Rubber Compound Chemical Compatibility Chart

Preliminary material-selection reference for common sealing elastomers and service media.

1.0 Rating Key and Scope

Rating	Meaning	Use guidance
A	Excellent	Generally suitable for continuous service.
B	Good	Usually suitable; minor property change may occur.
C	Conditional	Limited or application-dependent; testing required.
X	Not recommended	Likely swelling, hardening or degradation.

Scope: General room-temperature screening only. Ratings can change with compound formulation, concentration, temperature, pressure, exposure time, cleaning cycles and dynamic duty.

2.0 Compatibility Matrix

Chemical / medium	NBR	HNBR	EPDM	FKM	FFKM	VMQ	CR	IIR	NR
Water, ambient	A	A	A	A	A	A	A	A	A
Steam, up to 150 °C	X	C	A	C	A	C	X	B	X

Chemical / medium	NBR	HNBR	EPDM	FKM	FFKM	VMQ	CR	IIR	NR
Seawater	B	A	A	A	A	A	A	A	B
Glycol coolant, 50/50	B	A	A	B	A	B	B	A	B
Mineral / engine oil	A	A	X	A	A	C	B	X	X
Gasoline / petrol	B	B	X	A	A	X	C	X	X
Diesel / kerosene	A	A	X	A	A	X	C	X	X
Petroleum hydraulic oil	A	A	X	A	A	C	B	X	X
Phosphate-ester hydraulic fluid	X	X	A	X	A	C	X	A	X
Glycol brake fluid, DOT 3/4	C	C	A	X	A	C	B	A	B
Acetone / ketones	X	X	A	X	A	C	X	A	C
Isopropyl alcohol	B	B	A	B	A	B	B	A	B
Toluene / aromatic solvents	X	C	X	A	A	X	X	X	X
Dilute acids, approximately 10%	C	B	A	A	A	B	B	A	B
Concentrated acids	X	X	C	B	A	X	X	C	X
Dilute alkalis, approximately 10%	B	B	A	C	A	B	B	A	B
Aqueous ammonia	C	B	A	X	A	B	B	A	B
Vegetable oils	A	A	C	A	A	B	B	C	X

Chemical / medium	NBR	HNBR	EPDM	FKM	FFKM	VMQ	CR	IIR	NR
Ozone / UV / weathering	X	B	A	A	A	A	B	A	X
Hot air, 120 °C	C	B	B	A	A	A	C	B	X

3.0 Compound Selection Summary

Compound	Typical strengths	Typical limitations
NBR	Petroleum oils, fuels and greases; economical general-purpose sealing.	Ozone, weathering, ketones, phosphate esters and high-temperature steam.
HNBR	Improved heat, wear and ozone resistance over NBR; oils and fuels.	Ketones, aromatic solvents and phosphate esters remain problematic.
EPDM	Water, steam, glycols, brake fluids, dilute acids and alkalis, outdoor exposure.	Petroleum oils, hydrocarbon fuels and aromatic solvents.
FKM	Petroleum oils, fuels, aromatic solvents, heat and weathering.	Ketones, glycol brake fluids, phosphate esters, hot water and some amines.
FFKM	Broadest chemical resistance and high-temperature capability.	High cost; grade selection and low-temperature properties require review.
VMQ	Wide temperature range, hot air, ozone and weathering.	Fuels, aromatic solvents, abrasion and tear resistance.
CR	Weathering, moderate oils, water and general-purpose industrial service.	Aromatic solvents, ketones and strong oxidising media.
IIR	Low gas permeability, water, steam, acids, alkalis and polar fluids.	Petroleum oils, fuels and hydrocarbon solvents.
NR	Excellent resilience, tensile strength and abrasion resistance.	Oils, fuels, ozone, weathering and elevated temperatures.

4.0 Engineering Validation

- Confirm the exact fluid identity, mixture constituents and concentration.
- Assess minimum and maximum temperatures, pressure, exposure duration and static or dynamic duty.
- Include cleaning chemicals, lubricants and trace contaminants in the review.
- Check the selected supplier compound data sheet and required regulatory approvals.
- For critical, aggressive or borderline service, conduct immersion testing to ASTM D471 or ISO 1817 using the actual process fluid and operating temperature.

Disclaimer: This chart is a preliminary screening guide, not a product guarantee. Final compound selection must be approved against the complete application conditions by TSL Sealing Solutions Limited or the relevant material supplier.

5.0 Abbreviations

Abbreviation	Compound family
NBR	Nitrile rubber
HNBR	Hydrogenated nitrile rubber
EPDM	Ethylene propylene diene rubber
FKM	Fluorocarbon rubber
FFKM	Perfluoroelastomer
VMQ	Silicone rubber
CR	Chloroprene rubber

Abbreviation	Compound family
IIR	Butyl rubber
NR	Natural rubber