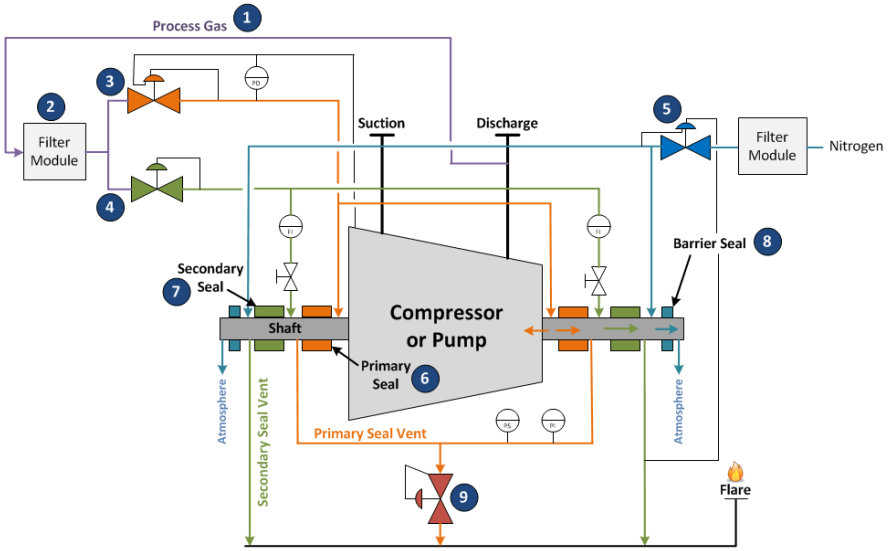
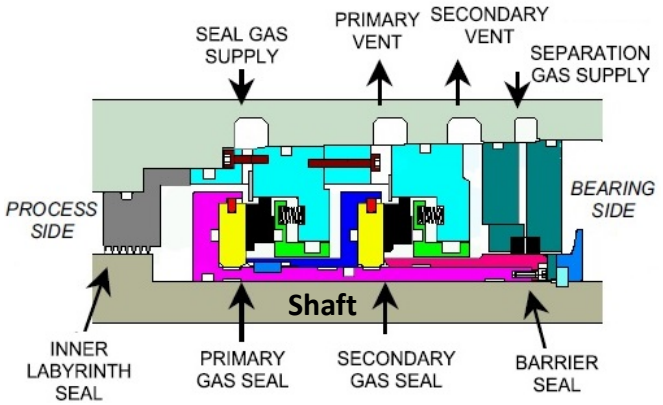
# Dry Gas Seal Systems
## Regulator Technologies

| | Equipment | Description |
|---|---|---|
| 1 | Sealing Gas | Sealing gas must be available at sufficient pressure to cover the entire operating range of the compressor including transients. The seal gas should be at least 50 PSI above the required sealing pressure. The industry standard is to use the compressor discharge, but quality and composition of the gas is extremely important. |
| 2 | Seal Gas Filter Module | To avoid getting debris into the seals the seal gas must be filtered and should at a minimum free of solids greater than 10 microns and 99.97% liquid free. |
| 3 | Primary Seal Regulator | The primary sealing regulator in a differential pressure (DP) configuration. DP systems use a differential regulator to control the supply of seal gas to the seal by regulating the seal gas pressure to a predetermined value (typically 10 PSI) above a reference sealing pressure. |
| 4 | Secondary Seal Regulator | The secondary sealing regulator in a flow control configuration. Flow control systems control the supply of seal gas to the seal by regulating the seal gas flow through a valve or orifice upstream of the seal. |
| 5 | Barrier (Separation Gas) Seal Regulator | Barrier seal control should be DP control by regulating the separation gas to 3-10 PSI above the secondary vent pressure. |
| 6 | Primary Seal | The primary seal is the main seal and during normal operation the primary seal absorbs the total pressure drop. |
| 7 | Secondary Seal | The secondary seal is intended to act as a backup in case of primary seal failure, providing the necessary shaft sealing until the compressor can be safely shut down. |
| 8 | Barrier Seal | The separation/barrier seal prohibits lube oil migration into the gas seals. It is very common to use instrument air or N2 as the medium. |
| 9 | Primary Vent Backpressure Regulator | In order to determine if there is a failure of the secondary seal back pressure can be maintained on the primary vent and the pressure monitored for a loss of pressure using a pressure switch or transmitter. |




**Tandem Gas Seal/Barrier Seal Configuration**

EMERSON
Process Management

# Dry Gas Seal Systems
Regulator Technologies

## Industry Standards

energy API AMERICAN PETROLEUM INSTITUTE

**API 692 - Compressor Dry Gas Seals 1st Edition** *(In Development)*

**API 614 (ISO 10438) 5th Edition - Lubrication, Shaft-sealing and Oil-control Systems and Auxiliaries** *(Current Standard)*

Part 1: General requirements

Part 2: Special-purpose oil systems

Part 3: General-purpose oil systems

**Part 4: Self acting gas seal support systems**

Dry Gas Seal Support System

## Sizing and Specification Tips

| Equipment | Sizing and Specification Tips |
|---|---|
| Primary Seal Regulator and Secondary Seal Regulator | • Typically smaller self operated regulators (i.e. MR95)<br>• In some cases MR95s with external sensing lines is preferred to sense pressure at a user specified location (i.e. downstream of filters)<br>• In many cases due to the use of process gas, which can be high in H2S gas, NACE is a commonly required specification for the regulators. It is especially important to make sure the NACE requirements are understood for differential pressure regulators where the spring case is going to be filled with process gas.<br>• Low flow stability is important especially during compressor start-up conditions. As the compressor starts-up there is very little pressure and the pressure regulator must take very large pressure drops as low flow rates. |
| Primary Vent Backpressure Regulator | • Typically smaller self operated regulators (i.e. MR98)<br>• In many cases due to the use of process gas, which can be high in H2S gas, NACE is a commonly required specification for regulator.<br>• In the event of a catastrophic failure of the primary seal, the primary vent is subject to a much higher gas flow, causing a backpressure in the piping upstream of the backpressure regulator. Review maximum flow and inlet requirements with the customer in the even of a primary seal failure. |

## Customer Challenges

- Dry gas seal systems can be designed using control valves instead of regulators to control the gas flow to the seals. While this is an acceptable and in some cases preferred option as it allows for very accurate control of seal gas flow it can be very costly. Gas sealing systems using control valves require stand alone PLCs to ensure the proper speed of response to changes which add cost and complexity to the sealing system.