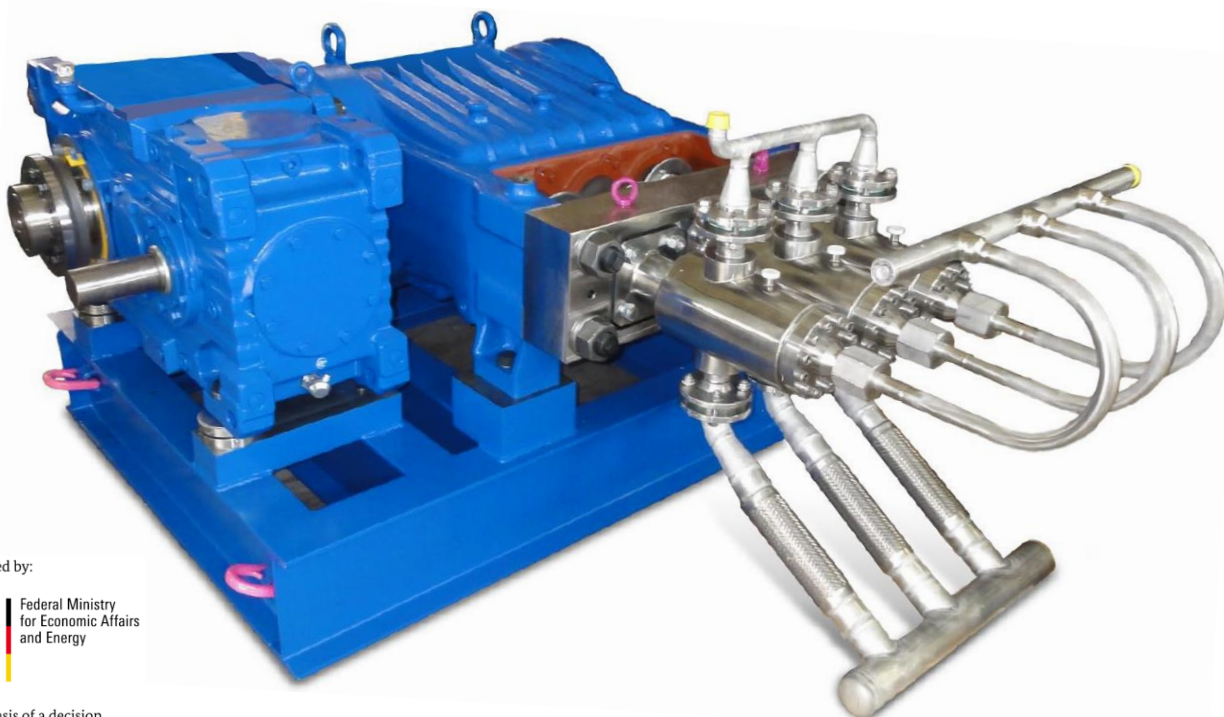


HLEP / VSAX

High Performance Cryogenic Reciprocating Pumps



Supported by:

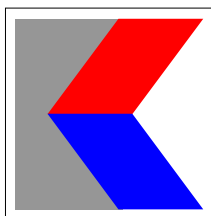


Federal Ministry
for Economic Affairs
and Energy

on the basis of a decision
by the German Bundestag

KRYTEM

wepuko PAHNKE



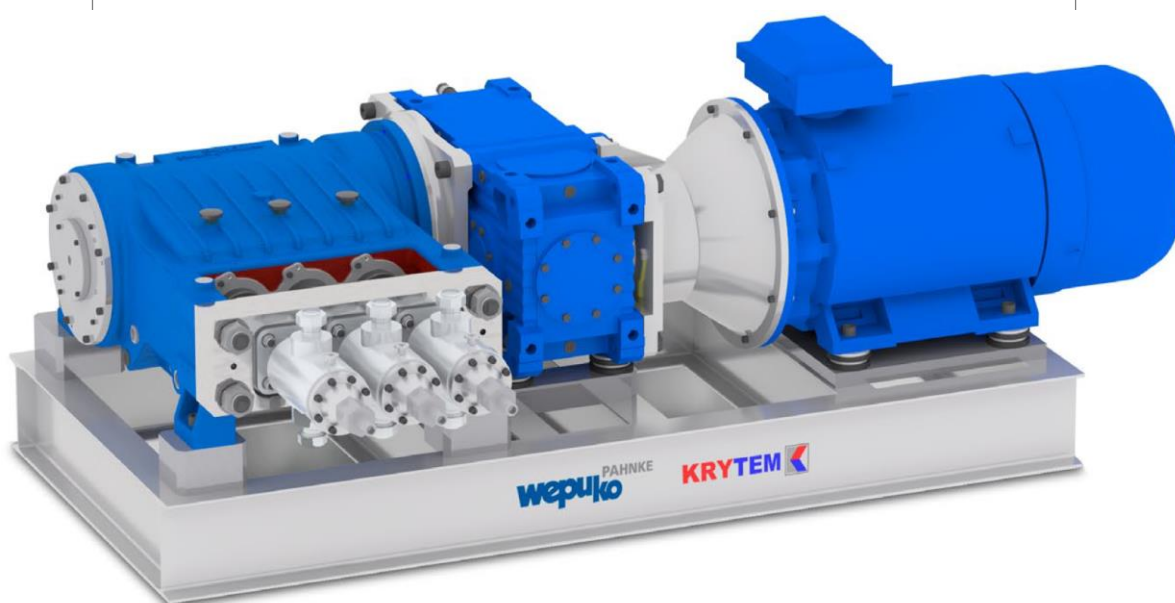
Designed for high pressure marine LNG injection systems

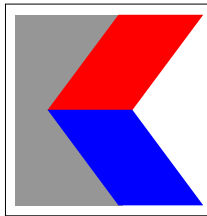
Tightened Emission Control Area regulations and increasing HFO / MGA prices force yards and ship holders to convert marine vessel propulsion systems for environmentally friendly low sulphur / low carbon fuels like LNG and methanol.

The new HLEP and VSAX high performance pump series were developed specifically for this application in co-operation with the leading manufacturer high pressure pump Wepuko Pahnke. The innovative system delivers up to 400 l/min of cryogenic fuels (approx. 12 t/h ref. to LNG) for high pressure injection into dual fuel two-stroke diesel engines. It is also suitable for high capacity on- or off-shore nitrogen supplies.

The HLEP cold end is based on the long-term approved Krytem SAH pump design with a piston-integrated suction valve which supports a low NPSH requirement. The slow crank speed provides for low wear, consequentially long service life and low maintenance demand of the pump heads. A new service-friendly seal design facilitates the quick replacement of the piston rod seal packing at the end of its service life.

In order to allow for the wide flow capacity range - which is mandatory for marine propulsion systems - the Wepuko high performance crank drive system is designed for a wide turn-down ratio. Depending on the particular load conditions crank speeds of 20 strokes per minute or less are possible.





HLEP / VSAX Key Design Features:

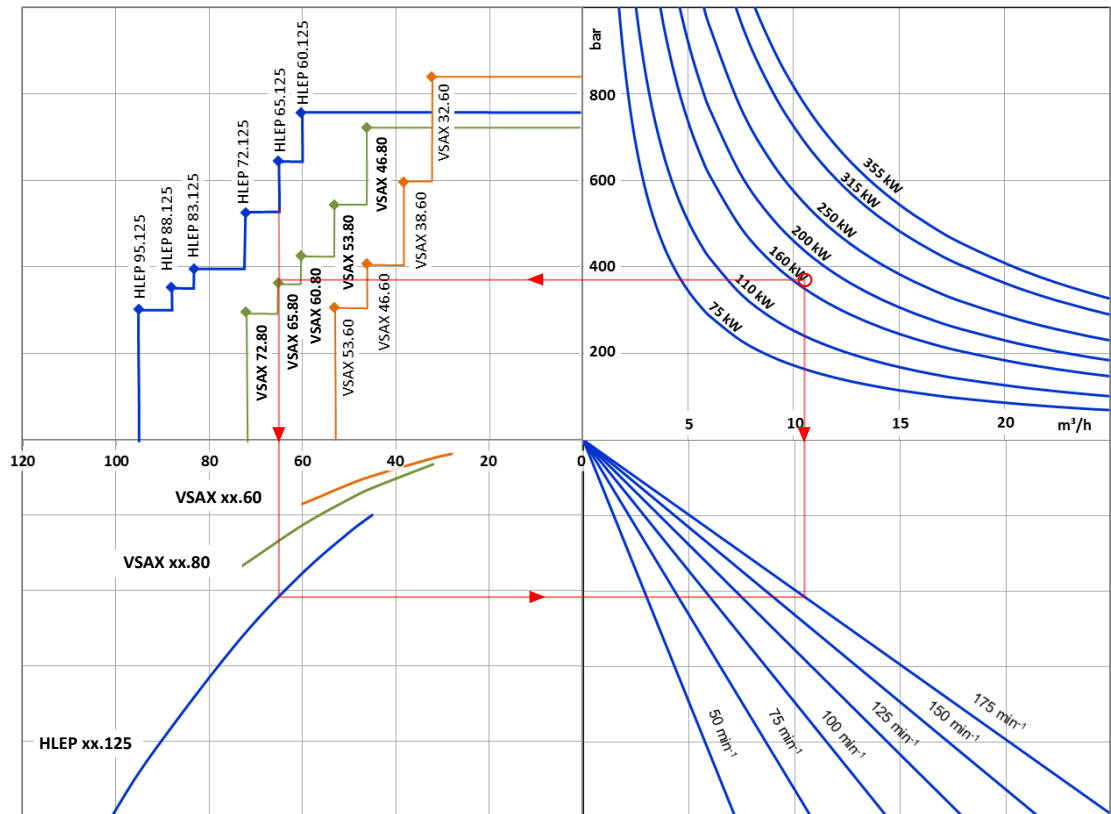
- highly efficient pressurisation of cryogenic liquefied gases: low weight, low space, low vibration and up to 70 per cent lower energy consumption compared to compressors
- designed for explosion-hazardous environments according to marine / off-shore standards and ATEX - no belt drives used
- vertical motor arrangement available (small foot print)
- standard design with electric motor - hydraulic drive available per request
- suitable for on-deck or lower deck installation at ambient temp. -40°C to +50°C
- heavy duty, torsion-resistant skid-mounted machine design including drive lubrication system
- 40,000 hours main service interval
- hermetic separation of process fluids (no contact to lubricants)
- slow speed crank shaft for reduced wear, low noise and low NPSH requirement
- improved turn-down ratio for full range dual fuel ship engine operation
- advanced pulsation damping for adaptation to application requirements and specific interface conditions
- long-lasting, easy to maintain cold end seal-system with advanced protection and monitoring features for extended service life
- standard design up to 400 bar / 400 l/min flow rate, increased pressure / capacity available per request

optional:

- matching VFD units for steady speed regulation.



Data Sheet HLEP / VSAX



HLEP / VSAX selection schematic:

basic data: 175 l/min (10,5 m³/h), 350 bar

- suitable type: HLEP 65.125, stroke speed approx. 175 min⁻¹
- required motor power: approx. 200 kW (actual motor power of slow running pumps may be higher due to low speed torque requirements)

pump design	skid-mounted triplex single stage reciprocating pump
media	cryogenic fuels and liquefied gases
perm. temp. process / ambient	-196 to -20°C / -20 to +40°C - extended temp. range per request
inlet pressure	1 to 15 bar g
discharge pressure	standard 350 bar - higher pressure available per request
capacity	up to 400 l/min (24 m ³ /h)
NPSP req.	50 to 500 mbar
recip. gear type	horizontal triplex crank drive
transmission	wheel transmission gear, oil-lubricated
stroke length VSAX / HLEP	60 or 80 mm / 125 mm
bore diameter VSAX / HLEP	32 ... 72 mm / 60 ... 95 mm
stroke speed VSAX / HLEP	30 ... 250 min ⁻¹ / 20 ... 200 min ⁻¹
drive	horizontal or vertical explosion-proof TEFC motor, 55 to 355 kW
materials	316, 321, galvanized steel, grey cast iron
standards	ECMD, ATEX, PED, API, DNV, ABS, BV

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