Pumps for heat transfer technology

Centrifugal pumps with uncooled mechanical seal or magnetic coupling

Regenerative turbine pumps with magnetic coupling
Investigation and development with recent test stands

Computer-controlled and fully automated test stands on the premises of Speck Pumpen 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 Pumpen in Roth. Investigation of impacts of high temperatures up to 350 °C on the lifetime of the pumps.

Your contacts at Speck Pumpen

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Pumps for heat transfer technology

Centrifugal pumps

Series TOE-G and TOE-M

Consistent design modular system with volute casings.
Choose from six different designs with mechanical seal or magnetic coupling.
Developed for circulating organic or synthetic heat transfer oils in heat transfer systems in accordance with DIN 4754, as well as hot water.
Suitable for pumped media with low amounts of non-abrasive impurities.

<table>
<thead>
<tr>
<th>Heat transfer oil</th>
<th>up to 30 °C to 350 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot water</td>
<td>up to 160 °C, up to 180 °C on request</td>
</tr>
<tr>
<td>Nominal pressure</td>
<td>PN 16</td>
</tr>
<tr>
<td>( H_{\text{max}} ) (2900 min(^{-1}))</td>
<td>100 m</td>
</tr>
<tr>
<td>( Q_{\text{max}} ) (2900 min(^{-1}))</td>
<td>550 m(^3)/h</td>
</tr>
<tr>
<td>Casing</td>
<td>Spheroidal graphite iron</td>
</tr>
</tbody>
</table>

Regenerative turbine pumps

Series NPY-MK and CY-MK

Tried and tested and compact close-coupled pumps with top/top casings and magnetic coupling.
Developed for transporting and circulating organic or synthetic heat transfer oils and hot water.
Suitable for pumped media with low quantities of non-abrasive impurities.

<table>
<thead>
<tr>
<th>Heat transfer oil</th>
<th>up to 350 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot water</td>
<td>up to 180 °C, higher temperatures on request</td>
</tr>
<tr>
<td>Nominal pressure</td>
<td>up to PN 24</td>
</tr>
<tr>
<td>( H_{\text{max}} ) (2900 min(^{-1}))</td>
<td>90 m</td>
</tr>
<tr>
<td>( Q_{\text{max}} ) (2900 min(^{-1}))</td>
<td>12 m(^3)/h (200 l/min), 24 m(^3)/h (400 l/min) on request</td>
</tr>
<tr>
<td>Casing</td>
<td>Stainless steel / spheroidal graphite iron</td>
</tr>
</tbody>
</table>

Main applications

- Tempering in plastics and die casting industry
- Baking ovens, large frying units as well as in the production of edible oil and dry masses for the food and feedstuff industries
- Heating calenders and melting containers in the leather and rubber industry
- Heating stirring and mixing vessels in the production of paints and varnishes
- Heating tank storage facilities on stationary and FPSE platforms, as well as in tankers
- Heating press lines in the wood and pulp industry
- Flat glass production
- Solar power plants and ORC processes
Find the right pump for your system

Choose the best solution from six ranges

Each heat transfer system is unique in its own way - on some, the sealing principle is key, on others the vertical installation frame or perhaps the special properties of the medium. With the heat transfer pumps from Speck Pumpen you can choose from six ranges with different characteristics and find the best solution for your system.

Series TOE-G with mechanical sealing
- Water up to 160 °C
- Water up to 180 °C on request
- Oil up to 350 °C

In comparison to pumps with magnetic coupling:
- More favourable in purchase and repair
- Less energy consumption with the same operating point

Different characteristics

Series TOE-M with magnetic coupling
- Oil up to 350 °C

In comparison to pumps with mechanical sealing:
- Longer lifetime
- No leakage and odour nuisance
- ATEX

- TOE-GN | TOE-MN -
  Bearing bracket / process design
  Base plate
  Dismantling of the bearing bracket possible without moving the motor
  Alignment / checking of the coupling required before start-up

- TOE-GA | TOE-MA -
  Bracket version
  No alignment of the coupling required before start-up
  Space for disassembling the cartridge insert required
  Base plate optional

- TOE-GI | TOE-MI -
  Bracket version
  No alignment of the coupling required before start-up
  Space for disassembling the cartridge insert required
Minimal spare parts stock and flexibility thanks to the modular system

Thanks to the modular system with consistent design, many components are identical and interchangeable across the six ranges. This means minimal spare parts stock.

And it also guarantees complete flexibility, as replacing pumps and components or retrofitting to a different design is easy.

Series TOE-G with mechanical sealing

1. Only two bearing brackets for all frame sizes
   - Bearing bracket 360 for 12 frame sizes identical and interchangeable
   - Bearing bracket 470 for 7 frame sizes identical and interchangeable
2. Only one bracket per bearing bracket

Series TOE-M with magnetic coupling

1. Only two bearing brackets and two brackets for all frame sizes
   - Bearing bracket 360 identical for 12 frame sizes
   - Bearing bracket 470 identical for 7 frame sizes
2. Interchangeability of the whole bearing bracket is given if the magnetic coupling is the same
High operational safety, optimal design and service-friendly

Robust design

Torsion-resistant casing cover
Ball bearings with lifetime lubrication

Wear-resistant SiC sleeve bearings
Solid, hydrodynamically lubricated sleeve bearings made from SiC as tried-and-tested slide material - extremely wear-resistant and good resistance in corrosive media.

Impellers with back vanes
The back vanes of the impellers significantly reduce the axial thrust and therefore remove strain from the mechanical seal and the ball bearings considerably. They also keep dirt particles away from the sleeve bearings.

Magnetic couplings
Supplied with radial start-up safety device as standard at Speck Pumpen.

Optimised for synthetic heat transfer oils

Dry-run safety function for the mechanical seal
Synthetic heat transfer oils are being used more and more frequently due to the benefits they offer. However, low-boilers develop in the synthetic oils over time in form of gas bubbles, can lead to dry-running on the mechanical seal.

This is ruled out completely in the generously designed mechanical seal casings from Speck Pumpen. An anti-vortex rib reliably prevents gas bubbles from forming on the mechanical seal.

The vacuum generated by the back vanes also ensures that the low-boilers do not collect in the mechanical seal casing and are returned to the media circuit.

Clever temperature management

Optimised cooling of ball bearings, mechanical seal and sleeve bearings
The air flow generated by the fan blade on the coupling cools the mechanical seal and the ball bearing optimally in combination with coupling protection or bracket and several cooling fins. The additional cooling zone reduces the temperature on the sleeve bearings.

Optimised cooling of the ball bearings and magnetic coupling
A fan blade is also used for cooling in the TOE-MN series. Here, the generated air flow, in combination with coupling protection, ventilation slots and cooling zone, reduces the temperature on the magnetic coupling and ball bearings extremely effectively.

On close-coupled pumps, the air flow from the motor fan also cools the bearing shield and therefore also the ball bearings inside it.

Pumps with mechanical seal

Dry-run safety function
Back vanes
Anti-vortex rib

Temperature management
Cooling zone
Cooling fins
Fan blades

Robust
Double-row angular ball bearings from bearing bracket 470

Robust
Solid sleeve bearing made from SiC

Fig.: TOE-GN, bearing bracket 470, casing with centreline mounting

Subject to technical modifications and errors
Also suitable for critical applications

Mechanical seal with quench
For media, which are prone to crack product formation on the sealing surfaces of the mechanical seal, versions with quench are available.

Pumps with magnetic couplings
100% free of leakage and with lower maintenance requirements than pumps with mechanical seal.

ATEX
All magnetically-coupled pumps are ATEX-certified.

Optimal design

Energy efficiency
High energy efficiency secures a lasting competitive edge. Speck Pumpen offers the important criteria for energy-optimised design: Seamless range of sizes, highly efficient impellers, switching of impellers for the best design at the operating point and, naturally, motors in accordance with IE2.

Optimal sizes of the magnetic couplings
Magnetic couplings in staged sizes guarantee optimal design at the operating point with minimal viscosity and eddy current losses.

Maintenance-friendly and flexible

Simple installation
All six series are extremely maintenance-friendly thanks to easy-to-remove bearing brackets.

For pumps with magnetic coupling, you can also replace the sleeve bearing cartridge easily as a complete spare part. It is quick and ensures correct installation every time.

Minimum spare parts stock
The high level of interchangeability of identical parts guarantees minimal spare parts stock requirements and an extremely high level of flexibility.

The bearing bracket 360 alone is used with mechanical seal in all three series in up to twelve sizes.

Retrofitting to a different series is also no problem at all - the volute casing can even be left in the system.

Optimal design
Magnetic couplings in staged sizes for optimal design with minimal viscosity and eddy current losses.

Temperature management
Several ventilation slots
Cooling zone
Fan blades (TOE-MN only)

Optimal design
Robust and maintenance-friendly
Solid sleeve bearing cartridge with SiC - can be replaced as a complete spare part.

Fig.: TOE-MN, bearing bracket 470, casing with centreline mounting
Longer lifetime

There are effects, which have little or no relevant impact on smaller designs, but lead to increased wear in larger pumps. Speck Pumpen offers larger pumps with special designs to guarantee a longer lifetime: Casing with centreline mounting and double volute.

Centreline mounting relieves strain from the bearings and coupling

Casings with feet can only expand upwards in high temperatures, which causes the shaft to tilt and bend. This has an impact on the sleeve bearings and shaft coupling in particular. As the heat expansion increases with larger casing size, the sleeve bearings and couplings also wear faster on larger pumps.

Speck Pumpen is the only manufacturer to use a centreline mounting for heat transfer pump volute casings. It eliminates the impact of vertical expansion completely. The shaft is also always aligned at the optimal height, even in hot operation, and bearings and coupling achieve a significantly higher lifetime.

A double volute remove strain from the sleeve bearings

Radial forces are applied directly on the sleeve bearings. The forces increase with higher impeller diameters and higher speeds. This is why the sleeve bearings on larger pumps with single volute casings wear faster.

Speck Pumpen therefore uses casings with double volute for larger pumps, which significantly reduce the radial forces. The strain on the radial and axial bearings is considerably reduced, helping them achieve a much longer lifetime.

Casing with feet: The larger the pump, the more strain placed on the bearings and coupling by heat expansion

Casing with centreline mounting eliminates the impact of the heat expansion completely.

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TOE-GN / GA, TOE-MN / MA – Sizes and casing designs

<table>
<thead>
<tr>
<th></th>
<th>32-160</th>
<th>40-160</th>
<th>50-160</th>
<th>65-160</th>
<th>80-160</th>
<th>100-160</th>
<th>–</th>
</tr>
</thead>
<tbody>
<tr>
<td>32-200</td>
<td>40-200</td>
<td>50-200</td>
<td>65-200</td>
<td>80-200</td>
<td>100-200</td>
<td>125-200</td>
<td>–</td>
</tr>
<tr>
<td>32-250</td>
<td>40-250</td>
<td>50-250</td>
<td>65-250</td>
<td>80-250</td>
<td>100-250</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Bearing bracket 360

Bearing bracket 470

All casings with dimensions in accordance with EN 733  
 Demonstrates Casing with double volute

Casing with centreline mounting

Subject to technical modifications and errors
Characteristic diagrams and casing designs

**TOE-GN / GA, TOE-MN / MA**

**TOE-GI, TOE-MI**

Subject to technical modifications and errors.
Regenerative turbine pumps with magnetic coupling

Extremely compact, robust, durable and safe

Type-related properties
Due to their design, regenerative turbine pumps have different properties than centrifugal pumps and are the better choice for certain applications.

They achieve relatively high pressures with smaller volume flows, which means that the characteristic curve also runs relatively steep. They belong to the pump types which offer the option of changing the conveying direction through right-left run. They can also pump media containing gas with no problems.

Compact, robust, durable and safe
Regenerative turbine pumps with magnetic coupling from Speck Pumpen have been used in a wide range of systems and assemblies successfully for many years. The compact design requires minimal installation space and reduces the weight. The perfected pumps also impress with the small number of extremely high-quality parts. Robust sleeve bearings made from SiC and ceramic shafts (Al₂O₃) guarantee a long lifetime and are free from leakage and maintenance-free thanks to magnetic couplings.

Special designs available on request
On request, Speck Pumpen can also develop special designs for special media or with different hydraulics. Please contact us.

NPY-2251-MK-HT, NPY-2251-MK-TOE

<table>
<thead>
<tr>
<th>Media</th>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPY-2251-MK-HT</td>
<td>Water max. 180 °C</td>
</tr>
<tr>
<td></td>
<td>Higher temperatures on request</td>
</tr>
<tr>
<td>NPY-2251-MK-TOE</td>
<td>Oil max. 350 °C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Casing</th>
<th>Stainless steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bracket</td>
<td>With or without feet</td>
</tr>
<tr>
<td>Drive 50 Hz</td>
<td>0.50 kW, 3~</td>
</tr>
<tr>
<td>Drive 60 Hz</td>
<td>0.55 kW, 3~</td>
</tr>
</tbody>
</table>

Flexible
Bracket with feet

Safe and maintenance-free
Magnetic coupling

Durable
Sleeve bearing made from SiC and ceramic shafts

Fig.: CY-6091-MK-TOE

The peripheral impeller transfers the hydraulic output through momentum exchange.

Due to their design, regenerative turbine pumps have different properties than centrifugal pumps and are the better choice for certain applications.

Fig.: CY-6091-MK-TOE

Subject to technical modifications and errors

05/2014 | 1096.1212
Media Connections

**CY-4281-MK-HT**
- Water max. 180 °C
- Higher temperatures on request

**CY-4281-MK-TOE**
- Oil max. 350 °C
- SAE 3/4

Media Hydraulics Connections

**CY-6091-MK-HT**
- Water max. 180 °C
- Higher temperatures on request

**CY-6091-MK-TOE**
- Oil max. 180 °C
- Oil max. 350 °C

Casing Stainless steel
Bracket With or without feet
Drive 50 Hz 1.00 – 2.20 kW, 3~
Drive 60 Hz 1.00 – 2.20 kW, 3~

Subject to technical modifications and errors.