



# FACE SEALS



STEIN SEAL



For over 50 years, Stein Seal Company has been a leader in the custom design, testing and manufacture of seals and precision components for the demanding and critical applications in military and commercial aircraft engines, power generation equipment, pumps, compressors, centrifuges, and the military and commercial marine industry.

Stein Seal's extensive line of precision crafted face seals meets our customers' demanding criteria for innovation, performance, versatility and reliability. Whether used independently or as part of a sealing system, our face seals are the smart choice for gas and liquid applications that require high-pressures and high shaft speeds, with moderate axial shaft movement.

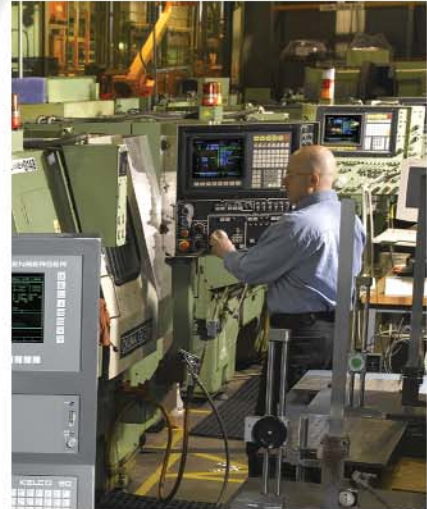
## Choosing the Best Fit for Your Application

Ideal in a wide range of aircraft and industrial applications, our face seals offer superior performance in aircraft engine main shafts, accessory gearboxes, compressors, centrifuges, pumps, chemical processing equipment and many other high-speed rotating machines.

Stein Seal designs both contacting (rubbing) and non-contacting (film riding) face seals, which are available as either hydrodynamic or hydrostatic. Choose from several configurations including standard single ring, back-to-back, face-to-face, or in a tandem arrangement.

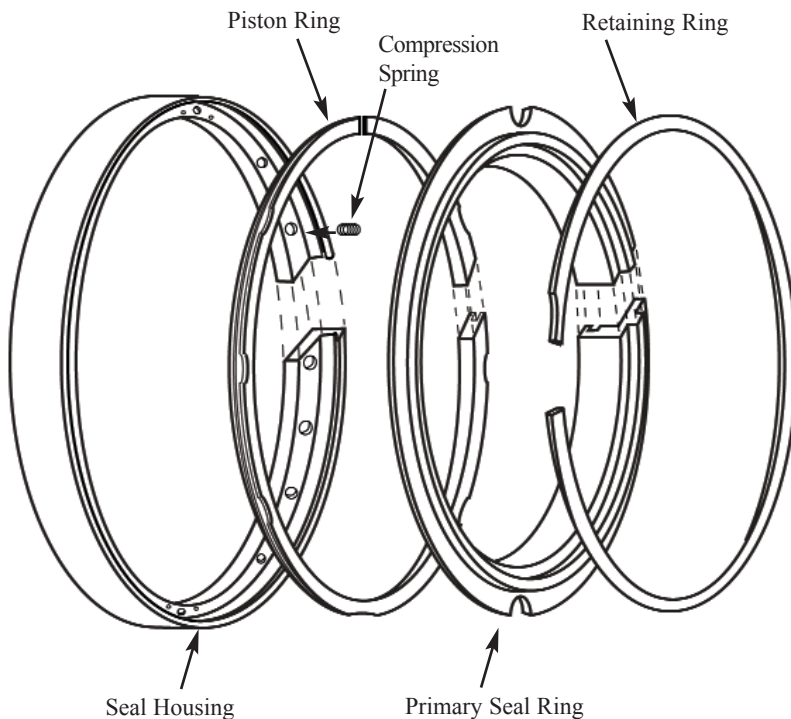
A face seal consists of a primary seal ring, which is pressure and spring loaded axially against a seal

race, which rotates with the shaft. The primary seal ring either rotates with another shaft or is fixed to a stationary housing with anti-rotation locks to prevent movement. All face seals require a secondary ring, which seals between the primary ring and the



stationary housing, but still allows the primary ring to follow the axial motions of the seal race.

The primary seal ring is made of carbon graphite usually retained by a metal ring. The secondary ring can be an O-ring, a Teflon C ring, a metal or carbon piston ring, a bellows or a segmented circumferential ring. The primary ring has a seal dam, which maintains contact with the axial face of the rotating seal race. The seal race, made of either metal or ceramic, is clamped to the shaft. The primary seal ring is axially loaded against the seal race by compression or wave springs.





## **Outstanding Performance Capabilities Offer Key Advantages**

A number of significant design features make the face seal one of our most flexible, versatile and reliable devices. The design easily accommodates large radial shaft movements while maintaining low leakage rates. These rates remain constant over the life of the seal, which ensures consistent, reliable sealing. They are also pressure balanced for higher delta pressure capability and decreased heat generation, which helps to extend the life of the seal. Where required, these seals can be designed to tolerate sudden pressure reversals, such as in chemical gas applications. As with all seals we design and manufacture, our face seals are fast and easy to install, maintain and replace to minimize downtime and reduce cost.

Our face seals meet or exceed our own rigorous specifications and are tested extensively to ensure compliance with industry standards. All our face seals can handle shaft rotation speeds up to 152.4 meters per second (500 feet/second); temperatures ranges over 538°C (1000°F); and pressure ranges up to 1206 KPa (175 psid). Shaft diameter sizes generally start at the low end of 12.7 millimeters (0.500 inches), while the high end depends on the application requirements. Our face seals can achieve a seal life of over 30,000 hours.

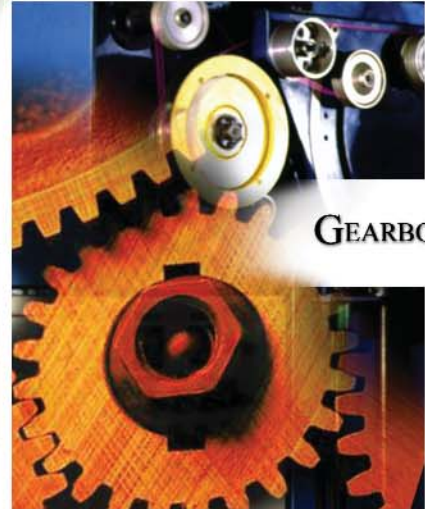
## **Reliable, Consistent Operation When It Counts**

Our face seal is an excellent choice for use on the main shaft in aircraft engines where a robust, long wearing design is essential. Its rigorous construction can withstand both extreme pressures and the sudden pressure reversals that can occur during flight conditions.

In many industrial applications using pumps, centrifuges and other high-speed rotating equipment, the face seal is generally part of a sealing system that prevents the leakage of hazardous gases from escaping into the environment. These tough seals operate at high temperatures and speeds with low wear and can act as a positive seal in pressure reversal conditions.



**PROPULSION**



**GEARBOXES**



**COMPRESSORS**



**PUMPS**

A crucial use of the face seal is on submarines where maintenance and the replacement of parts are always a challenge. In stern tube applications where the propeller shaft exits the hull, the face seal consistently stands up to high pressure and long wear conditions, extending overall operating life.

## **Backed by The Best**

As a supplier of first-class, custom designed seals, Stein Seal continuously invests in our resources and capabilities: expert design engineers with solid, technical credentials and years of hands-on experience in a broad range of applications, our proven manufacturing techniques, superior quality and testing processes, and a responsive customer support staff. This investment allows us to deliver innovative, reliable sealing systems that meet and surpass both our customers' requirements as well as most design standards.

We are committed to our long established, collaborative working relationships with our customers and pledge to continue to deliver unparalleled value in products and services, today and in the future.

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

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