ELASTOMER SHLASTOMER, RIGHT?

Selecting the Right Elastomer for Your Sealing Boots and Fasteners

APM HEXSEAL
Sealing Specialists

SELECTING THE RIGHT ELASTOMER FOR YOUR SEALING BOOTS AND FASTENERS

Elastomers are synthetic polymers that can bend and stretch in numerous ways and then return to their original shape. They're most commonly used as insulation and for injection molding products like vehicle tires, rubber bands, and pencil erasers.

Because elastomeric products are so ubiquitous, it's tempting to believe that all elastomers serve the same purpose. But think again! Elastomer production is actually one of the most dynamic fields in manufacturing, and more than 20 different types of elastomers exist to serve unique functions in both process equipment and finished products.

Different elastomer formulations affect your parts' physical properties, functions, and service life. Therefore, it's important to test a few different elastomers, when assembling your product, to determine the best one for your needs. In this eBook, we've assembled a handy guide of the different types of elastomers that APM Hexseal uses, as well as some of their most common applications.

Elastomer Types and Their Advantages, Disadvantages, and Uses

Silicone

Although it's used extensively for outdoor applications, silicone appears in a wide range of industries and industrial processes as well. Silicone elastomers hold up well against:

- Ozone
- Salt spray
- Soap
- Weather
- Fungus
- Dust
- Most acids
- Lubricating oil

This elastomer also performs well across the widest range of temperatures of all elastomer options while remaining extremely flexible. Its low compression requirements ensure that it has many different uses, and the FDA recommends its use in the food and beverage industry.

Silicone is the most common elastomer we work with at APM Hexseal. We use it in the fabrication of:

- Boots
- Seelnuts
- Seeloc Washers
- O-rings

However, silicone does not perform well when exposed to petroleum or related products. It also tears and abrades easily, making it unsuitable for applications that expose it to sharp objects or coarse surfaces. These properties can also cause silicone to create a lot of friction, and it's permeable to gases as well. We recommend using other elastomers if you intend your finished products to operate in environments where exposure to ketones or highly concentrated acids is likely.

FluoroSilicone

Aerospace manufacturers value FluoroSilicone for its ability to hold up against ozone, petroleum, soap, and chemical exposure, making it an excellent choice for applications where there is exposure to oil and fuel. It also performs well at temperature extremes, so it is geographically universal.

However, FluoroSilicone has limited physical strength, low abrasion resistance, and high friction characteristics. We don't recommend it for applications that involve exposure to brake fluids, hydrazine, or ketones.

We use FluoroSilicone as an alternative to silicone in many of our products, like:

- O-rings
- Seelnuts
- Seeloc washers
- Boots

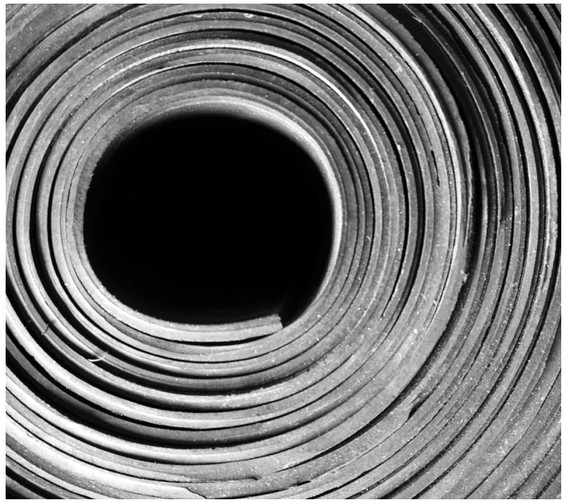
Neoprene

Neoprene has relatively low compression requirements, and industries as varied as construction, medical, sporting goods, and marine manufacturing prize it for its high resilience and physical toughness.

Furthermore, neoprene can withstand a wide range of elements, such as:

- Hydrogen and natural gas
- Ammonium salts
- Mineral oils
- Silicone oils and greases
- Petroleum oil
- Ozone
- Soap
- Freon®
- Oxygen and oxygen aging

Finally, Neoprene is relatively inexpensive to produce, allowing manufacturers to construct economically competitive products with this material without sacrificing performance.



Neoprene can resist moderate levels of chemical exposure, but it doesn't perform well in applications that expose it to strong oxidizing acids, chlorinated/aromatic/nitro hydrocarbons, ketones, or esters.

We use Neoprene as another alternative to silicone in our boots, Seeloc washers, O-rings, and Seelnuts. The FDA approves of Neoprene's use in many food and beverage processing applications.

Buna-N (Nitrile)

Nitrile holds up against threats from:

- Water
- Soap
- Hydraulic fluid
- Silicone greases
- Alcohol
- Petroleum

Oil drillers and automotive manufacturers use Buna-N in a wide variety of applications, valuing it for its resistance to petroleum-based oils and fuels, low compression set, high abrasion resistance, and high tensile strength.

Nitrile doesn't hold up well against environmental factors like weather and temperature extremes. It also performs poorly in environments that involve high amounts of ozone, polar solvents, chemicals, or flames, as well as those with ambient chlorinated hydrocarbon and aromatic hydrocarbons.

Buna-N is yet another alternative to silicone in our boots, Seeloc washers, Seelnuts, and O-rings.

Viton® (Fluorocarbon)

When you want an elastomer that can handle the highest temperatures and the most hostile conditions, Viton fluorocarbon is the material for you. It boasts high resistance to:

- Chemicals
- Oils
- Weather
- Water
- Ozone
- Fuels

Viton's extremely high chemical resistance stands out among other elastomers, making it particularly useful for manufacturing O-rings. The base polymer and compounding ingredients in the final products improve the elastomer's performance. Many industries use fluorocarbons, from aerospace/aviation manufacturing to chemical processing, and it is also the top choice for oil/gas exploration and refining.

Fluorocarbon does not perform well with ketones, nitrohydrocarbons, amines, hot hydrofluoric/chlorosulfonic acids, or low–molecular weight esters and ethers. It also loses flexibility when exposed to low temperatures.

We use Viton O-rings primarily in petroleum applications.

EPDM

Widely used in industries like HVAC installation, industrial manufacturing, roofing, and automotive assembly, ethylene propylene diene terpolymer (EPDM) provides excellent resistance to ozone, oxidants, and weather conditions. It can also stand up to soap, aging, and steam as well as temperature extremes, and it comes with excellent insulating capabilities. In addition to its resistance to acids and solvents, EPDM can also withstand a wide range of weather conditions, making it a good choice for use in outdoor equipment.

EPDM doesn't perform well against oils or in food-related applications. It also doesn't work well when exposed to hydrocarbon fluids.

We use EPDM to construct boots, Seeloc washers, Seelskrews, and Seelnuts.

Additional Elastomer Properties

Despite their numerous differences, all elastomers bring advantages to the injection molding field. Injection molding forces rubber compounds through runners into a mold by using high pressure, and elastomers' unique properties allow them to perform very well in this environment.

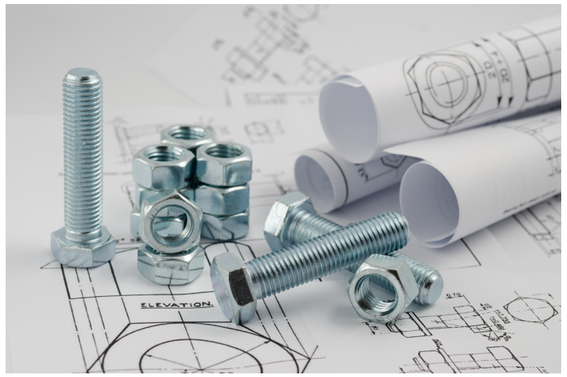
Elastomers are also a great choice for products made via compression molding. This process handles high-viscosity compounds. It processes compounds into a pre-form, and then compresses the pre-form into a mold and cures it.

Elastomers protect against a host of hostile environments, including:

- Extreme temperatures
- Oils and chemicals
- Food and beverage
- Road salt
- Air
- Dirt/dust/sand
- Water
- Extreme weather

Ready to Find the Right Elastomer?

With all the options available for elastomers, finding the right one for your needs is crucial. APM Hexseal uses its in-depth knowledge of elastomers to create the most optimal self-sealing boots, fasteners, and hardware for every application. To learn more about how we can help you choose the best material, ask the experts at APM Hexseal.



Learn More

Since 1947, we've been the leader in developing and manufacturing sealing solutions that prolong the life of sensitive electronic and mechanical components and systems in hostile environments. We offer a wide variety of elastomeric covers and sealing hardware, including a complete line of reusable, self sealing fasteners and sealing washers.

From self sealing boots and fasteners in a wide array of elastomer options, to a full design and manufacturing team ready for custom engineered sealing solutions, we have what you need to maximize performance from every component. To learn more about our offerings and capabilities, contact us today and let us help you find the perfect sealing solution. Ask the Experts at APM Hexseal!

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