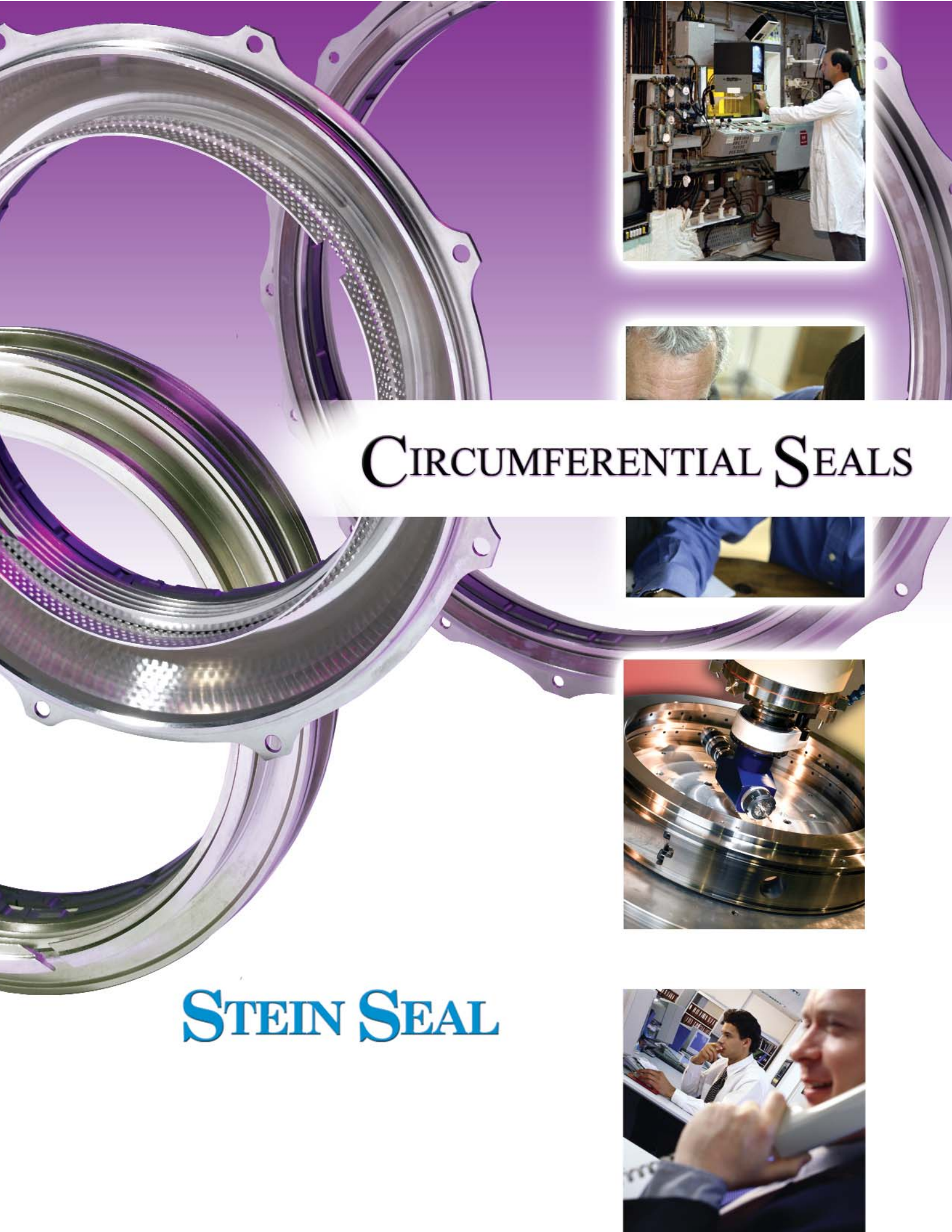


Circumferential Seals

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 line of precision crafted circumferential sealing devices is perfect for low-pressure applications where minimal, controlled gas leakage, high temperatures, unlimited axial shaft movement and low wear are critical. They can be used independently or as part of a sealing system. A split housing option makes it fast and easy to assemble the seal around a shaft.

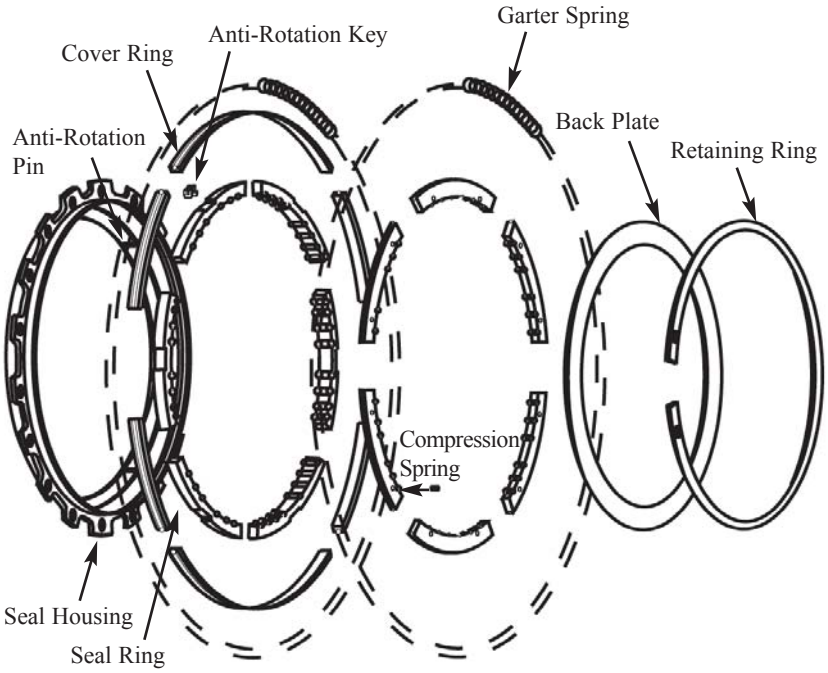
Choosing the Best Fit for Your Application

A versatile choice for a wide range of applications, our circumferential seals offer exceptional performance in aircraft engine main shafts, accessory gearboxes, compressors, centrifuges, pumps and chemical processing equipment.

Our primary circumferential seal is a contacting device that seals directly against the shaft. It is designed to exclude dangerous or toxic gases and prevent contamination of oil sumps. We also offer clearance, film riding, gas and liquid circumferential seals, which have a specific bore geometry to create hydrodynamic lift or suction, permitting the seal to operate under high-pressure differentials, or liquid or alternating liquid and gas environments. Circumferential seals are available in several configurations including standard single ring, back-to-back, face-to-face, or in a tandem arrangement.

Circumferential seals are comprised of three or more carbon segments that create a ring, which

is contained in a seal housing. The segments are radially loaded against the shaft using a garter spring and each seal ring segment is locked against rotation.



Designed for Excellence

Key features in our circumferential seal design significantly extend operating life while maintaining top-notch performance. A unique scalloped design incorporated into the individual carbon segments increases flexibility to provide better sealing. A special gap design at the end of each segment permits the seal to handle dimensional changes in the shaft diameter. This gap design, consisting of a precision machined overlapping tongue and socket,

creates a tight fit to further minimize leakage. Grooves on the face and bore of the segment reduce pressure loading to maximize seal life. A combination of compression and garter springs ensures that the segments remain in contact with mating surfaces during low delta pressure and at shutdown conditions.

The exceptionally lightweight carbon material and split housing capability make it easy to install, remove or repair seals in limited space areas. These characteristics are especially important in servicing aircraft engines and other confining applications

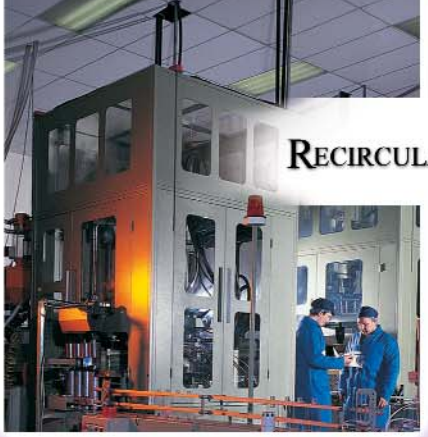
Performance Characteristics

All our circumferential seals meet or exceed our rigorous specifications and are tested extensively to ensure compliance with industry standards. These seals can handle shaft rotation speeds up to 183 meters per second (600 feet/second); temperatures ranges over 538°C (1000°F); and pressure ranges up to 586 KPa (85 psid). We have designed seals with diameter sizes ranging from 23.495 to 1054.100 millimeters (0.925 to 41.500 inches), although there is no practical upper limit restriction. Leakage rates are determined by the design requirements and remain consistent over the life of the seal, which may exceed 20,000 hours.

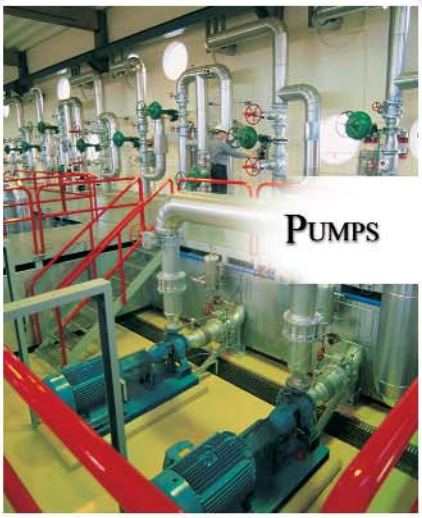
A Versatile Solution to Challenging Applications

In commercial and military aircraft engines, our circumferential seals provide reliable sealing capability in main shaft and gearboxes. Even if a seal malfunctions, the engine does not have to be shutdown in flight. This lightweight, easily interchanged seal generates low heat, fits into confined spaces, and reduces the number of wearing parts, reducing long-term costs for replacement hardware. These features are critical in meeting government mandated requirements and severe operating conditions, such as temperature extremes, high pressures, high shaft speeds and vibration.

Circumferential seals are a key element in the efficient functioning of compressors, generators, centrifuges, pumps, gas turbines and chemical



RECIRCULATION



PUMPS

PROCESS CONTROL

PROPULSION

processing equipment. They operate effectively and consistently at high temperatures and high speeds with minimal leakage and low wear. Often paired with our dry gas face seal to make a reliable sealing system, the circumferential seal can also function as an emergency shutdown seal if the dry gas face seal fails.

In marine propulsion applications, circumferential seals are most often used on the bulkhead shaft and in gas turbine drives and gearboxes to provide low leakage under moderate pressure. Used alone or as a component of a multiple seal, our flexible, split circumferential seal allows fast, easy installation on very large shaft diameters without disturbing other equipment.

When installed on water turbine shafts and in gas cooled generators, this reliable, long-wearing seal can handle the many challenges of power generation applications, including the effects of radiation, decontamination, vibration and misalignment on seal performance, conditions which often occur in nuclear reactor systems applications.

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 circumferential seals, our complete line of seal products or to discuss your application requirements with our experts, please contact Stein Seal Company.

Corporate Headquarters
Stein Seal Company
1500 Industrial Blvd.
Kulpsville, PA 19443-0316
U.S.A.
Tel: 215-256-0201
Fax: 215-256-4818
E-mail: sales@steinseal.com

Subsidiary
Stein Seal UK Ltd.
Runneymede Malt House,
Hummer Road
Egham, Surrey
TW20 9BD England
Tel: +44 (0) 1784-497023
Fax: +44 (0) 1784-497024
E-mail: saleseurope@steinseal.com

www.steinseal.com

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