Richter Vortex Type
Chemical Process Pumps

Higher solids contents
Larger and fibrous particles
Gas-laden media

Materials:
PFA, PTFE, PE-UHMW
Conveyance of solids-containing and gas-laden media

Vortex pumps are preferably used for media with higher solids contents. In addition, they have relatively good gas/liquid pumping capability.

**Media are conveyed gently for pump and medium**
- Solids contents of up to roughly 50 % by volume, depending on grain sizes and properties
- Particle sizes of about 10 to 20 mm (1/4” - 5/8”), depending on the pump size
- Long-fibre constituents
- Gas contents of up to 5 % by volume

**Pressure/temperature range**
- Operating temperature: -60 to +180 °C (-75 to 360 °F), depending on design and operating pressure
- Operating pressure up to 16 bar (235 psi), depending on housing design
- Version for elevated vacuum (at standstill) optional

**Flanges**
- for connection to DIN EN 1092-2 (ISO 7005-2), on request for connection to ASME B16.5, class 150 or BS

**Type code**
- with magnetic drive, frame-mounted MNK-X/
- with magnetic drive, close-coupled MNK-XB/
- with mechanical seal, frame-mounted SCK-X/
- PFA/PTFE lining ...
- PE-UHMW lining ...
- Antistatic lining on request.

**Gas-laden media**
Standard centrifugal pumps can convey liquids with a gas content of up to 3 % by volume. If the gas content is higher, delivery fails and is not resumed even after the gas volume has been reduced: The pump must be shut down.

By contrast, Richter vortex pumps can also convey gas contents of up to 5 % at a minimum flow rate of about 20% $Q_{optimum}$.

If the gas content exceeds 5 %, the delivery head drops sharply until delivery stops. However, delivery continues again immediately after a reduction in the gas volume without the pump having to be shut down.

**Vortex pumps as mixers**
When a vortex pump is used a mixer, which in many cases would otherwise be necessary, can be dispensed with: As a result of the strong circulation currents, the liquids to be conveyed are intimately mixed inside the pump and then discharged.

**Favourable cavitation behaviour**
Vortex pumps exhibit excellent cavitation behaviour. Although cavitation occurs somewhat earlier than in standard centrifugal pumps, the cavitation curves become much flatter.

The pump therefore maintains delivery at a slightly reduced head for longer than a comparable standard centrifugal pump. No cavitation damage is to be expected as cavitation would occur in the liquid-filled free space of the housing.

**Flow rates**
The $Q/H$ performance curve of a vortex pump runs comparatively flat: The delivery head is smaller in the lower rate range than with a standard centrifugal pump but higher in the upper range.

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**Solids-containing media**
Centrifugal pumps of standard designs involve the risk that solids may clog the impeller channels – especially with closed impellers – or cause increased wear in the space between the impeller and the housing. Richter vortex pumps have large free spaces in the housing and the medium rotates in the vane-less area! Gentle conveyance of media with fibrous or crystalline constituents.
Reliable: magnetic drive or mechanical seals

Magnetic drive pumps
- Plain bearings made of pure SSic and optionally with SAFEGLIDE® PLUS: protection against damage in case of dry-running
- Non-metallic, eddy-current-free can systems made of CFRP/PTFE, can monitoring connection on request
- A special plain bearing and can flushing system can be provided, depending on the content and type of solids (see illustration on cover)

Alternative to the vortex magnetic drive pump MNK-X (frame-mounted) or MNK-XB (close-coupled):

Mechanical seal vortex pump SCK-X of frame-mounted design
- Internal or external mechanical seal
- Heavy-duty design also for high and varying loads, minimal shaft deflection
- Shaft sleeve Al₂O₃, SSic, Hastelloy etc.

For detailed sectional drawings and descriptions of the basic pumps, refer to publications MNK and SCK. For Richter mechanical seal RG-4 and plain bearings SAFEGLIDE® PLUS please request special literature.
Components and materials

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<th>Standard design*</th>
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<td>Pump housing</td>
<td>Ductile iron EN-JS 1049 ASTM A395/PFA, PTFE, PE-UHMW</td>
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<td>159</td>
<td>Can</td>
<td>CFRP carbon-fibre compound</td>
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<td>Pump shaft</td>
<td>Stainless steel</td>
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<tr>
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<td>Plain bearing pedestal</td>
<td>Ductile iron EN-JS 1049 ASTM A395/PFA, PE-UHMW</td>
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<td>Mechanical seal housing</td>
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<td>Shaft sleeve</td>
<td>Al₂O₃, SSiC etc. depending on specifications</td>
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<tr>
<td>529</td>
<td>Bearing sleeve</td>
<td>Pure SSiC, on request with SAFEGLIDE® PLUS</td>
</tr>
<tr>
<td>545</td>
<td>Bearing bush</td>
<td>Pure SSiC, on request with SAFEGLIDE® PLUS</td>
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<td>858</td>
<td>Drive magnet assembly</td>
<td>Steel/permanent magnets</td>
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<td>859</td>
<td>Inner magnet assembly</td>
<td>Steel/PFA, permanent magnets</td>
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</tbody>
</table>

* Antistatic and PFA-P highly permeation-resistant linings available on request

Higher delivery capacities on request.
Richter vortex pumps are also available for 1,750 and 3,500 rpm for flows up to 250 m³/h (1100 US gpm) and TDH up to 130 m (425 ft).
For 60 Hz curves please contact factory.