

# Seal Design Options

Ingersoll Rand offers a complete range of seal arrangements to meet the specific needs of your application.

## Standard Labyrinth-style Air/Gas and Oil Seals

- Used with atmospheric air and low-pressure gases
- Effectively confine air in the stage casings and prevent contamination of the gas stream from lubricating oil
- Non-contacting seals eliminate shaft wear
- Do not require periodic replacement
- Only require inspection every five to six years under normal operating conditions



**Babbitted Air Seal**

## Babbitted-style Air/Gas Seals

- Used with high-pressure and nitrogen applications
  - When used with educting, these seals have an excellent recovery rate
  - Knife edges on pinion cut into the babbitt material on seal for closer fit and very low leakage
  - Babbitt material has a high tin content for lubricity
  - Seal maintenance is not required for five to six years under normal use
- Ports can be machined in the seal to recover process gas or buffer the seal during periods of non-use

**Labyrinth Oil Seal**



## Carbon Ring Seals

- Designed with two solid, floating carbon rings with close shaft clearance
- Non-contacting seal, so periodic maintenance is not required under normal usage
- Complete assembly bolts inside the scroll and is accessed by removing the impeller
- Leakage control is significantly better than the babbitt seal for the same pressure

## Single Dry-face Seal

- Used on hydrocarbon and process gases where leakage is not allowed, or on high-pressure applications where labyrinth seals cannot provide enough leakage protection
- Seal system is completely oil-free
- Buffer gas pressure can be set so that no buffer gas enters the process and a small amount of process gas vents out of the system

## Other Types of Seals

- Tandem seal with buffered backup seal
- Oil bushing seal with separate seal oil system

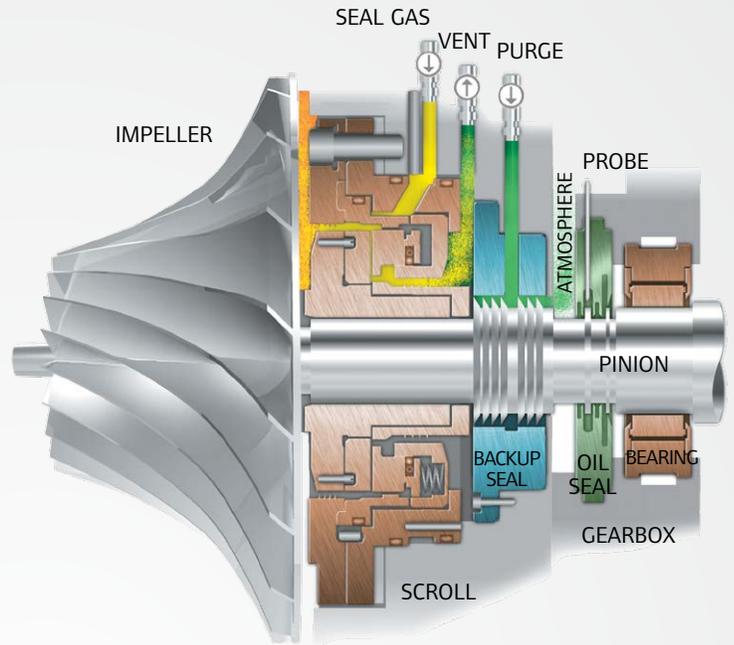


**Labyrinth Air Seal**

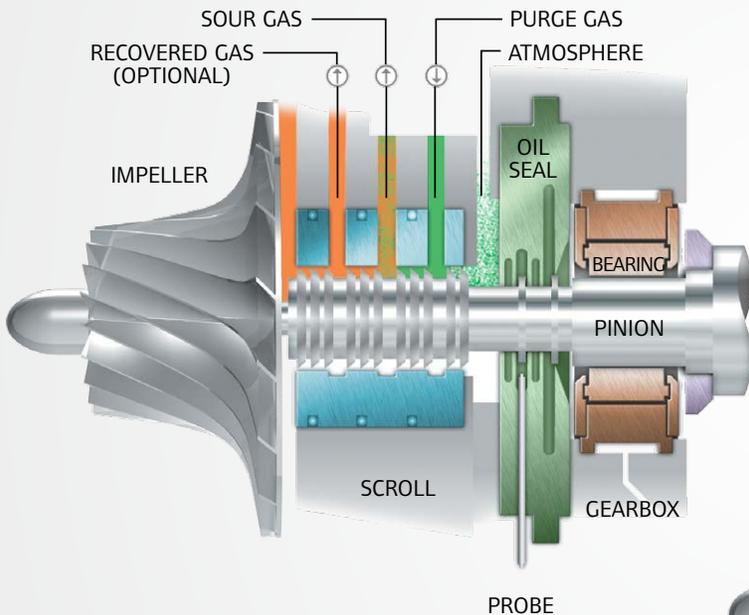
## Gas Seal Options for Your Process Applications

Multiple gas seal designs are available for a wide range of process gases and leakage requirements. Ingersoll Rand can suggest a seal type based on your process, or we can design the seal of your choice – all major seal suppliers can be used.

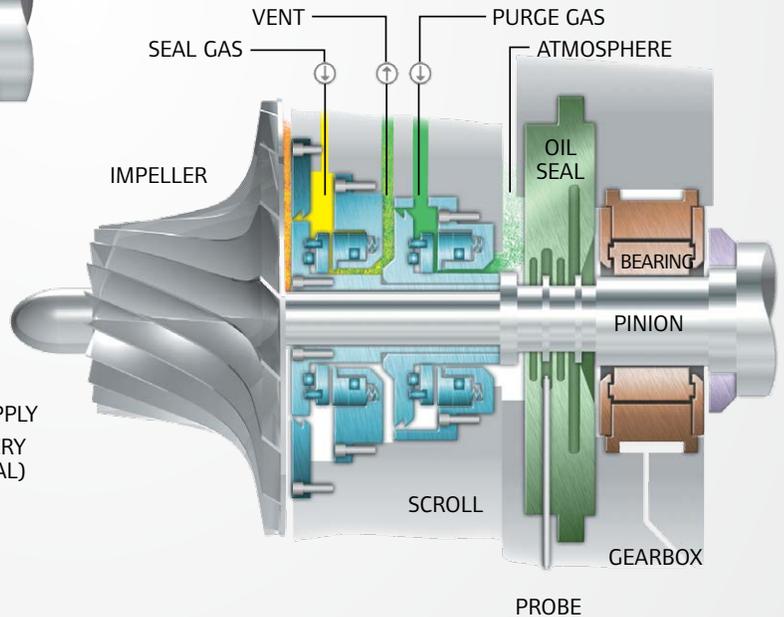
Ingersoll Rand’s standard dry-face seal uses a floating self-centering rider. The clearance fit allows the seal to be removed easily and installed without puller tools. The seal comes as a complete assembly with an installation plate.



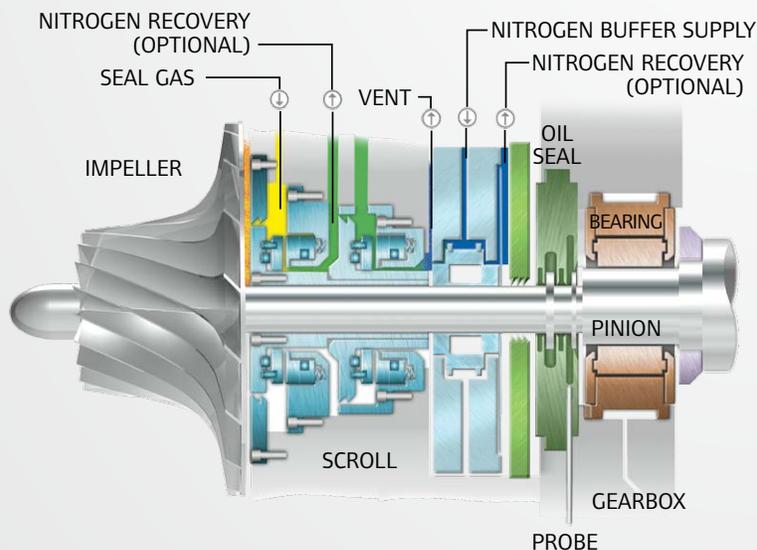
Single dry-face seal with a babbitted backup



Multiport babbitted seal with purge



Tandem dry-face seal with integral labyrinth

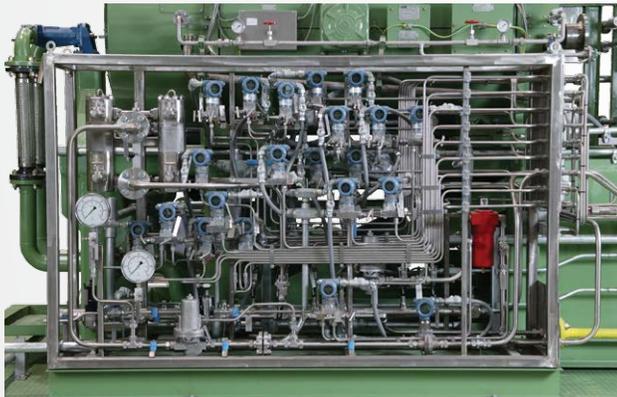


Tandem dry-face seal with carbon ring back-up

# Process Gas Seal Support

Gas seal support systems are designed, built and tested per API 614. System designs can be based on differential pressure control, flow control or other control methods. The scope of supply is virtually unlimited and fully automatic. Manual or customer-specified systems can be engineered for most gas seal types.

Systems are designed with instrumentation to monitor seal condition. Filters and accessories are supplied with sufficient instruments to plan maintenance and reduce downtime. The goal is to save you time and money by providing worry-free operation of your equipment with simple maintenance.



**Gas seal transmitter rack with 2-of-3 voting, seal gas filtering and purge gas filtering**

## Aerodynamic Performance

### Unique Impeller Designs

Impellers, diffusers and scrolls are uniquely designed to meet your specific needs. Examples of our impellers include:

### Custom Engineered/Five-axis Milled

- Custom-designed using computational fluid dynamics (CFD) for aerodynamic design and finite element analysis (FEA) for mechanical integrity
- Optimized designs for custom applications
- Overall savings can be as great as a 5% increase in efficiency over some cast impeller designs



**Fuel gas booster skid with scrubber, bypass and recirculation piping**