

Elastomer Properties Comparison Table

Property	Natural (NR)	SBR	EPDM	Hypalon (CSM)	Polyurethane (PU)	Viton (FKM)	Silicone (VMQ)	Neoprene (CR)	HNBR	Nitrile (NBR)	XNBR
Ozone Resistance	P	F	E	E	E	E	E	G	G	P	P
Weather Resistance	P	F	E	E	E	E	E	G	G	P	P
Heat Resistance	F	F	E	G	F	E	E	G	E	G	G
Chemical Resistance	P	P	G	G	P	E	F	F	G	F	F
Oil Resistance	P	P	P	G	E	E	F	F	E	E	E
Impermeability (Gas)	F	F	F	G	G	E	P	G	G	G	G
Cold Resistance	E	G	E	F	G	P*	E	F	G	F	F
Tear Resistance	E	F	F	G	E	F	P	G	G	F	E
Abrasion Resistance	E	G	G	G	E+	G	P	G	E	G	E
Compression Set	E	G	G	F	F	G	G	G	G	G	F
Dynamic Properties	E	G	G	F	G	F	F	G	G	G	G
Acid Resistance	F	F	G	E	P	E	F	G	G	F	F
Tensile Strength	E	G	G	G	E	G	P	G	E	G	E
Electrical Properties	E	G	E	G	G	F	E	F	F	P	P
Water / Steam Resistance	G	G	E	G	P*	G	G	G	G	G	G
Flame Resistance	P	P	P	G	P	E	F	G	P	P	P

Legend

- **E** = Excellent
- **G** = Good
- **F** = Fair
- **P** = Poor
- **E+** = Exceptional (Best in class)
- ***** (Asterisk)**:**
 - *Viton (Cold)*: Standard grades are poor, but special low-temp grades exist (-40°C).
 - *Polyurethane (Water)*: Prone to hydrolysis (degradation by hot water/steam) unless specifically formulated.



Key Insights on Specific Materials

Here are the important nuances to understand the differences between the similar materials in your list:

1. The Nitrile Trio (NBR vs. HNBR vs. XNBR)

- **Nitrile (NBR):** The standard for oil and fuel. Inexpensive, but hates the sun (ozone/UV).
- **HNBR (Hydrogenated NBR):** A "super-charged" version of Nitrile. It resists **heat** much better (up to 150°C vs. 100°C for NBR) and has higher mechanical strength.
- **XNBR (Carboxylated NBR):** A version of Nitrile modified for extreme **abrasion and tear resistance**. It is the ideal choice for parts that rub constantly but must still resist oil.

2. Hypalon (CSM)

- Often used for inflatable boats (dinghies) or cable sheathing because it does not fade in the sun and resists oxidizing chemicals very well.

3. Viton vs. Silicone

- Use **Silicone** for extreme cold or food/medical applications. It is very flexible but tears easily.
- Use **Viton** for aggressive environments (fuels, acids, high temperatures). It is chemically almost indestructible but expensive.

4. Polyurethane (PU)

- The king of wear resistance. If you have a part undergoing shocks and intense friction (skateboard wheels, scrapers), this is the best. Warning: It does not like hot water.