As we’ve discussed in past entries on this blog, O-Rings can come in a variety of sizes and have a wide range of uses.

They can also be made from a number of different substances. Here’s a guide to the kinds of O-Ring materials we use, how they are used, and when to avoid using them.

**Nitrile (Buna, NBR):** A widely used, economical material that has strong wear resistance and mechanical properties.

- Temperature: -55 to 250 degrees Fahrenheit
- Applications: Petroleum based oils and fuels, dynamic applications
- Avoid: Brake fluids and ozone

**Hydrogenated Nitrile (HNBR):** Nitrile base with added chemical strength and resistance following hydrogenation.

- Temperature: -50 to 300 degrees Fahrenheit
- Applications: Water and steam up to 300 degrees Fahrenheit, fuel systems, oil resistant and high abrasion applications
- Avoid: Strong acids and polar solvents such as ethers and ketones

**Polyacrylate (ACM):** Widely used by auto makers in power steering and transmission systems.

- Temperature: -15 to 350 degrees Fahrenheit
- Applications: Mineral oil, engines, gear boxes, power steering, transmissions
- Avoid: Cold temperatures, hot water, steam

**Ethylene-Propylene (EPDM):** Strong ozone and chemical resistance

- Temperature: -55 to 275 degrees Fahrenheit, 300 degrees Fahrenheit when used with peroxide curing agents
- Applications: Brake systems, glycol-based fluids, H20 steam
- Avoid: Mineral oil products and hydrocarbon fluids

**Chloroprene (Neoprene, CR):** The first commercial synthetic rubber developed,
chloroprene has good mechanical properties over a wide range of temperatures.

- Temperature: -40 to 250 degrees Fahrenheit
- Applications: Refrigeration, due to its excellent ozone resistance, low-temp H2O
- Avoid: Esters, ketones and aromatic and chlorinated hydrocarbons.

**Butyl**: An all-petroleum compound, butyl has low gas permeability and good resistance to sun exposure and ozone.

- Temperature: -70 to 400 degrees Fahrenheit
- Applications: Life science and medical devices, FDA applications, numerous specialized compounds for specific material certifications
- Avoid: Highly abrasive applications and water and steam over 250 degrees Fahrenheit

**Fluorosilicone (FVMQ)**: Broad temperature performance and strong fuel and solvent resistance, but weak abrasion resistance due to high friction.

- Temperature: -75 to 400 degrees Fahrenheit
- Applications: Aerospace, fuel and mineral oil
- Avoid: High temperature air, dynamic applications

**Fluorocarbon (Viton, FKM)**: The high fluorine levels in fluorocarbon rings give them excellent swelling and permeability resistance. They also feature high temperature and chemical resistance.

- Temperature: -15 to 400 degrees Fahrenheit
- Applications: Broad chemical resistance, transmission and blended gasoline
- Avoid: Low temperatures, ketones and amines

**Tetrafluoroethylene-Propylene (AFLAS)**: Excellent chemical and temperature performance.

- Temperature: 15 to 450 degrees Fahrenheit
- Applications: Aerospace, steam, hot water, oil fields
- Avoid: Chlorinated hydrocarbons, ketones, acetic acid

**Perfluorelastomer (FFKM)**: Of all elastomers, this one has the highest performing temperature and chemical properties, as well as low out-gassing and extractable properties.

- Temperature: -15 to 600 degrees Fahrenheit
- Applications: Semiconductors, chemical processing, vacuum applications
- Avoid: Fluorinated solvents and perfluorinated lubricants

If you have questions about O-Ring materials, contact Gallagher Fluid Seals, Inc. Our
experts can answer any questions you might have about these small, yet crucial, sealing products.

You can also learn more about O-Rings by downloading this guide, which discusses their technical performance characteristics, materials, chemical and temperature compatibility, hardware considerations and failure modes.

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