

APP.7 Sealing materials data

FKM (Viton) 75 ShA FPM / FKM / Viton® / Fluorocarbon Rubber

Viton® O-rings have excellent chemical resistance and can be used at temperature range of between -15°C and 200°C. Although generally more expensive than NBR (Nitrile) O-rings, FKM has found wide acceptance in the aircraft, automotive and chemical industries. The terms FPM, FKM and Viton® can lead to incorrect interpretations. These designations stand for one single base material: fluorocarbon rubber.

Operating temperature range: -15°C to 200°C

Physical Property	Test Method	Units	Typical Values
Hardness	ASTM D 2240	Shore A	79
Tensile Strength	ASTM D 412	Mpa	14
Elongation	ASTM D 412	%	175
Modulus at 100%	ASTM D 412	Mpa	6
Specific Gravity	ASTM D 297	g/cm3	1.85
Compression Set 22h / 200°C	ASTM D 395 B	%	22
Low Temperature Resistance	ASTM D 1329 - TR10	°C	-17

Aging Property	Test Method	Time (h)	Temperature (°C)	Hardness	Tensile Strength (%)	Ultimate Elongation (%)	Volume (%)
Air	ASTM D 573	70	250	1	-13	-2	
ASTM 101 Service Liquid	ASTM D 471	70	200	-10	-15	-6	13
ASTM Fuel C	ASTM D 471	70	23	-4	-21	-7	4

Chemical resistance

- Mineral oil and grease, ASTM oil No. 1, and IRM 902 and IRM 903 oils
- Non-flammable hydraulic fluids (HFD)
- Silicone oil and grease
- Mineral and vegetable oil and grease
- Aliphatic hydrocarbons (butane, propane, natural gas)
- Aromatic hydrocarbons (benzene, toluene)
- Chlorinated hydrocarbons (trichloroethylene and carbon tetrachloride)
- Gasoline (including high alcohol content)
- High vacuum
- Very good ozone, weather and aging resistance

Not compatible with:

- Glycol based brake fluids
- Ammonia gas, amines, alkalis
- Superheated steam
- Low molecular weight organic acids (formic and acetic acids)

Silicone (VMQ) Red 70 ShA

VMQ / SI / Vinyl Methyl Silicone

Silicone rubber contains methyl and vinyl groups attached to the main silicone chain. Silicone O-rings are characterised by excellent resistance to temperature extremes and thermal cycling. Silicone does not impart odour or taste, which makes it suitable for many food and pharmaceutical applications. Silicone rubber however, has poor mechanical properties as compared to other elastomers and for this reason silicone O-rings are generally not used in dynamic applications. It is not suitable for use with silicone O-ring lubrication, PTFE alternatives should be used instead.

Operating temperature range: **-55°C to 200°C**

Physical Property	Test Method	Units	Typical Values
Hardness	ASTM D 1415	IRHD	70 ±5
Tensile Strength	ASTM D 412	Mpa	6.1
Elongation	ASTM D 412	%	261
Specific Gravity	ASTM D 297	g/cm3	1.38 ±0.03
Compression Set 22h / 175°C	ASTM D 395 B	%	15
Low Temperature Resistance	ASTM D 1329 - TR10	°C	-42

Aging Property	Test Method	Time (h)	Temperature (°C)	Hardness	Tensile Strength (%)	Ultimate Elongation (%)	Volume (%)
Air	ASTM D 573	70	225	2	-15	-24	
ASTM Oil 901	ASTM D 471	70	150	-6	4	-10	5
ASTM Oil 903	ASTM D 471	70	150	-16			38

Temperature Range

- Up to 200°C (Intermittant)
- Down to -55°C

Recommended temperature range **-20°C to +180°C**

Chemical resistance

- Dry heat
- High - aniline point oils
- Chlorinated DI - phenyls
- Food processing applications
- Excellent ozone resistance.
- Water (Low temperature only)

Not compatible with:

- Most Petroleum fluids
- Ketones (MEK, Acetone)