

# Wind Power O-rings

## Key Materials and Capabilities



### Eliminate downtime:

System reliability is essential to the wind power industry. Turbine downtime reduces power productivity and increases operation and maintenance costs. To eliminate these obstacles, Parker's O-Ring Division offers a unique combination of experience, innovation, and support to accommodate customer sealing needs.

Parker materials provide compatibility in outdoor environments as well as various service oils. With a multipurpose laboratory, we offer advanced material analysis, failure mode analysis, and new product research and development capabilities. Use Parker's expertise to your advantage.



### Contact Information:

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### Advantages:

- Unlimited size capability
- Full range of industry-applicable materials in various polymer families
- Exceptional lab capability
- State-of-the-art mixing facility
- Worldwide manufacturing capability
- Global distribution channels
- Complimentary application engineering and design support
- Competitive lead time



ENGINEERING YOUR SUCCESS.

Compound Comparison	NBR	HNBR	FKM	VMQ
Basic Properties	N0674-70	N1173-70	V1164-75	S0604-75
Hardness, Shore A, points	71	74	75	67
Tensile strength, psi	2546	3306	1913	889
Elongation, %	331	206	185	160
Heat resistance (70 hrs. @)	212°F	302°F	482°F	437° F
Hardness chg. pts.	+6	+3	0	+3
Tensile strength change, %	+6.3	-4	-6	-0.3
Elongation change, %	-30.2	-18	+4	-28.1
Compression Set (22 hrs. @)	212°F	302° F	347° F	347° F
% of original deflection	12.6	18.4	11.5	15.0
ASTM #1 oil, (70 hrs. @ )	212° F	302° F	N/A*	302° F
Hardness change, pts.	+3	-1	N/A*	-5
Tensile strength change, %	+5.5	+11	N/A*	-7.9
Elongation change, %	-15.1	+10	N/A*	-12.5
Volume change, %	-2.3	+2	N/A*	+3.2
ASTM #3 oil, (70 hrs. @ )	212° F	302° F	302° F	300° F
Hardness change, pts.	-7	-9	N/A*	-17
Tensile strength change, %	+2.9	-13	N/A*	N/A
Elongation change, %	-7.9	-11	N/A*	N/A
Volume change, %	+14	+19	+2	+32
Temperature range	-30 to 250° F	-25 to 300° F	-15 to 400° F	-65 to 450° F

Compound	Recommended for	Not recommended for
NBR	Petroleum oils, water (up to 212° F), salt & alkali solutions, and weak acids	Phosphate esters, strong acids, glycols, ozone, aging, weather, and polar solvents
HNBR	Petroleum based oils, transmission fluid, grease, water/glycol/steam, HFA, HFB, & HFC fluids, ozone, aging, and weather resistance	Polar solvents (ketones & esters), strong acids, and chlorinated hydrocarbons
FKM	Petroleum, mineral, & vegetable oils, silicone fluids, aromatic hydrocarbons (benzene, toluene), chlorinated hydrocarbons, high vacuum, ozone, aging, and weather resistance	Hot water & steam, amines, ketones, and low molecular weight esters and ethers
VMQ	Dry heat, some petroleum oils, moderate water resistance, fire resistant hydraulic fluids (HFD-R & HFD-S), ozone, aging, weather resistance, and low temperature	Ketones, acids, silicone oils, and dynamic applications

\*FKM materials are seldom tested in ASTM #1/ASTM #3 (IRM 903) oil due to universal minimal effect.

