

# KNOWHOW

Rubber and products developed from it are subject to natural aging processes. Modern elastomer materials, however, are more stable both in terms of their base rubber and also because of suitable compound additives, and can, therefore, be used for a very long time. A few rules must be observed during storage.

The ageing process is essentially dependent on the following factors:

- Temperature
- Heat radiation
- Solar radiation
- moisture
- Relative air humidity
- Ozone and ionising radiation
- Stress state of the component

Therefore, our products should be stored as follows in order to maintain their function for a long time:

- Storage temperature below 25 °C.
- No direct heat sources in the storage area
- No direct sunlight
- No exposure to ozone and ionising radiation
- Storage largely free of stress

## GASKET MATERIAL OVERVIEW AND PROPERTIES

Abbreviation	chemical designation	Trade name(s)	Fields of application
<b>NBR</b>	Acrylonitrile butadiene rubber	Perbunan®, Hycar®, Krynac®, Elaprim®, JSR- N®, Chemigum®	The vulcanizates made of nitrile rubber are highly resistant to oils, fats and hydrocarbons, have good aging properties and low abrasion. They are used in the manufacture of seals, hoses, rubber gloves, and rubber threads. The acrylonitrile content in NBR can be between 18 and 50 percent and influences the following properties:

Abbreviation	chemical designation	Trade name(s)	Fields of application
			<ul style="list-style-type: none"> <li>• Swelling resistance in aliphatic hydrocarbons, such as mineral oils, fats and fuels</li> <li>• elasticity</li> <li>• low-temperature flexibility</li> <li>• gas permeability</li> <li>• compression set</li> </ul> <p>For example, an NBR material with an ACN content of 18 percent shows very good low-temperature flexibility down to approx. -38 °C with moderate oil and fuel resistance, while an NBR material with an ACN content of 50 percent only shows low-temperature flexibility down to approx. -3 °C, but optimum oil and fuel resistance. As the ACN content increases, the elasticity and gas permeability decrease, and the compression set deteriorates.</p> <p>Because of their good technological properties, materials based on this synthetic rubber are suitable for a wide range of applications. In particular, radial shaft seals, sealing elements for hydraulics and pneumatics and O-rings are manufactured in large quantities from NBR-based materials.</p>
<b>EPDM, APTK</b>	Ethylen-Propylen-Rubber Ethylen-Propylen-	Vistalon®, Buna AP®, Dutral®, APTK®	The saturated framework structure leads to properties such as high weather and ozone resistance and high thermal resistance.

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	Terpolymer-Rubber		<p>Because of its high elasticity and good chemical resistance, it is used for various seals such as O-rings in mechanical seals or flat seals. EPDM is a common material for hoses used for steam or hot water.</p>
<b>MVQ, VMQ</b>	Silicone-rubber	Silopren®, Silastic®, SE®, Blensil®, Silicone	<p>Silicone rubbers contain reinforcing substances and fillers, the type and quantity of which significantly influence the mechanical and chemical behavior of the silicone elastomers produced by cross-linking.</p> <p>Silicone rubbers can be coloured with suitable pigments.</p> <p>A distinction is made between cold (RTV) and hot (HTV) crosslinking silicone rubbers (RTV = room temperature crosslinking, HTV = high temperature crosslinking) according to the necessary crosslinking temperature. HTV silicone rubbers are plastically deformable materials. They very often contain organic peroxides for crosslinking. The elastomers produced from this by crosslinking at high temperatures are heat-resistant products that are elastic between -40 and 250 °C. They are used, for example, as high-quality sealing, damping, electrical insulation components, cable sheathing.</p>

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<b>FPM, FKM</b>	Fluoro-rubber	Viton®, Tecnoflon®, Fluorel®, Dai-el®	<p>FPM has excellent resistance to high temperatures, ozone, oxygen, mineral oils, synthetic hydraulic fluids, fuels, aromatics, many organic solvents, and chemicals. Gas permeability is low and similar to that of butyl rubber. Special FPM compounds have a higher resistance to acids, fuels, water, and steam.</p> <p>Heat resistance: up to about +200°C for a short time up to 250°C Cold resistance: up to about -25°C (partly -40°C static).</p>
<b>CR</b>	Polychloroprene, chloroprene rubber	Neoprene®, Bayrene®, Butaclor®, Petro- Tex Neoprene®, Denka®	<p>Resistance to silicone oils and greases, refrigerants; better ozone resistance, weather resistance and aging resistance to NBR. Temperature range from -40°C to approx. 100°C, short-term up to 120°C.</p> <p>Chlorinated rubber is not unlike PVC. Low water vapor permeability, good resistance to low and high temperatures, to moisture, acids, salts, and alkalis are the hallmarks of “CR”.</p>
<b>CSM</b>	Chlorosulfonated polyethylene elastomers	Hypalon®	<p>Hypalon is used in many ways in industry. Since Hypalon remains handy and non-slip when wet, it is used to make knife handles.</p>

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			<p>It is used as an insulating material for electrical cables with the DIN/VDE designation 6G.</p> <p>Heat resistance: up to approx. +120°C</p> <p>Resistance to cold: up to approx. - 30°C</p>
<b>NR</b>	Natural Rubber	NK	<p>Natural rubber is much more durable than the conventional synthetic variants and is therefore used, for example, for heavily loaded tire applications in the construction industry.</p> <p>NR has good mechanical properties (very high strength, high elongation at break, very high impact elasticity and good abrasion resistance).</p> <p>However, no resistance to mineral oils and greases and very low aging resistance and ozone resistance.</p>
<b>IIR</b>	Isobutene-Isoprene rubber	Polysar Butyl®, Enjay Butyl®, Petro-Tex Butyl®, Bucar®, Exxon Butyl®	<p>Butyl rubber dampens vibration and impact energy well and offers good resistance to acids and bases. It also has very good weather and ozone resistance, high electrical insulation, very low gas permeability, and elastic behaviour even at very low temperatures. Disadvantages are its lack of resistance to oils and greases and its comparatively low elasticity at room temperature.</p>

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<b>SBR</b>	Styrene-butadien- rubber	Buna®, Butakon®, Cariflex®, Europrene®, Krynol®, Solprene®, Sumitomo®	<p>SBR shows good resistance and low swelling in inorganic and organic acids and bases as well as in alcohols and water. It is insensitive to brake fluid but is usually replaced by EPDM.</p> <p>It is, however, strongly swelling in aliphatic, aromatics and chlorinated hydrocarbons, especially in mineral oil, grease and petrol.</p> <p>It is more resistant to weathering than natural rubber, but worse than chloroprene rubber (CR) and ethylene-propylene-diene rubber, for example. (EPDM).</p> <p>Thermal Range of application: approx. -40°C to +70 °C.</p>