

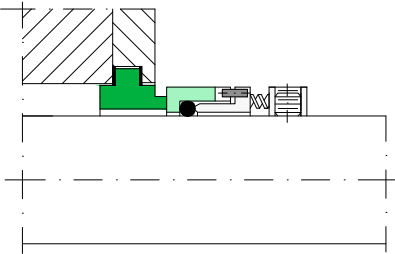
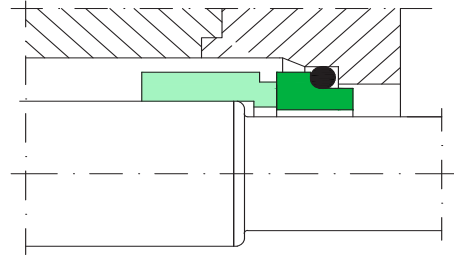
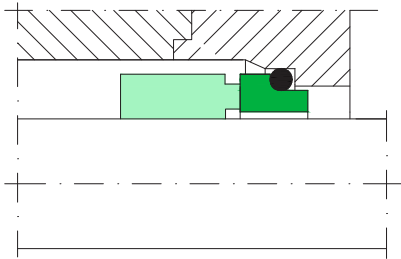
Assembly characteristics

The mechanical seal assembly type (internal or external, single or double) is determined by the application, the working conditions and different factors related to the environment.

• Single assemblies:

- Internal single assembly:

This is the most common type. The fluid is in contact with all the mechanical seal components; the chemical compatibility of these with the fluid must be ensured. It is best to use it when working with clean fluids or loaded ones with a concentration that does not endanger the lubricating characteristics of the fluid.



- Single external assembly:

This is used when the fluid contains fibres or solids which could block the spring, when the medium to be sealed is chemically very aggressive and may attack the metals used to make the springs, or in certain hygienic applications that require exhaustive cleaning or sterilising processes (usually within the scope of food and pharmaceutical processing industries).

• Double assemblies:

In some cases a single assembly is not sufficient to ensure sealing or the desired performance of an application. Some examples of these special applications are:

- Applications with costly, dangerous or contaminant fluids.
- Applications where it is essential to immediately detect a failure in the sealing system.

- Applications with non-lubricating fluids.
- Applications with fluids at high temperatures where cooling is necessary.
- Applications that operate with fluids at very high pressures.

The main configurations of double assemblies are as follows:

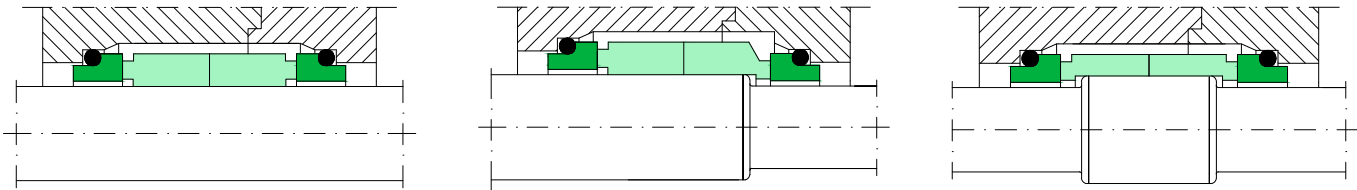
- “Back-to-back” assemblies:

This type is recommended for sealing non-lubricating fluids, gases, fluids with a high concentration of solids or with a tendency to crystallise, adhesives, pastes, paints or dangerous fluids.

This assembly requires the injection of a fluid known as buffer or barrier fluids in the chamber formed by the two seals. The barrier fluid pressure must be 1.5 to 2 bar above the pressure of the fluid to be sealed. Therefore, if there is a leak on the product side, the leak will be towards the interior of the system and the barrier fluid will be mixed with the product fluid. This characteristic is especially interesting in cases in which the working fluid is dangerous or pollutant.

It is not advisable to use this installation with no pressure in the barrier fluid, as the product fluid pressure could open up a leak route through the secondary seal of the stationary part or between the contact surfaces.

One advantage of this type of assembly compared to the others is that it permits a very short assembly length, which usually incurs fewer costs.



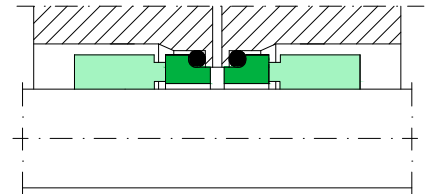
- “Face-to-Face” assemblies:

This type is recommended for sealing non-lubricating fluids, gases, fluids with a high concentration of solids or with a tendency to crystallise, adhesives, pastes, paints or dangerous fluids.

This type of assembly makes it possible to work with pressurised barrier fluids or non-pressurised ones, depending on the application needs, which makes it a versatile, reliable assembly. It has improved tolerance to the pressure oscillations of the barrier fluids, and to axial shifting and vibrations in the system.

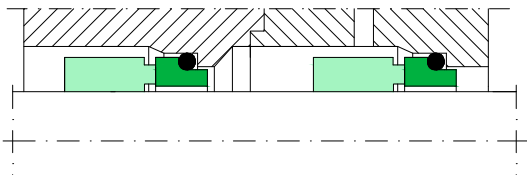
Given that it can work at excess pressure and low pressure, the leak can be directed in the most appropriate direction: towards the product or towards the barrier fluid. In all cases, the hydraulic balancing must be considered.

Since one rotating part of the mechanical seal has no components in the internal chamber of the sealing system, it is advisable to add a mechanism that will generate a pumping movement.

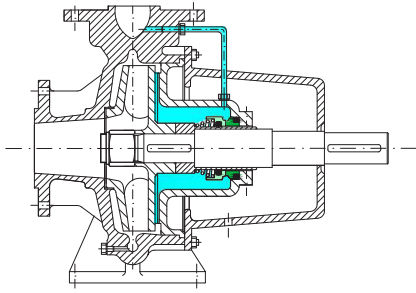


- “Tandem” assembly:

This is used to seal non-lubricating fluids, gases or dangerous fluids. In this case the fluid to be sealed is in contact with the seal components in contact with the product. The barrier fluids should be at a pressure of approximately 1 kg/cm² below the pressure of the fluid to be sealed, meaning that the direction of a leak would be towards the barrier fluid. This is particularly interesting for working fluids which must not contaminate the barrier fluid.



GENERAL INFORMATION: : ASSEMBLY TYPES

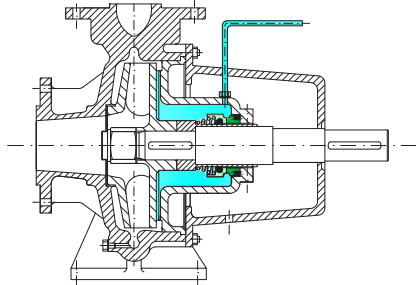


• Auxiliary assemblies:

- Circulation:

This system consists of circulating a small quantity of the fluid, aspired or piped, to make it act on the contact surfaces. In this way the heat generated is eliminated and particles and sediments are removed from the mechanical seal closure. It is recommended to install a cyclonic filter.

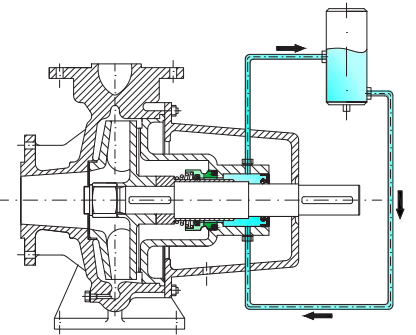
Corresponds to Plan API 11.



- Flush:

This consists of injecting an external fluid that is compatible with the mechanical seal closure. The pressure of this fluid must be approximately 2 bar above that of the fluid to be sealed. It is used in applications where the fluid is sticky, very thick or contains a high concentration of abrasive substances.

Corresponds to Plan API 32.

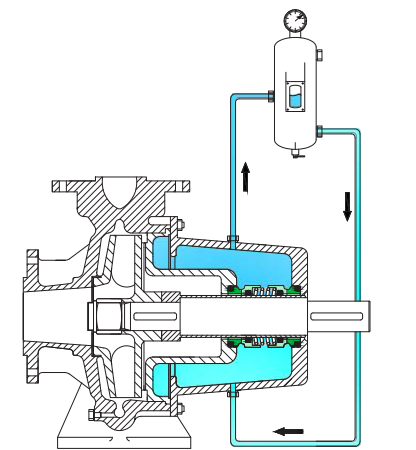


- Quench or drain:

In this system, a fluid is injected on the external side of the mechanical seal. Normally, an auxiliary sealing system must be provided.

It is used in cases where there is a possibility that the fluid to be sealed will freeze, during short periods of dry operation and with gases or very dangerous fluids.

Corresponds to Plan API 62.



- Pressurised barrier fluid:

This system is used in double mechanical seal assemblies. A fluid is injected into the interior chamber between the two mechanical seals, at a specific pressure. This pressure may be above or below the working fluid pressure, depending on the application needs.

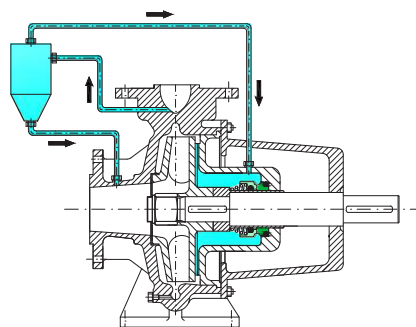
Excess pressure will be used if the working fluids must be directed towards the exterior in the event of a sealing failure. This way, the barrier fluid will enter the product side and be mixed with it. It is recommended in cases of toxic, dangerous or pollutant fluids or if the product is not harmed with mixed with the barrier fluid.

It must be used at a lower pressure than that of the working fluid if the aim is to prevent the working fluid from contaminating the barrier fluid, for instance, with very costly working fluids.

A lubricating fluid is normally used which can evacuate the heat generated between the contact surfaces. It is advisable for it to have a pressure 1 and 2 bar above (or below) the pressure of the working fluid.

The circulation of the barrier fluid takes place through a thermosyphon effect; elements which facilitate this circulation exist, such as a pumping ring on the mechanical seal casing. By placing the appropriate devices in the tank the level, pressure, temperature can be read, or the barrier fluid pressure can be generated.

Corresponds to Plan API 52, 53A.



- Cyclonic filter:

A cyclonic filter is an auxiliary accessory used in the circulation assembly. The circulation fluid would pass through the cyclonic filter before reaching the sealing area. The cyclonic filter is a filtering system which separates the particles in suspension in the working fluid through a kinetic effect generated by the movement of the pumped fluid and by the geometry of the filter. This way, the fluid reaching the sealing area is free from particles in suspension, as these are expelled to the pump intake area.

Corresponds to Plan API 31.