

KOLBEN

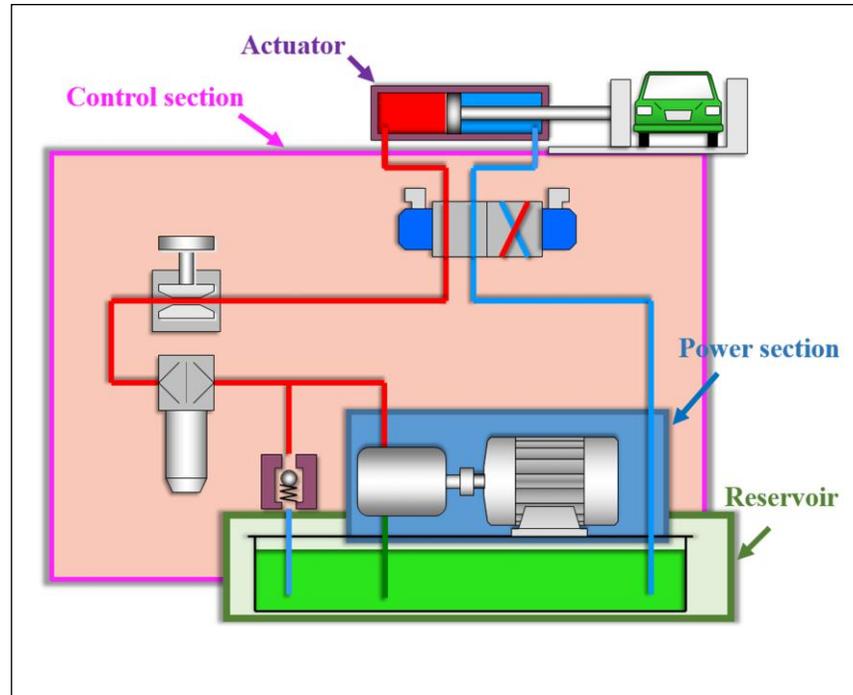
Technical Manual





KOLBEN

Hydraulic System Introduction



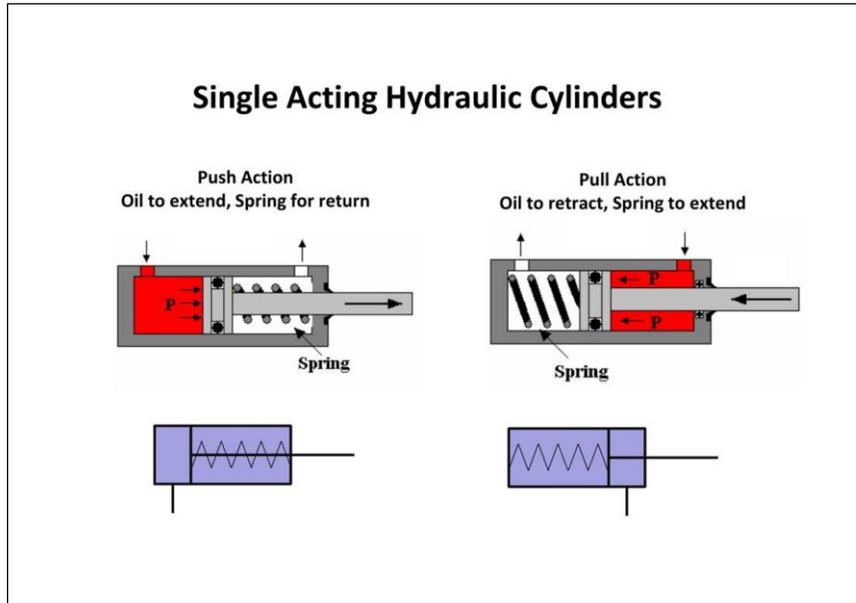
The basic hydraulic systems are including parts :

1. Oil Tank
2. Valves
3. Motor
4. Pumps
5. Coupling
6. Hydraulic Cylinder
7. Hydraulic Hoses
8. Filters

The seals are keep roles to sealing the equipment. The hydraulic seals will be used much more in the hydraulic cylinders part. The cylinder is operating as executive structures for the applications.

Hydraulic Cylinder

1. Single Acting



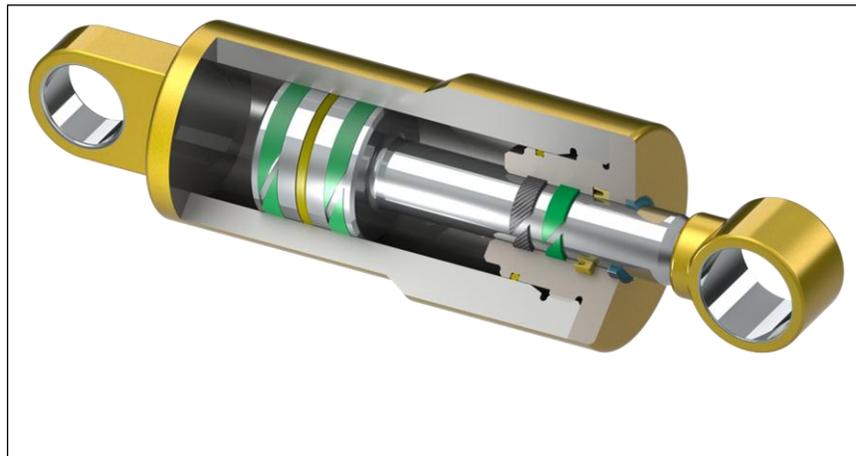
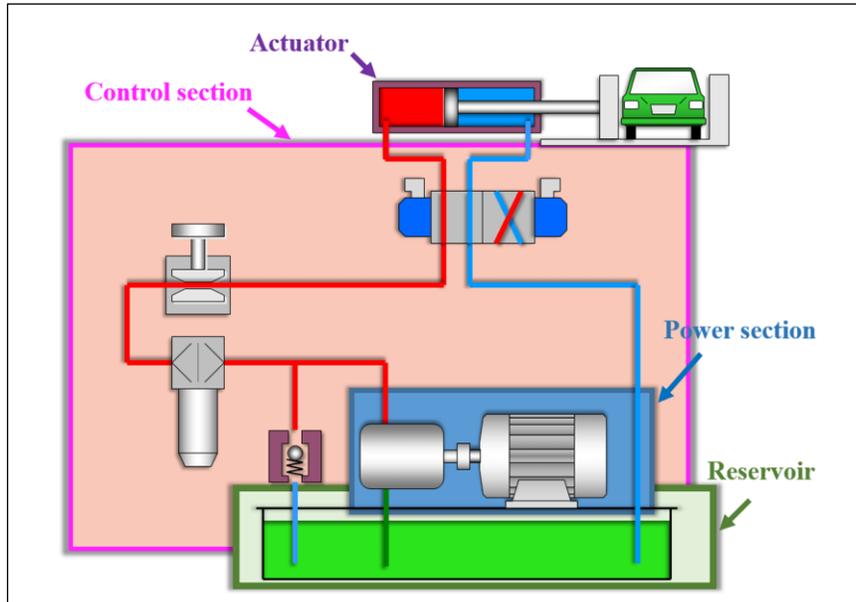
- Single Acting cylinder only extends by pressure from a pump and then retracts by the weight of the load or by an inbuilt spring. A Double Acting cylinder uses hydraulic power to both extend and retract.

- A simple way to tell the cylinders apart is by looking at the number of ports. A Single Acting cylinder will have one port for the connection of a hydraulic cylinders Hydraulic Hose Fittings A Double Acting cylinder will have TWO ports. The first port is where the “advance” (extend) Hydraulic Hose Fittings will attach and the second is where the “retract” Hydraulic Hose Fittings will attach.



Hydraulic Cylinder

2. Double Acting



A double acting cylinder alternates cycles of pressurized fluid to both sides of the piston and creates extend and retract forces to move the piston rod, permitting more control over the movement. Using a control system made up of a 2-, 3-, 4- way position valve would be required to achieve the desired movement for your application.

What it comes down to when selecting which type of cylinder is the amount of control that you need versus what you can afford to have in place. If the heavy lifting, so to speak, is only in one direction, a single acting hydraulic or pneumatic cylinder may be your best bet. If you are moving a part in two directions and need to have full control, it's best to have a double acting hydraulic or pneumatic cylinder.





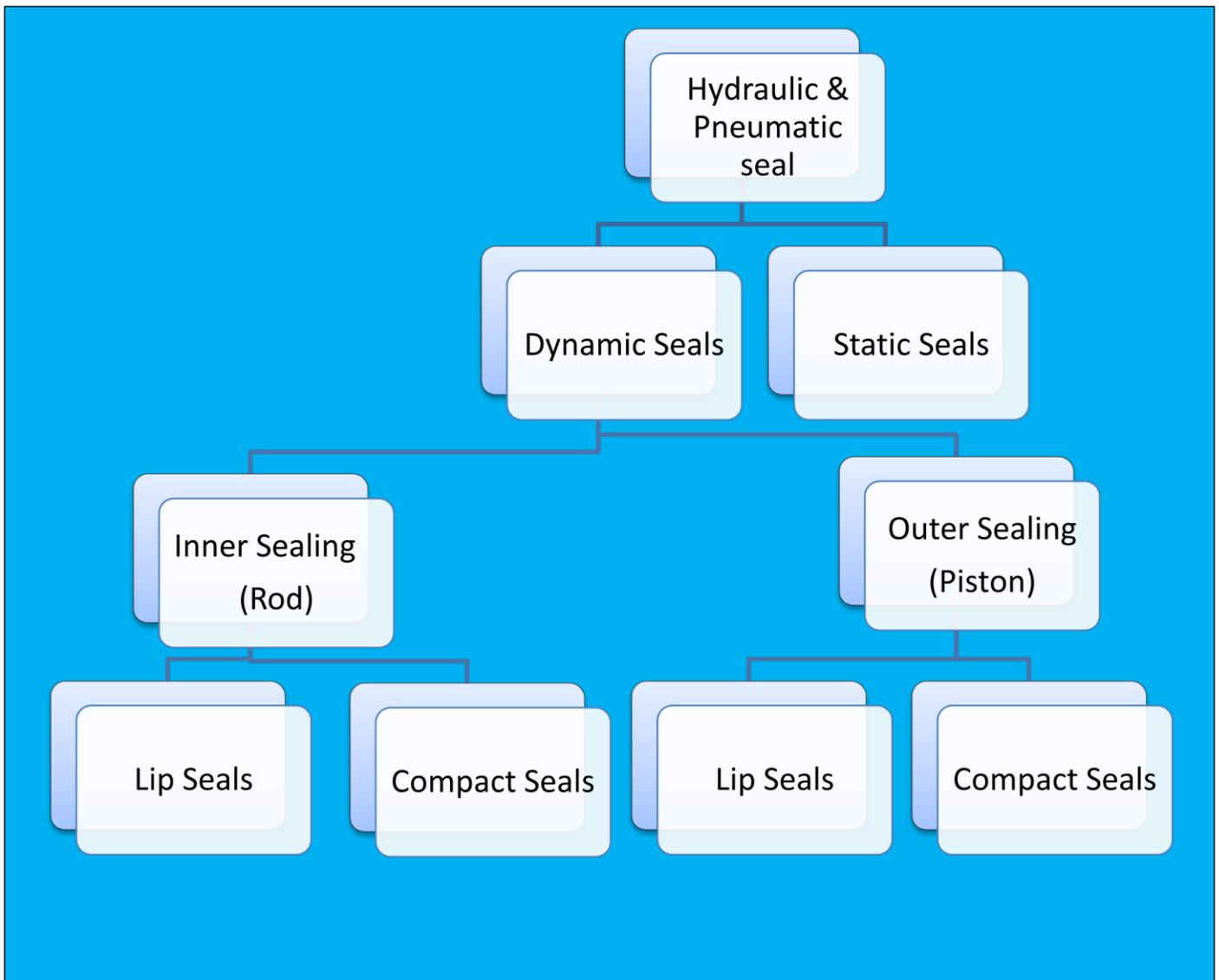
Use Of Hydraulic And Pneumatic Seals

Different requirements and loads in numerous applications have resulted in the development of different seal designs

Hydraulic seals can be categorised by function and design

Hydraulic seals are also classified into seals with a symmetrical cross-section and seals with an asymmetrical cross-section.

Asymmetrical seals are designed so the pre-load is distributed over the entire axial width on the supporting mating area to give them a sufficiently fixed seating in the groove. The correct pre-load on the moving side is not derived until after fitting in the housing.

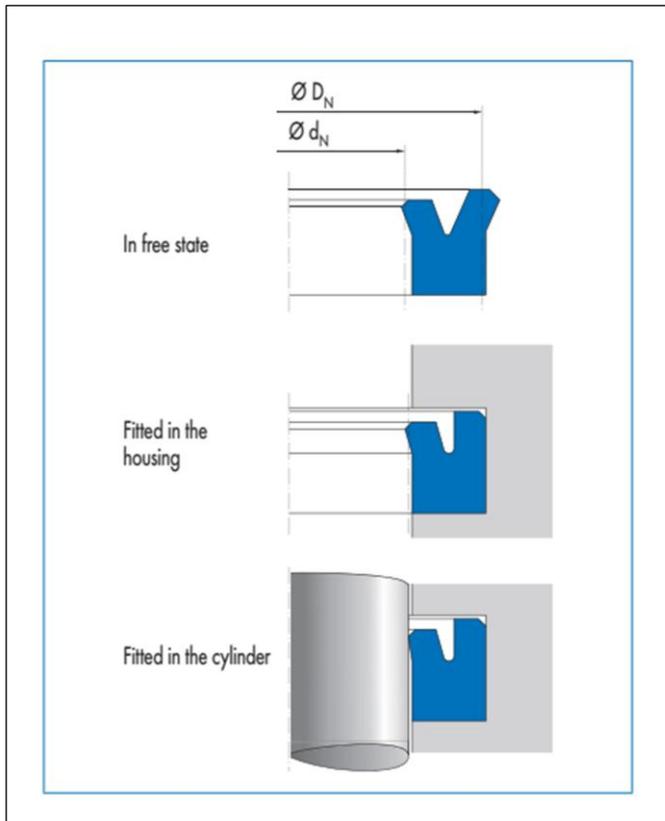




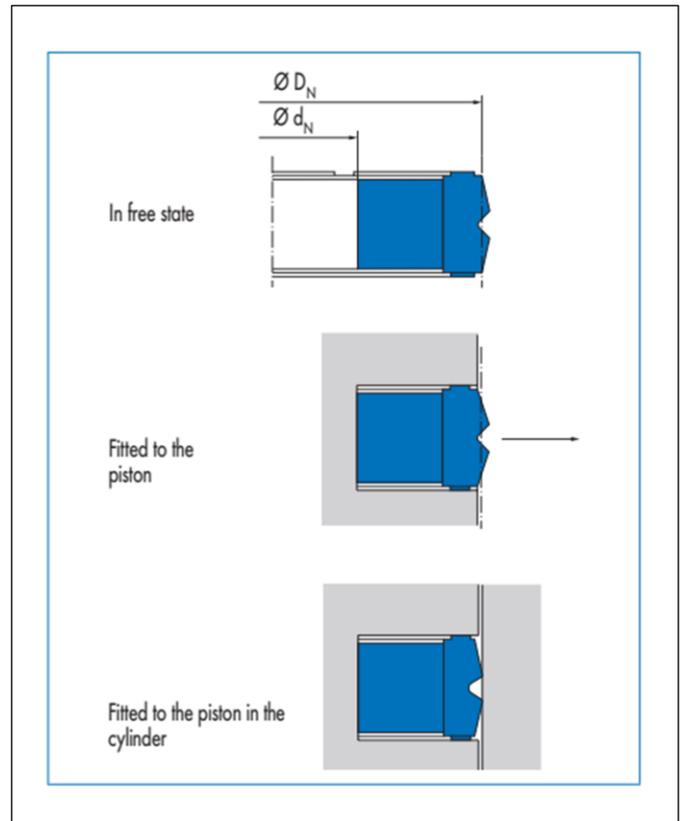
Hydraulic seals/preselecting seals

In addition to the main requirement for a good sealing effect, the user expects the following from hydraulic seals:

- ❖ Functional reliability
- ❖ Long service life
- ❖ Easy fitting
- ❖ Compatible with hydraulic fluid at high and low temperatures
- ❖ High resistance to mechanical damage (e.g. gap extrusion)
- ❖ Low friction
- ❖ Good shape elasticity to ensure correct function, even with eccentricity between rod and housing or piston and cylinder barrel caused by operation as well as the barrel widening as a result of the operating pressure.

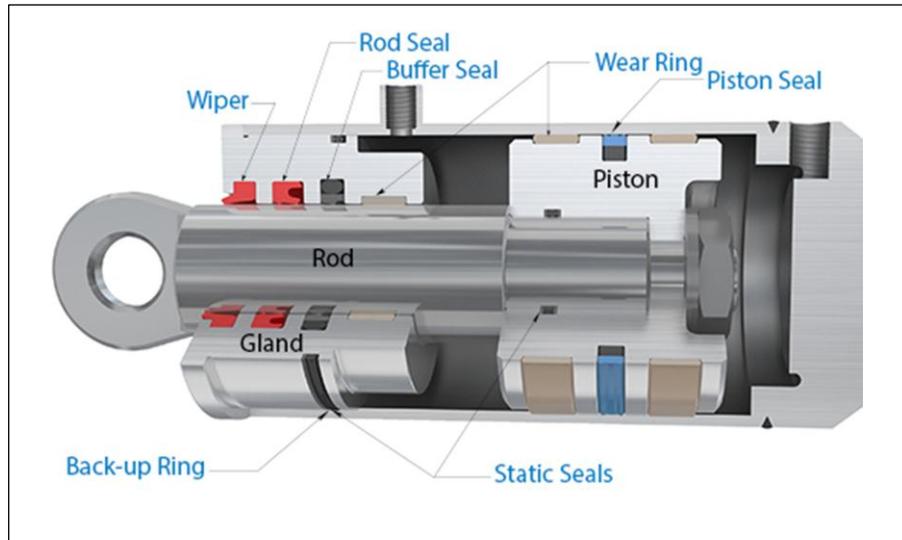


Rod Seal



Piston Seal

Sealing Systems



Definition

Sealing components are used to retain the hydraulic medium securely inside a hydraulic system. A defined moistening of the counter surface with lubricating medium is desirable when the required service life is taken into account. A sealing component is referred to in this regard as leaky if the hydraulic medium is visible from the outside in the form of dripping leakage.

Requirements

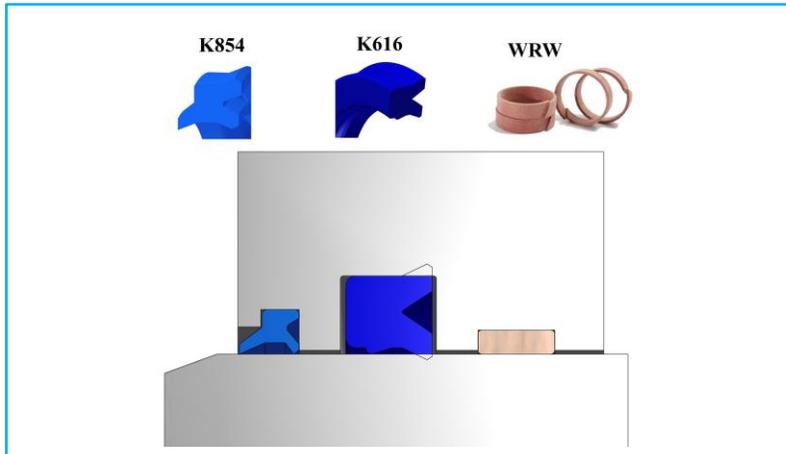
During operation sealing components are subject to a reciprocating or rotary movement when operating pressure is applied. In addition to other influences, the selection of a sealing component is significantly influenced by the material-dependent resistance against extrusion and the equally material-dependent friction and wear characteristics. The values of the main properties of sealing effect, form stability and friction or wear work against one another and in total cannot be optimally represented by one single sealing component. An approximation of the ideal sealing component is reached with a reasonable combination of single components with appropriate properties into one sealing system.

Arrangement

Sealing systems generally consist of an arrangement of sealing components with a primary seal, a secondary seal, a wiper and guide elements. The properties of the individual components are optimized with reference to the main requirement.

The operating pressure is applied to the primary seal. The main requirement is a high resistance against extrusion simultaneously with acceptable friction values under high pressure. Compact sealing components with a slip ring of PTFE compound are primarily used inside sealing systems. The remaining oil film is comparatively thick and without additional reduction by a secondary sealing component (depending on the operating parameters) may be visible as dripping leakage in front of the wiper edge. The lower gap pressure (<5 MPa) is applied to the secondary seal. The main requirement is therefore effective reduction of the residual oil film left by the primary seal simultaneously with acceptable friction values in the lower pressure range. With sufficient media resistance U-rings of polyurethane or compact sealing components with a slip ring of polyurethane are generally used in this case. The sealing effect is better with such sealing components compared to PTFE sealing components.

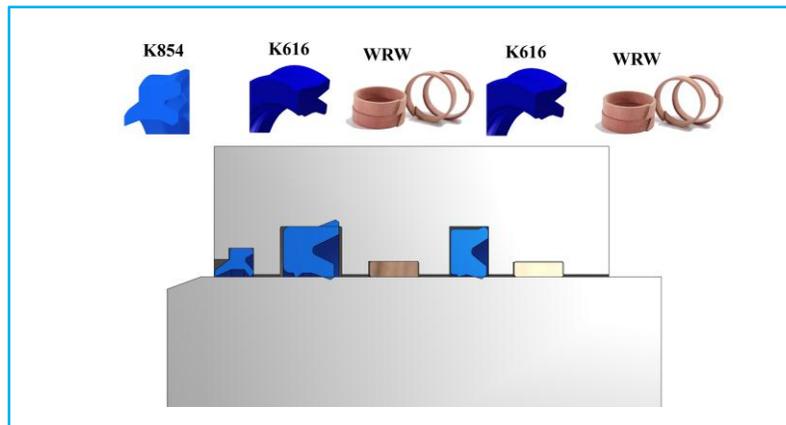
Standard Sealing Systems For Rods 1



Operation Condition:

- Pressure: < 400 Bar
- Running Speed: 0.8 m/s
- Temperature : -40 to 160 oC
- Media : Hydraulic Oil

Standard Sealing Systems For Rods 2

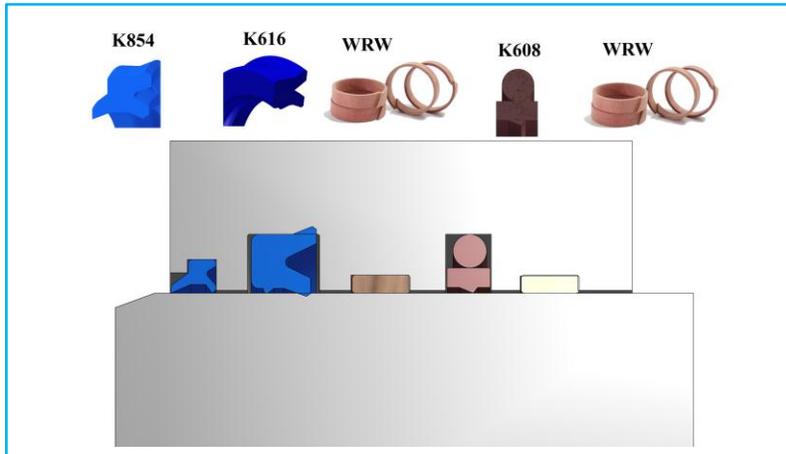


Operation Condition:

- Pressure: < 500 Bar
- Running Speed: 1.4 m/s
- Temperature : -40 to 160 oC
- Media : Hydraulic Oil



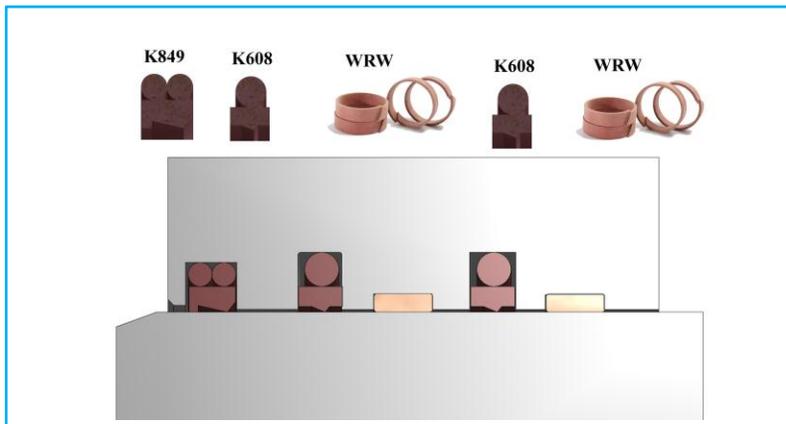
Standard Sealing Systems For Rods 3



Operation Condition:

- Pressure: < 400 Bar
- Running Speed: 1.5 m/s
- Temperature : -40 to 160 oC
- Media : Hydraulic Oil

Standard Sealing Systems For Rods 4



Operation Condition:

- High Chemical resistance is required.
- Pressure: < 500 Bar
- Running Speed: 1.4 m/s
- Temperature : -40 to 160 oC
- Media : Hydraulic Oil

