



BUSHINGS



STEIN SEAL



As a leader in the custom design, testing and manufacture of seals and precision components, Stein Seal Company has continually succeeded in meeting the demanding requirements found in industrial, aerospace and military applications. For over 50 years, our seals have consistently offered high performance reliability and quality. Stein Seal's products are used worldwide in power generation equipment, pumps, compressors, centrifuges, high-speed process equipment as well as in military and commercial aircraft engines and marine applications.

Stein Seal's line of bushing seals is the smart choice for high-pressure gas and liquid applications. Although bushings have been a long-time standard part of sealing systems, each of our bushings is

custom designed to fit the specific application. They are regularly used in combination with our other seals in complete system assemblies designed to meet unique and stringent operating conditions.

A Practical Solution for Controlled Leakage Requirements

Our bushing seal forms a sleeve that allows a small clearance around a shaft where leakage is then limited by the flow resistance between the shaft and the bushing. Bushings can be designed in either a fixed or floating sleeve arrangement depending on the tolerances of the operating clearance, shaft movement, vibration or alignment requirements. Fixed bushings are held stationary in the housing with

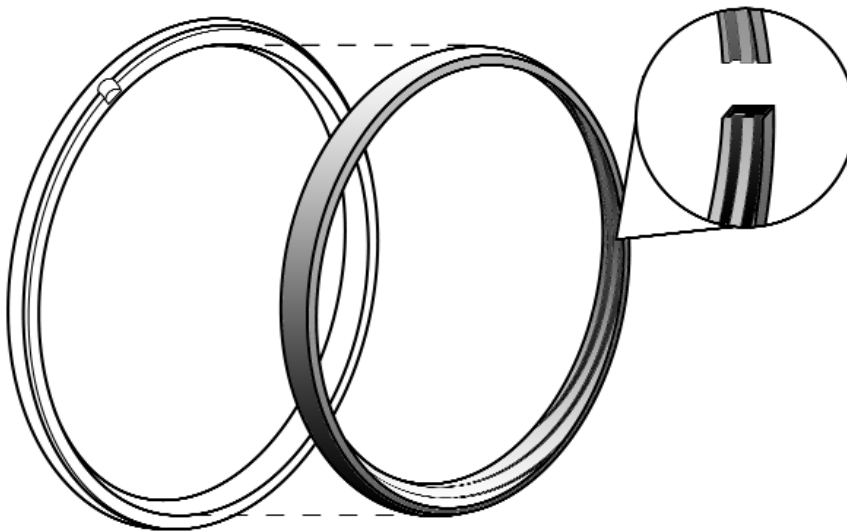
anti-rotation locks and require a sufficient shaft clearance to operate accurately. Bushings in a floating sleeve move radially with

the shaft but are captured axially in



the housing by spring loading. This allows the bushing to handle a greater degree of shaft movement and misalignment under very tight tolerances.

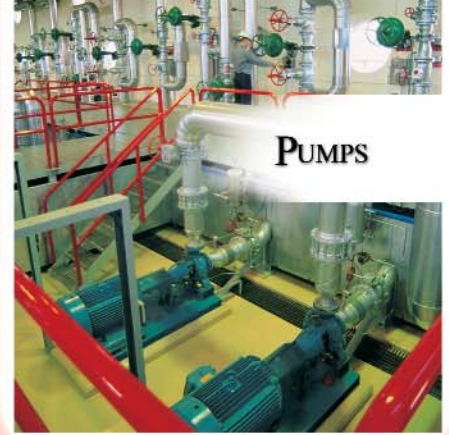
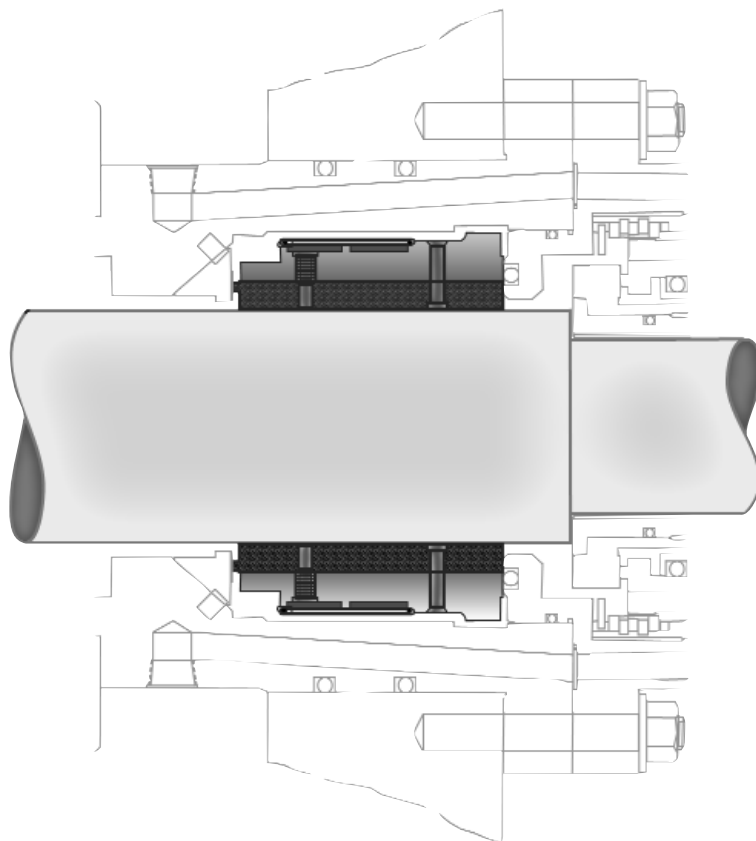
In cases where the bushing will not be able to be installed over the end of a shaft, or where the bushing will need to be removed periodically to allow regular maintenance, a segmented bushing should be used. This bushing design allows the entire bushing to be assembled in sections, typically made of carbon, while still performing efficiently and effectively as the primary seal.



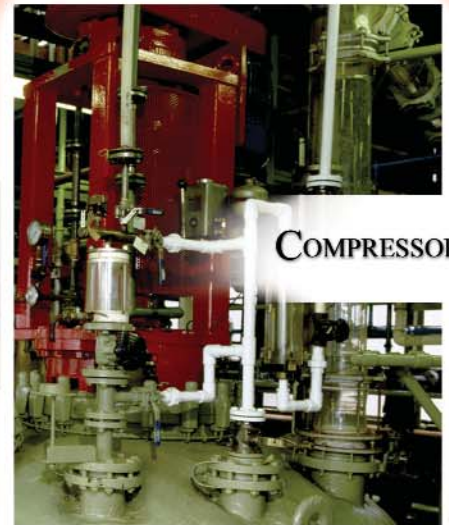
The helical grooves shown in the bore of this carbon graphite ring allow for thermal stability and improved liquid leakage control.

The carbon ring is girded by a segmented metal ring bound by a garter spring, providing additional structural support in high pressure applications.

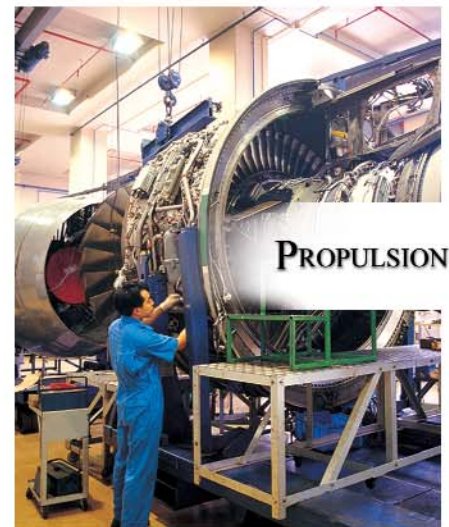
Most commonly, bushings are comprised of a seal housing, the bushing sleeve, a retaining plate and ring, axial springs and an anti-rotation lock. Multiple bushing sleeves can be added to the configuration depending on the application requirements. In applications using multiple bushings, each bushing is precisely designed to work in combination with the other seals to optimize operation. A bushing is often paired with one of Stein Seal's face seals to support the prevention of gas, toxic or corrosive chemicals from escaping.



PUMPS



COMPRESSORS



PROPULSION



PROCESS EQUIPMENT

Getting the Best Performance

As with all our seals and components, we offer our bushings in a wide range of materials suitable for each application. Choices in materials include alloy steels, 300/400 stainless steel, inconels, ceramics and carbon graphite.

Our bushings are quality checked to ensure they meet or exceed not only our own demanding specifications, but also our customers' operating requirements. Stein Seal's bushings:

- Support unlimited shaft rotation speeds
- Temperature ranges up to 260°C (500°F)
- Pressure ranges up to 6,895KPa (1000 psi)
- Available in diameters up to 46 cm (18 inch)

Stein Seal's commitment to reinvesting in our people, resources and capabilities allow us to deliver innovative, reliable, sealing systems. Our design engineers have solid, technical credentials and years of practical, real world experience in a broad range of applications. With proven manufacturing techniques, superior quality and testing processes, and a responsive customer support staff, the result is always a superior product. Our long established, collaborative working relationships with our customers means we continue to deliver unparalleled value in products and services.

For more information on our bushing seals, our complete line of seal products and systems, or to discuss your application requirements with our experts, please contact Stein Seal Company.

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