



Sigma Seals & Gaskets can create S-seals to your exact specifications.

S-seals are designed to be reliable under the most extreme conditions of temperature and pressure. They are also quick and easy to install, and they can provide prolonged service with minimum maintenance.

Sigma Seals & Gaskets' experienced engineers will custom tailor S-seals to your exact requirements and manufacture 1 or 1,000 seals to your specifications that same day.

DESIGN CONSIDERATIONS

An S-seal consists of a thick ring of elastomeric material, in which two circular springs are embedded. These springs are located around the edges of the seal that are at the outer corners of the groove in which the seal sits. The springs act as internal backup rings, stiffening the elastomer and greatly reducing extrusion even under the most severe conditions. In addition, the bulk of the seal and the rigidity of the springs mean that an S-seal is immune to twisting failure.

For maximum seal longevity, the seal must be constructed from the correct elastomer for the particular application. Sigma Seals & Gaskets often builds seals from elastomers that tolerate high or low temperatures, high or low pressures, dynamic applications, and corrosive environments. If you are unsure which material would be best, ask us—our engineers will help you select exactly the right material for your situation.



Cutaway of an S-seal designed for installation between the shaft of a piston and the barrel

Sigma Seals & Gaskets makes most S-seals from nitrile (Buna-N, NBR) or hydrogenated nitrile (HNBR). For seals that will operate under particularly demanding conditions, Sigma Seals & Gaskets recommends using high-performance materials. Similarly, the best material to use for the internal springs depends on the severity of the conditions that the seal will encounter.

The following table details the materials that are commonly used to construct our S-seals. If you are unsure which materials to use, our engineers will gladly help you determine the optimum composition of your S-seals.

Material	Temperature Range (°F)*	Comments
Nitrile (Buna-N, NBR)	-20 to 212	Highly resistant to abrasion and tearing. Nitrile is the most commonly used elastomer for O-rings and sealing applications, and it is the material of choice for petroleum applications.
Hydrogenated nitrile (HNBR)	-20 to 300	Compared to nitrile, HNBR has better chemical resistance, better heat resistance, and better resistance to seal extrusion.
Ethylene-propylene (EPDM)	-60 to 250	Very resistant to ozone.
Neoprene	-40 to 250	Resists both weathering and exposure to petroleum oils.
Butyl (isobutylene, IIR)	-50 to 250	Extremely low gas permeability; resists a diverse range of chemicals. Useful in applications requiring an air-tight seal.
Viton® (fluorocarbon, fluoroelastomer)	-15 to 400	Better resistance to chemicals and high temperatures than most other elastomers.
Silicone (VMQ, PVMQ)	-150 to 400	Excellent tolerance for temperature extremes, and high resistance to compression set.
Fluorosilicone (FVMQ, FK)	-75 to 400	Tolerant to temperature extremes, and resists degradation by fuel and oils. Primarily used where resistance to hot, dry conditions is required.
FFKM (perfluoroelastomer)	-15 to 600	Highly resistant to many chemicals, and outstanding resistance to high temperatures.

* Temperature ranges given here are approximate; the values relevant to any particular situation depend upon the application. If in doubt, ask us—we will help you design a backup ring to meet the temperature tolerance needs of your system.

APPLICATIONS

- Static or dynamic applications
- High or low temperatures
- High or low pressures
- Usable in corrosive environments
- Drilling in deep and unconventional wells

BENEFITS

- Fabricated from custom materials to meet the exact needs of the application
- One-piece design greatly simplifies installation and replacement
- Directly replaces other types of seal in the same size gland (no re-machining or redesign required)
- Designed not to undergo spiral (twisting) failure
- Extremely resistant to extrusion
- Usable with comparatively large extrusion gaps
- Provides prolonged service
- Requires minimum maintenance

TO DISCUSS YOUR APPLICATION, GIVE US A CALL!