



English version



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Technology of components used in heating.

## Chapter 38

### Comparative characteristics of elastomers



## Comparative characteristics of elastomers

**Table of chemical and thermal resistance of the various usual elastomers used for the manufacture of seals and membranes.**

### 1-Mechanical and chemical characteristics

Abbreviation according to ASTM 1418-79 and ISO 1629	NBR	EPDM	VMQ	FKM	TPE
Trade names and other designations	Buna-N, Nitrile	EP, EPT, EPR, EPDM	PVMQ, SI, Silicone	Fluoroelastomers, Viton®, Fluorel®	Santoprene®, PP and EPDM compound
Minimum temperature (°C/°F)	-30 (-22)	-40 (-40)	-50 (-58)	-20 (-4)	-50 (-58)
Maximum temperature (°C/°F)	95 (203)	130 (266)	200 (392)	200 (392)	110 (230)
Shore A hardness	30 to 95	30 to 90	30 to 85	40 to 95	40 to 80
Maximum elongation	650%	700%	900%	500%	450%
Chlorine resistance	Resistant to sodium hydroxide at 60°C, concentration 2.5%	Resistant to sodium hydroxide at 100°C, concentration 5%	Resistant to sodium hydroxide at 60°C, concentration 2.5%	5	5
Resistance to ozone (Rates higher than 1000 ppm)	0	5 (at room temperature)	5	5	5
UV resistance	0	5	5	5	5

### 2 - Resistance to chemicals

	NBR	EPDM	Silicone	Fluoroelastomers	PP and EPDM compound
Diesel fuel	5	0	1	5	0
Benzene, Toluene	1	2	1	5	2
Alcohols	5	5	5	5	5
Ether	1	4	1	5	4
Ketone	0	5	4	5	5
Ethyl acetate	1	5	3	5	5
Organic acids	1	0	4	5	0
Bases	4	5	5	5	5
Drinking water applications	Depending on the grades used, these elastomers may be in accordance with - NSF: standard 61 for drinking water - WRC, KTW: for drinking water application - FDA: white list				

5: Excellent: No effect.

4: Good: Minor effect weakly detectable, slight corrosion, discolouration.

3: Medium: Visible effects, with weak alteration of properties.

2: Fair: Visible effects, with alteration of properties, not recommended for continuous use.

1: Bad: Not recommended use.

0: Dangerous: Severe effects, not recommended regardless of application.

- Viton® is a registered trademark of E. I. du Pont de Nemours.

- Fluorel® is a registered trademark of Dyneon LLC.

- Santoprene® is a registered trademark of Monsanto / Advanced Elastomer Systems.

### 3 - Other characteristics of elastomers

	NBR	EPDM	Silicone	Fluoroelastomers	PP and EPDM compound
Estimated life if used in membranes	10 millions cycles	10 millions cycles	15 millions cycles	3 millions cycles	15 millions cycles

## Comparative characteristics of elastomers

	<b>NBR</b>	<b>EPDM</b>	<b>Silicone</b>	<b>Fluoroelastomers</b>	<b>PP and EPDM compound</b>
<b>Temperature limits if used in membranes</b>	0-70°C	-20+85°C	-20+150°C	-10+120°C	0-100°C
<b>Disadvantages</b>	No resistance to water vapor	No resistance to animal and vegetable fats	No resistance to water vapor above 130°C	No resistance to acetones, halogenated hydrocarbons or freon.	Incompatible with Acetal and PVC. Not resistant to hot oils
<b>Special advantages</b>	Better resistance to animal and vegetable fats than silicone	Good resistance to hot water and steam	Can be used at low temperature and high temperature. Resistant to hydrogen peroxide	Operating temperatures similar to those of EPDM, but better resistance to dry heat.	Excellent resistance to ozone. Excellent flexural strength

NB : these values and chemical and physical properties are the general properties of these materials. Different limits may apply if these materials must meet specific standards for finished products (UL, EN or EU Directives).