Side channel pumps

SK and ASK series
with mechanical seal or magnetic coupling
PN 40
Research and development with recent test stands

Computer-controlled and fully automated test stands on the premises of Speck in Roth.
Measuring of hydraulics, power requirements, axial thrust, vibrations and NPSH values. Heads of up to 400 m and flow rates of up to 750 m³/h are possible.

Thermal oil test stand with pump surveillance system on the premises of Speck in Roth.
Research of impacts of high temperatures up to 350 °C on the lifetime of the pumps.

Your contacts

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International representatives
⇒ page 15
Side channel pumps made by Speck

Design

» Horizontal multistage modular pumps
» Designed for feeding, filling and emptying operations under difficult physical conditions
» Suitable for the delivery of gas / self-priming
» Suitable for liquids without abrasive contaminants and without solid particles
» Available in a wide range of materials with components from stainless steel, bronze and spheroidal graphite cast iron
» ATEX certified

SK series
Side channel pumps in acc. with EN 734

Proven side channel pumps for universal applications

ASK series
Side channel pumps with NPSH stage

Combi-pumps for delivering liquids in physically difficult conditions on the suction side

Their very good NPSH values make them particularly suitable for pumped media near the boiling-point

Main applications

» Filling and emptying tanks and tankers
» Delivery of hot water or feedwater in boiler systems
» Delivery of salt water and fresh water in marine applications
» Recovering condensates (water) in the food and chemical industries
» Delivery of liquefied gas and hydrocarbons
» Delivery of coolants
» Extracting palm oil
» Filling and emptying thermal oil systems

With mechanical seal
from 0 to + 180 °C

With magnetic coupling
from -100 to + 350 °C

Nominal pressure
PN 40

H_{max} 400 m

Q_{max} 42 m³/h

Temperature ranges depend on materials, seals and pumped media.
Find the right pump for your system

Choose the best solution from six ranges

Each system is unique in its own way - on some, the sealing principle is key, on others the installation frame or perhaps the special properties of the medium. You can choose from six ranges and find the best solution for your system.

Pumps with mechanical seal

Pumped media temperatures from 0 to + 180 °C depending on the materials used

Wide range of seals

Available in clockwise and anticlockwise rotation

SKG-LL
- 1 – 8 stages
- 2 external rolling bearings

SKG-L0
- 1 – 8 stages
- 1 internal casing sleeve bearing
- 1 external rolling bearing

SKG-LA
- 1 – 3 stages
- 1 internal casing sleeve bearing
- 1 external rolling bearing

ASKG
- With NPSH-stage
- 1 – 8 stages
- 1 internal casing sleeve bearing
- 1 external rolling bearing

Pumps with magnetic coupling

Pumped media temperatures from -100 to +350 °C depending on the materials used

Wide range of magnetic coupling sizes

Hastelloy® or ceramic separating cans

SKM
- 1 – 8 stage
- 2 internal casing sleeve bearings

ASKM
- With NPSH-stage
- 1 – 8 stages
- 2 internal casing sleeve bearings
Performance range

Characteristic diagram SK series

Characteristic diagram ASK series with NPSH-stage
Smart modular system

Pumps with mechanical seal

With Speck you get a smart modular system with many identical parts. In addition, the SK series allows two directions of rotation, providing full flexibility when replacing or converting a system.

* View on pump shaft end

Pumps with magnetic coupling

No. Designation
1 Suction casing
2 Discharge casing
3 Suction stage
4 Discharge stage
5 Shaft
6 Star impeller
7 Mechanical seal

No. Designation
8 Rolling bearing
9 Sleeve bearing made of SiC (or carbon bearing, not illustrated)
10 N-stage
11 Radial impeller
12 Bearing cartridge made of SiC
13 Magnetic coupling
High operational safety, optimal design and service-friendly

**Robust and durable**

**Rolling bearing**
Robust lifetime lubricated rolling bearings suitable for a long service life.

**Wear resistant sleeve bearings**
Solid, hydrodynamically lubricated sleeve bearings made from carbon, a proven slide material – extremely hard wearing and highly resistant to corrosive media. Alternatively, SiC sleeve bearings are also available.

**A perfect seal**

**Mechanical seals**
We offer a wide range of mechanical seals for a variety of applications.

- Nominal pressure up to PN 40
- Balanced and unbalanced mechanical seals
- Double-acting mechanical seals
- Non-cooled mechanical seals
- Cooled mechanical seals available for media temperature exceeding 140 °C
- Diverse combinations of materials available depending on the pumped medium:
  - Sealing rings in A-carbon, B-carbon or SiC
  - O-rings in FKM, EPDM or FFKM

**Magnetic couplings**
You will find a great variety of magnetic couplings at Speck. The magnetic couplings are optimally designed for your operating point. See page 8 for further details.

**Stuffing box packing**
- Available on request

**Wide temperature range**
Depending on the material, the seals and the pumped medium, these side channel pumps can be used across a wide range of temperature.

<table>
<thead>
<tr>
<th>Material</th>
<th>with mechanical seal</th>
<th>with magnetic coupling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spheroidal graphite cast iron</td>
<td>0 – 180 °C</td>
<td>- 20 – 350 °C</td>
</tr>
<tr>
<td>Bronze</td>
<td>0 – 180 °C</td>
<td>0 – 180 °C</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>0 – 180 °C</td>
<td>- 100 – 250 °C</td>
</tr>
</tbody>
</table>

**Flexible and simple to service**

**Minimum stock of spares required**
Thanks to the consistently developed modular system, many components are completely identical and interchangeable across six ranges. This means you require a minimum stock of spare parts. It guarantees complete flexibility as replacing pumps and components or changing the pump execution is easy.

**Efficient motors**
4-pole motors meeting current energy efficiency standards

**Even for critical media**
We offer a range of medium-specific designs suitable for the delivery of acids, lyes, fuel, glycol, glycerine, hot water, oil, etc.
Casing seals with graphite, FKM, FFKM or EPDM O-rings are available. You can choose for stage sealing among graphite, Teflon® or various liquid seals by Epple®.

**ATEX**
All series are ATEX certified
- Mechanical seal version: II 2G / 2D c TX
- Magnetic coupling version: II 2G / 2D cb TX

Side channel pumps | Subject to technical modifications and errors.
Magnetic couplings

**Optimal design**

The wide range of magnetic couplings offers an optimum configuration for your operating conditions and cuts energy consumption.

**Wide range**

Magnetic couplings consist of an inner rotor, a separating can and an outer rotor. The separating can hermetically seals the pumped media from the atmosphere.

A great variety of sizes and configuration using the latest software guarantee the best design for your operating point.

The transmissible torques of the magnetic couplings range between 10 and 500 Nm.

**Type code for magnetic couplings**

<table>
<thead>
<tr>
<th>Type code (example)</th>
<th>135-</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal diameter DN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnet length [mm]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Magnetic coupling sizes and versions**

<table>
<thead>
<tr>
<th>Magnet diameter</th>
<th>DN 60</th>
<th>DN 75</th>
<th>DN 110</th>
<th>DN 135</th>
<th>DN 165</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnet length in mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>x</td>
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<tr>
<td>60</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>70</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
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<td>80</td>
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<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

Separating can made of Hastelloy®

<table>
<thead>
<tr>
<th>Separating can made of ceramic ZrO2/Mg</th>
<th>PN 40</th>
<th>PN 25 / PN 40</th>
</tr>
</thead>
<tbody>
<tr>
<td>not available</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Cooling through flushing bores**

Eddy current, viscosity and bearing friction losses generate heat inside the pump, adding to the temperature of the medium. Flushing bores in the inner rotor and the casing ensure that critical points are cooled with the medium.

At the same time, gases or air are conducted out of the inner rotor.

**Robust Hastelloy® separating cans**

Proven and with low eddy current losses

High-grade Hastelloy® separating cans come as standard with Speck. This robust material has proven its properties in daily use in many industries.

The finely graduated coupling and separating can diameters allow optimum design with minimum eddy current losses.

**Safety with temperature monitoring**

If required (e.g., in areas with potentially explosive atmospheres), with Hastelloy® separating cans, temperature sensors can be mounted into the bracket to monitor the surface temperature of the separating can.

**PT-100 temperature sensor (standard design)**

The universal linear PT-100 temperature sensor with a detection range from -100 to +400 °C is available in three versions.

- Standard design
- ATEX design without SIL/IPL2
- ATEX design with SIL/IPL2

All three versions can be optimally adjusted for length using a compression fitting. In addition, the sensor tip is held against the separating can using a spring to guarantee secure contact.
Ceramic ZrO₂Mg separating cans

No current eddy losses in the separating can
When non-conductive ceramics are used, no eddy currents occur within the coupling. This has two advantages.

Energy savings
Magnetic fields cause eddy currents within metal separating cans, increasing the overall energy consumption of the pumps. Ceramic separating cans mean there are no eddy currents, leading to significant energy savings.

The graph below shows the additional energy consumption of a metal separating can in kW due to eddy currents. It shows the energy consumption in relation to the length of the magnet (in 10 mm increments) and to the diameters.
In the case of the largest separating can diameter, energy consumption rises to the power of three.

![Graph showing additional energy consumption](image)

The additional energy consumption found in magnetic couplings with metal separating cans in kW due to electrical eddy currents is completely eliminated by using ceramic separating cans.

No entry of heat into the medium
In metal separating cans, the electrical eddy currents described above are converted into thermal energy, thereby increasing the heat of the medium. With ATEX applications and media near vapour pressure, this can become a considerable problem.
Ceramic separating cans do not create losses of energy through eddy currents and the medium retains its temperature.

Safety through leak detection
Separating cans often break as a result of vibrations caused, for example, by damaged bearings after they have been running dry, or by vibrations in the system.
In the event of a rupture, there is a danger of the medium getting into the motor through the motor casing, which must be avoided when explosive substances are being pumped.

For your safety we can offer a leak monitoring sensor which detects any medium emerging after a rupture of the separating can and immediately switches off the pump or the system.
In addition, the sealed slots on the bracket temporarily prevent the medium from entering the environment.

On request, we can also fit a pipe to the bracket to safely remove the pumped medium. The connector for the pipe is directly opposite the sensor.

1 Leak sensor
2 Externally sealed slots
covered: the connector for the media removal pipe on the back of the bracket opposite the sensor
Simple and optimal configuration software

**SPAIX selection program**

The software allows you to configure heat transfer pumps, side channel pumps and boiler feed pumps via your Internet browser. As well as design details, the system will also request operating details and details about the medium to be pumped.

**Ideal for system planners**
Speck now also offers the latest version 4 of its renowned SPAIX design software.

We make the program available to authorised customers who can pre-select the pumps within their system.

The web-based software always accesses an up-to-date database.

**Easy pre-selection**
The configuration system avoids a wide range of selection parameters with regard to design, sealing systems, hydraulics, operating conditions and media.

The software has language options for German and English.

**Checking the pre-selection**
When the order is submitted, the customer’s choices are double-checked to ensure that your project requirements are met.

**Key**

1. List of all pump designs that can be configured in the software
2. List of all series within the pump designs
3. Selection parameters operating parameters and medium data in the first instance
4. Characteristic curve depending on hydraulic selection generated

Characteristic curve depending on hydraulic selection.
Documentation based on the selection program

Side channel pumps
ASM 3006

Data Sheet
side channel pumps
ASM 3006

Save projects
Interim configuration results such as characteristic curves, scale drawings or technical data sheets can be saved as a project and generated as a pdf file.

Characteristic curve (example)

Dimensional drawing (example)

Technical data sheet (example)

Dimensional drawing
side channel pumps
ASM 3006

Technical data sheet
side channel pumps
ASM 3006

Performance curve
side channel pumps
ASM 3006

10/2015 | 1966.1324
Main dimensions

**SK series**

Connecting dimensions for SKG-LL, SKG-L0, SKG-LA and SKM

<table>
<thead>
<tr>
<th>Size</th>
<th>Stage no.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>h1</th>
<th>h2</th>
<th>Flanges</th>
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<tbody>
<tr>
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<td></td>
<td>120</td>
<td>120</td>
<td>154</td>
<td>188</td>
<td>222</td>
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<tr>
<td>SK…32 / 33</td>
<td></td>
<td>146</td>
<td>146</td>
<td>186</td>
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<td>266</td>
<td>306</td>
<td>346</td>
<td>386</td>
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<tr>
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<td>215</td>
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<td>325</td>
<td>380</td>
<td>435</td>
<td>490</td>
<td>545</td>
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<td>DN 50</td>
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<td>735</td>
<td>825</td>
<td>180</td>
<td>180</td>
<td>DN 65</td>
</tr>
</tbody>
</table>

Position of inlet and outlet nozzle

With almost all sizes, the nozzles can be rotated 90°

**ASK series**

Connecting dimensions for ASKG and ASKM

<table>
<thead>
<tr>
<th>Size</th>
<th>Stage no.</th>
<th>1, 2, 3, 4, 5</th>
<th>6, 7, 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASK…20</td>
<td></td>
<td>Nozzles at the side / on top</td>
<td>Nozzles at the side / on top</td>
</tr>
<tr>
<td>SK…32 / 33</td>
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<td>253</td>
<td>293</td>
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<tr>
<td>ASK…40</td>
<td>268</td>
<td>323</td>
<td>378</td>
</tr>
<tr>
<td>ASK…50</td>
<td>305</td>
<td>380</td>
<td>455</td>
</tr>
<tr>
<td>ASK…65</td>
<td>337,5</td>
<td>427,5</td>
<td>517,5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Stage no.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>h1</th>
<th>h2</th>
<th>Flanges</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASK…20</td>
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<td>195</td>
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<td>263</td>
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<td>ASK…32 / 33</td>
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<td>293</td>
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<td>160</td>
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</tr>
<tr>
<td>ASK…65</td>
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<td>337,5</td>
<td>427,5</td>
<td>517,5</td>
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<td>697,5</td>
<td>787,5</td>
<td>877,5</td>
<td>967,5</td>
<td>180</td>
<td>180</td>
<td>DN 65</td>
</tr>
</tbody>
</table>

**Flanges**

Flanges in acc. with EN 1092 PN 40.
Flanges in acc. with DIN EN 1092-2, drilled in acc. with ANSI 150 lbs or 300 lbs on request.
Order-related tests and dimensioning

**Pressure tests**

Speck carries out the tests below as standard:

**Gas pressure test**
The gas pressure test is used to prove that the components are leak-proof. All components that bear pressure are tested, such as the discharge casing and the suction casing, stages and mechanical seal casing. The test is carried out with forming gas at 2 bar. The holding time is 15 minutes.

**Hydrostatic pressure test**
The hydrostatic pressure test is used to prove strength of the components and that the pump is leak-proof. The fully assembled pump is tested. The test is carried out with a hydrostatic test pressure based on prEN 12162; the hydrostatic test pressure corresponds to 1.5 x the nominal pressure (PN16) at 20 °C. The holding time is 10 minutes.

If you want to use pressure tests according to different criteria, please enter them in the request.

**Testing the performance**

At the customer’s request, Speck offers the following tests:

**Hydraulic tests**
The measurement of the characteristic curves apply to the delivery of water with a temperature of 20 °C at nominal speed. Tolerances: flow rate ± 10 %, total head ± 10 % power requirement + 10 %.

Deviating properties of the media to be pumped affect the characteristic curves.

**NPSH test**
In this test, the suction-side pressure is gradually reduced until the decrease in the delivered head reaches 3 % at a constant flow rate. At least four flows are evaluated that are spread appropriately over the admissible operating range. The NPSH value is not a guarantee point.

**Vibration test**
Vibration test according to EN ISO 5199, Edition 2002
The vibration values are measured radially and vertically at every operating point on the bearing casing at the nominal speed and with the corresponding flow rate.

**Temperature measurement**
The measurement is taken on the motor-side bearing at operating temperature. The operating temperature and the ambient temperature at every operating point measured are documented.

**Standard conditions at site**

- Ambient temperature from -20 °C to +40 °C
- Permissible altitude up to 1000 m above sea level

Deviations from the site conditions specified herein must already be disclosed in the inquiry.

**Dimensioning**

**Assessment of the maximum pump outlet pressure**
The pump outlet pressure at the pump nozzle depends on:
- the pump inlet pressure
- the density of the medium to be pumped

The maximum pump outlet pressure \(p_{2\text{max оп}}\) is calculated using the formula:

\[
p_{2\text{max оп}} = p_{1\text{max оп}} + \rho \cdot g \cdot H \cdot 10^{-5}
\]

With:
- \(p_{2\text{max оп}}\) = maximum pump outlet pressure [bar]
- \(p_{1\text{max оп}}\) = maximum pump inlet pressure [bar]
- \(\rho\) = density of the medium to be pumped [kg/m³]
- \(g\) = gravitation constant [m/s²]
- \(H\) = maximum total head at zero flow or at the peak of the pump’s characteristic curve [m]

Pumps must be selected and operated in a way which ensures that the maximum pump outlet pressure does by no means exceed the maximum permissible operating pressure of the casing \(p_{\text{all w c}}\) at operating pressure.
This also applies to commissioning while the discharge valve is closed (refer to diagram).

**Pressure and temperature limitations**
The maximum casing operating pressure \(p_{\text{all w c}}\) of the pressure retaining parts depends on the operating temperature:

\[
\begin{align*}
\text{Temperature} & \quad \text{Maximum permissible casing operating pressure} \\
-20 °C & \quad 40 \text{ bar} \\
-10 °C & \quad 35 \text{ bar} \\
0 °C & \quad 30 \text{ bar} \\
10 °C & \quad 25 \text{ bar} \\
20 °C & \quad 20 \text{ bar} \\
30 °C & \quad 15 \text{ bar} \\
40 °C & \quad 10 \text{ bar}
\end{align*}
\]

### Materials:
- 1.4571: stainless steel
- EN-GJS-400-15: spheroidal graphite cast iron
- EN-GJL-250: cast iron