

TYPES OF SEALING MATERIAL

Urethane

Formulated of copolymers of ether or ester based urethanes, this material is used in a wide application of seals, wipers, back-up rings, cushions, bumpers, and a myriad of other uses. Highly resistant to oil swell, ozone, oxidation and abrasion, it also has excellent cut resistance. Highly resilient, urethanes also have high tensile strength and elongation properties. Urethanes remain an excellent choice in hydraulic systems using petroleum based fluids. Most urethane seals remain flexible and efficient in temperatures ranging from -65° F to +200° F with some able to withstand intermittent temperatures up to +300° F.

Nitrile

The most common nitrile copolymer blend is known as Buna-N. Possessing very good resistance to petroleum based hydraulic oils, Buna-N also works well with fuels such as diesel or gasoline. Nitrile seals have a good resistance to compression set, but their flexibility suffers somewhat in the lower temperature range. Seals made from this material have a low resistance to ozone and must be stored carefully in most environments. Working temperatures are -40° to +240° F.

PTFE

Most PTFE seals, in order to retain their toughness and flexibility, are fortified with short glass fiber, bronze flashes, carbon graph-ite, or a combination of these fillers. Because of a lack of resilience (memory) in PTFE, an energizer is most often employed to obtain the desired fit. Benefits are chemical inertness, high heat resistance, low temperature flexibility, low running friction, and non-adhesive characteristics. Temperatures to +500° F are obtainable but are often reduced by the filler or energizer employed.

Fluorocarbon

Fluorocarbon has a high temperature resistance with excellent chemical resistance. Excellent for use with alcohol and aromatic fuels and highly resistant to ultraviolet light and ozone. This material is not for use in low temperatures or in aircraft hydraulic fluids. Temperature range is -20° to +400° F.

Ethylene-Propylene

Ethylene-Propylene can be used for sealing phosphate ester hydraulic fluids such as Skydrol. Not suitable for petroleum based fluids, Ethylene-Propylene is highly effective for use with steam, acetone, and dilute acids and bases. Specially Ethylene-Propylene can be made suitable for automobile brake systems. Temperature range from -20° to +300° F.

Silicone

Silicone is an elastomer made from silicon, oxygen, hydrogen, and carbon. The key use of this material is in static seals employed in a wide (-75° F to +450° F) range of temperatures. Silicone has a high resistance to dry heat, ultraviolet light and ozone. This material is not commonly used for dynamic situations due to poor abrasion resistance and high friction characteristics.

Glossary of Terms

- Bearing/Wear Rings:** Soft metal or plastic rings placed in grooves on the piston or in the head to prevent contact between hard metal surfaces.
- Durometer:** A generic term referring to the instrument and the scale used to measure the relative hardness of various elastomers. The lower the durometer reading, the softer the material.
- Dynamic Seal:** A sealing device used between mating surfaces that have relative motion.
- Elastomer:** A rubber-like material having the capacity for large deformation and rapid recovery from the deforming force.
- Gland:** A groove or open area machined into the head or piston that houses the sealing device.
- Static Seal:** A sealing device used between mating surfaces that have no relative motion.
- Wiper/Scraper:** A device placed in the head of a cylinder for the purpose of excluding foreign matter from the inside of the cylinder.