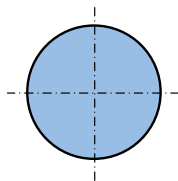


O-Ring Cord EP-10



Description

- cord made of elastomer
- extruded cord with circular cross-section
- deliveries are wound on spools
- cord length per spool depends on the cord diameter

Special features

- available in various cross sections
- 4 standard materials available from stock
- can be cut-to-size from spool

Applications

- basic material for the production of joined cord rings
- static seals for simple sealing applications
- sealing of large flanges or lids/covers
- can be used as elastic design element
- suitable for customer-specific assembly in the event of on-site repairs

Materials

Standard elastomers

Material	Hardness [Shore A]	Color	Curing	Temperature range [°C]
NBR	70	black	sulfur	-30 to +100
FKM	75	black	bisphenolic	-15 to +200
EPDM	70	black	peroxide	-45 to +150
VMQ (Silicone)	60	red	peroxide	-55 to +200

formulation conforms to the FDA White List pursuant to FDA 21 CFR 177.2600

Other materials, hardnesses and colors available on request.

General descriptions of the materials:

Acrylonitrile-butadiene rubber – NBR

Among standard seals, NBR is the most widely used material. The reasons for this are good mechanical properties, high abrasion resistance, low gas permeability and the high resistance to mineral oil based oils and greases.

NBR has good resistance to:

- mineral oil-based oils and greases
- aliphatic hydrocarbons
- vegetable and animal oils and fats
- hydraulic oils H, H-L, H-LP
- hydraulic fluids HFA, HFB, HFC
- silicone oils and silicone greases
- water (max. 80°C)

NBR is not resistant to:

- fuels with high aromatic content
- aromatic hydrocarbons
- chlorinated hydrocarbons
- polar solvents
- hydraulic fluid HFD
- glycol-based brake fluids
- ozone, weathering, ageing

Fluoro rubber – FKM

FKM materials have conquered many applications in which high thermal and / or chemical resistance is required. FKM also has excellent resistance to ozone, weathering and ageing. Very low gas permeability, FKM is recommended for vacuum applications.

FKM has good resistance to:

- mineral oil-based oils and greases
- aliphatic hydrocarbons
- aromatic hydrocarbons
- chlorinated hydrocarbons
- hydraulic fluids HFD
- vegetable and animal oils and fats
- silicone oils and silicone greases
- fuels
- non-polar solvents
- ozone, weathering, ageing

FKM is not resistant to:

- glycol-based brake fluids
- polar solvents (e.g., acetone)
- superheated steam
- hot water
- amines, alkalis
- low-molecular organic acids (e.g., acetic acid))

Ethylene propylene diene rubber – EPDM

EPDM can be used in a wide temperature range, has good resistance to ozone, weathering and ageing and is resistant to hot water and steam.

EPDM has good resistance to:

- hot water and hot steam
- many polar solvents (e.g., alcohols, ketones, esters)
many organic and inorganic acids and bases
- washing brines
- silicone oils and silicone greases
- ozone, weathering, ageing

EPDM is not resistant to:

- all kinds of mineral oil products (oils, greases, fuels)

Silicone rubber – VMQ

Silicone materials have excellent aging resistance, against oxygen, ozone, ultraviolet radiation and weathering and a very wide application temperature range with excellent cold flexibility. Silicone is physiologically harmless and therefore very good in food and medical product applications. Silicone has good electrical insulation properties and is highly permeable to gas. Due to the weak mechanical properties, silicone O-rings are preferably used in static applications.

Silicone has good resistance to:

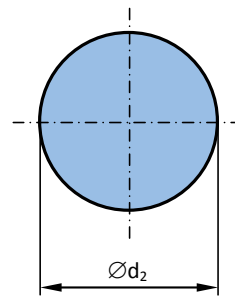
- animal and vegetable oils and fats
- water (max.100°C)
- aliphatic engine and gear oils
- ozone, weathering, ageing

Silicone is not resistant to:

- silicone oils and greases
- aromatic mineral oils
- fuels
- steam over 120°C
- acids and alkalis

Tolerances

Cross section tolerances pursuant to DIN ISO 3302-1
 Tolerance class E1 for NBR 70, FKM 75 and EPDM 70
 Tolerance class E2 for VMQ 60



Nominal $\varnothing d_2$		Tolerance class	
over [mm]	up to [mm]	E1 [mm]	E2 [mm]
0	1.5	± 0.15	± 0.25
1.5	2.5	± 0.20	± 0.35
2.5	4.0	± 0.25	± 0.40
4.0	6.3	± 0.35	± 0.50
6.3	10	± 0.40	± 0.70
10	16	± 0.50	± 0.80
16	25	± 0.70	± 1.00
25	40	± 0.80	± 1.30
40	63	± 1.00	± 1.60

Bonding

A suitable cyano-acrylate adhesive or a 2-component glue should be used when joining the cord to cord rings.

Good results can be achieved with the following types of adhesive, as an example:

Material	Adhesive	Primer	Thermal stability of the joint
NBR	Loctite® 406		80°C
FKM	Loctite® 406	Loctite® Primer 770	80°C
EPDM	Loctite® 406	Loctite® Primer 770	80°C
VMQ (Silicon)	Loctite® 406	Loctite® Primer 770	80°C

- roughen both ends to be joined slightly with abrasive paper before the actual bonding
- de-grease both ends with a suitable solvent
- condition both ends with primer (recommended for FKM, EPDM and VMQ)
- carry out the bonding as instructed by the manufacturer

The adhesive joint will determine the maximum rating as regards temperature, elongation etc.

Installation

The reliable function of the cord depends on the correct installation. The cord must not be damaged during installation. The following points are important for the installation:

- Before the seal is installed, all components should be cleaned from machining residue, e.g., chips and contamination of any kind.
- The seal and the installation groove should be lubricated with suitable grease before the installation (check lubricant for compatibility with the sealing material).
- All components of the installation groove should have lead-in chamfers.
- Sharp edges should carefully be deburred or – better even – avoided by the designer by providing suitable chamfers or radii.
- Seals should in no case be drawn over sharp edges. Threads, key grooves, boreholes, etc. should be covered during installation of the O-ring. We recommend using installation sleeves or installation mandrels.
- Make sure not to damage the cord when you expand it for installation. Protect the glued joint of spliced rings against excessive stretching.
- The cord should not be rolled during installation and not be twisted when it rests in the groove.