids heat acids chemicals	All types of hydraulic cylinders, injection moulding machines, mining equipment, marine hydraulics, loading platforms, cranes and other heavy-duty applications.
HYTREL	TPC-ET	-30°C+125°C	Lubricating oils Hydraulic fluids petroleum ester etc.	All types of hydraulic cylinders, injection moulding machines, mining equipment, marine hydraulics, loading platforms, cranes and other heavy-duty applications. (Flexible material).

Available in other materials on request.

Sealing solutions with back-up rings

If the pressure exceeds the recommended level or if the gap is larger than recommended, the O-ring should be supplemented with a back-up ring to prevent extrusion into the gap and consequential damage to the O-ring. A spiral or cut PTFE back-up ring is the usual choice as these models are easy to fit. Note: Back-up ring height = groove depth + gap. Always use a solid PTFE back-up ring in high pressure and high temperature applications.

3D drawing of back-up ring



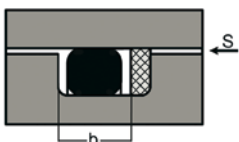
3D drawing of O-ring with back-up ring



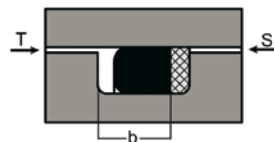
When gap measurements are calculated correctly, it is assumed that, in a static application, no gap extrusion will occur in an O-ring with hardness Shore 70 A, at 20°C and pressure 160 bar (16 MPa). To eliminate risk, in dynamic applications at pressures in excess of 50 bar (5 MPa), the recommended O-ring has hardness Shore 90. If the pressure exceeds 50 bar (5 MPa), the O-ring should be supplemented with a back-up ring to close the gap to approaching 0 mm.

Back-up rings are frequently produced in a material harder than that used in the O-ring, e.g. PTFE possibly with fillers or polyamides, to ensure that the back-up ring resists heavier loads. A back-up ring must always be fitted on the side, on which no pressure is applied. In the event of a load/compression on both sides, 2 back-up rings can be fitted. The gap width (S) must be increased by 1 x or 2 x the depth of the back-up ring.

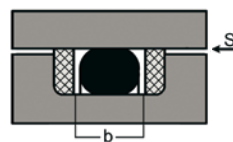
In existing designs where the groove width (b) cannot be increased, you can, in an emergency, select a harder O-ring.



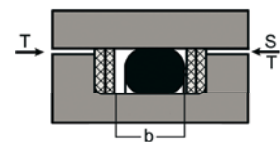
O-ring in groove without pressure with back-up ring



O-ring in groove under pressure with back-up ring



O-ring in groove without pressure with 2 back-up rings









O-ring in groove (designed for compression applied from both sides, i.e. dual function)

O-RING CORDS



O-ring cords – Profile list

Description	Material	Profiles	Temperature °C
O-RING CORD NBR	NBR		-30°C+100°C
O-RING CORD FKM	FKM		-15°C+200°C
O-RING CORD EPDM	EPDM		-50°C+150°C
O-RING CORD SI	SI / VMQ		-55°C+200°C
O-RING CORD BOXED SET NBR75	NBR		-30°C+100°C
O-RING CORD BOXED SET FKM75	FKM		-15°C+200°C

How an O-ring cord works

O-ring cord is primarily used for special dimensions or in place of an O-ring. O-ring cords are cheap and simple sealing elements, which have a very wide area of application in hydraulic and pneumatic systems.

PROFILE



PRODUCT BENEFITS

- ✓ Suitable for use in hydraulic and pneumatic systems
- ✓ Can be used in low pressure static applications
- ✓ Wide range of compounds
- ✓ Wide range of dimensions
- ✓ Easy installation and removal
- ✓ Economical sealing solutions

ALWAYS IN STOCK

We stock a very wide range of O-ring cords, i.e. most sizes and materials. Other sizes and qualities available on request. For a list of materials, see table on pages 8 and 9. We also stock adhesives suitable for most of these materials.

APPLICATIONS

Used in almost every industry but especially in non-moving machinery and in static sealing applications such as flange or cover seals.

Tolerances

The table (below) shows examples of O-ring cord tolerances at the following cross-section diameters (d2).

O-ring cord tolerances

Cross-section diameter d2	> 0.0 - 1.5	> 1.5 - 2.5	> 2.5 - 4.0	> 4.0 - 6.3	> 6.3 - 10.0	> 10.0 - 16.0	> 16.0 - 25.0	> 25.0 - 40.0	> 40.0 - 63.0	> 63.0 - 100.0
Class E1 Tolerance mm	+/- 0.15	+/- 0.20	+/- 0.25	+/- 0.35	+/- 0.40	+/- 0.50	+/- 0.70	+/- 0.80	-	-
Class E2 Tolerance mm	+/- 0.25	+/- 0.35	+/- 0.40	+/- 0.50	+/- 0.70	+/- 0.80	+/- 1.00	+/- 1.30	+/- 1.60	+/- 2.00

O-Ring cord boxed set

We also supply O-ring cords in a practical boxed set.

A boxed set contains the following: knife, cutter, adhesive, measuring tape and a range of different cords (each 2 m long).

O-ring cord boxed set NBR-70

Ø 1.78 mm	Ø 2.40 mm	Ø 3.00 mm	Ø 4.00 mm	Ø 5.00 mm	Ø 5.70 mm	Ø 7.00 mm
Ø 2.00 mm	Ø 2.62 mm	Ø 3.50 mm	Ø 4.50 mm	Ø 5.33 mm	Ø 6.00 mm	Ø 8.00 mm

Also available in FKM

**MATERIAL
APPROVALS**



Material approvals

– for the pharmaceutical and food industries

Carsten Holm A/S has been registered with and audited by the Danish Veterinary and Food Administration since 2011. We are permitted to manufacture and market food contact material (FCM) seals and gaskets. You can rest assured that our food contact materials are approved to meet international standards and regulations. Our material approvals for the pharmaceutical and food industry are listed below.

Approvals for the pharmaceutical and food industries

Approvals product	Countries	Food	Pharma & Medicine	Drinking water	Gas	Sanitary	Electrical
REGULATION EC1935/2004 EUROPEAN ALIMENTARY (ELASTOMER)	EU	X	X	X			
REGULATION EC2023/2006 EUROPEAN ALIMENTARY (GMP)	EU	X	X	X			
REGULATION 10/2011 EUROPEAN ALIMENTARY (PLASTIC)	EU	X	X	X			
FDA - FOOD AND DRUG ADMINISTRATION. FDA 21. CFR 177.2600 (ELASTOMER) FDA 21. CFR 177.2400 (PERFLUOROELASTOMERS) FDA 21. CFR. 177.1500 (PLASTICS)*	US	X	X	X		X	
USP CLASS VI - UNITED STATES PHARMACOPEIA	US		X				
3-A – SANITARY STANDARD INC.	US	X				X	
NSF 51. – NATIONAL SANITATION FOUNDATION	US	X				X	
NSF 61. – NATIONAL SANITATION FOUNDATION	US			X		X	
UL – UNDERWRITERS LABORATORIES	US						X
BFR – BUNDESANSTALT FÜR RISIKOBEWERTUNG	DE	X					
UBA-ELL – ELASTOMERLEITLINIE	DE			X			
DVGW – W270 E – DEUTSCHER VEREIN DES GAS- UND WASSERFACHES	DE			X			
DVGW – EN 681-1 – DEUTSCHER VEREIN DES GAS- UND WASSERFACHES	DE				X		
DVGW – W534 – DEUTSCHER VEREIN DES GAS- UND WASSERFACHES	DE			X			
DVGW GAS EN549 OG EN682 – DEUTSCHER VEREIN DES GAS- UND WASSERFACHES.	DE				X		
BAM – BUNDEANSTALT FÜR MATERIALFORSCHUNG UND PRÜFUNG. (GAS/OXYGEN)	DE				X		
WRC / WRAS – THE WATER REGULATIONS ADVISORY SCHEME	UK			X			
ACS – ATTESTATION DE CONFORMITÉ SANITAIRE	F			X			
KIWA – HOLLAND - (HOT DRINKING WATER)	NL			X			
TGM – ÖNORM B5014 – FEDERAL INSTITUTE OF TECHNOLOGY	A			X			

*To learn more about FDA standards, see: www.fda.gov
 Note: A component may be made of a rubber material that is certified as suitable as a food contact product. This does not necessarily mean that the component is technically suitable for every food-related application.



OUR TRACK RECORD

Global references

Over the years, Carsten Holm A/S has developed and manufactured O-rings, back-up rings and standard and customised seals for demanding industrial applications across the globe. We know our market well and strive constantly to improve so that we can continue to meet changing customer needs. We have a solid background of experience with sealing applications in many branches of industry.



- Metals
- Wind Energy
- Marine & Offshore
- Transport
- Food & Beverages and Pharmaceuticals
- Oil & gas
- Chemicals
- Agriculture
- Mining

Carsten Holm A/S accepts no liability for typographical errors and reserves the right to make changes to technical specifications.



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