

Steel and stainless steel pickling

Horizontal and vertical pumps



Processes of the steel and stainless steel pickling



H₂SO₄ Pickling

Sulphuric acid pickling has been for a long time the principal method of surface treatment for plain carbon steel. The concentration of the sulphuric acid can be some 20 % but may vary from plant to plant. The temperature of the solution ranges from 60 to 70 °C. Plastic pumps are mainly used in this process because of their good wear and corrosion resistance. For acids containing solids in combination with high temperatures, SIGUSS has proved to be a proven alternative pump material.

HCl Pickling

Due to the better effectiveness of hydrochloric acid solution the process can be run at temperatures lower than necessary with the sulphuric acid process. The great advantage may be seen in the less costly thermal regeneration of spent acid. So not only acid is recovered, but iron oxide is formed also. Depending on process details pumps made of ultra-high molecular Polyethylene PE or Polypropylene PP, if necessary with recessed type impeller, are advantageously used.



Strengths of Rheinhütte Pumpen

- Pumps for all pickling processes in the steel and stainless steel industry
- Resistant special materials for aggressive media such as sulphuric acid, nitric acid and sodium sulphate
- Special seals for sulphuric acid, nitric acid and sodium sulphate
- Customized design options
- Customized safety instrumentations

Neutral pickling

Neutral pickling, also called sodium sulphate pickling, is an electrochemical process. The process does not use acids, but an aqueous sodium sulfate solution. Removal of the surface layers is achieved by permanently alternating anodic and cathodic loadings acting on the metal. Here the development and the action of gas bubbles cause flaking off of the oxide skin. Neutral pickling is mainly used to treat chromium-alloyed steel.

Product Range

A wide variety of designs for steel and stainless steel pickling.

The product range of Rheinhütte Pumpen offers specific solutions for all industrial processes of steel and stainless steel pickling. Diversity and flexibility characterise Rheinhütte pumps, especially in the pump design. Taking into account the special requirements of the pumped media and the individual customer wishes, the appro-

priate Rheinhütte pump is designed, the right material is selected and the optimum sealing system is chosen. In this way we have been a successful and proven partner in the steel and stainless steel pickling industry for many decades.

			
	RCNKu ⁺	CPDR	RCNKu
Assembly type	Horizontal	Horizontal	Horizontal
Q _{max}	400 m ³ /h 1,760 us. gpm	200 m ³ /h 881 us. gpm	2.500 m ³ /h 11,007 us. gpm
H _{max}	110 m 361 ft	100 m 328 ft	60 m 197 ft
Medium temperature max.	+130 °C +266 °F	+190 °C +374 °F	+190 °C +374 °F
Submersible depth max.	—	—	—
Solid content max:	~ 20 %	~ 5 % / 30 %*	~ 5 % / 30 %*
Impeller design	closed	open	closed
Casing design	fully armoured	fully armored, optional as vortex design	fully armored, optional as vortex design
Shaft seal type	Mechanical seal	Mechanical seal	Mechanical seal
Materials	Polypropylene, polyethylene, polyvinylidene fluoride	Polypropylene, polyethylene, polyvinylidene fluoride, polytetrafluorethylene	Polypropylene, polyethylene, polyvinylidene fluoride, polytetrafluorethylene

* Vortex Impeller



RVKu	RKuV	FNPM	RNSi
Vertical	Vertical	Horizontal	Horizontal
1.000 m³/h 4,400 us. gpm	120 m³/h 528 us. gpm	350 m³/h 1540 us. gpm	1.500 m³/h 6,604 us. gpm
70 m 230 ft	60 m 197 ft	100 m 328 ft	100 m 328 ft
+90 °C +194 °F	+100 °C +212 °F	+190 °C +374 °F	+300 °C +572 °F
+3 m 9,8 ft	+1,8 m 5,9 ft	—	—
~ 5 % / 30 %*	~ 5 % / 30 %*	~ 5 %	~ 5 %
closed	open	closed	closed
Solid plastic (without metallic screw connections), optional as vortex design	Solid plastic (without metallic screw connections), optional as vortex design	PFA lined or solid plastic with full armouring	Silicon cast insert closed protective armour
Labyrinth seal, lip ring seal	Labyrinth seal, lip ring seal	Magnetic coupling	Mechanical seal, hydrodynamic shaft seals
Polypropylene, polyethylene, polyvinylidene fluoride	Polypropylene, polyethylene, polyvinylidene fluoride	Perfluoroalkoxy, polytetrafluorethylene	SIGUSS

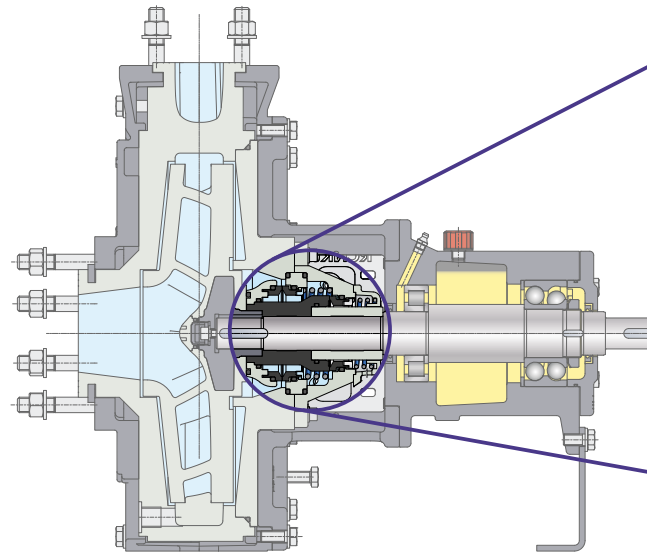
Mechanical seal

Plastics are very economically usable materials for conveying highly corrosive, often solids-laden acids and alkalis, such as those used in pickling plants. Many years of experience in the use of pumps in pickling plants have gone into the development of Rheinhütte plastic pumps. The latest RCNku⁺ series is the highlight of this development. The heart of this series is the newly developed, metal-free mechanical seal RHETA[®].

RHETA[®] – Easy To Assemble

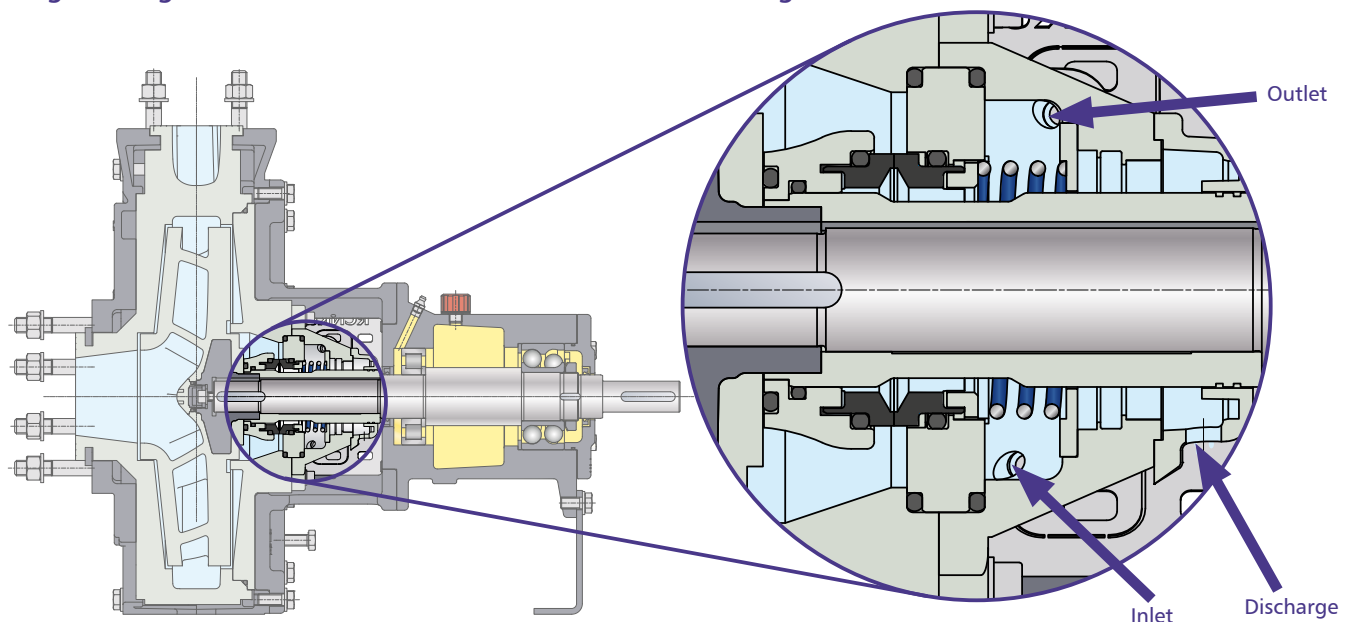
The metal-free mechanical seal engineered by Rheinhütte Pumpen is characterised by its high level of serviceability. Disassembly and assembly can be carried out quickly and smoothly from one side, which is a great advantage for maintenance and servicing. Due to the ingenious parts concept, it is also possible to change, quickly and easily, from a single to a double-acting mechanical seal. The parts for the second mechanical seal are simply retrofitted. RHETA[®] consists of innovative, metal-free materials, which contribute to the long service life of the seal due to their corrosion resistance. The unique design of the mechanical seal prevents capital damage to the impeller and seal insert. The individual parts of the seal are made of chemically resistant plastics, which can easily withstand temperatures of up to 130 °C and achieve a high

Single-acting mechanical seal RHETA[®] CST

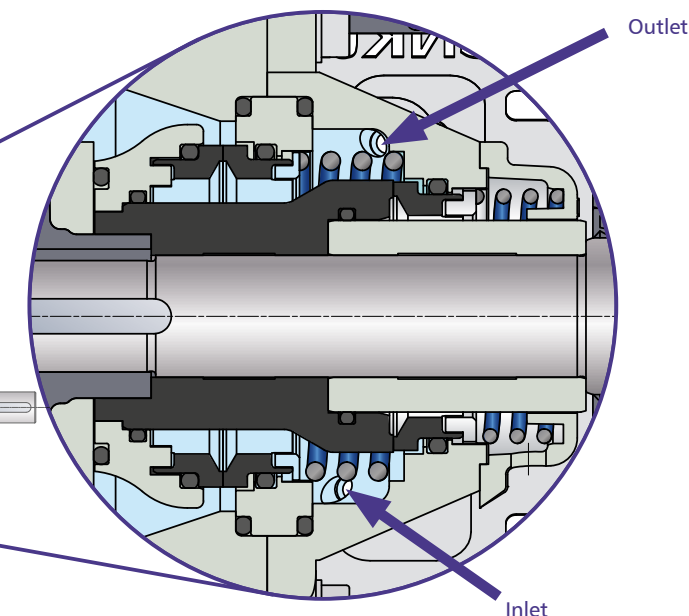


degree of standardisation. Chambers and channels are designed to optimise flow for the respective individual rinsing concepts.

Single-acting mechanical seal RHETA[®] CS with service flushing



The drawings essentially correspond to the execution. We reserve the right to make design changes.



Service flushing as standard

RHETA® offers a cost-effective solution for regular rinsing, as service rinsing is integrated into the design of the CS product. Crystallisation residues and deposits can be rinsed out of the seal using different rinsing modes. Simple rinsing is possible in the standard CS design, which can be carried out during operation and standstill. So-called service flushing takes place via the lower rinsing connection with a pressure of approximately 0.3 bar. The rinsing liquid is discharged via the upper rinsing connection (see illustration). Rinsing can be performed as often as required. The CST seal offers a convenient solution when permanent rinsing is needed. The end-of-work (CSR) and external (CSX) rinsing connections are provided as standard and so can be used at any time.

Materials

Rheinhütte Pumpen has wide experience in the field of handling pickling fluids, gained by practical activities in operative plants, additionally backed-up by laboratory research. So we claim to be able to find the most suitable material of construction for pumps, even for tough fluids.

PP – Polypropylene

This material is particularly suitable for simple, common applications. It offers amazing performance at temperatures from 0 to 100 °C. PP has been proven with acids, alkalis and salt solutions as well as in hydrochloric acid pickling.

PE 1000 (UHMWPE) – Polyethylene

The outstanding property of this high-molecular polymer is its wear resistance to solids in the pumped medium. Additionally, there is a wide range of corrosion resistance. In the temperature range from -50 to +80 °C PE 1000 is in many cases an alternative to stainless steels.

PVDF – Polyvinylidene-Fluoride

PVDF is distinguished by its excellent general corrosion resistance. Its high resistance to stress cracks and its ability to resist UV. For temperature ranges between -20 °C and 130 °C.

PFA – Perfluoralkoxi

PFA is a perfluorinated alkyl vinyl ether ether. Centrifugal pumps lined with PFA can be used up to 180 °C. With a few exceptions this material has a universal resistance to chemicals.

PTFE – Polytetrafluoroethylene

PTFE shows an outstanding resistance against nearly all organic and inorganic media over a wide temperature range. Centrifugal pumps made of PTFE can be used between -50 °C and 180 °C.

SIGUSS

Highly corrosion resistant chromium alloy silicon cast iron with a good resistance to wear and increased chemical resistance. This material is chemically resistant to H₂SO₄ at all concentrations up to boiling point, therefore for all sulphuric acid applications including the evaporation of waste sulphuric acid, Siguss is virtually indispensable.



— An ITT Brand

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