Liquid ring vacuum pumps
Liquid ring compressors

Series LVP
General
LEDERLE-HERMETIC has been producing and successfully marketing both vacuum pumps and compressors to the whole world for decades. Operation, design and application have been constantly optimised and adapted to our customers’ requirements. The pumps are available in conventional sealed and hermetically sealed units. Magnetic coupled or canned motor design guarantees operation without leakage and minimal maintenance. The compact design enables simple, fast and economical maintenance.

Function
The vacuum pumps and compressors are rotary positive displacement pumps that cover a wide range of applications. The applications are in chemical, petrochemical, pharmaceutical, paint industries as well as general industries.

The internals of the liquid ring vacuum pump or compressor are partially filled with liquid in operation. Casing and port plates form the internals, where the eccentrically mounted rotating impeller forms a liquid ring. The liquid ring forms a cell between the impeller blades, that expands during rotation and thus draws the gas through the suction port. As the impeller rotates further, these cells are getting smaller and consequently compressing the gas through the discharge port. Together with the gas, a part of the liquid will be expelled through the discharge port that is separated from the gas in the separator.

By means of a flexible discharge port in the port plate, the liquid ring vacuum pump operates with maximum efficiency in the whole range of suction pressure. The port opening adapts to the actual compression ratio, so that overcompression will be avoided.

The major application of liquid ring vacuum pumps and compressors is in the handling of wet gas and vapours that will condense partially during compression. Because compression is near isothermal, these machines are specifically suitable for the handling of explosive or polymerising gases or vapours.

The liquid ring vacuum pumps can reach a maximum vacuum of about 30 mbar (abs). Lower suction pressures can be achieved in combination with gas or steam ejectors, or roots booster pumps.
Liquid ring vacuum pumps are positive displacement compressors, which are equipped with single or double suction impellers, according to size. Liquid ring vacuum pumps do not need lubricants; there are no parts in direct contact inside the hydraulics. Therefore these pumps feature low noise operation as well as simple and robust design.
**Capacity**
Suction capacity is depending on rotational speed. Pump capacities up to 3000 m³/h are available.

**Temperature**
Depending on the liquid and materials of construction a maximum liquid operating temperature of 100 °C is possible. Special designs for higher temperatures are available on request.

**Pressure**
Depending on the design, liquid ring vacuum pumps are available for suction pressures down to approx. 30 mbar (abs) and discharge pressures up to 2500 mbar (abs), in special applications up to 6 bar possible.

**Connections**
Nominal size is related to pump size. The range is for DN 40 to DN 100. Special executions, e.g. dimensions according to ANSI are available on request.

**Shaft sealing**
All sizes of the LVP range can be equipped with various methods of shaft sealing. Available are single mechanical seals and double mechanical seals as well as hermetically sealed magnetic couplings and canned motors.

In hermetically sealed pumps, the shaft seal is replaced by a magnetic coupling or a canned motor. Therefore wear at seals is eliminated. The permanent magnetic coupling or canned motor transmits the torque between driver and pump through the containment shell and thus eliminates the shaft seal.

**Environmental safety**
Liquid ring vacuum pumps and compressors are suitable for use on hazardous gases. Certifications for mechanical explosion protection according to European standard 94/9/EC (ATEX) II 2 G c T4 to T6 are available. Certification for Category 1 is also available. The pump seals are also certified by TÜV Cert to comply with "TA-Luft".

**Quality**
HERMETIC liquid ring vacuum pumps and compressors are state of the art and quality is compliant to design standards e.g. ISO, VDMA, DIN and European standards. Our quality manual according to ISO 9001 supports the manufacturing process.
Material and performance range

<table>
<thead>
<tr>
<th>Parts</th>
<th>Steel / Cast steel</th>
<th>Stainless steel</th>
<th>Hastelloy</th>
<th>Titanium</th>
</tr>
</thead>
<tbody>
<tr>
<td>End shield</td>
<td>GS-C25 1.0619</td>
<td>CrNiSt 1.4408</td>
<td>Hastelloy</td>
<td>Titanium</td>
</tr>
<tr>
<td>Port plate</td>
<td>St S2-3 1.0570</td>
<td>CrNiSt 1.4571</td>
<td>Hastelloy</td>
<td>Titanium</td>
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<tr>
<td>Casing</td>
<td>GS-C25 1.0619</td>
<td>CrNiSt 1.4408</td>
<td>Hastelloy</td>
<td>Titanium</td>
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<tr>
<td>Impeller</td>
<td>GS-C25 1.0619</td>
<td>CrNiSt 1.4408</td>
<td>Hastelloy</td>
<td>Titanium</td>
</tr>
<tr>
<td>Shaft</td>
<td>St S2-3 1.0570</td>
<td>CrNiSt 1.4571 / 1.4462</td>
<td>Hastelloy</td>
<td>Titanium</td>
</tr>
<tr>
<td>Bearing bracket</td>
<td>GGG 40</td>
<td>GGG 40</td>
<td>GGG 40</td>
<td>GGG 40</td>
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<tr>
<td>Mechanical seal</td>
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<td>CrNiSt / Carbon / Viton</td>
<td>acc. to specification</td>
<td>acc. to specification</td>
</tr>
<tr>
<td>Magnetic coupling</td>
<td>CrNiSt / Hastelloy</td>
<td>CrNiSt / Hastelloy</td>
<td>Hastelloy</td>
<td>Titanium</td>
</tr>
<tr>
<td>Gaskets</td>
<td>AFM 34</td>
<td>AFM 34</td>
<td>acc. to specification</td>
<td>acc. to specification</td>
</tr>
<tr>
<td>O-rings</td>
<td>FEP / Viton</td>
<td>FEP / Viton</td>
<td>acc. to specification</td>
<td>acc. to specification</td>
</tr>
<tr>
<td>Slide bearings</td>
<td>SIC, CD6N / SIC30</td>
<td>SIC, CD6N / SIC30</td>
<td>SIC, CD6N / SIC30</td>
<td>SIC, CD6N / SIC30</td>
</tr>
</tbody>
</table>

Performance range

- Suction capacity [m³/h]: up to 3000
- Discharge pressure [mbar (abs)]: up to 2500*
- Temperature [°C]: –20 to +100*
- Pressure rating [PN]: 10*
- Test pressure [bar]: 16*

Sizes

<table>
<thead>
<tr>
<th>Mechanical seal execution</th>
<th>Magnetic-coupled execution</th>
<th>Canned motor execution</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVPS</td>
<td>LVPL 600</td>
<td>LVPH 600</td>
</tr>
<tr>
<td>125</td>
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<td>2200</td>
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<tr>
<td>3000</td>
<td></td>
<td>450</td>
</tr>
</tbody>
</table>

Pump and hydraulic denomination

- LVP / M / _320 /
- D for compressor
- Size
  - (50, 125, 150, 250, 320, 450, 600, 800, 1200, 1800, 2200, 3000)
- Style / Shaft sealing
  - S (short size “close coupled”)
  - L (long size “bearing bracket”)
  - G (mechanical seal)
  - M (magnetic coupling)
  - MB (magnetic coupling “close coupled”)
  - ML (magnetic coupling “bracket design”)
  - H (canned motor)
- Series
Design options

*with mechanical seal*

**LVPG**
Vacuum pump with single mechanical seal, external roller bearings and double suction impeller.

**LVPS**
Vacuum pump in short shaft size design, with single mechanical seal and single ended impeller with seat on motor shaft.

**LVPL**
Vacuum pump in bearing bracket design (long shaft size), with single mechanical seal and single ended impeller.
Design options

*with magnetic coupling*

**LVPM**
Vacuum pump with magnetic coupling, product lubricated slide bearings and double ended impeller.

**LVPMH**
Vacuum pump in bearing bracket design with magnetic coupling, product lubricated slide bearings and single ended impeller.

**LVPM**
Vacuum pump in modular construction with magnetic coupling, product lubricated slide bearings and single ended impeller.

*with canned motor*

**LVPH**
Vacuum pump with canned motor and product lubricated slide bearings and double ended impeller.

Special feature: flanged auxiliary pump

**LVPH**
Vacuum pump with canned motor and product lubricated slide bearings and single ended impeller.

Special feature: flanged auxiliary pump
Examples for vacuum systems

**Vacuum package unit type ALVPM 800**
Liquid ring vacuum pump type LVPM 800 (with magnetic coupling, double-flow)
- For suction of a mixture of:
  - air, nitrogen, epichlorohydrin and water vapour
- Suction temperature approx. 20 °C
- Pumping capacity 280 m³/h at 26 mbar
- Compression to 1113 mbar

Special features: vacuum package unit with connected gas ejector

**Vacuum package unit type ALVPMB 150**
Liquid ring vacuum pump type LVPMB 150 (with magnetic coupling, close coupled, single-flow)
- For suction of a mixture of:
  - air, nitrogen, epichlorohydrin and water vapour
- Suction temperature approx. 25 °C
- Pumping capacity 81 m³/h at 106 mbar
- Compression to 1113 mbar

**Vacuum package unit type ALBPH 1800**
Liquid ring vacuum pump type LVPH 1800 (with canned motor, double-flow)
- For suction of nitrogen
- Suction temperature approx. 40 to 45 °C
- Pumping capacity 1007 m³/h at 30 mbar
- Compression to 1113 to 1120 mbar

Special features: vacuum package unit with integrated canned motor pump type CNK and 2 metering pumps
50 Hz

Denomination to the performance curve

1. LVP 50/2850 min⁻¹
2. LVP 125/1450 min⁻¹
3. LVP 150/1450 min⁻¹
4. LVP 250/1450 min⁻¹
5. LVP 320/1450 min⁻¹
6. LVP 450/1450 min⁻¹
7. LVP 600/1450 min⁻¹
8. LVP 800/1450 min⁻¹
9. LVP 1200/970 min⁻¹
10. LVP 1800/970 min⁻¹
11. LVP 2200/740 min⁻¹
12. LVP 3000/740 min⁻¹
60 Hz

Denomination to the performance curve

1. LVP 50/3420 min⁻¹
2. LVP 125/1750 min⁻¹
3. LVP 150/1750 min⁻¹
4. LVP 250/1750 min⁻¹
5. LVP 320/1750 min⁻¹
6. LVP 450/1750 min⁻¹
7. LVP 600/1750 min⁻¹
8. LVP 800/1750 min⁻¹
9. LVP 1200/1170 min⁻¹
10. LVP 1800/1170 min⁻¹
11. LVP 2200/880 min⁻¹
12. LVP 3000/880 min⁻¹
Among others, our products comply with:
- Directive 2006/42/EC (Machinery Directive)
- Explosion protection acc. to Directive 94/9/EC (ATEX); UL; KOSHA; NEPSI; CQST; CSA; Rostechnadzor
- Directive 96/61/EC (IPPC Directive)
- TA-Luft
- RCC-M, Niveau 1, 2, 3

HERMETIC-Pumpen GmbH is certified acc. to:
- ISO 9001:2008
- GOST; GOST "R"
- Directive 94/9/EC
- AD 2000 HP 0; Directive 97/23/EC
- DIN EN ISO 3834-2
- KTA 1401; AVS D 100 / 50; IAEA 50-C-Q
- Certified company acc. to § 19 I WH

Convincing service.

Important features are readiness, mobility, flexibility, availability and reliability. We are anxious to ensure a pump operation at best availability and efficiency to our customers.

**Installation and commissioning**
- service effected on site by own service technicians

**Spare part servicing**
- prompt and longstanding availability
- customized assistance in spare part stockkeeping

**Repair and overhauling**
- professional repairs including test run executed by the parent factory
- or executed by one of our service stations worldwide

**Retrofit**
- retrofit of your centrifugal pumps by installing a canned motor to comply with the requirements of the IPPC Directive

**Maintenance and service agreement**
- concepts individually worked out to increase the availability of your production facilities

**Training and workshops**
- extra qualification of your staff to ensure the course of your manufacture

PRODUKTINFO
LVP/E/04/2012

All details as stated in this document comply with the technical standard that is applicable at the date of printing. These details are subject to technical innovations and modifications at any time.