Turning Ideas Into Engineered Solutions

KAYDON

RING & SEAL, INC.

The K-MRC

Multi-Ring Circumferential Seal for
Oil Free Screw Compressors and
Centrifugal Compressors

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The K-MRC

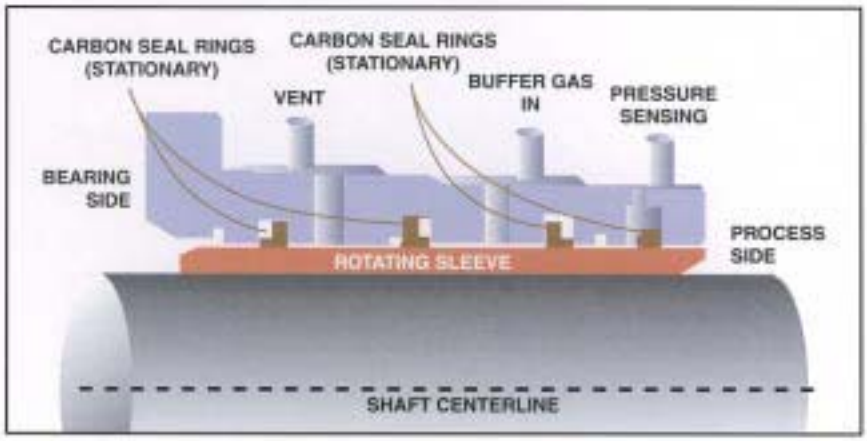
Multi-Ring Circumferential Seal for Oil Free Screw Compressors and Centrifugal Compressors

Responding to demand from rotary equipment engineers, the K-MRC works best in applications where dry gas face seal performance is desired, but not practical from the standpoint of economics, environment, or space restrictions. K-MRCs are dry running circumferential gas seals and offer the same performance as face seals in their pressure range—up to 100 psig (7 bar). Their low profile is ideal for the tight space restrictions of oil free screw compressors, but they also replace dry gas face seals in centrifugal compressors for many lower pressure applications. Low buffer gas consumption, typically 0.1 scfm per inch of seal diameter (0.11 nlpm/mmø) makes K-MRCs economical to run. And because they are priced lower than face seals, you can realize great savings in maintenance costs while actually increasing the reliability of your sealing system.

Check these benefits:

- Replaces bushing, labyrinth and dry gas face seals—easy to switch over
- Longer service life in corrosive environments
- Lower buffer gas consumption than labyrinth or bushing seals
- Low environmental impact: eliminates oil as a hazardous waste and system contaminant
- Sized right and priced right
- Low HP consumption
- Tolerates axial and radial misalignments well
- Low-to-no maintenance and field serviceable
- Not affected by temperature differentials
- No rotating shoulders and carbon ring cracking
- Unlike gas face seals, K-MRC is not prone to sudden, unpredictable failure

The working faces of the carbon rings are partially pressure balanced. Sealing occurs across narrow sealing dams to partially unload the carbon ring in both axial and radial directions. This allows the seal to track radially with the rotating shaft and minimizes wear at the bore. The K-MRC uses buffer gas at a rate 1/10th that of a floating bushing ring seal and 1/100th that of a labyrinth seal, while providing a superior barrier to protect the bearing cavity from migrating compressor gas, such as methane, sour gas or hydrogen. Eliminates contamination of the bearing oil, the creation of explosive mixtures in the bearing case, and the venting of polluting, toxic and explosive gases into the atmosphere.



The K-MRC is a bore contact type of seal, having multiple segmented carbon ring sets which run against a shaft-mounted rotating sleeve at speeds up to 350 feet per second (108 meters/sec) and pressures up to 100 psig (7 bar). Typical seal life is 35,000 hours or four years.

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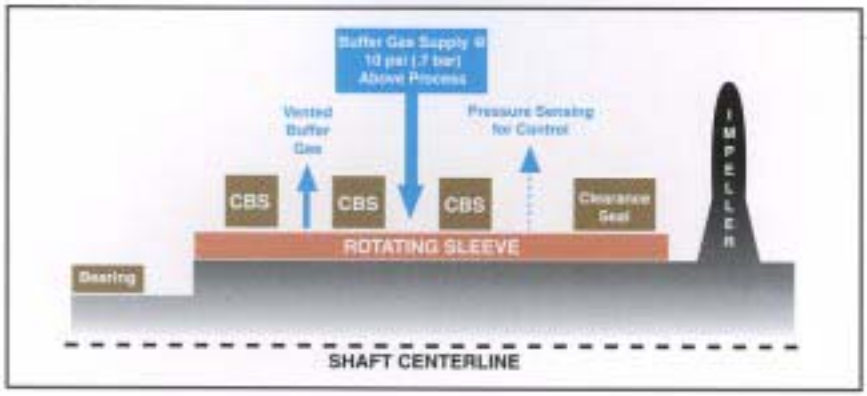
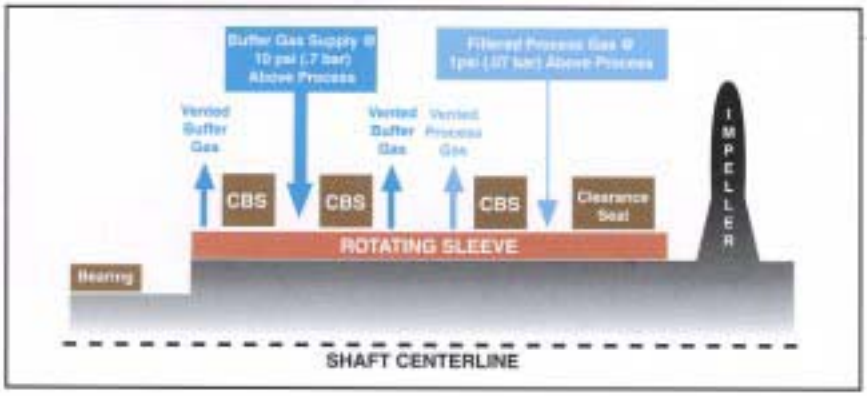
Design Flexibility.

The sealing rings can be arranged to suit different compressor/process applications with varying purge/vent orifices. Shaft diameter is not a limiting factor. K-MRCs typically range in size from 1.0" (25.4mm) to 15.0" (381mm); however, special applications up to 72" (1829mm) are possible.



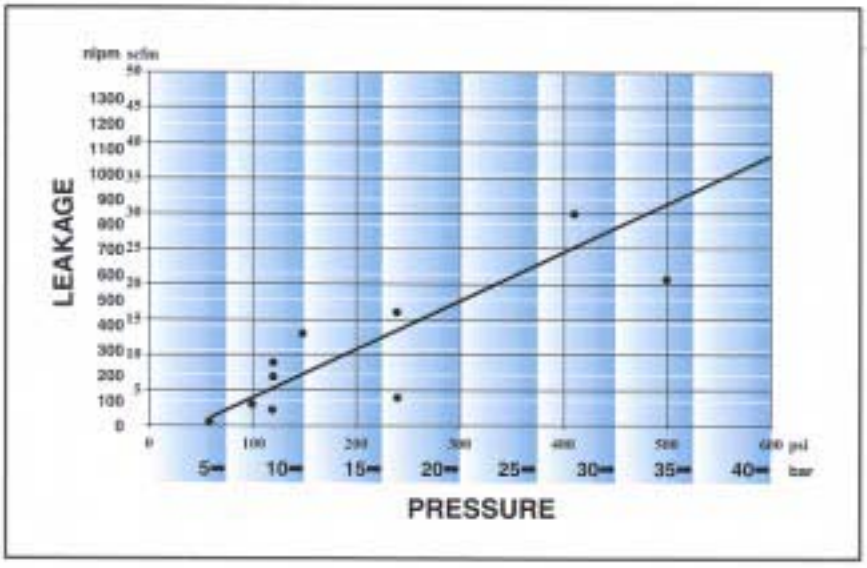
Single Buffer Gas Configuration.

A typical K-MRC arrangement where a trace of buffer gas in the process is tolerable. This configuration allows a small amount of buffer gas to leak to process and to the seal vent.



Dual-Gas Configuration.

A dual-gas system is required to protect the process from contamination with nitrogen buffer gas. This configuration uses filtered process gas on the process side, so the trace of leakage required for sealing has no impact on the process. A small amount of buffer gas will safely contain all filtered process gas to the seal vent.



Safe Emergency Shutdown!

Zero clearance means safety. 15 minutes after a simulated emergency shut-down, a 5.5" (140mm) K-MRC demonstrates superior containment. Since most emergency shutdowns are completed within one minute, the K-MRC has safety margin to spare. The K-MRC, unlike an aluminum labyrinth or carbon bushing seal, is not designed as a clearance seal. It is a bore contact seal and does not rely on critical seal clearances and centering. During an emergency shutdown due to loss of buffer gas, K-MRC's zero clearance prevents process gas from venting through the bearing cavity and bearings are protected from process contaminants and debris.

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K-MRC
Gas Control Systems

Kaydon provides a complete systems approach:

Fully engineered, manufactured and tested for performance

The control system provides clean, filtered buffer gas at a determined seal differential to support the sealing application design. Variables include: purge and vent arrangement, buffer gas type and whether or not the compressor is balanced. Centrifugal compressors are typically balanced, so only one reference pressure is required to be monitored to maintain the seal pressure differential. Oil free screw compressors are typically unbalanced, requiring the monitoring and control of several independent inlet and discharge seal pressures. Kaydon engineers complete system solutions, specific to your application.

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