

# Dry Gas Seals



Dry gas seals, an alternative to Iso-sleeve™ and Iso-carbon® seals, eliminate the need for oil supply systems. A dry gas seal is a mechanical seal that uses a sealing gas to create a barrier between the process gas and the atmosphere. Dry gas seals are non-contacting, dry-running, mechanical face seals comprising a rotating mating ring and a stationary primary ring. When operating, grooves in the mating ring generate a fluid-dynamic force, causing the primary ring to lift off the mating ring and create a running gap between the two surfaces. Inboard of the dry gas seal, an inner labyrinth seal separates the process gas from the gas seal. A sealing gas, typically filtered process gas, is injected between the inner labyrinth seal and the gas seal, filling the lift-off void. Dry gas seals do not require a seal oil system; however, they do require a supply of clean, dry buffer gas at all compressor operating points. A dry gas seal is not a standalone item. To ensure proper functionality, they are always configured with a process side labyrinth seal, a gas seal cartridge, a separation seal cartridge, and a buffer gas system.

## Benefits of the Dry Gas Seal

- ♦ Minimizes process gas leakage rates
- ♦ Reduces power consumption (mechanical losses): higher efficiency
- ♦ Increases reliability with fewer shutdowns with less unplanned expenses
- ♦ Eliminates maintenance costs associated with seal oil system
- ♦ Eliminates the need to dispose of contaminated seal oil (environmental advantage)

## Dry Gas Seal STANDARD Retrofit Package includes the following:

- ♦ Two (2) dry gas seal cartridges
- ♦ Two (2) buffer seals
- ♦ One (1) rotor shaft machining
- ♦ One (1) low speed rotor balance
- ♦ Gas seal buffer system
- ♦ One (1) set of assembly/disassembly tooling
- ♦ Standard Documentation Package: Wiring diagram, P&ID, outline, IOM, manufacturing data record book, inspection and test plans, instrument index, equipment datasheets updated assembly drawings and installation and removal instructions.

Dry gas seals are available in a variety of configurations (single, double opposed, and tandem) to suit all applications. The tandem style seal configuration is the most common for process gas service.

Dry Gas Seals Sealing Pressure Application Limits		
Configuration	Application	Sealing Pressure
Double opposed seal	Low pressure, hazardous gas	< 250 psig
Single seal	Low pressure	< 400 psig
Tandem seal	Most popular seal, multiple arrangements	< 1,200 psig
Single seal, high pressure*	Higher pressure design	< 1,800 psig
Tandem seal, high pressure	Higher pressure design	< 2,900 psig

\*Seal design and component materials can be tailored to specific higher pressure applications or corrosive processes.

Application	Description	Iso-Carbon® Cartridge Seal	Iso-Sleeve™ Cartridge Seal	Dry Gas
Natural Gas	Gas cleanliness depends on where the gas is in its processing, upstream or midstream. There can be a wide range of pressures. Natural gas can be dirty and wet, but can be handled easily once purified.	✓	✓	
Wet Gas	The gas is typically dirty and close to its dew point; it can condense easily to a liquid state. Application pressures are very low. Oil seals are tolerant of dirty, hazardous gas since they use oil as a "buffer."	✓		
Hydrogen Recycle	The gas is typically dirty and close to its dew point; it can easily condense to a liquid state. Application pressures range from moderate to high. Oil seals are tolerant of dirty, hazardous gas since they use oil as a "buffer."		✓	✓*
Ethylene Refrigeration	This gas starts out as a liquid, but evaporates as it passes through an expansion valve. The vapors are then compressed for condensation. There are low inlet pressures and a high risk of product contamination. It is important to maintain a clean and oil-free process.			✓

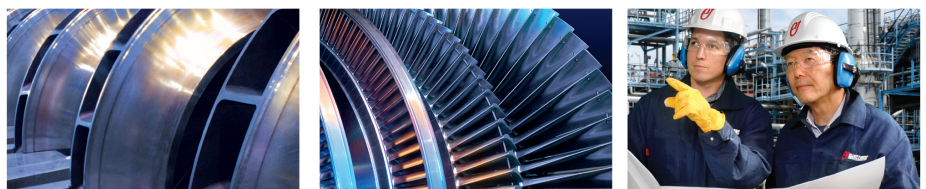
\*Often requires a booster system for startup and/or additional gas conditioning as part of the buffer gas system.



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