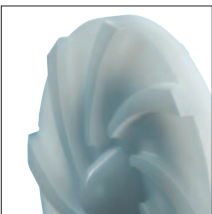
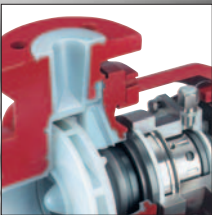
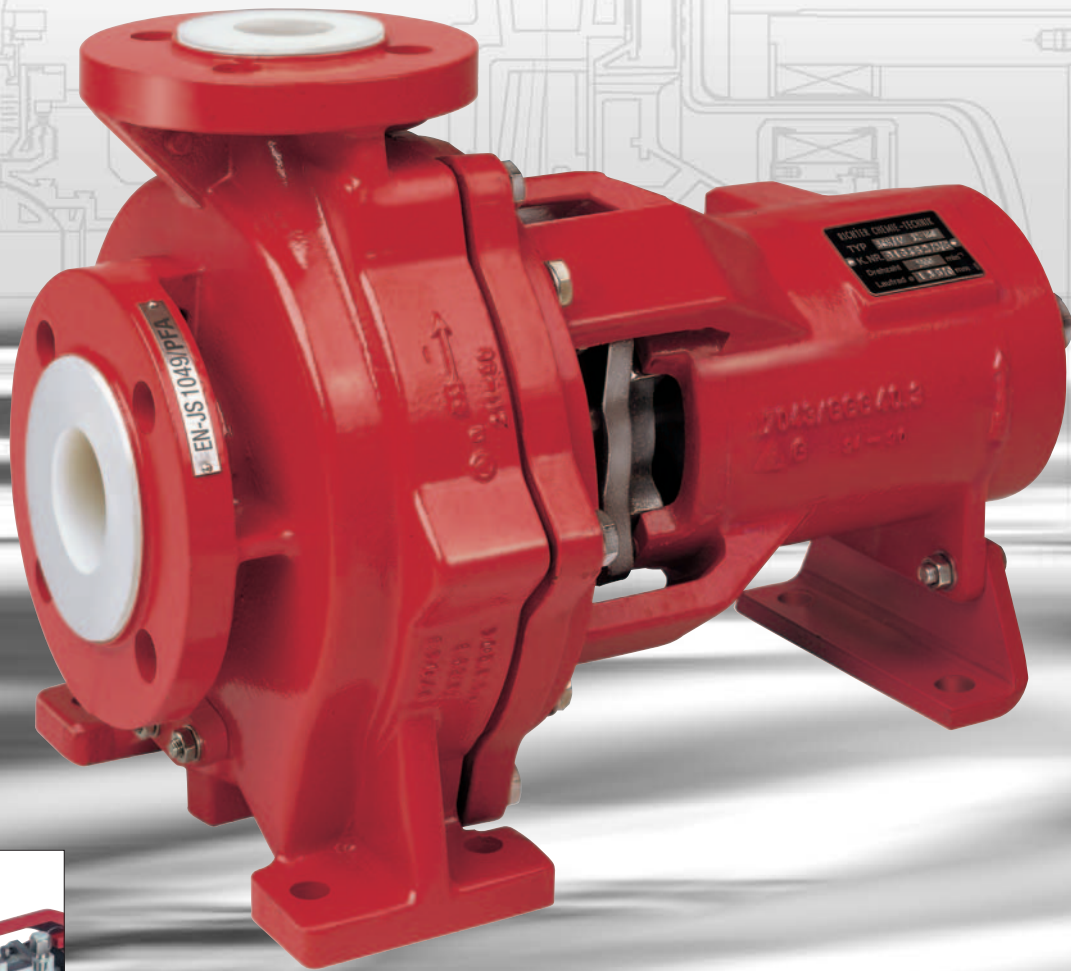


# Richter Heavy-duty Chemical Process Pump



Reinforced shaft and bearing  
pedestal for long service life

PFA/PTFE, PE-UHMW

New: Highly permeation  
resistant PFA-P lining



**RICHTER**  
Process Pumps & Valves

**IDEX**  
FLUID & METERING

## Richter SCK chemical process pump

### Fields of application

Corrosive, pure and contaminated media in the chemical, pharmaceutical and petrochemical industries, in metal processing, waste disposal and recycling etc.

- when stainless steel is not sufficiently resistant
- alternatively to expensive Hastelloy, Monel, tantalum pumps
- when anti-adhesive surfaces are important.

The SCK is particularly economical and reliable with

- **less environmentally critical or hazardous media** as pumps with single mechanical seals are lower priced than sealless pumps
- **high solids-laden, gas-containing or other problematic media** especially when sealless pumps are unsuitable
- badly lubricating media: gas-lubricated mechanical seals

### Design

Single-stage, plastic-lined, frame-mounted chemical process pump of heavy-duty design. Dimensions to EN 22 858/ISO 2858.

Size 25-25-100: Close-coupled design for flange motor.

Flanges with holes drilled to ISO 7005-2/PN 16.

On request drilled to ANSI B16.5 Cl.150, JIS or BS.

### Wetted materials

Lining: PFA, PTFE, PE-UHMW, PFA antistatic, highly permeation-resistant PFA-P. Mechanical seal: SSiC/SSiC, Al<sub>2</sub>O<sub>3</sub>/PTFE glass etc.

### Type codes, materials

- |   |           |
|---|-----------|
| • Frame-mounted design                                  | SCK/...   |
| • Close-coupled design (only 25-25-100)                 | SCK-B/... |
| • Perfluoroalkoxy (PFA), polytetrafluoroethylene (PTFE) | .../F     |
| • Polyethylene, ultra-high molecular (PE-UHMW)          | .../E     |
| • Antistatic linings PFA                                | .../...-L |
| • Highly permeation-resistant lining (PFA-P)            | .../F-P   |

### Pressure-bearing parts

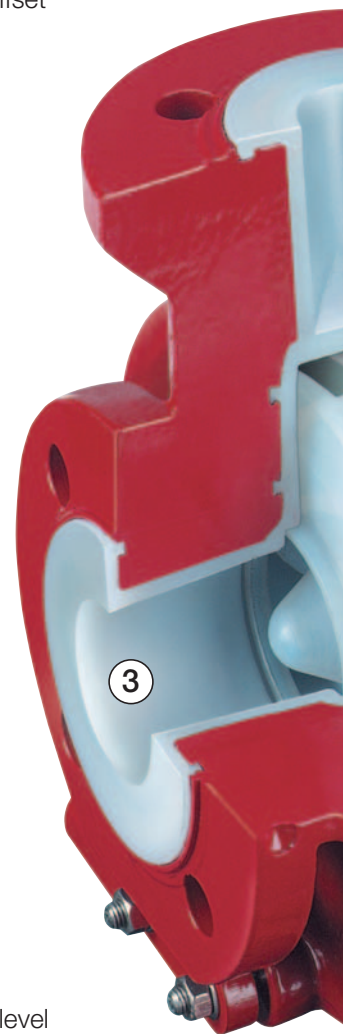
Ductile cast iron EN-JS 1049. Mechanical seal housing made of stainless steel.

### Operating range

|                | 50 Hz operation                             | 60 Hz operation                             |
|----------------|---|---|
| Flow rates     | 0.1-300 m <sup>3</sup> /h<br>(1,320 US gpm) | 0.1-300 m <sup>3</sup> /h<br>(1,320 US gpm) |
| Delivery heads | up to 90 m LC (300 ft)                      | up to 110 m LC (360 ft)                     |

- Operating temperatures: -60/+180 °C (-75/+360 °F) with PFA/PTFE
- Operating pressure: up to 16 bar (235 psi), depending on operating temperature
- Solids: depend. on pump design.  
Vortex pump SCK-X up to 50 %.

- ① **Semi-open or closed impeller**
  - Semi-open with curved vanes as standard feature
  - Closed impeller with **optimised hydraulics** when a particularly low pump NPSH is required
  - **Large metal core** for reliable torque transmission
  - **Secured against loosening** if the pump is started up in the wrong direction of rotation
  - With back vanes to offset axial thrust.



### The SCK satisfies the requirements of DIN/ISO 5199:

- The **shaft deflection is reduced to a very low** level owing to the reinforced pump shaft and the sturdy bearing pedestal:
  - The mechanical seal and rolling bearings last much longer than in a standard pump.
  - Also suitable for critical conditions such as cavitation, low flow rate, large head, high density.
- The SCK can also be modified at a later date **for high solids and gas-laden media** as well as **self-priming operation**.

- ② **Very sturdy one-piece ductile cast iron bearing pedestal**  
Standard feature: rolling bearings type 2RS with high load rating:
- long-life grease lubrication, grease chambers outside on both sides to protect against corrosion
  - optional oil-bath lubrication
  - stainless steel labyrinth disc protects rolling bearings in case of mechanical seal leakage.

- ③ **Thick-walled PFA/PTFE, PE-UHMW linings** of the ductile cast iron housing
- Armouring bears system pressure and pipe forces. No need for expansion joints
  - **Virgin lining without fillers**, full chemical suitability and optimum quality assurance.

See also page 7.

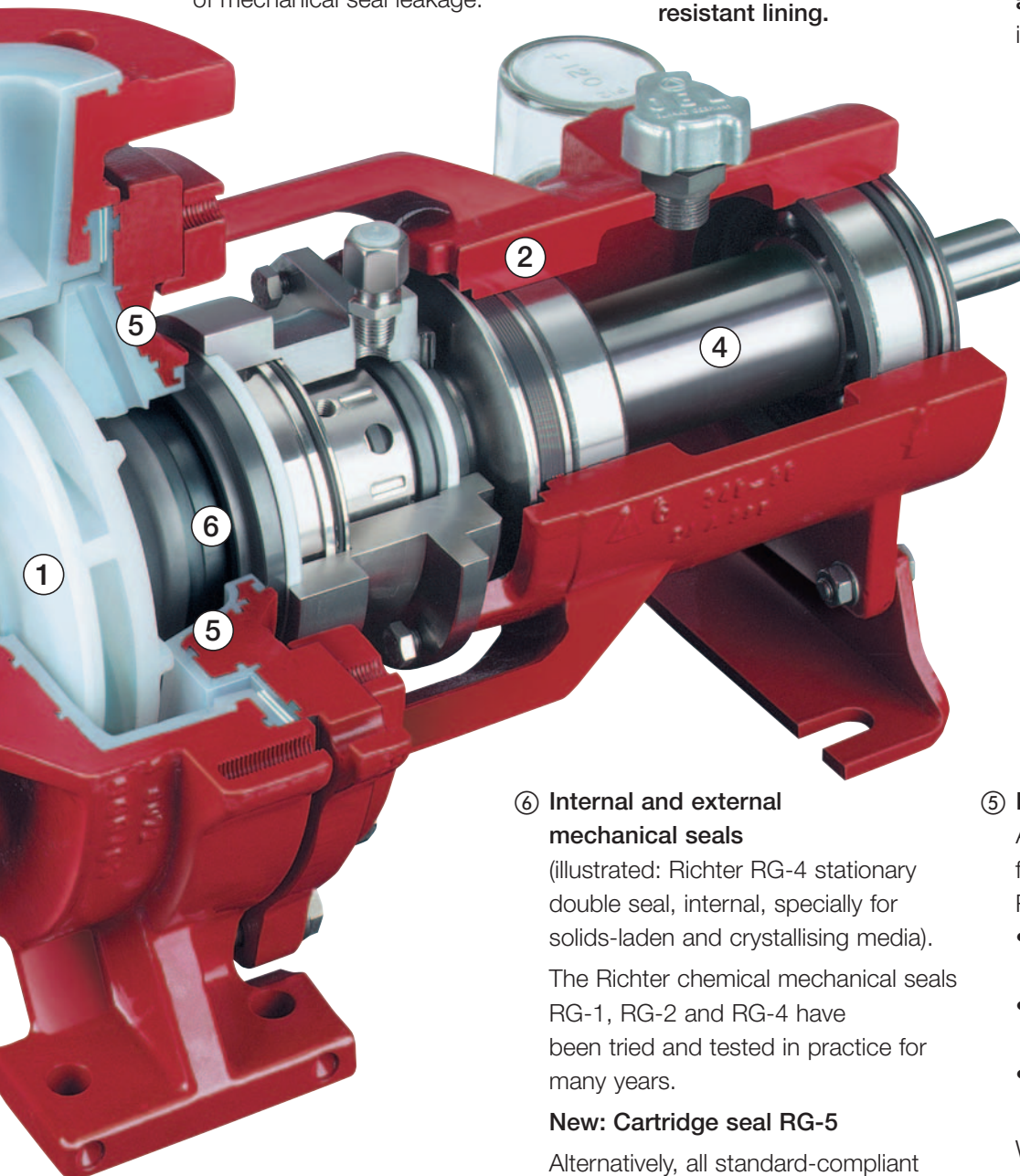
**New: PFA-P highly permeation resistant lining.**

#### Shaft sleeve

made of  $Al_2O_3$ , optionally e.g. SiC, Hastelloy, tantalum etc.

The stainless steel cup spring assembly ensures leak-tight sealing between impeller and shaft sleeve.

- ④ **Deflection-resistant pump shaft**  
Large shaft diameter, also in the area of the mechanical seal, ensures **very smooth running and low shaft deflection** – even in Q/H boundary conditions.



- ⑥ **Internal and external mechanical seals**  
(illustrated: Richter RG-4 stationary double seal, internal, specially for solids-laden and crystallising media).  
The Richter chemical mechanical seals RG-1, RG-2 and RG-4 have been tried and tested in practice for many years.

#### **New: Cartridge seal RG-5**

Alternatively, all standard-compliant makes (DIN 24960), e. g. Crane, Burgmann, Chesterton etc.:

- single/double mechanical seals
- designs for solids contents
- gas-lubricated seals
- lip seals

For examples, see pages 4 and 5.

- ⑤ **Back plate**

A **special back plate** was designed for the stationary internal seals Richter RG-4 and Richter RG-5:

- **open seal chamber** promotes the discharge of solids
- **flushing bores** ensure good medium circulation
- **flow-breakers** prevent abrasive medium turbulence.

With conventional external mechanical seals:

standard back plate with replaceable or vacuum-proof anchored lining.

# Frequently used mechanical seal versions

The mechanical seal technology suitable for the SCK covers the entire range from reasonably priced, single-acting seals up to complex self-lubricated or externally lubricated and remotely monitored double-acting sealing systems.

As a result, a mechanical seal pump can also be used in difficult operating conditions and for hazardous media. The most common versions are illustrated on these pages. Other versions and makes, thermosiphon and liquid sealing systems etc. on request.

## Stationary mechanical seals Richter RG-4 and RG-5

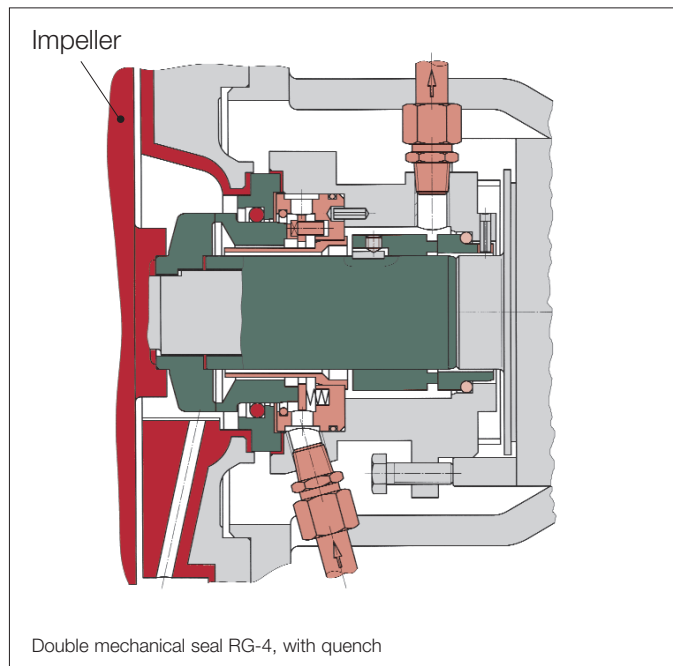
Main application: solids-laden and crystallising media.

The internal seals RG-4 and RG-5 are metal-free on the wetted side. They are combined with a **special back plate**:

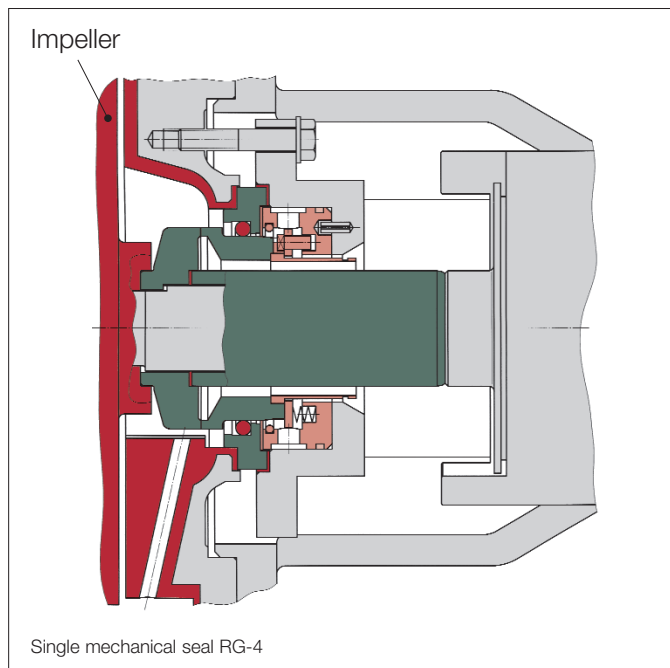
- flow-optimised sealing chamber and flushing bores prevent clogging by solids.
- centrifugal force keeps particles away from the seal surface.
- flow-breakers prevent abrasive turbulence.

## Further information:

See special publication „Mechanical seals for solid-containing and crystallising media“

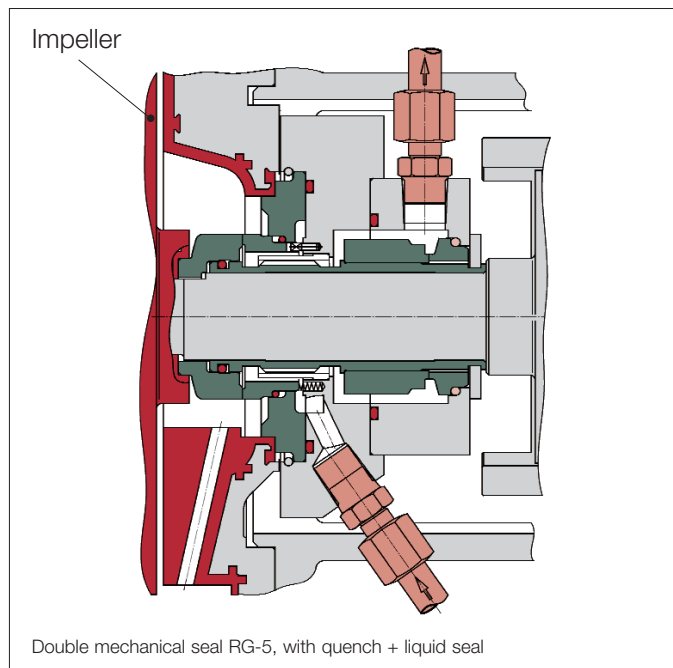


**Double mechanical seal RG-4, with quench/liquid seal**



## Single mechanical seal RG-4

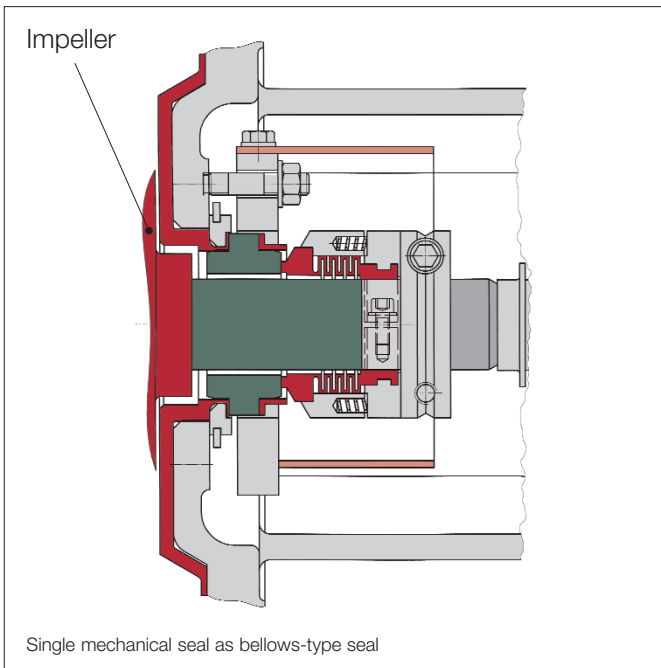
For media which do not crystallise and are not environmentally hazardous. Low to medium solids contents.



## Cartridge double mechanical seal RG-5, with quench/liquid seal

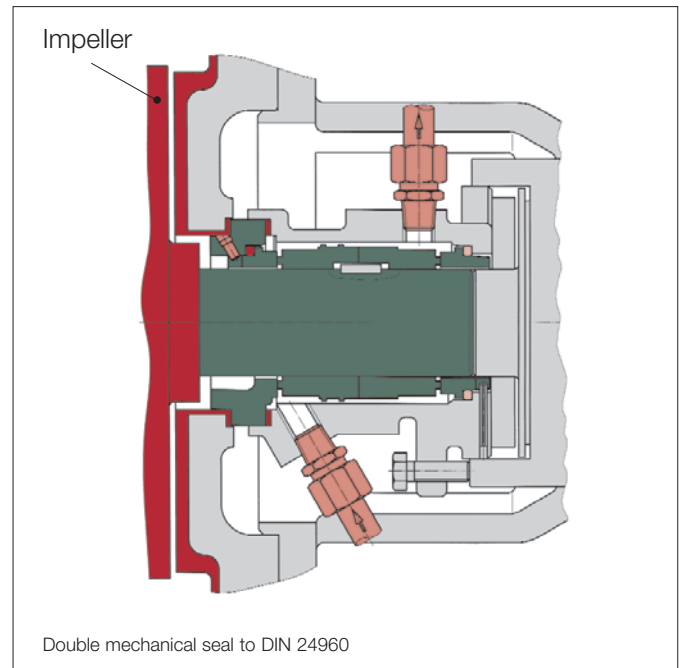
**With quench:** For media which tend to crystallise on contact with the air or cause sedimentation and are not environmentally hazardous. Also if there is a risk of freezing, dry running and with highly odorous media.

**With liquid seal:** In addition, also for media with higher solids contents, crystallising or environmentally hazardous media.



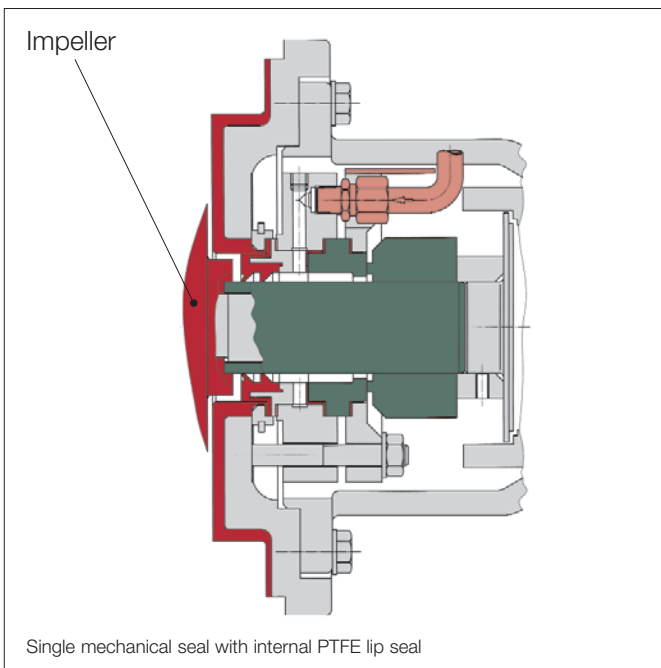
**Single mechanical seal as bellows-type seal**

e.g. Richter RG-1, Crane 10 T etc. in various material combinations. With acrylic glass splash guard. Optionally with PFA splash guard and integrated leakage collecting connection.



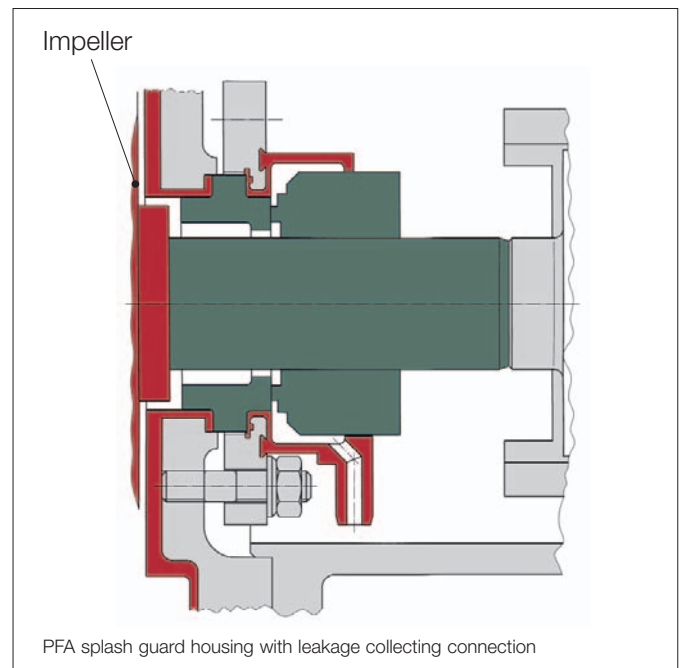
**Double mechanical seal to DIN 24960**

e.g. Crane 59U/59U, Burgmann M7FS2/M7S2 etc. in various material combinations. Optionally with pumping screw. Mechanical seal housing made of stainless steel.



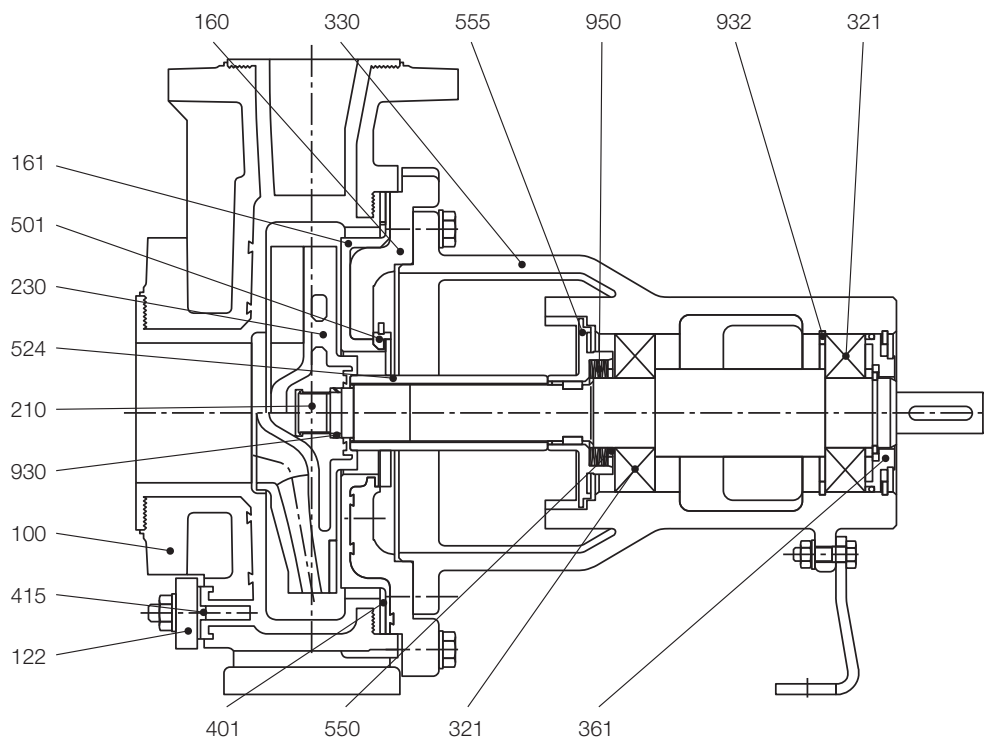
**Single mechanical seal, liquid-sealed, with internal PTFE lip seal**

Specially intended for solids-laden and crystallising media. Lips and sealing pressure prevent the ingress of solids and sedimentation.



**PFA splash guard housing for internal and external single mechanical seals**

Reliable collection of a mechanical seal leak which can be specifically drained from the collecting connection. For mechanical seals with an outside Ø of up to 95 mm (3.74").



SCK series

Fig.: for external mechanical seal

Impeller: semi-open (top) and closed (bottom)

Back plate: lining replaceable (top) or anchored vacuum-proof (bottom)

The bearing pedestal of size 25-25-100 in frame-mounted and close-coupled design differs from the above illustration.

## Parts and materials

| Part No. | Designation         | Material  |
|----------|---------------------|---|
| 100      | Housing armouring   | Ductile cast iron EN-JS 1049 (0.7043)/ASTM A395   |
|          | Housing lining      | PFA/PTFE, PE-UHMW, PFA antistatic, highly permeation-resistant PFA-P                      |
| 122      | Blind cover         | Ductile cast iron EN-JS 1049 (0.7043)/ASTM A395   |
| 160      | Back plate          | Ductile cast iron EN-JS 1049 (0.7043)/ASTM A395   |
| 161      | Back plate lining   | PFA/PTFE, PE-UHMW, PFA antistatic, highly permeation-resistant PFA-P                      |
| 210      | Shaft               | Stainless steel 1.4057  |
| 230      | Impeller            | PFA/PTFE, PE-UHMW, PFA antistatic, highly permeation-resistant PFA-P, metal impeller core |
| 321      | Radial ball bearing |   |
| 330      | Bearing pedestal    | Ductile cast iron EN-JS 1049 (0.7043)/ASTM A395   |
| 361      | Rear bearing cover  | Steel 1.0601  |
| 401      | Housing gasket      | PTFE  |
| 415      | Centering gasket    | PTFE  |
| 501      | Ring, 2-piece       | Stainless steel 1.4571  |
| 524      | Shaft sleeve        | Al <sub>2</sub> O <sub>3</sub> , SSiC, Hastelloy etc.                                     |
| 550      | Washer              | Stainless steel   |
| 555      | Labyrinth disc      | Stainless steel   |
| 930      | Locking unit        | Spring steel  |
| 932      | Circlip             | Spring steel  |
| 950      | Cup spring          | Stainless steel   |
| w/o No.  | Bolts, nuts         | Stainless steel   |

### The pump housing

with ductile cast iron armouring to EN-JS 1049/ASTM A395 absorbs all hydraulic and pipe forces to DIN/ISO 5199/Europump 1979. In contrast to partially or non-armoured plastic pumps, no expansion joints are required. Flanges with service-minded through holes to ISO/DIN, ASME/ANSI, BS, JIS etc.

Available on request:

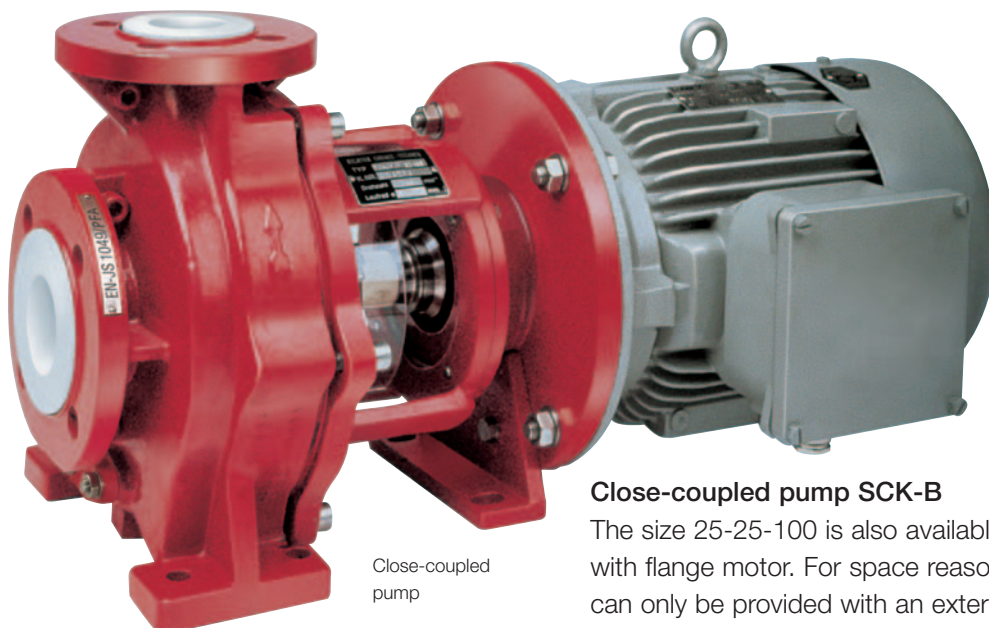
- housing drain, can also be used as a flushing and monitoring connection
- heating jacket, e.g. for crystallising or polymerising media. Can also be retrofitted.



Pump housing



Semi-open impeller



Close-coupled pump

### Semi-open impeller with curved vanes

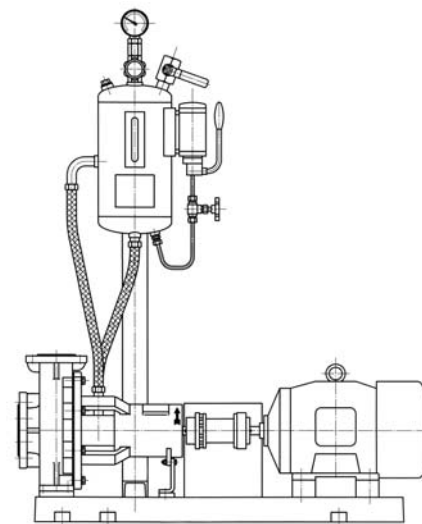
The large metal core ensures the dimensional stability of the impeller, even at elevated temperatures and high flow rates.

Optionally **closed impellers**, e.g. in the event of NPSH problems.

Axial forces reduced by back vanes, increasing the service life of the rotating components.

The lining is seamless; the metal core is protected by thick-walled plastic.

The impeller is secured against loosening if the pump is started up in the wrong direction of rotation or in the case of back-flowing media.



Thermosiphon and liquid sealing systems

### Important options

With the options package of the SCK the standard versions can also be tailored to specific and particularly difficult operating conditions.

- Heating jacket for mechanical seal and pump housing
- Thermosiphon and liquid sealing systems
- Temperature, rolling bearing and motor load monitors
- Self-priming (SCK-S) and vortex versions (SCK-X)

### Close-coupled pump SCK-B

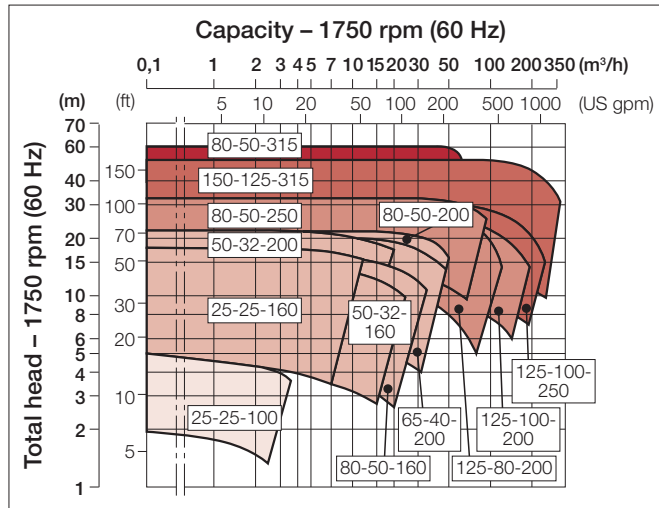
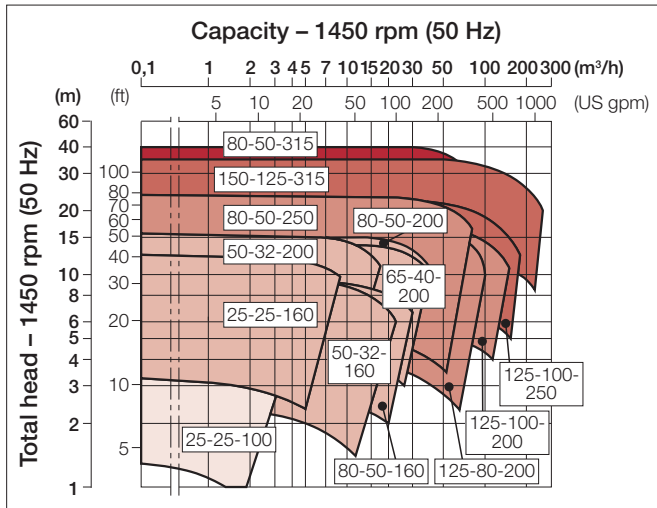
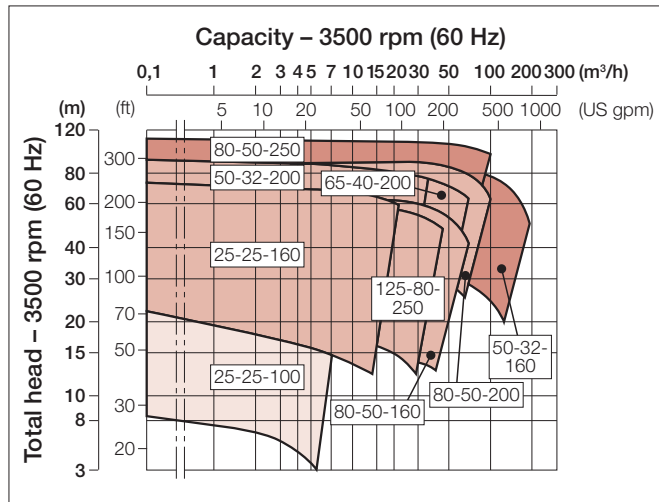
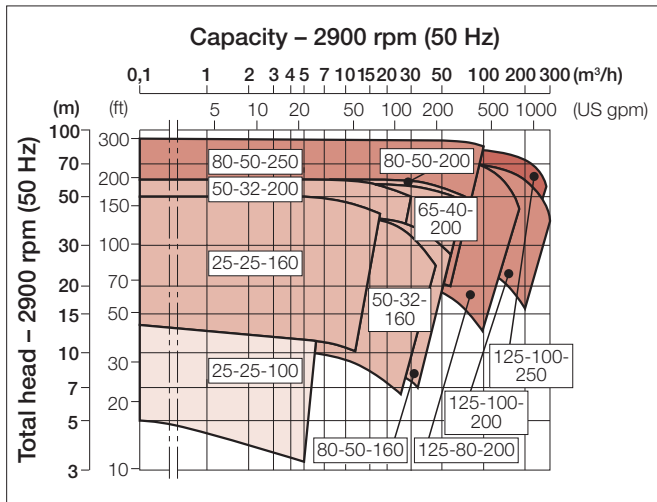
The size 25-25-100 is also available as a close-coupled version with flange motor. For space reasons this close-coupled pump can only be provided with an external single mechanical seal but the frame-mounted design 25-25-100 can also be fitted with external single and double mechanical seals.

# Performance curves

Richter process pumps SCK are available for the performance range up to 300 m<sup>3</sup>/h (1,320 US gpm) and up to 90 m (300 ft) LC at 2,900 rpm. The SCK attains heads of up to 110 m (360 ft) LC at 3,500 rpm.

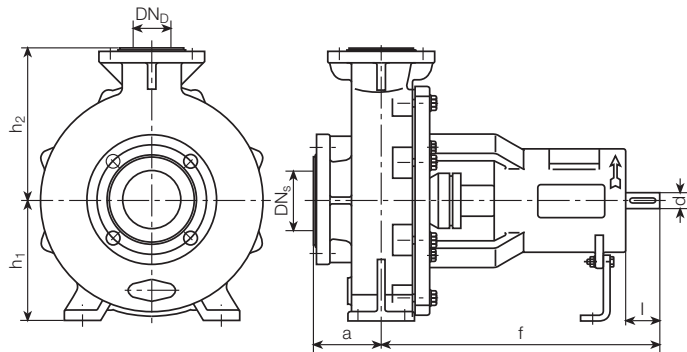
13 sizes from 25-25-100 to 150-125-315 are available for a pump design to suit your application. This range offers suitable pump sizes both for applications in small production and test plants as well as for conveying large volume flows. Delivery heads which exceed the SCK performance range can be covered by the Richter series MNK,

**MNKA and MPB (up to 600 m<sup>3</sup>/h/ 2,640 gpm and 140 m LC/460 ft).** The curves relate to a viscosity of 1 mm<sup>2</sup>/s.





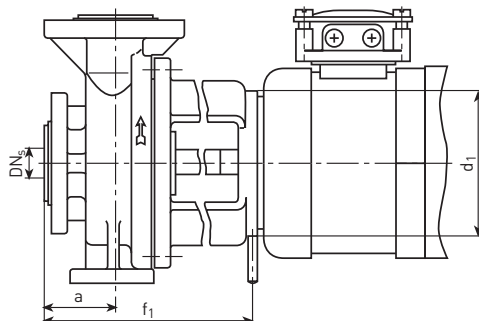
# Dimensions for frame-mounted and close-coupled pumps



## Frame-mounted SCK

| Pump size   | Flanges         |                 | Pump |     |                |                | Shaft end |     | Weight approx. kg (without drive) |
|-------------|-----------------|-----------------|------|-----|----------------|----------------|-----------|-----|-----------------------------------|
|             | DN <sub>S</sub> | DN <sub>D</sub> | a    | f   | h <sub>1</sub> | h <sub>2</sub> | d         | l   |                                   |
| 25-25-100   | 25              | 25              | 80   | 385 | 132            | 160            | 24        | 50  | 16                                |
| 25-25-160   | 25              | 25              | 80   | 385 | 132            | 160            | 24        | 50  | 46                                |
| 50-32-160   | 50              | 32              | 80   | 385 | 132            | 160            | 24        | 50  | 46                                |
| 50-32-200   | 50              | 32              | 80   | 385 | 160            | 180            | 24        | 50  | 52                                |
| 65-40-200   | 65              | 40              | 100  | 385 | 160            | 180            | 24        | 50  | 54                                |
| 80-50-160   | 80              | 50              | 100  | 385 | 160            | 180            | 24        | 50  | 49                                |
| 80-50-200   | 80              | 50              | 100  | 385 | 160            | 200            | 24        | 50  | 57                                |
| 80-50-250   | 80              | 50              | 125  | 500 | 180            | 225            | 32        | 80  | 94                                |
| 80-50-315   | 80              | 50              | 125  | 500 | 225            | 280            | 32        | 80  | 98                                |
| 125-80-200  | 125             | 80              | 125  | 500 | 180            | 250            | 32        | 80  | 106                               |
| 125-100-200 | 125             | 100             | 125  | 500 | 200            | 280            | 32        | 80  | 110                               |
| 125-100-250 | 125             | 100             | 140  | 530 | 225            | 280            | 42        | 110 | 120                               |
| 150-125-315 | 150             | 125             | 140  | 530 | 280            | 355            | 42        | 110 | 160                               |

All dimensions in mm



## Close-coupled SCK-B

| Close-coupled pump dimensions depending on motor |                 |                 |      |                |                |                |                |                                   |    |
|--|-----------------|-----------------|------|----------------|----------------|----------------|----------------|-----------------------------------|----|
| Pump size  | Flanges         |                 | Pump |                |                |                | Motor size     | Weight approx. kg (without drive) |    |
|  | DN <sub>S</sub> | DN <sub>D</sub> | a    | f <sub>1</sub> | h <sub>1</sub> | h <sub>2</sub> | d <sub>1</sub> |                                   |    |
| 25-25-100  | 25              | 25              | 80   | 275,5          | 132            | 160            | 80             | 200                               | 15 |

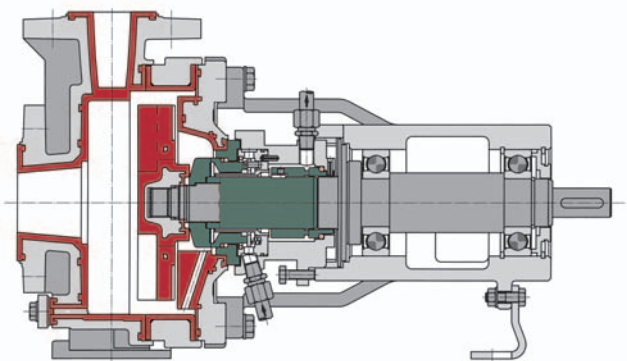
All dimensions in mm

# Conveyance of solids and gas-laden media

With low solids contents it is frequently sufficient to merely install an internal or external liquid-sealed double mechanical seal with SSiC silicon carbide sliding surfaces.

The vortex version SCK-X with an internal double mechanical seal RG-4 permits solids contents of up to 30 % by vol., in specific cases even up to 50 % and particle sizes of up to 10-20 mm (2/5-4/5"), depending on the pump size.

The SCK-X is also ideally suited for media with long-fibre constituents and with gas contents of up to 5 %.



## Vortex pump SCK-X

The semi-open special vortex impeller is located outside the main flow:

- more space in the pump housing for larger particles
- milder conveyance of the medium
- longer service life thanks to minimised abrasion.

More detailed information:

- publication "Vortex Pump"
- publication "Mechanical seals for solid-containing and crystallising media"

## Other Richter process pumps

Richter magnetic drive and mechanical seal pumps are – just like Richter chemical shut-off and control valves – at home in a host of different chemical and related processes.

This pump range also includes more specialised designs. The plant operator can thus choose from Richter pumps even for difficult applications.

### Close-coupled pumps

as a space-saving alternative. 0.1 to 80 m<sup>3</sup>/h (0.4-350 US gpm) and up to 115 m (380 ft) LC at 2,900 and 3,500 rpm.

### Self-priming pumps

for emptying containers and basins from the top. Suction height up to 6 m (20 ft) WC, suction back pressure up to 18 m (59 ft) WC. Up to 33 m<sup>3</sup>/h (145 US gpm) and 40 m (130 ft) LC at 2,900 and 55 m (180 ft) at 3,500 rpm.

### Magnetic drive pumps

- to EN 22858/ISO 2858 up to 600 m<sup>3</sup>/h (2,640 US gpm) and 90 m (300 ft) LC at 1,450/2,900 rpm
- to ASME B73.3 for ANSI plants, up to 90 m<sup>3</sup>/h (395 US gpm) and 140 m (460 ft) LC at 3,500 rpm.

### Vortex pumps

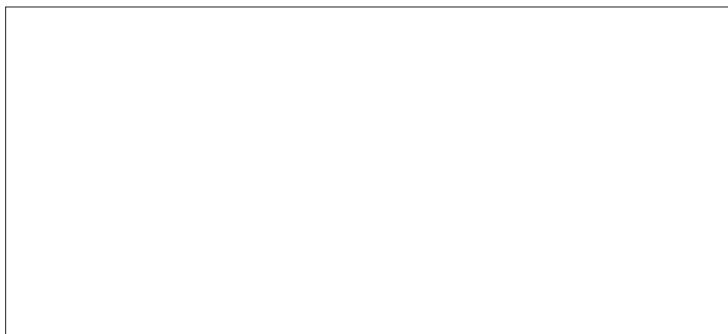
for solids contents up to 50 %, lumpy particles and gas contents of up to 5 %. Up to 200 m<sup>3</sup>/h (880 US gpm) and 85 m (280 ft) LC at 2,900 rpm and 120 m (395 ft) at 3,500 rpm.

### Peripheral pumps

for lower flow rates at high heads. 0.1-5 m<sup>3</sup>/h (0.4-22 US gpm) and up to 115 m (380 ft) LC at 2,900 and 3,500 rpm.



Presented by:



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