SIHI® LPH/KPH
Liquid Ring Vacuum
Pumps and Compressors

Experience In Motion
Vacuum technology at the heart of gas-handling systems

The SIHI LPH/KPH range of liquid ring vacuum pumps and compressors from Flowserve is a proven and cost-effective solution for a wide variety of industrial gas-handling processes. The product line offers vacuum capabilities from atmosphere down to 25 Torr (28.9 in Hg) or compression from atmosphere to 10.3 barg (150 psig).

Proven liquid ring performance

Many pump and compressor systems become unreliable when liquid or vapor are present in a gas element. The liquid ring technology used in SIHI LPH pumps and KPH compressors is a proven economical alternative.

By creating a continuous “ring” of fluid, liquid ring pumps and compressors enable the efficient handling of gases for a wide range of industrial processes. Liquids and condensed vapors separated out of the process can be discharged, recirculated or recovered.

(For more details about liquid ring operating principles, see page 5.)

Benefits

• Near isothermal compression
• Oil free; no internal lubrication required
• Handles almost all gases and vapors
• Tolerant to some liquid carryover
• Low maintenance and safe operation
• Low noise and almost vibration free
• Available in a wide range of materials
• No metallic contact of the rotating parts
Ideal for demanding industrial processes

SIHI LPH pumps and KPH compressors are engineered to operate in the most demanding gas-handling applications. A broad selection of alloys is available for corrosive applications.

Principle industries

- Chemical
- Pharmaceutical
- Food and beverage
- Medical
- Power generation
- Oil and gas
- Environmental
- Plastics
- General industry

Key vacuum applications

- Drying
- Distillation
- Filtration
- Sterilization
- Deaeration and gasification
- Forming and extrusion
- Vacuum chucking
- Scrubbing and vapor recovery
- Packaging and bottling
- Poultry processing
- Batch reactors

Operating parameters

<table>
<thead>
<tr>
<th></th>
<th>LPH</th>
<th>KPH</th>
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<tbody>
<tr>
<td>Flows to</td>
<td>3,653 m³/h (2,150 cfm)</td>
<td>3,400 m³/h (2,000 cfm)</td>
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<tr>
<td>Pressures to</td>
<td>Suction — 25 Torr (0.5 psia)</td>
<td>Discharge — 10.3 barg (150 psig)</td>
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<tr>
<td>Hydraulic overpressure test*</td>
<td>—</td>
<td>up to 10.3 barg (150 psig)</td>
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<tr>
<td>Temperatures to</td>
<td>100°C (212°F)</td>
<td>100°C (212°F)</td>
</tr>
<tr>
<td>Service liquid temperatures to</td>
<td>60°C (140°F)</td>
<td>80°C (183°F)</td>
</tr>
<tr>
<td>Size range</td>
<td>DN 40 to 250 (1.5 to 10 in)</td>
<td>DN 50 to 200 (2 to 8 in)</td>
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</tbody>
</table>

* Dependent on model
Reliable vacuum performance

Liquid ring reliability

Liquid ring pumps and compressors are less sensitive to conditions that can cause other systems to fail. Liquid carryover and process gas condensables pass through the system without damaging the equipment. These and other performance factors have made liquid ring technology widely accepted as an industry standard for more than 100 years.

Low noise and vibration

With no reciprocating parts, SIHI LPH pumps and KPH compressors operate quietly with low vibration. This eliminates the need for special foundations while helping you to comply with industry noise standards.

Minimal routine maintenance

The simple construction of liquid ring pumps or compressors enables service with minimum downtime. LPH and KPH units feature a globally accepted port plate design, which has no valves, gears or metal-to-metal contact of any kind. There is only one moving part, thus requiring no internal lubrication. This enables long service life with very little maintenance for the pump or compressor itself while extending the useful life of mechanical seals.
Application versatility

SIHI LPH/KPH pumps and compressors have the capability to span pressures above and below atmospheric level. This unique attribute of liquid ring principles enables a wide range of differential pressures with a single technology. Service liquids are selected from those compatible with the process gas, enabling you to select the option that best suits the needs of your process.

In addition, LPH and KPH models are available with a variety of shaft seals and materials, including cast and ductile iron, bronze, stainless steel, Hastelloy®, titanium and other alloys.

Broad vacuum range

The effect of a cool liquid ring to absorb condensable process gas and vapor increases capacity, enhancing vacuum performance. SIHI LPH liquid ring vacuum pumps and KPH liquid ring compressors are available in one- and two-stage models with a wide range of vacuum and compression capabilities.

Ideal for harsh and hazardous processes

The non-sparking design of the LPH/KPH product range coupled with the low-temperature rise of the liquid ring principle ensure the safest isothermal compression of hazardous, flammable or explosive process gases.

Liquid ring operating principles

A rotating element (impeller) is eccentrically mounted within a round center body. Service liquid is centrifuged into a uniform liquid ring around the circumference of the center body.

Volume between each of the impeller blade sections varies, relative to the liquid ring, as the impeller rotates. This creates a reciprocating piston action on the volume of gas contained within each of the blade sections. As volume increases, vacuum is created; as volume reduces, compression occurs.
Performance data

LPH range

Model-Installed HP
LPH80557 - 125HP
LPH70540 - 75HP
LPH70530 - 60HP
LPH70123 - 40HP
LPH60527 - 40HP
LPH60520 - 25HP
LPH50523 - 20HP
LPH40517 - 15HP
LPH40412 - 10HP
LPH3408 - 7.5HP
LPH3404 - 5HP
LPH20107 - 3HP
LPH20105 - 2HP
LPH20103 - 2HP

Model-Installed HP
LPH85353 - 150HP
LPH85340 - 125HP
LPH75340 - 100HP
LPH75330 - 75HP
LPH75320 - 60HP
LPH65327 - 40HP
LPH65320 - 30HP
LPH55320 - 25HP
LPH55316 - 20HP
LPH55312 - 15HP
LPH45317 - 10HP
LPH45312 - 7.5HP
LPH3708 - 7.5HP
LPH3704 - 5HP
LPH25007 - 5HP
LPH25003 - 3HP

KPH range

Model-Installed HP
KPH 70540 - 150HP
KPH 70530 - 100HP
KPH 70123 - 100HP
KPH 60527 - 60HP
KPH 60520 - 50HP
KPH 50523 - 40HP
KPH 50518 - 30HP
KPH 40517 - 20HP
KPH 40412 - 15HP
KPH 3408 - 7.5HP
KPH 3404 - 5HP
KPH 20107 - 3HP
KPH 20105 - 2HP
KPH 20103 - 2HP

Model-Installed HP
KPH 95652 - 1250HP
KPH 85227* - 400HP
KPH 85220 - 350HP
KPH 65218 - 200HP
KPH 65212 - 125HP
KPH 40517 - 20HP
KPH 40412 - 15HP
KPH 3408 - 7.5HP
KPH 3404 - 5HP
KPH 20107 - 3HP
KPH 20103 - 2HP

* HP shown is the maximum installed motor HP based on standard running operating conditions at maximum speed. Performance based on 15°C (60°F) water as the service liquid.
Vacuum and compressor systems

The LPH vacuum pump and KPH gas compressor are the heart of gas-handling systems. Pumps are driven with industry standard motors, and discharge gases are processed with a host of engineered components. Flowserve offers pre-engineered and custom engineered vacuum systems to ensure peak performance in your process.

Pre-engineered vacuum systems

SIHI pre-engineered packages offer fast, turnkey commissioning of complete and fully integrated systems. All packages come factory pre-assembled and quality tested, with full system documentation and single-source accountability. Once-through, partial recirculation and total recirculation service liquid arrangements. Refer to the SIHI Pre-engineered Liquid Ring Vacuum Systems brochure (PUBR000027) for more details.

Custom engineered gas-handling systems

For processes with more complex gas-handling requirements, Flowserve can provide custom SIHI engineered systems. Our experienced application engineers have the capability to design complete systems to your specifications from the ground up. We can also collaborate with EPCs to develop vacuum systems for greenfield projects or integrate new vacuum packages in existing systems.

With our custom gas-handling systems, you can expect highly efficient performance and our turnkey service, inclusive of engineering, commissioning and aftermarket support.
Flowserve Corporation has established industry leadership in the design and manufacture of its products. When properly selected, this Flowserve product is designed to perform its intended function safely during its useful life. However, the purchaser or user of Flowserve products should be aware that Flowserve products might be used in numerous applications under a wide variety of industrial service conditions. Although Flowserve can provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper sizing and selection, installation, operation, and maintenance of Flowserve products. The purchaser/user should read and understand the Installation Instructions included with the product, and train its employees and contractors in the safe use of Flowserve products in connection with the specific application.

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