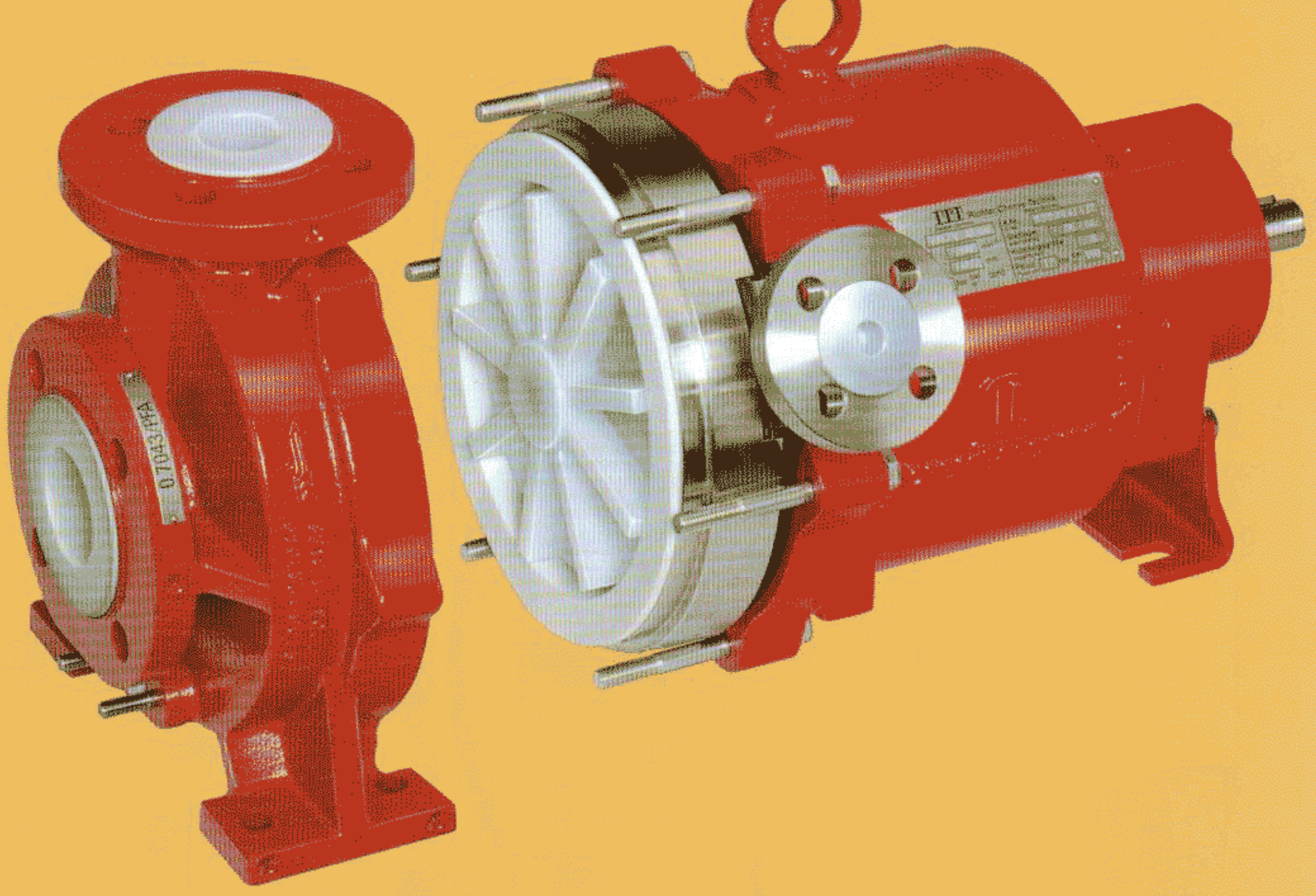
ITT RICHTER CHEMIE-TECHNIK

Vortex Type
Chemical Process Pumps

Series
MNK-X, MNK-XB, SCK-X

The Answer to Corrosion

- Higher Solids Content
- Larger and Fibrous Particles
- Gas-laden Media
- Impeller Outside the Main Flow



Materials:
PFA · PTFE · PVDF ·
PP · PE-UHMW

CHEMIE-TECHNIK

Conveyance of solids-containing and gas-laden media

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

Media with
- **solids contents of up to roughly 50% by volume, depending on grain sizes and properties**
- **particle sizes of about 10 to 20 mm, depending on the pump size**
- **long-fibre constituents**
- **gas contents of up to 5% by volume**

are conveyed gently for pump and medium.

- **Solids-containing media**
  The large free space in the housing and the semi-open radial bladed impeller with star-shaped vanes are the decisive factors for these conveying properties. Vortex pumps do not show any tendency to clog. See also page 4.

- **Gas-laden media**
  Richter vortex pumps can handle process fluids with gas contents of up to 5% by volume. They have excellent behaviour under cavitating conditions. See also page 4.

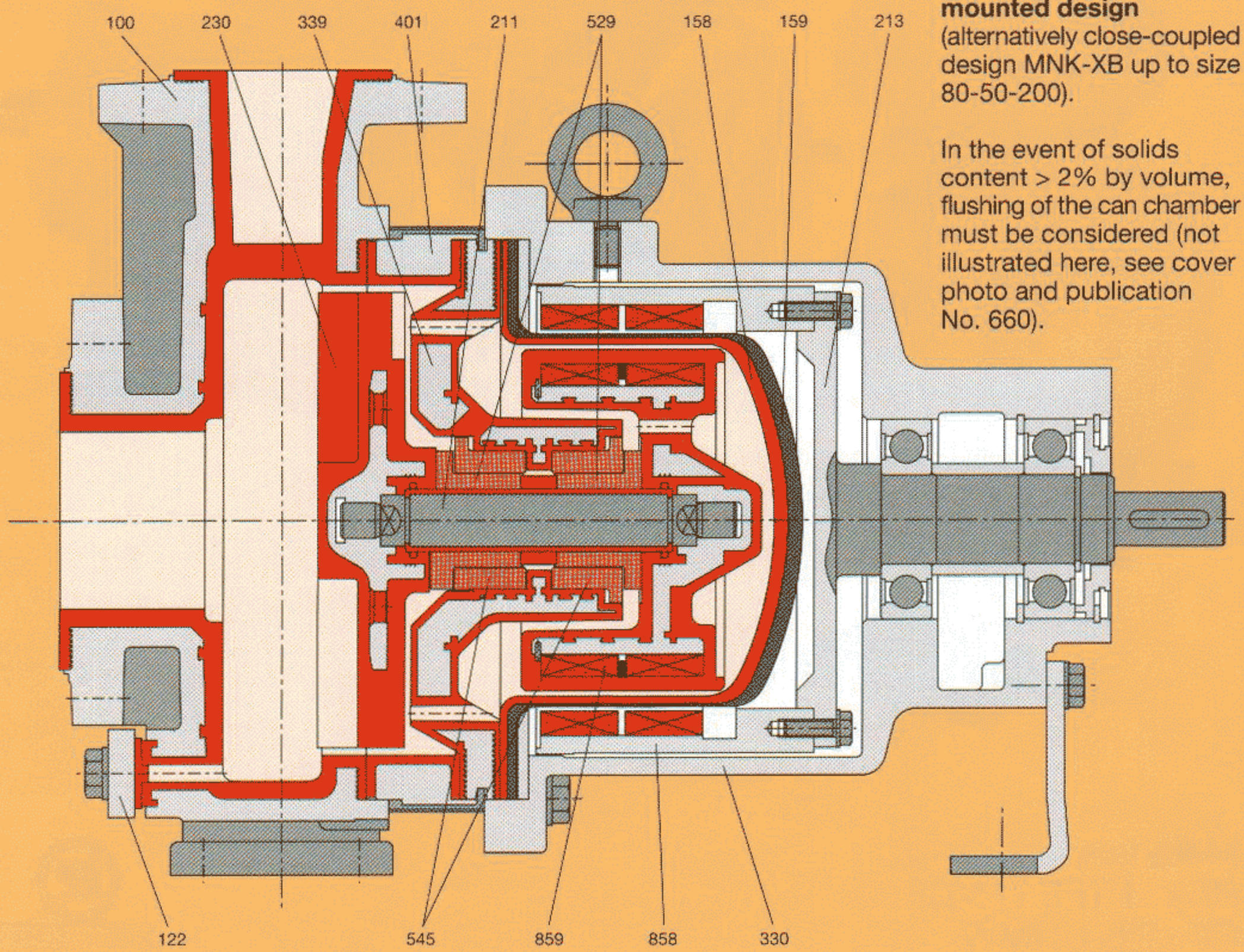
- **Pump housing**
  - ductile cast iron 0.7043/ASTM A395 with thick-walled lining made of PFA/PTFE, PVDF, PP/PE-UHMW
  - connection for housing drain as standard

- **Slide-in unit**
  - **of the time-tested magnetic drive pump MNK** with eddy-current free can system and Richter SAFEGLIDE PLUS plain bearings, available in frame-mounted and close–coupled designs, or
  - **series SCK with either internal or external mechanical seals** (frame-mounted design)

- **Semi-open vortex impellers**
  - positioned outside the main flow
  - radial vanes
  - large metal core for increased stability
  - secured against detachment in the event of start-up in the wrong direction of rotation
  - back vanes reduce axial thrust forces

Fig.:
Vortex pump MNK-X with magnetic drive, frame-mounted design (alternatively close-coupled design MNK-XB up to size 80-50-200).

In the event of solids content > 2% by volume, flushing of the can chamber must be considered (not illustrated here, see cover photo and publication No. 660).

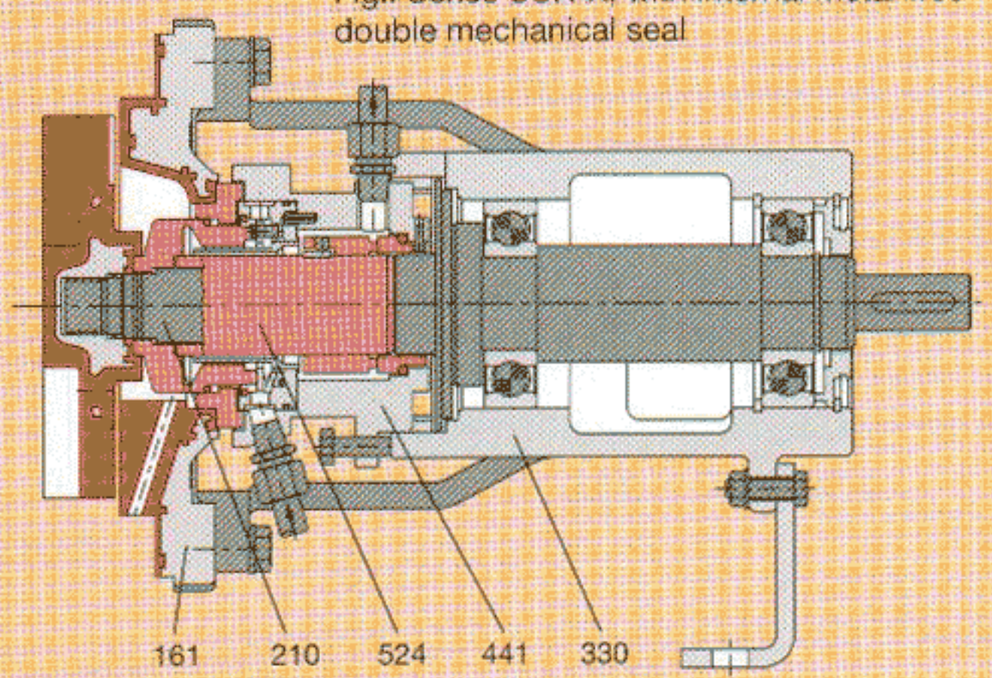


- **Reliable: magnetic drive or mechanical seals**
- **Flow up to 200m³/h (800 gpm) and 85 m LC at 2.900 min⁻¹**

As an alternative to the vortex magnetic drive pump MNK-X (frame-mounted design), or MNK-XB (close-coupled design):

- **Vortex mechanical seal pump SCK-X of frame-mounted design**
  - Internal or external mechanical seal
  - Heavy-duty design also for high and variable loads, minimal shaft deflection
  - Shaft sleeve Al_2O_3, SiC, Hastelloy etc.

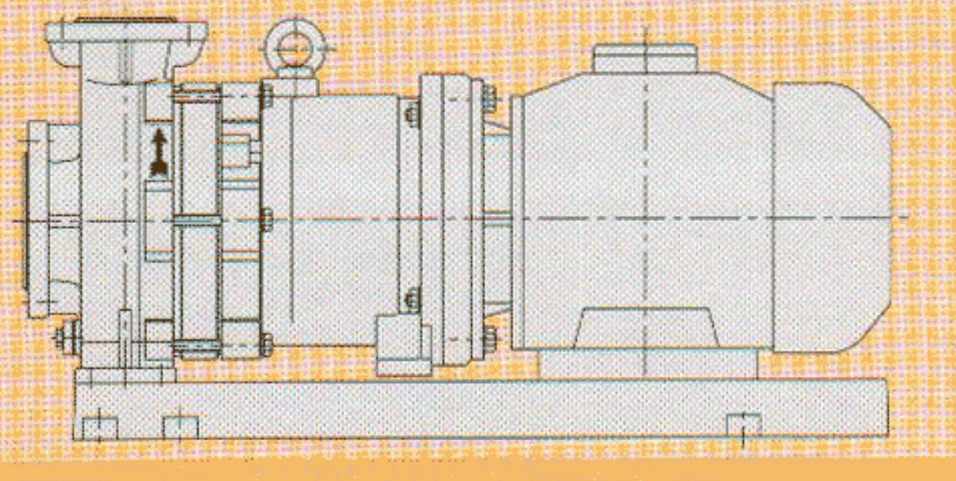
Fig.: Series SCK-X, with internal metal-free double mechanical seal



- **For detailed sectional drawing and descriptions of the pumps, see publications No. 635 (SCK), 645 (MNK) and 671 (MNK-B).**
  Richter mechanical seal RG-4 and plain bearings SAFEGLIDE PLUS: please request special literature.

- **Magnetic drive pumps**
  - Plain bearings made of pure SiC with optional Richter SAFEGLIDE PLUS: protection against damage due to dry-running
  - Non-metallic, eddy-current-free can systems made of CFRP/PTFE or PAEK, can monitoring connection on request
  - Temperature-monitoring on request
  - A special plain bearing and can flushing system with filtered pumped liquid or external flushing medium can be provided, depending on the solids content (request special publication!).

Fig.: Series MNK-XB with magnetic drive, close-coupled design



- **Pressure/temperature range**
  - Operating temperature: -60 to +180°C (-75 to +360°F), depending on design and operating pressure
  - Operating pressure up to 10 bar resp. 16 bar (145 resp. 235 psi), depending on housing design
  - Design for elevated vacuum (at pump standstill) optional

- **Flanges**
  - For connection to DIN 2533/PN 16, on request for connection to ANSI or BS

- **Rolling bearings**
  - Long-life grease lubrication, oil lubrication on request (for frame-mounted design)

Item	Description	Standard [1]
100	Pump housing	Duct. iron 0.7043 (ASTM A395)/ PFA, PTFE, PVDF, PP, PE-UHMW
122	Blind cover	Duct. iron 0.7043 (ASTM A395) / PTFE
158	Can insert	PTFE[2]
159	Can	CFRP carbon-fibre compound
161	Back plate	Duct. iron 0.7043 (ASTM A395)/PTFE, PE-UHMW
210	Pump shaft	Stainless steel
211	Pump shaft	Stainless steel/PFA
213	Drive shaft	Steel
230	Impeller	PFA with ductile iron core
330	Bearing pedestal	Duct. iron 0.7043 (ASTM A395)
339	Plain bearing pedestal	Duct. iron 0.7043 (ASTM A395)/PFA, PVDF, PE-UHMW
401	Distance ring	Stainless steel/PTFE
441	Mechanical seal housing	Stainless steel
524	Shaft sleeve	Al_2O_3, SiC etc. depending on specifications
529	Bearing sleeve	Pure-SiC, on request with Richter SAFEGLIDE PLUS
545	Bearing bush	Pure-SiC, on request with Richter SAFEGLIDE PLUS
858	Drive magnet assembly	Steel/permanent magnets
859	Inner magnet assembly	Steel/PFA, permanent magnets

[1] Antistatic lining available on request
[2] Alternatively single can made of PAEK (Polyaryletherketone)

- **Type code**
  MNK-X/... with magnetic drive, frame-mounted
  MNK-XB/... with magnetic drive, close-coupled
  SCK-X/... with mechanical seal, frame-mounted
  ... /F PFA/PTFE lining
  ... /V PVDF lining
  ... /P/E PP/PE-UHMW lining

Fields of application and flow rates

- **Solids-containing media**
  Centrifugal pumps of standard design involve the risk that solids might 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 space in the housing and the medium rotates in this area!

- **Gentle conveyance of media with fibrous or crystalline constituents**

- **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. Delivery continues again immediately after a reduction in the gas volume without the pump having to be shut down.

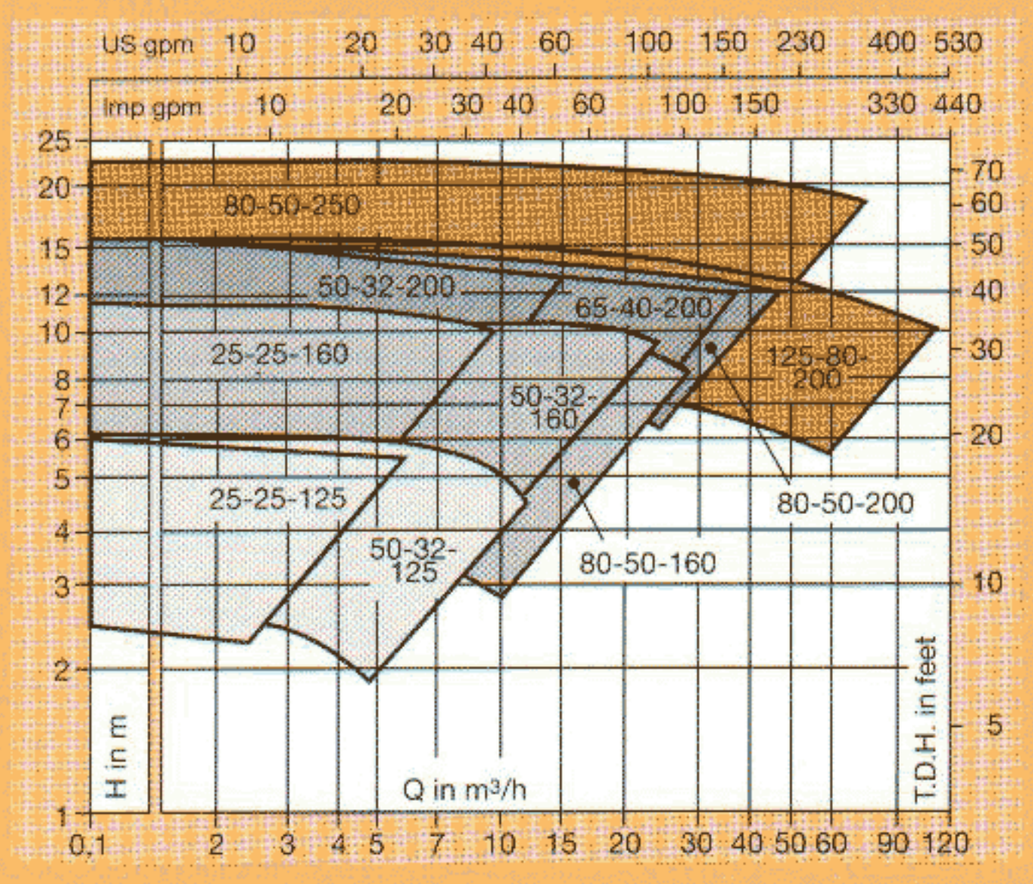
- **Vortex pumps as mixers**
  When a vortex pump is in use, a mixer, which, in many cases, is otherwise necessary, can be dispensed with. As a result of the strong circulation currents, the liquids to be conveyed are intimately mixed inside the pump and then discharged.

- **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.

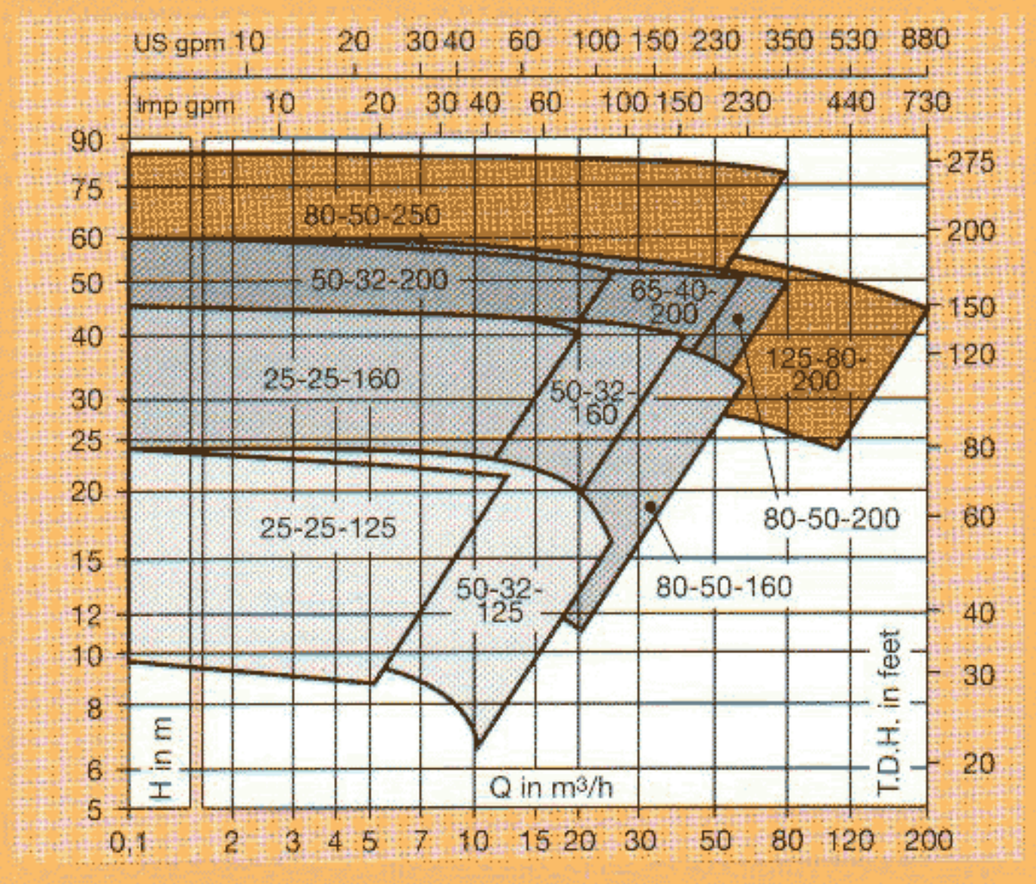
  The pump therefore maintains delivery at a slightly reduced head for longer than a comparable standard centrifugal pump. No cavitation damage is to be expected as cavitation occurs in the liquid-filled free space of the housing.

- **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.

1,450 min^{-1}



2,900 min^{-1}



- **Higher flow rates on request. Richter vortex pumps are also available for 1,750 and 3,500 min^{-1}. We provide performance curves on request.**

ITT Richter Chemie-Technik GmbH
P.O.Box 10 06 09
D-47883 Kempen

Telephone 0 21 52 / 1 46-0
Telefax 0 21 52 / 1 46-1 90
0 21 52 / 1 46-2 00

No. 691.03.08.00