

# Type EL-CHEM. Oil lubricated bearings - single or multi stage

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## Design features:

Improved pump design by using Computational Fluid Dynamics (CFD).

## Pump shafts:

Oil lubricated shafts of stainless steel, supported by angular contact bearings and slide bearings. Trouble-free tripping operations without dry running.

## Impeller:

Stainless steel, enclosed with double curved vanes for maximum efficiency. Designed for non-overloading KV-curve over the entire head-capacity range. Precision machined and dynamically balanced. First stage impeller specially designed with built-in inducer for very low NPSH requirements.

## Magnetic couplings:

Hermetic sealed transmission providing absolute protection against contamination of cargo. No traditional mechanical seals. Dual volute casing: Reduced radial load for extended lifetime of mechanical shaft seals and wear rings.

## Pump bowl:

Integrated diffuser vanes cast in bowl and thoroughly machined to guide the flow to next stage, providing complete de-swirling.

## Radial split design:

Easy maintenance/dismantling of pump head within the cargo holds.

## Pump sizes:

The principle: PRES-VAC deep-well cargo pumps with magnetic coupling are employed where pumps with conventional sealing systems are inadequate and/or maintenance costs high and/or cargo contamination unsolicited.

Instead of the traditional mechanical seal, a hermetically tight shroud of stainless steel (hasteloy) serves to seal the shafts/radial bearings lub oil from the cargo eliminating cargo contamination. Permanent magnets with high performance density transfer torque are used.

## The magnetic coupling in a Pres-Vac leak-proof pump consists of four essential parts:

- Shroud: The ordinary mechanical seal is replaced by a shroud. This purely static method of sealing enables even the most critical of mediums to be pumped 100% free of leakage.

- Magnets: The magnets are manufactured in high grade Samarium-cobalt. Outstanding features are their high magnetic energy, small size and high temperature application.
- Bearings: The thrust and radial bearings are hydro dynamically balanced and lubricated by the medium. Sleeve bearings are manufactured in wear resistant silicon carbide.
- Outer rotor / Inner rotor: The magnetic coupling is a torsionally connected coupling without contact. Single magnetic rings are circumferentially arranged in the outer/inner rotor with alternating polarity. The flux lines lead from the exterior magnet to the magnet on the inside of the shroud. From there they are directed by an interior steel ring to the neighboring pole, and again to the exterior magnet, so that a magnetic cycle is made. The magnetic energy produces the transmission torque of the magnetic coupling.

## **PRES-VAC Pump**

### **Control Program (PCP)**

The Pump Control Program is a PLC (Programmable Logic Control) based unit, which makes it very reliable and robust (no moving internal parts). The screen is a color touch-flat-screen built into the console. To the right is shown the backside of the touch screen and the PLC unit. Notice the small space requirements.

The following features are standard in the PCP:

- R.p.m. and flow is step-less controlled. Also in local mode in the cargo control room.
- Amp., torque, r.p.m. and running time read-out on screen.
- Minimum space requirement.
- Log history always available.
- Main power on/off control.
- Easy access to basic pump data setup.
- Various overview functions.
- Buzzer function for operator's attention.
- Automatic slow down function (increases performance at the end of discharge cycle resulting in less cargo residues).
- Enables operation of cargo pumps in groups.
- Discharge mode, automatic tank-wash cycle and re-circulation mode.
- The PLC is equipped with Automatic Dry Running Protection.

## **PLC unit**

### **Backside of flat-screen**

The touch screen is one of the easiest to use and most intuitive of all interfaces. The touch interface allows the user to navigate the PCP by touching links on the screen.

Tank operation (discharge, tank wash and re-circulation) for one or more cargo pumps is easily managed. The PCP can interface with the ship's control system. GSM communication equipment enables PRES-VAC's service engineer to access the PCP around the clock.