NEBOT FLUID SCIENCE DYNAMICS

FLUID PROCESS DYNAMICS

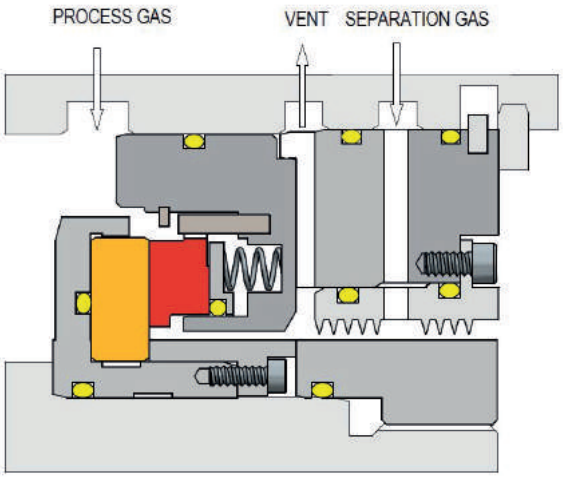
DRY GAS SEAL PRODUCT SERIES - NG TYPE

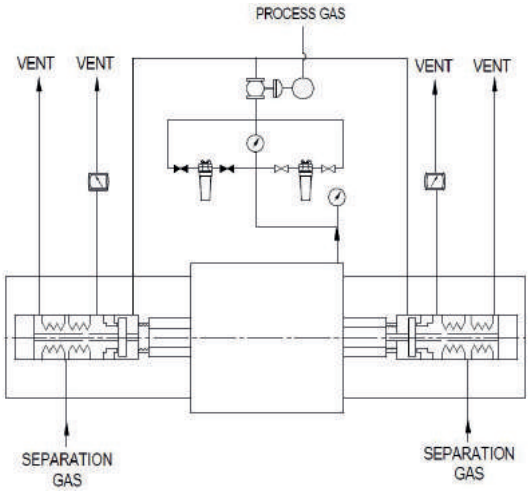
NG SERIES DRY GAS SEAL

NG series dry gas seal is a non-contacting mechanical seal lubricated by gas film, which combined hydrodynamic and hydrostatic effect. Dry gas seals are mainly used in turbo-compressors, turbo-expanders, etc. in natural gas pipeline, refinery, petrochemical industries, chemical industries and other industries. Compared with other mechanical seals, the main distinctive attribute of dry gas seal is that shallow grooves are machined on the sealing face of either rotating ring or stationary ring. Sealing faces do not contact during dynamic operation by means of gas film between them, resulting almost no wear. The sealing face grooves are using patented technologies which include 'Face seal with spiral grooves' and 'Bi-direction rotatable face seal with spiral grooves'. According to the arrangements of sealing faces, there are five types of seals, single seal, double seal, tandem seal, tandem seal with intermediate labyrinth, tandem seal with prepositive labyrinth.

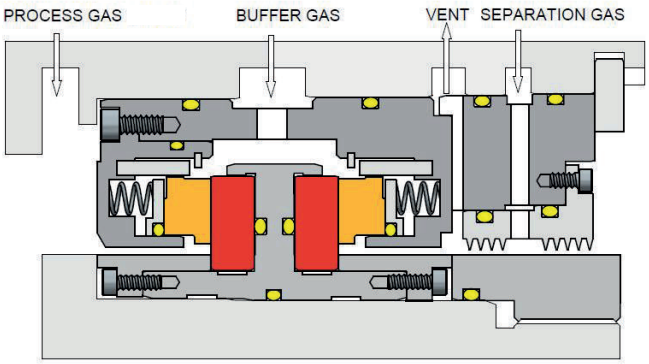
Dry gas seals have the features of high reliability and long life, almost negligible leakage, very low power consumption, no gas contaminated oil, no oil contaminated gas, elimination of bulky and complex seal oil system, light weight and small occupying area of control system.

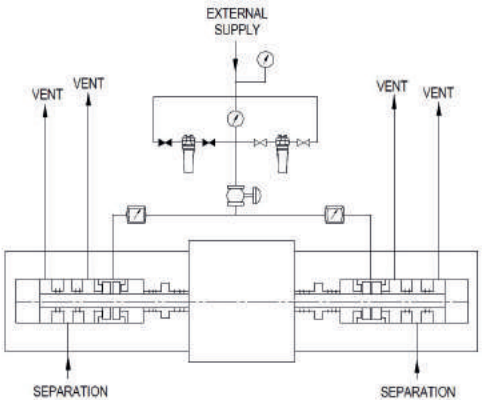
Typical Single Dry Gas Seal and Control System



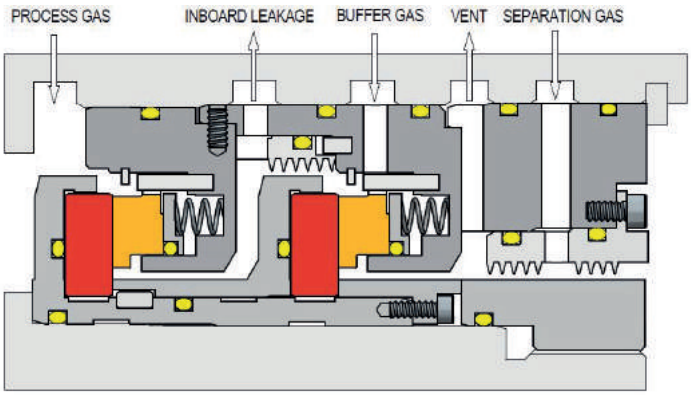


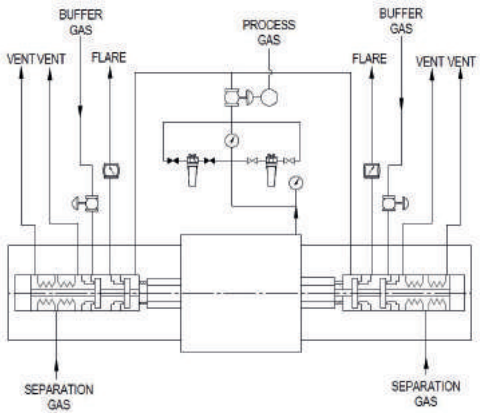
Typical Double Gas Seal and Control System



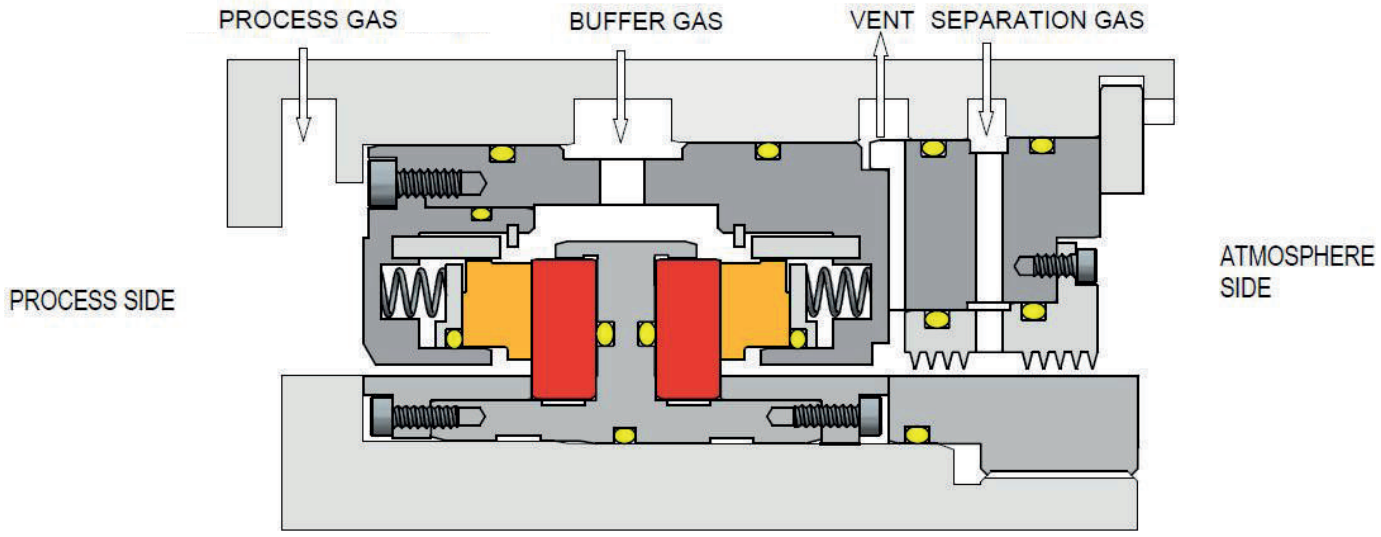


Typical Tandem Gas Seal and Control System





NGD - Double Dry Gas Seal



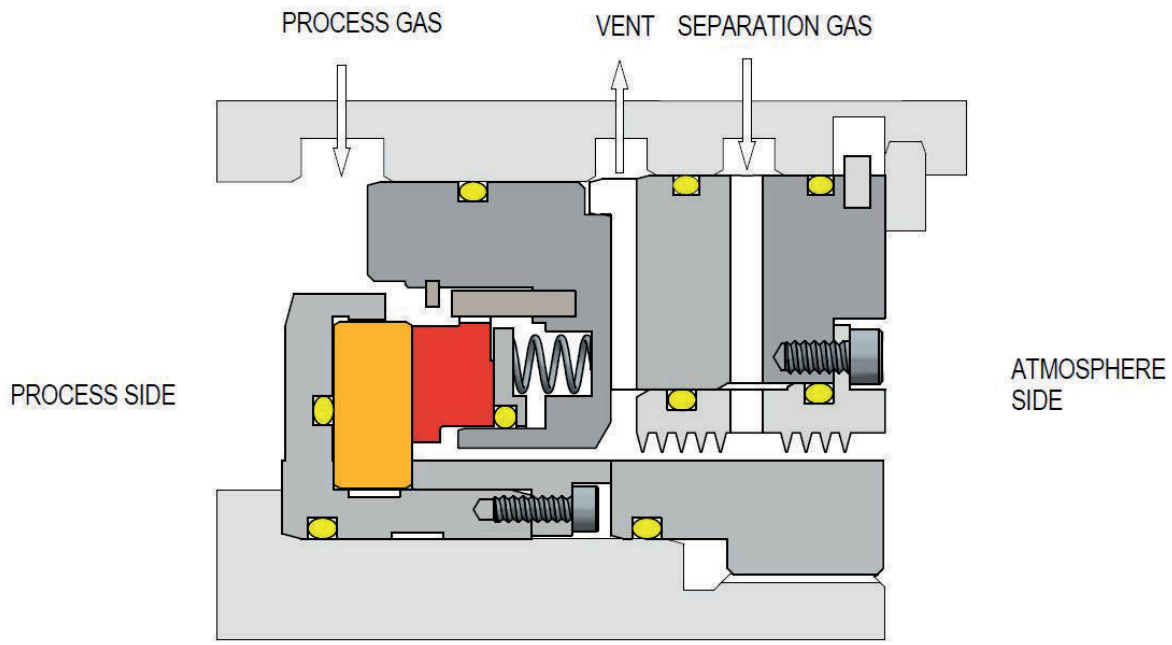
Operating Limits

Pressure	0	17bar	40
Temperature	-100	-40°C to 260°C	300
Speed	0	150m/s	300

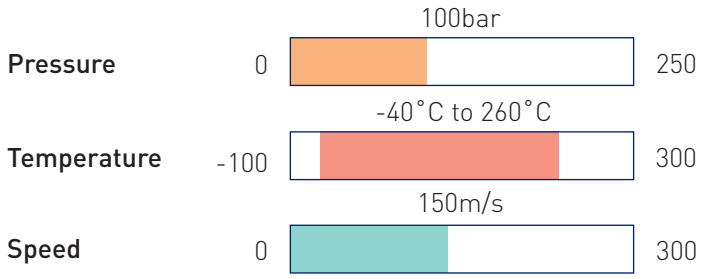
Application Scope

- The double seal is used where leakage of the process gas to the atmosphere is unacceptable, but a little buffer gas leakage into the process could be admissible. Such as the gas is dirty, unstable or there is a danger of negative pressure.
- The double seal is just like two single seals arranged face to face. The buffer gas which pressure is 0.2~0.3 MPa higher than process gas fed between two seals, always leaks to process gas and atmosphere, which isolates the process gas from atmosphere.

NGS - Single Dry Gas Seal



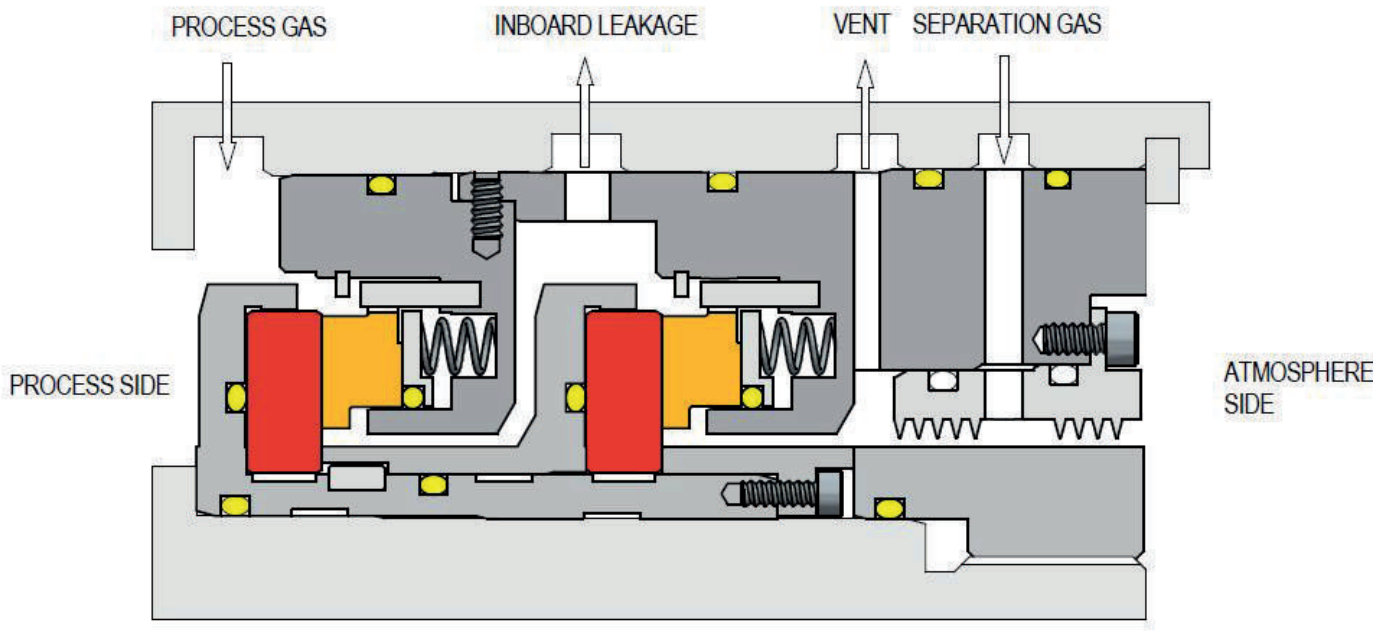
Operating Limits



Application Scope

- The single seal is used mainly on non-hazardous process gas where a little leakage to atmosphere is acceptable. The process gas from compressor discharge could be used as buffer gas.

NGT - Tandem Dry Gas Seal without intermediate Labyrinth



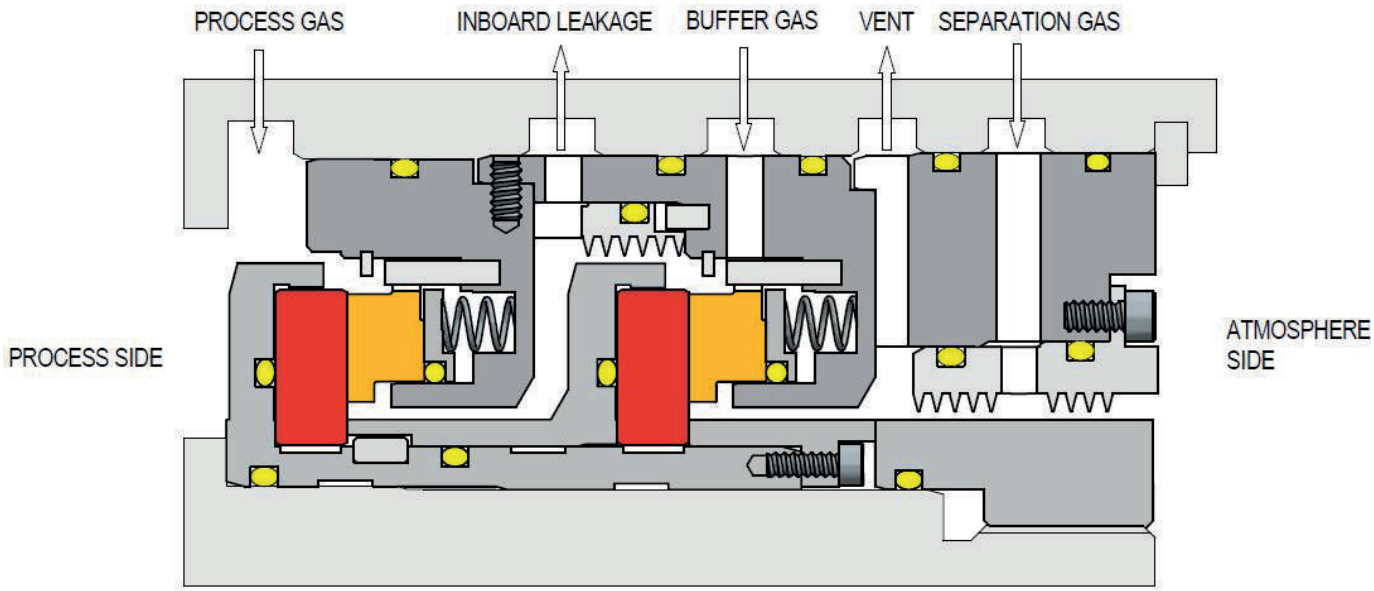
Operating Limits

		100bar	
Pressure	0		250
		-40°C to 260°C	
Temperature	-100		300
		150m/s	
Speed	0		300

Application Scope

- The tandem seals are used where a little process gas leakage to the atmosphere side are acceptable. Tandem seals could be like two or more single seals connected by end to end. It is similar to single seal that the buffer gas is just process gas.
- Normally the primary seal handles the full product pressure and the secondary seal is a back-up seal that normally operates at low pressure but can handle the full pressure in the event of a primary seal failure.

NGT - Tandem Dry Gas Seal with intermediate Labyrinth



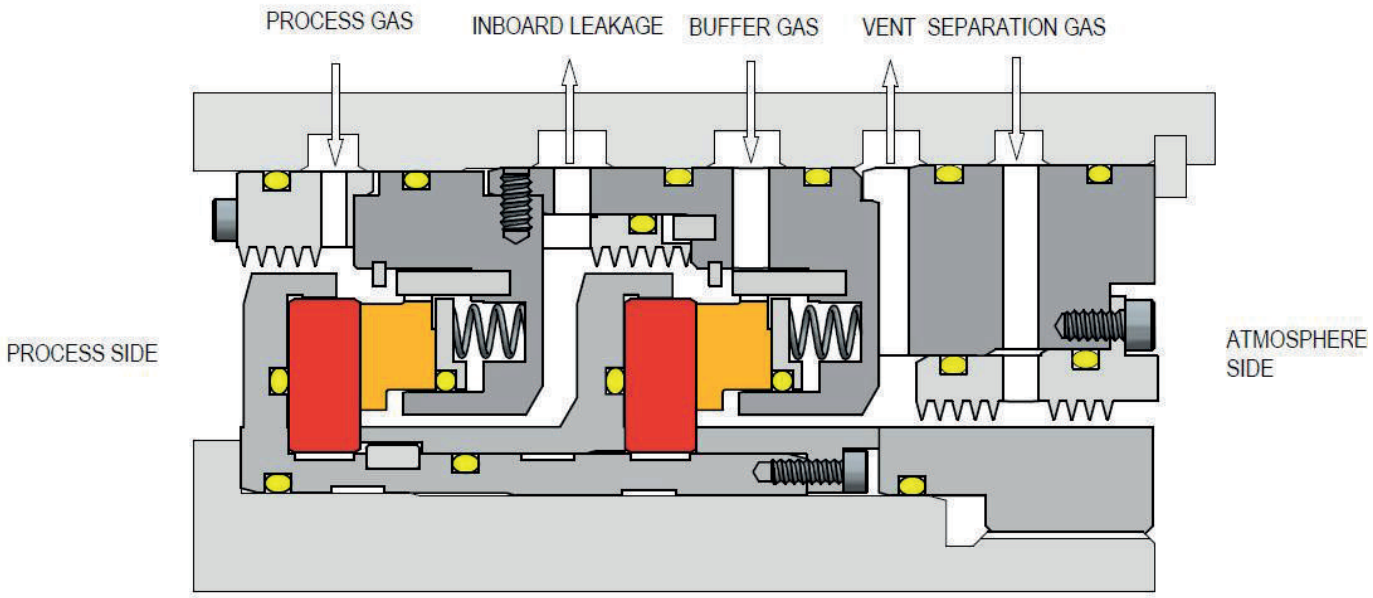
Operating Limits

		100bar	
Pressure	0		250
		-40°C to 260°C	
Temperature	-100		300
		150m/s	
Speed	0		300

Application Scope

- Where the process gas leakage to the atmosphere as well as buffer gas leakage to the process gas is both inadmissible, the tandem arrangement with an intermediate labyrinth is used.
- The labyrinth seal is installed between primary and secondary seal of tandem seals. Except the process gas, the nitrogen gas needs to be used between secondary seal and labyrinth seal. The secondary seal could be a back-up when the primary seal breaks down.

NGT - Tandem Dry Gas Seal with Prepositive Labyrinth



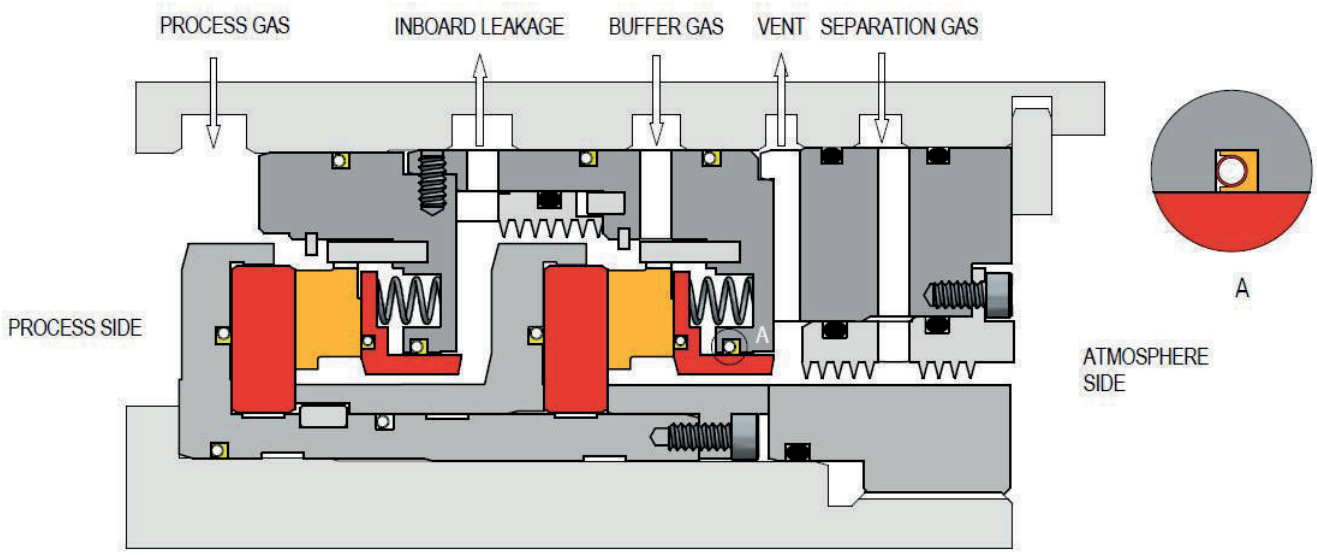
Operating Limits

Pressure	0	100bar	250
Temperature	-100	-40°C to 260°C	300
Speed	0	150m/s	300

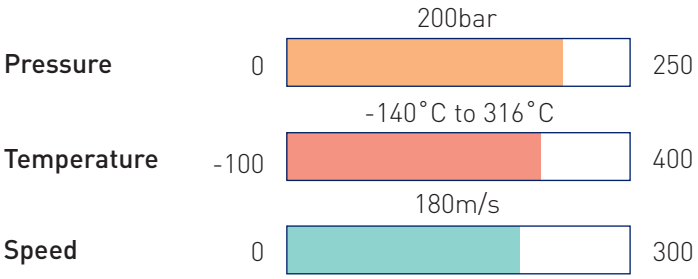
Application Scope

- The tandem seal can be used where the sealed gas pressure is close to the atmosphere, whose structure is a tandem seal with a prepositive labyrinth.
- It can not only avoid seal failure caused by negative pressure differential between inboard cavity and flare cavity but also prevent large volume gas flowing through the process labyrinth into the inside of compressor.

NGX - High Pressure Tandem Dry Gas Seal



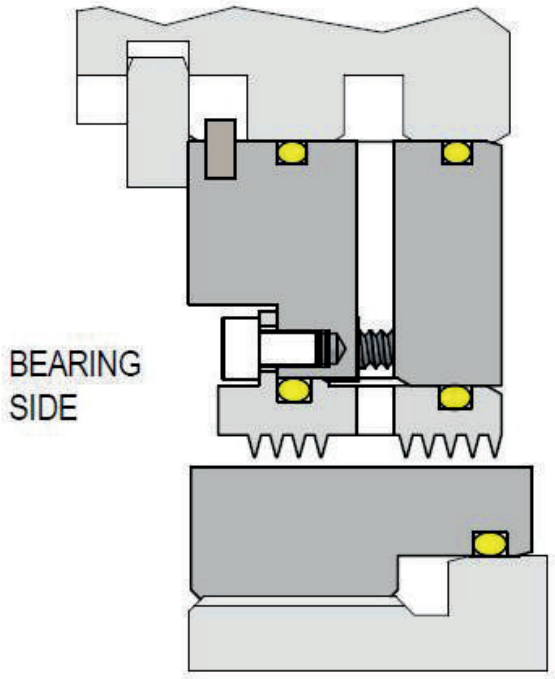
Operating Limits



Application Scope

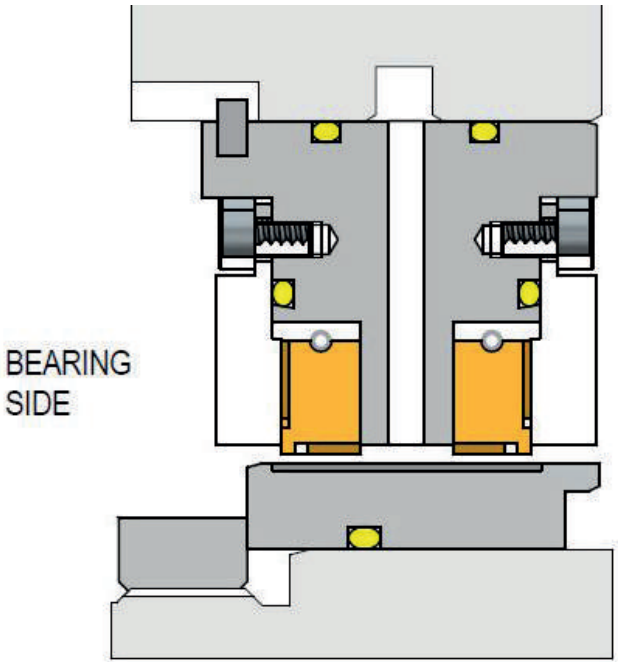
- NGX seal use polymer seal in place of 'O' ring. There is no elastomeric degradation.
- NGX seal has longer shelf life, it can be applied to more wide range of operating conditions.

NC Series Separation Seal



Labyrinth

- Simple structure, simple installation procedure.
- High consumption of separation gas.

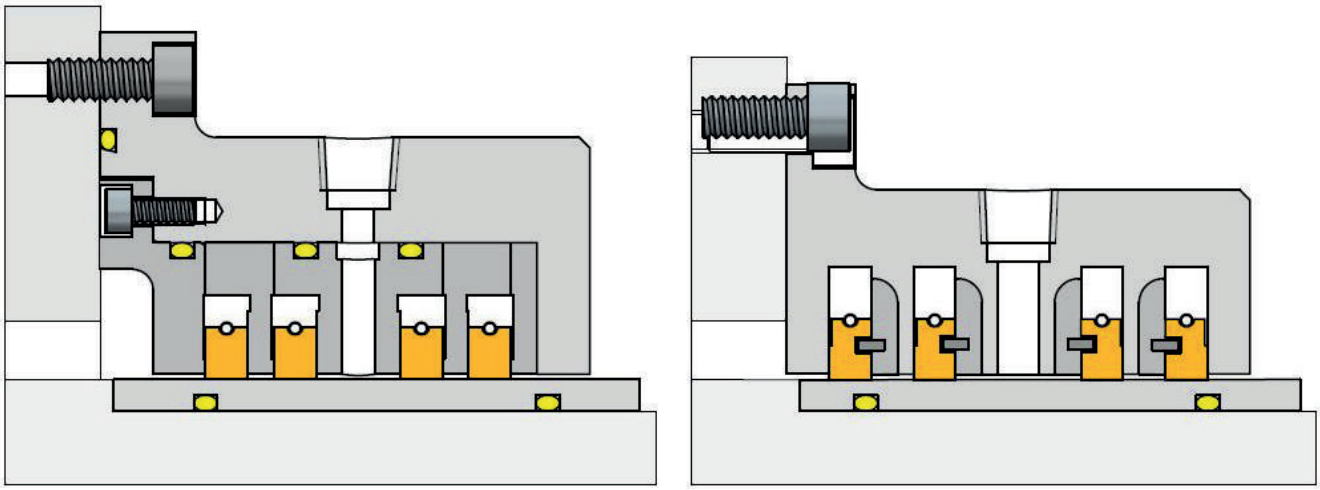


Carbon Ring

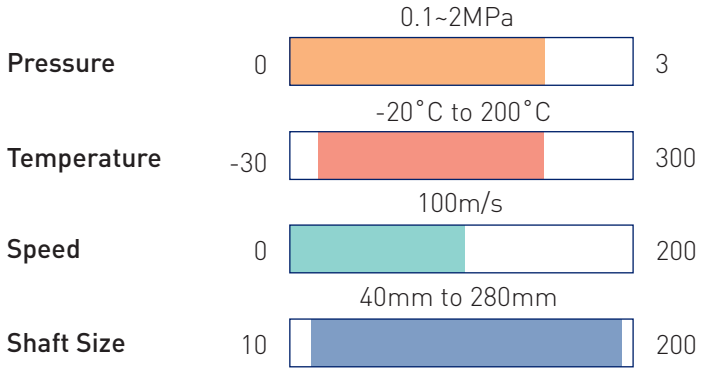
- Lower consumption of separation gas, only 20~30% of labyrinth.
- Better oil proof ability and more complicated installation and maintenance.

Dry gas seal is equipped with separation seal in order to prevent dry gas seal contamination of lubricating oil. At the same time the process gas is prevented from going into lubricating oil. NG series dry gas seal can work well with either carbon ring or labyrinth.

NC Series Circumferential Gas Seal



Operating Limits



Application Scope

- The adjustable orientation of segmented carbon rings in chamber is advantageous for compensation of radial shaft displacement, maintaining a stable gap.
- Cartridge design can assemble at random by the customer's requirement.
- The seal can be use in the high-pressure range, because of the special design, high operation safety and reliability, long useful life can be gained.
- Lower gas consumption and simple system design.

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