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COMPANY OVERVIEW



Hammelmann GmbH

Founded 1949

Located in Oelde, Germany

Company in the Interpump Group

340 Employees in Oelde

65 % Export share

40 Agents worldwide

Fluids

Typical fluids:

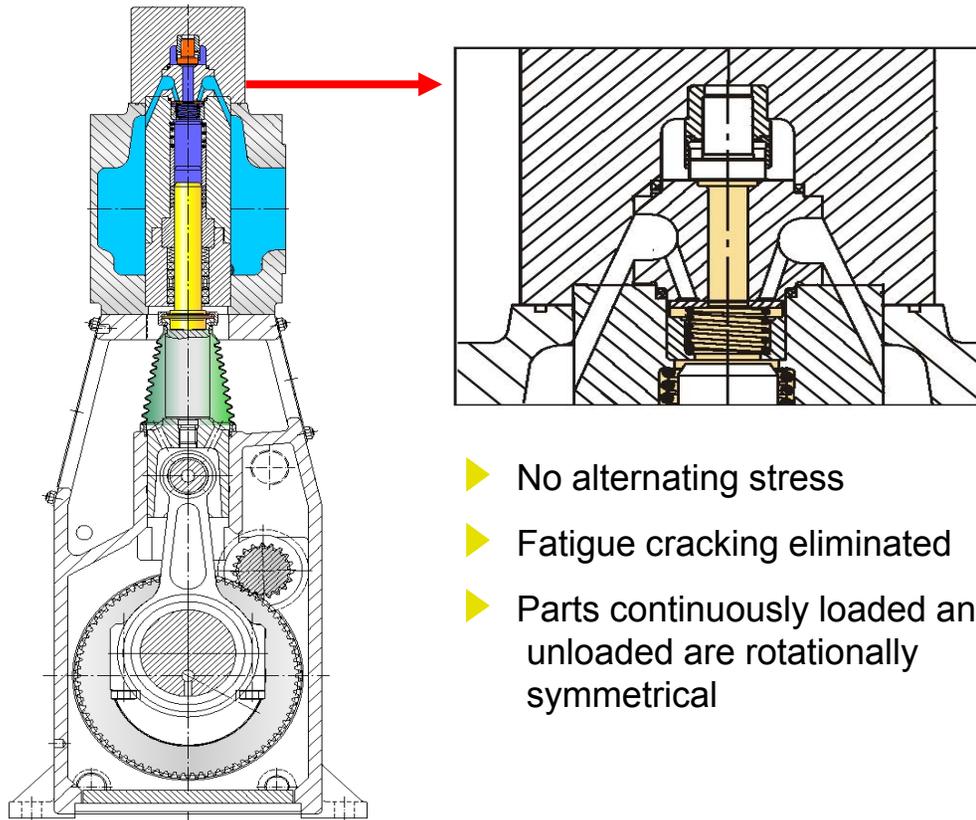
- Acrylic Acid
- Adipoladipinate
- Aggressive water
- Amine
- Ammonia
- Butane
- Carbon dioxide
- Corrosion inhibitor
- Crude oil
- Diesel oil
- Ester
- Fatty acids
- Hot water
- Hydrocarbons
- Jet fuel
- LDHI
- Methanol
- Methyl ester
- Pentane
- Propylene
- Process water
- Salt water
- Scale inhibitor
- Vinyl Acetate

Fluid end design



Hammelman pump design

PUMP HEAD



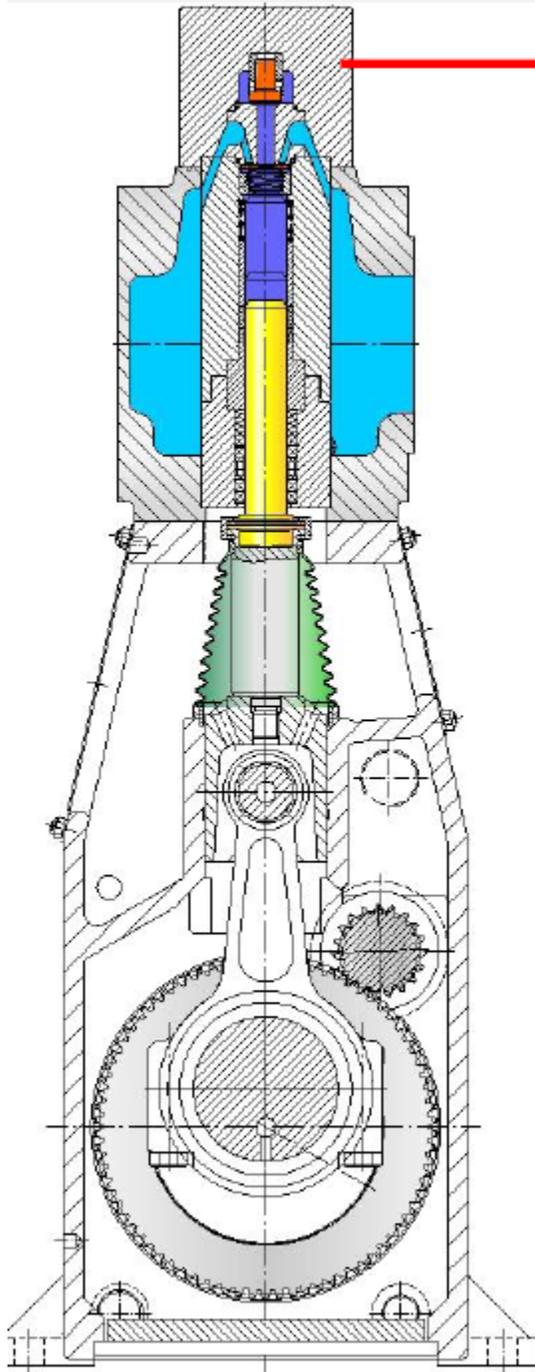
- ▶ No alternating stress
- ▶ Fatigue cracking eliminated
- ▶ Parts continuously loaded and unloaded are rotationally symmetrical

▶ Design features

The valve block is not subjected to alternating stress and therefore not sensitive to cracking by low cycle fatigue.

A minimum clearance volume (dead area) results in low pulsation and high volumetric efficiency.

 clearance volume



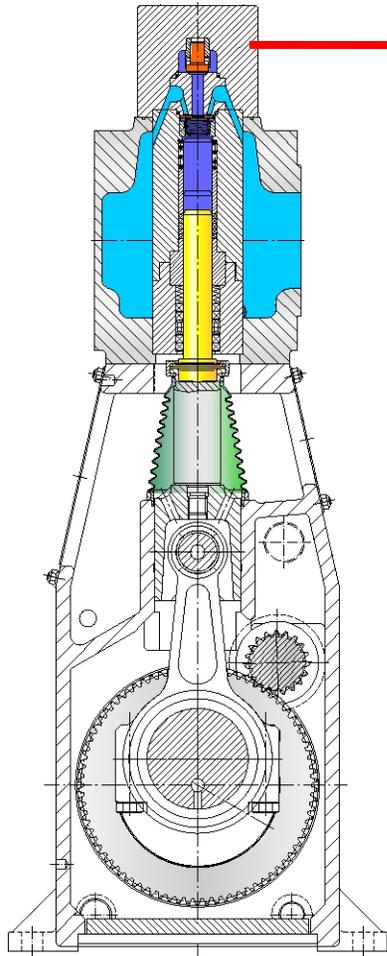
Valve Designs



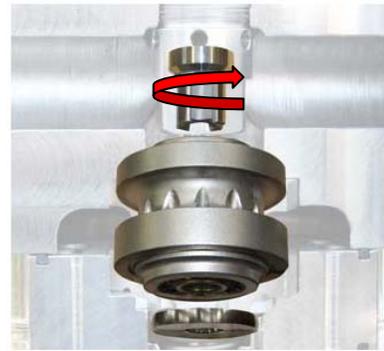
▶ **Discharge valve conical, suction valve flat**



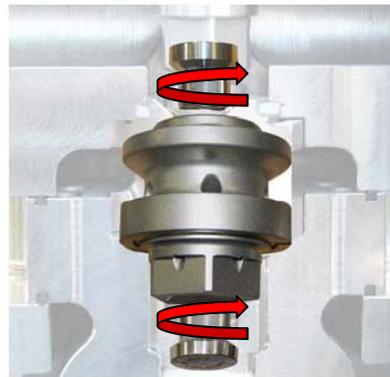
▶ **Both valve conical**



Valve Rotation

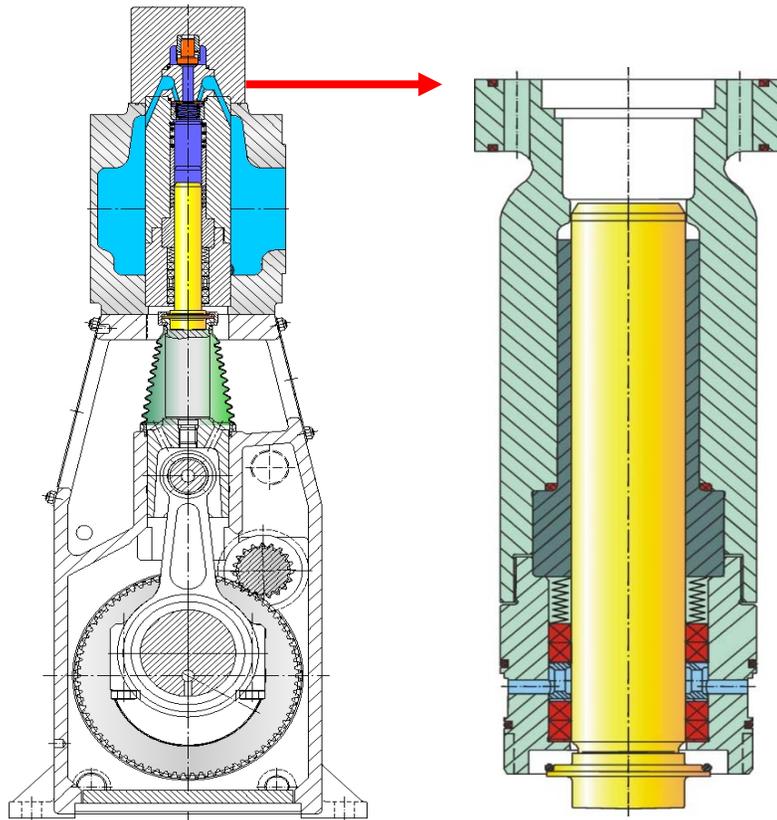


► **Reduction of wear by valve rotation**



Hammelman pump design

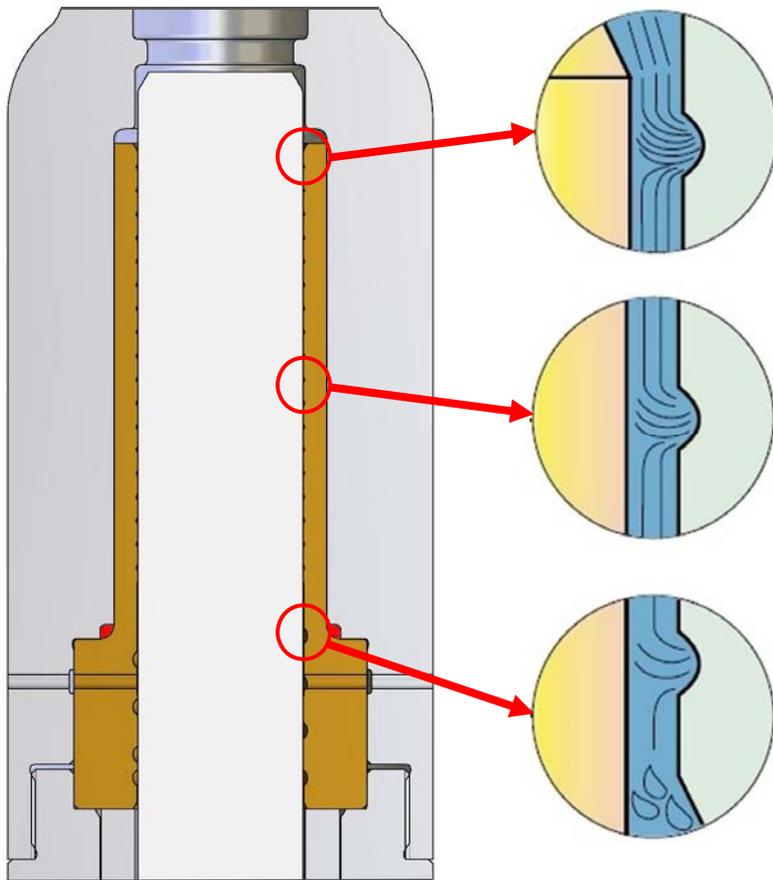
LABYRINTH PLUNGER SEAL



- ▶ Leakage is fed back to the pump suction chamber
- ▶ Life time up to 5 years continuous duty
- ▶ Operating pressure up to 4000 bar up to 58,000 psig

- Labyrinth
- Seals
- Pressure loaded parts
- Plunger
- Barrier fluid

Function description of a non contacting seal

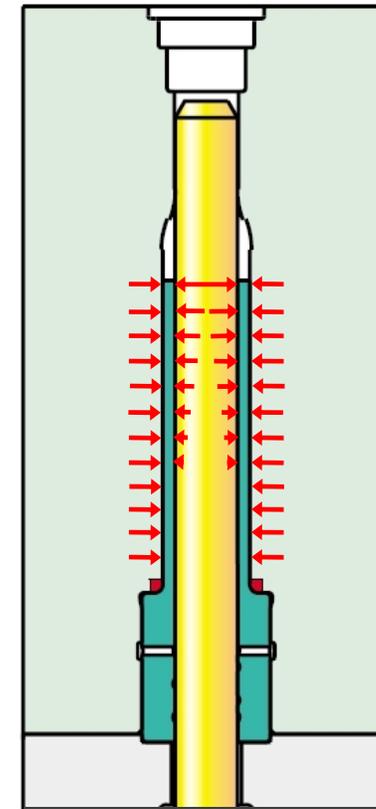
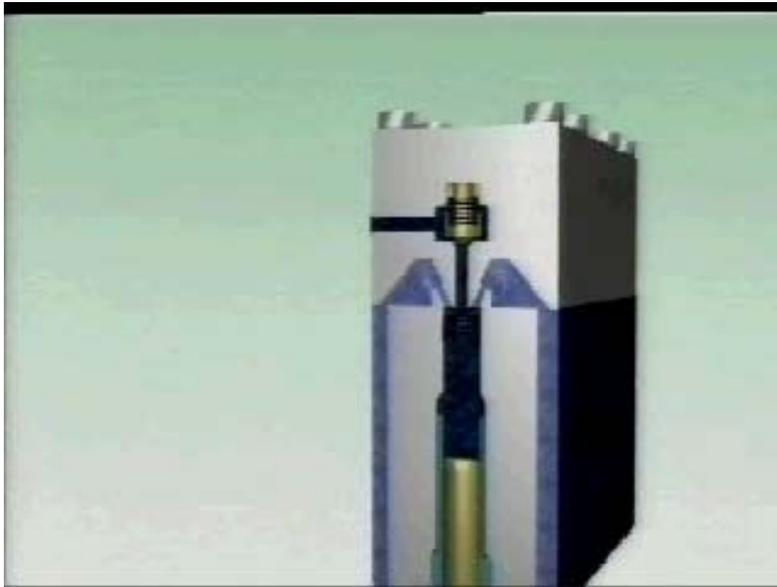


During the pressure (upward) stroke a tiny amount of medium is forced into the very fine cylindrical gap between the plunger and the labyrinth insert.

There are grooves in the insert all along its length into which some of the medium flows. The resultant turbulence reduces the flow velocity in the gap and therefore the pressure as it travels downwards. The medium in the gap also keeps the plunger centralised.

This tiny amount of medium also acts as a lubricant for the components before returning to the suction chamber .

Function description of the dynamic plunger seal



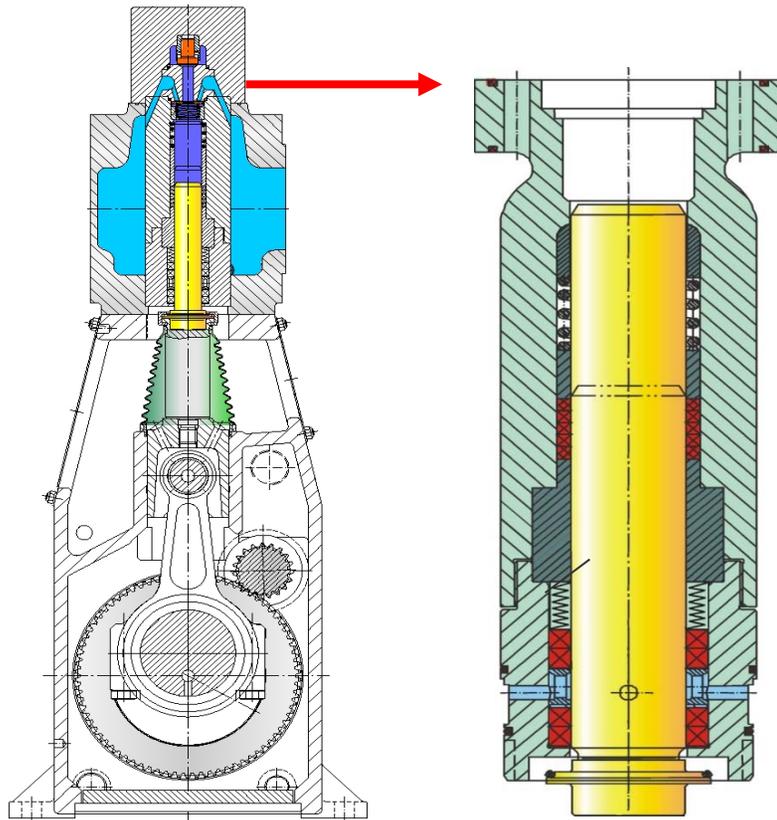
-  Bush
-  Sealing
-  Sleeve
-  Plunger

On the pressure stroke this further development of the labyrinth seal forcibly reduces the gap between the plunger and the labyrinth bush by dynamic distortion.

The distortion is achieved by forcing ultra high pressure medium between the sleeve and the outer diameter of the labyrinth bush.

Hammelman pump design

PACKED PLUNGER SEAL

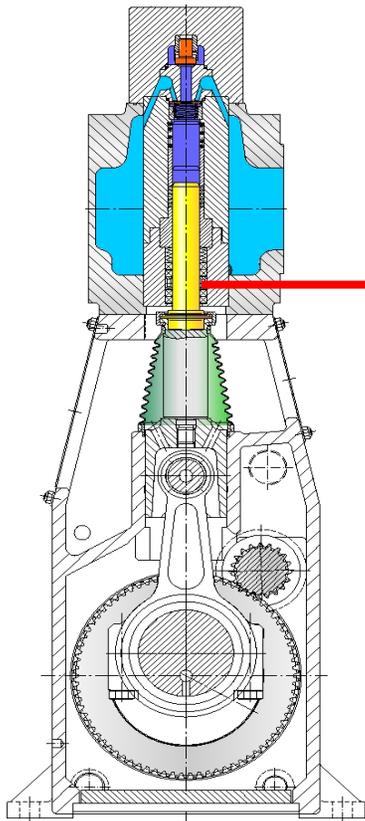


- ▶ Operating pressure up to 1200 bar up to 17,400 psig
- ▶ For abrasive or corrosive fluids
- ▶ Self adjusting packings

- Bush
- Seals
- Pressurised parts
- Plunger
- Barrier fluid

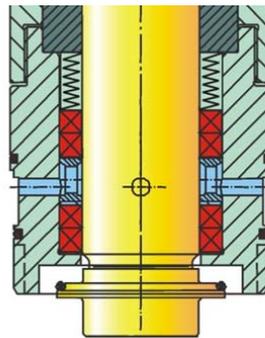
Hammelman pump design

LOW PRESSURE PLUNGER SEAL



Low pressure sealing

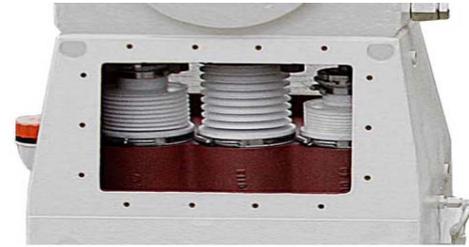
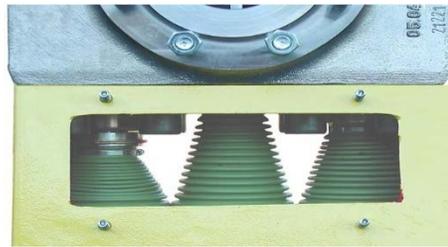
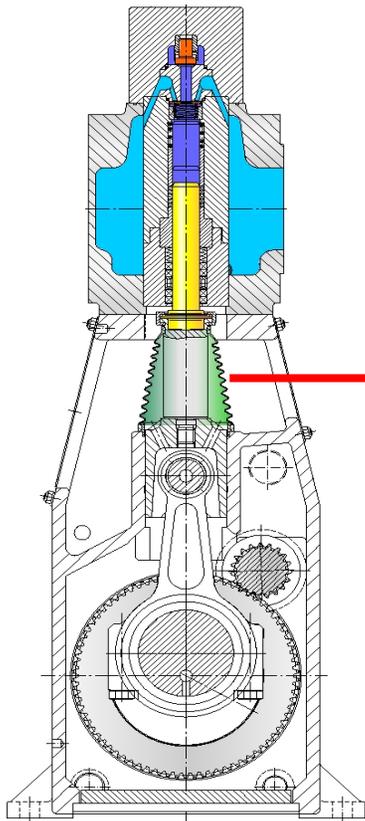
- ▶ Spring loaded seal pack
- ▶ Lantern ring for cooling, flushing or leakage monitoring (only used in special applications)



- Plunger
- Bushing
- Seals

Hammelman pump design

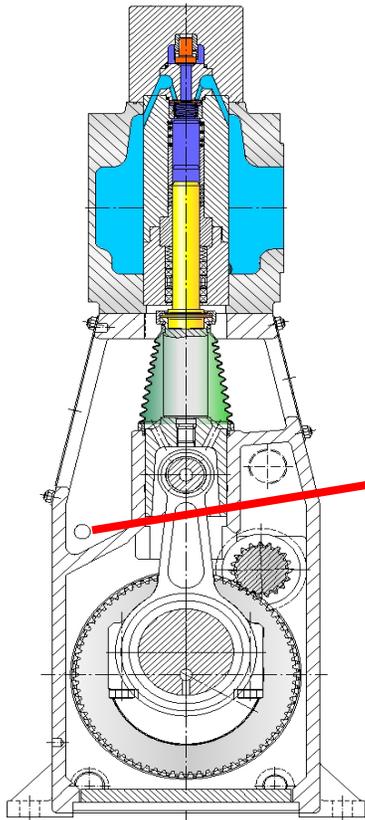
BELLOW SEAL



- ▶ Forms a hermetic seal between suction chamber and crank section
- ▶ Prevents fluids and gases entering the crank section
- ▶ Available with Viton, Nitrile rubber or PTFE material

Hammelman pump design

LOW PRESSURE PLUNGER SEAL

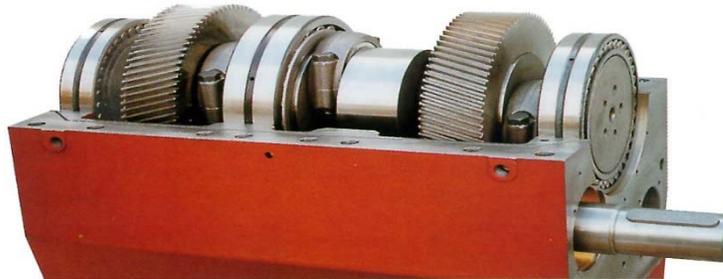
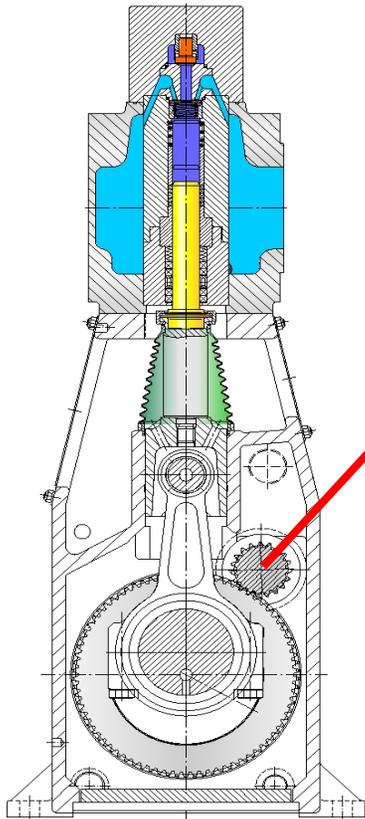


Drainage point

- ▶ To drain off leaked fluids from the intermediate chamber
- ▶ Can be used for leakage indication

Hammelman pump design

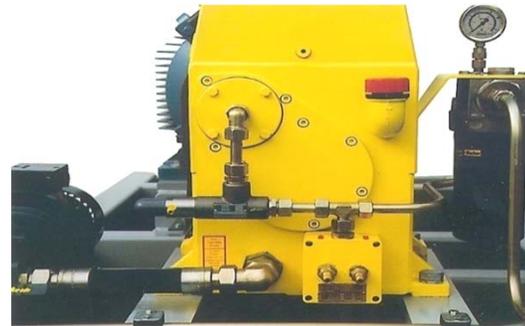
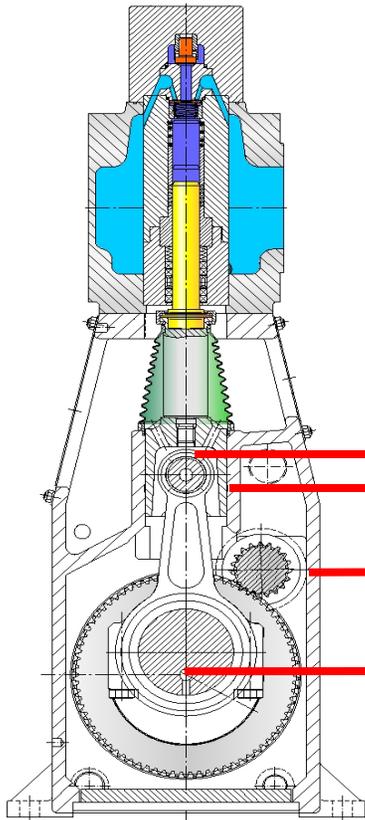
INTERNAL SPEED REDUCTION GEAR



- ▶ Pressurised oil lubrication system (pump, filter, cooler)
- ▶ Helical gears in herringbone configuration
- ▶ Drive shaft supported by 2 bearings
- ▶ Heavy duty crankshaft bearings
- ▶ Compact design
- ▶ Mechanical efficiency > 95 %

Hammelman pump design

PRESSURIZED OIL LUBRICATING SYSTEM



- ▶ Forced lubrication of all rotating and sliding components
- ▶ Maximum operational safety
- ▶ Even temperature distribution

Footprint



Space saving

- Integral speed reduction gearbox
- Vertical configuration = compact footprint

Flexible choices

- Easy exchange of fluid end components to change pump performance parameters
- Choice of plunger materials and sealing arrangements available
- Select components materials to suit the pumped medium

Efficiency



Smooth operation

- Choice of triplex or quintuplex designs
- Vertical configuration eliminates side to side unit oscillation

Efficiency

- 95 % to 98 % volumetric efficiency
- 95 % mechanical efficiency

Reliability



- **Low plunger speed**
- **Wear and corrosion resistant materials used for all wetted components**
- **Choice of ceramic or tungsten carbide plungers**
- **Low medium velocity in the suction and discharge valve sets**
- **Vertical configuration eliminates uneven, one sided wear on plungers and valves**

Safety

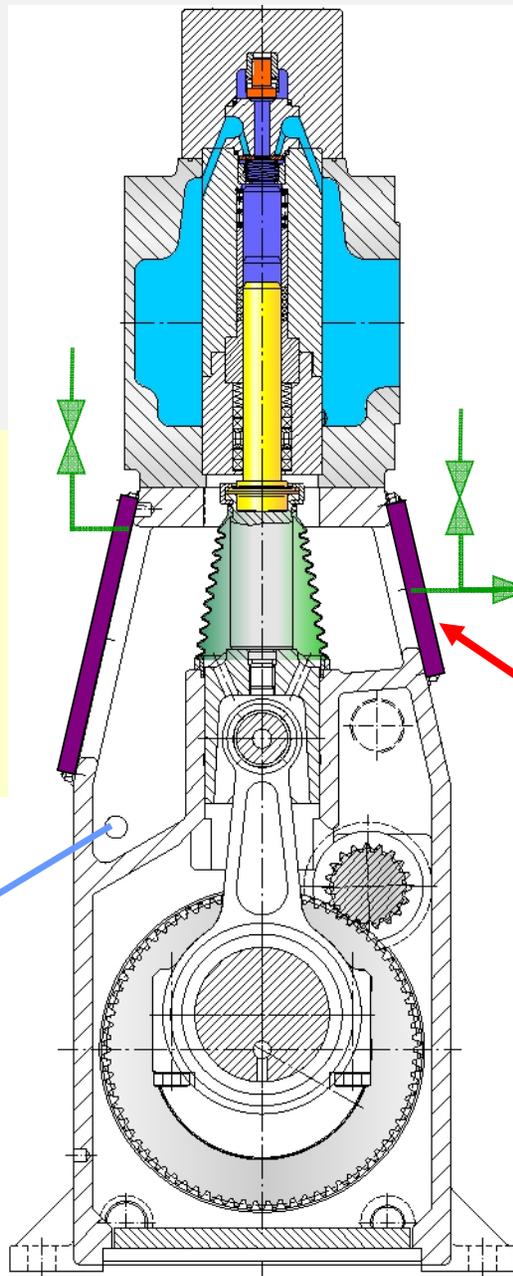
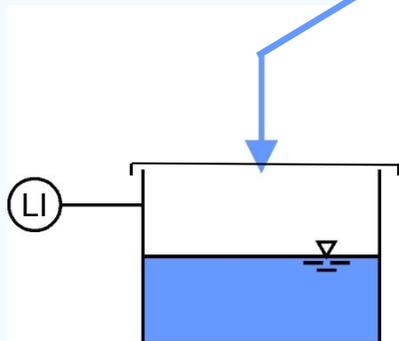


- No uncontrolled leakage to atmosphere
- Hermetic piston rod seal
- Guided leakage via flushing or gas tight barrier chamber
- Pump head free of alternating stress

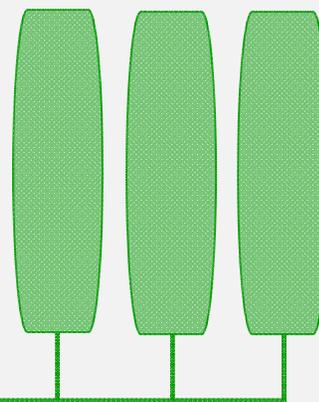
Zero Emission System



- Leakage detection system (gas tight)



Optional nitrogen purge



Gas tight cover plates

- Emission free sealing system
- Zero leakage to the atmosphere

Liquid barrier system

- ▶ Continuous cooling of the plunger
- ▶ Removal of product residues from the low pressure packing
- ▶ Packing lubrication
- ▶ Prevention of the emission of harmful fluids

NRV = non return valve

PSV = pressure safety valve

