



Specialist for Pumping Technology



HYDRAULIC DECOKING SYSTEMS

**Charge Pump, Pit Pump, Coke Cutting Pump,
Crosshead, Drill Stem Drive**

Overview

Conventional Delayed Coking is a useful and economical refinery process to convert fractions of crude oils.

Today due to many improvements in coking and decoking techniques and product demands Delayed Cokers are often built to make coke. The fresh coker feed is pumped into the fractionation tower and the conditioned coker feed being pumped out from the bottom to the furnace. Furnace effluent is feeded into the drum with the overhead vapours returning to the fractionation tower.

Delayed Coking is a process which produces gas, gas oils and coke. The furnace provides the heat which starts the vaporisation and cracking at approximately 485° C (905° F). As the feed enters the drum at the bottom the cracking and polymerisation continues until solid coke is formed and the gases go overhead to the fractionation tower. When the drum is nearly full the feed is switched over to the second drum.

The various types of coke produced are fuel coke, sponge coke, needle coke and shot coke.

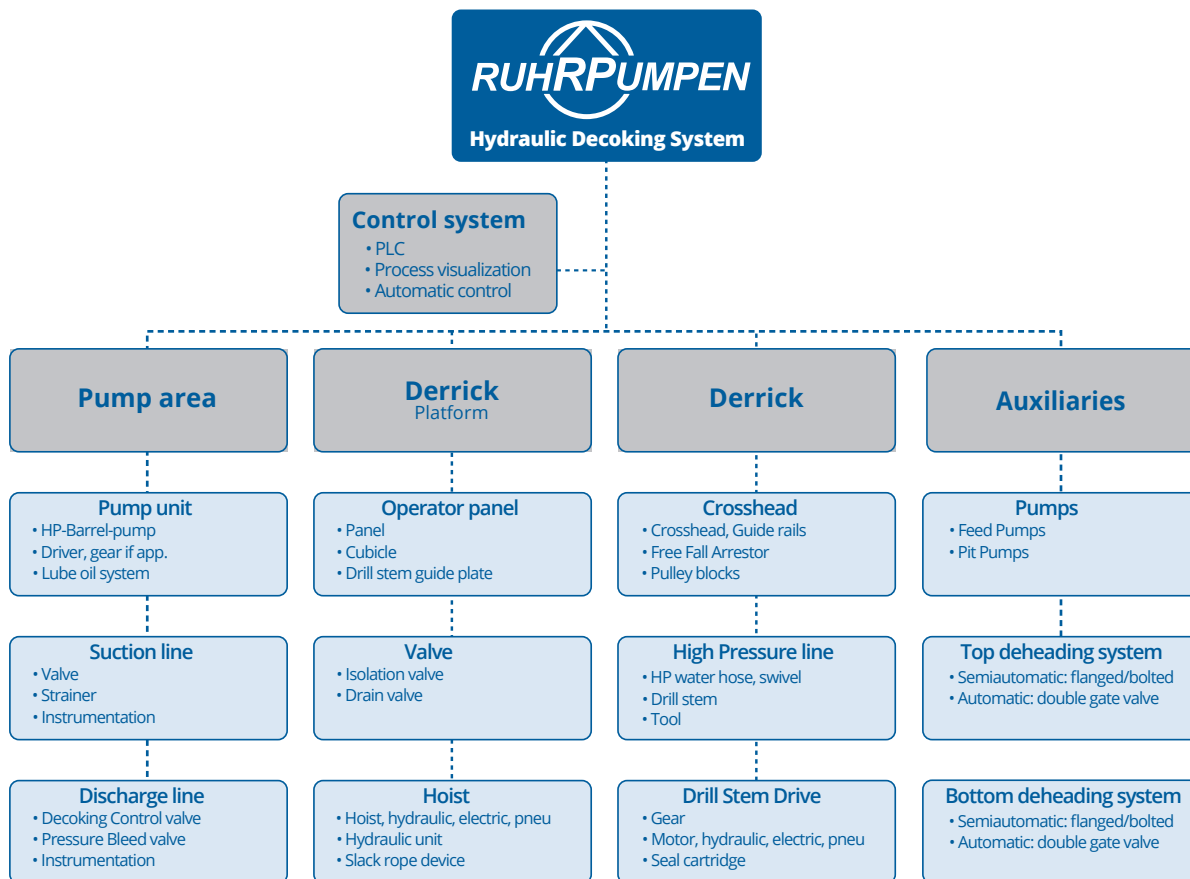


Figure: Components of RUHRPUMPEN - Hydraulic Decoking System

Design Features

System calculated, designed and manufactured for the demands of the customer

Ambient conditions

From -45 °C (-49 °F) up to +50 °C (+122 °F).

Water

Normal water; seawater.

Area Classification

According to standard of refinery.

Hoist

Hydraulically (preferred), electrically or pneumatically driven hydraulic power unit for hoist and Drill Stem Drive.

Drive Unit

Crosshead, running in 4 points.

Heavy load wheels, Free Fall Arrestor for high safety. Gearbox for heavy-duty service with grease lubricated axial bearing for high load.

Tools

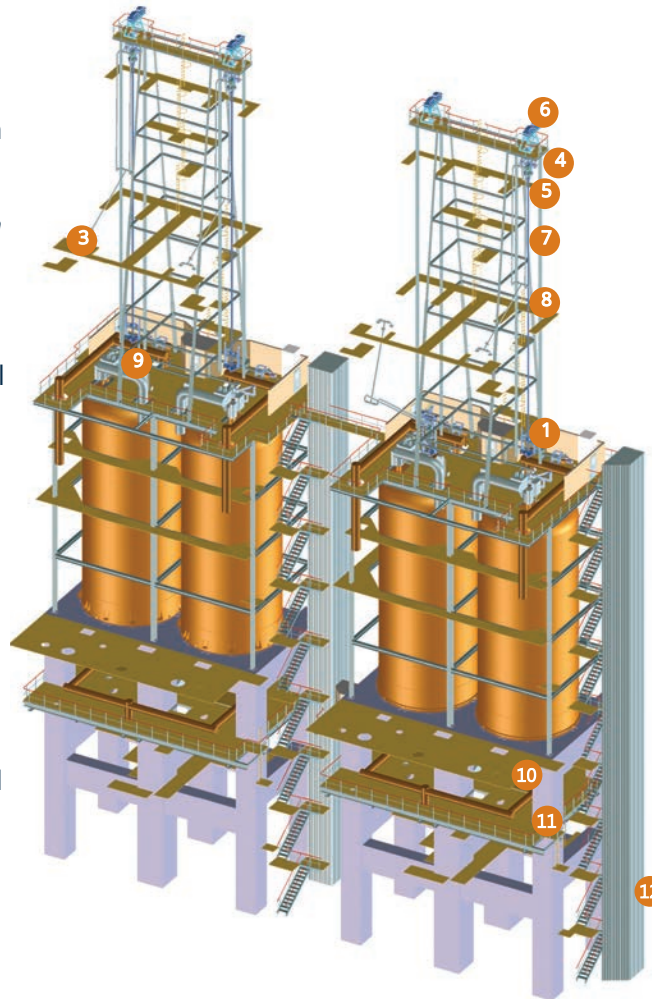
Combination Drilling and Cutting Tool.

Control System

PLC-System for Process Data Measurement. Data Logging and Visualisation. Automatic Interlocking System.

Ruhrpumpen Components

- 1 Hoist** – Hydraulically or electrically driven
- 2 HPU** – Hydraulic Power Unit (in case of hydraulically driven hoists and/or Drill Stem Drive and/or Deheading System container version) – *not shown*
- 3 HPW** – High Pressure Water line, flexible hose or swing pipe
- 4 LCP** – Local (Operator) Control Panel free standing or installed in operator shelter (optional) one panel for one pair of drums.
CH + FFA – Crosshead with Free Fall Arrestor
- 5 DSD** – Drill Stem Drive, hydraulically or electrically driven
- 6 PB** – Single and double Pulley Block equipped with instruments for rope load and tool position
- 7 Guide Rails** – T-type guide rails with shims, connectors, bolts and nuts with latching mechanism and proximity switches



- 8 DS + Tool** – Drill Stem (threaded or welded), Tool (manual or autoswitch tool)
- 9 TOP-Unheading Device** – Automated Top Unheading (*optional*) Device, electrically or hydraulically driven
- 10 Feed Entry** – (*optional*) side entry connection of feedline, separate or connected to cone
- 11 Bottom Unheading Device** – (*optional*) automatic bottom unheading system hydraulically driven, with hanger and installation system
- 12 LCP** – Local (Operator) Control Panel for bottom unheading system, installed in an operator shelter (*optional*), for close and remote operation - *not shown*

Pump Unit and Main Control Panel



- 1 Pump Unit** Pump – (Gear) – Motor unit
- 2 LOS** Lube Oil System for Motor – (Gear) – Pump
- 3 DCV** Decoking Control Valve
- 4 MCP** Main Control Panel equipped with PLC, monitoring system and operation switches, push buttons and lamps



Cuttingdeck with details

Crosshead with Drill Stem Drive

Crosshead Design

Standard components of heavy-duty industry

- Guide rails
- Wheels
- Free Fall Arrestor
- Double block

Functional test

- Simulation of broken rope

Drill Stem Drive

Standard components of heavy-duty industry

- Main gear, grease lubricated
- Auxiliary gear, oil lubricated
- Packing cartridge
- Drive with hydraulic, electric or pneumatic motor

High torque at the Drill Stem

- High gear ratio
- Main gear without sealing at the Drill Stem

Control Tool Position

- Measurement of torque and speed at the Drill Stem
- Manual override for max. torque (optional for hydraulic systems)

Favourable maintenance

- Cartridge system

Test Condition of Drill Stem Drive

Hydro test	525 bar (7,800 psi)
Functional test	15 rpm at 350 bar (5,200 psi)
Measurement	Torque leakage

Hoist, Hydraulically Driven

Pull force	45 kN (9,9 lbf) 4,500 kg (9,912 lbf) Compact design Low noise
Pull speed (hoist)	up to 70 m/min (230 ft/min)



Pulley Block



Crosshead with Free Fall Arrestor and Drill Stem Drive, hydraulic



Tool with Guide Plate



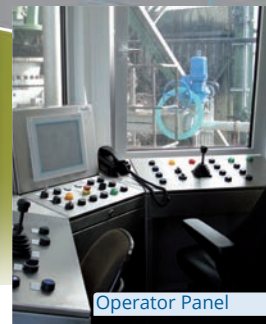
Hoist



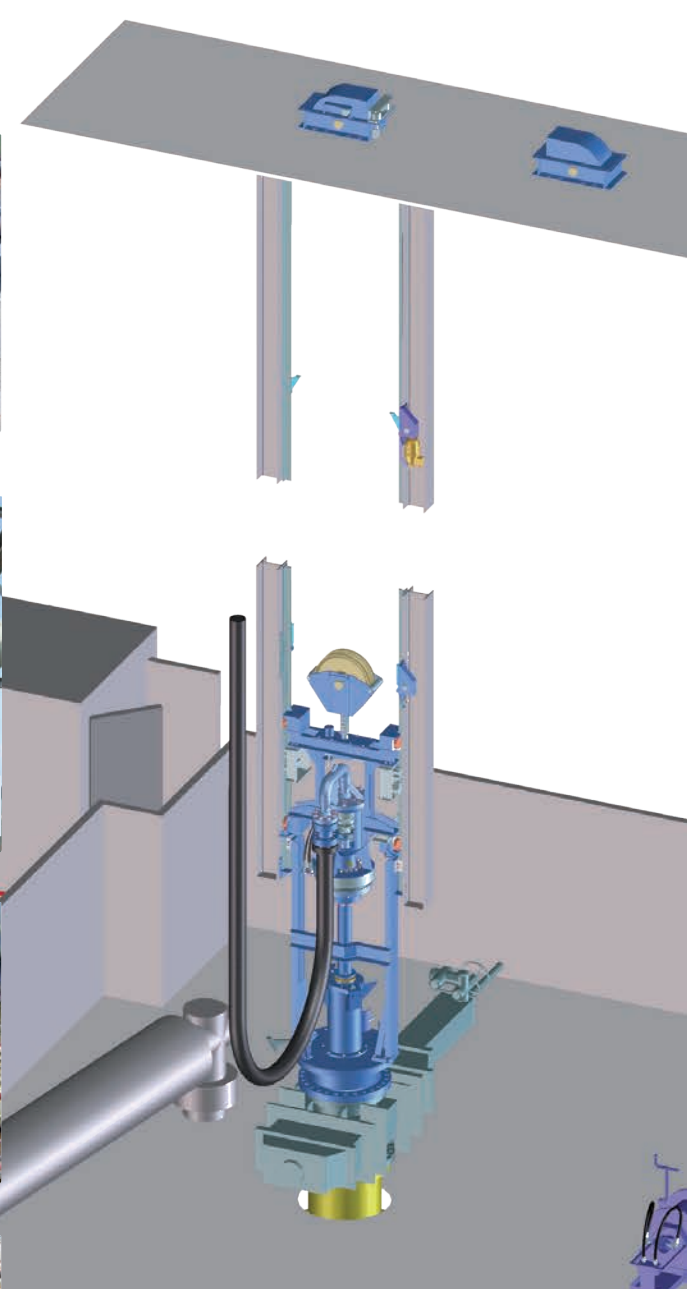
Top Valve with Guide Plate

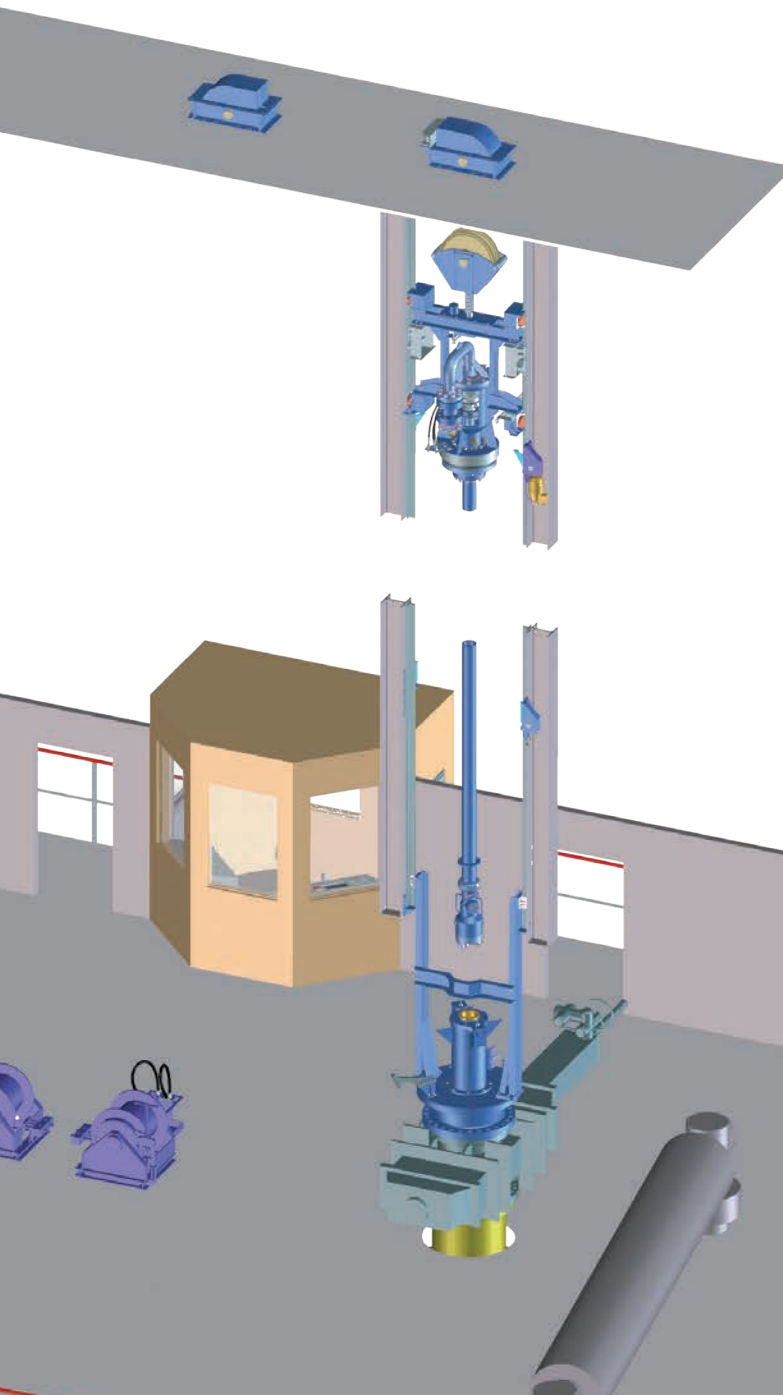


Operator Cubicle



Operator Panel





Combination Cutting Tool

Basic design

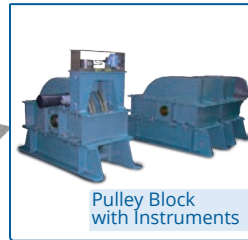
- Slim tool, diameter 13" (310 mm)
- Low lift force
- Low torque
- Hydrodynamic optimised channels

Switching device

- Manual/automatic switch
- At the top of the tool

Valves

- Ballshape valves
- No seals
- Pressure operated



Pulley Block with Instruments



Latching Device

Guide Plate

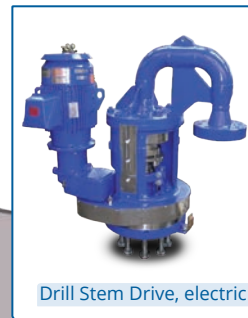
Basic Design

Guide Plate

- Centering Device
- Safety Latches

Dome

- with Vent / Chimney
- Drill Stem Guide



Drill Stem Drive, electric

Guide Beams

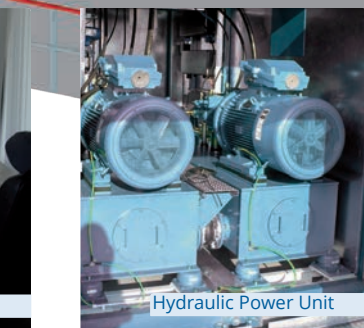
Top Deheading

Automatic

- Double gate / slide valve (by others)
- Electrically (preferred) or hydraulically driven
- Adapter to guide plate
- Operation via Ruhrpumpen control system



Guide Plate



Hydraulic Power Unit



Hoist with Slack Rope Device

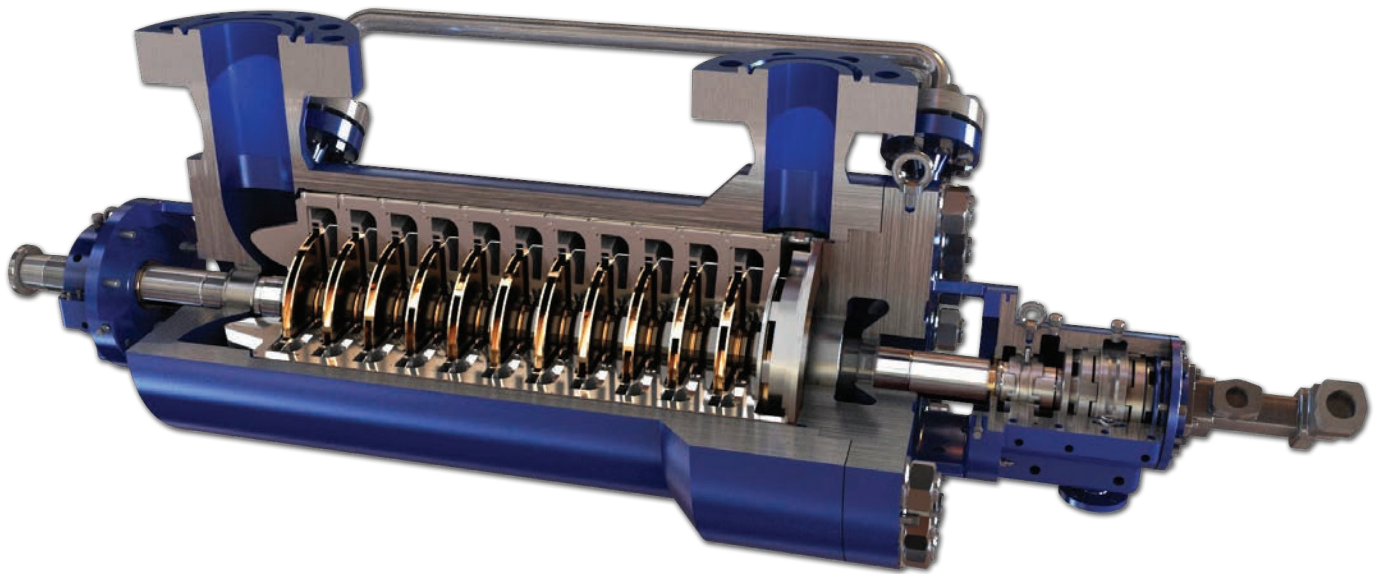


Tool



Hose

Centrifugal Process Pumps in Barrel Type Design



ADC barrel pump for Hydraulic Decoking service

The ADC pump can pump fluids up to 400 m³/h (1,760 gpm) and a head of 4000 m (13120 ft). These pumps are mainly used as water injection pumps and jet pumps for hydraulic decoking in refineries. The pumps are of significantly robust and heavy-duty construction. They are built according to API 610 last edition, with special modifications available for individual working conditions.

The pump is mostly direct driven by a motor; higher speeds are achievable through a drive by a gear box or a steam turbine. Lube Oil System according to API 610 and/or 614 is included in the system as a standard component.

Bearings

Forced-feed oil lubricated axial and radial bearings as sleeve bearings, oil supply by lube oil pump driven by the pump shaft and/or separate lube oil unit.

Standard materials

Casing - forged carbon or alloy steel

Impeller - cast steel, alloy steel

Pump shaft - alloy steel

Other materials on request.

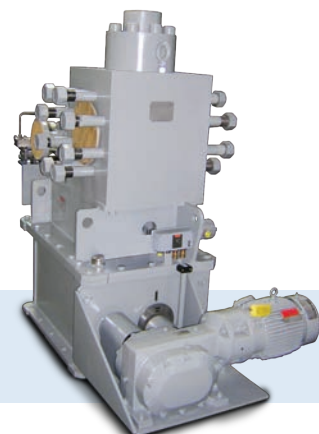
Application

High pressure cutting water

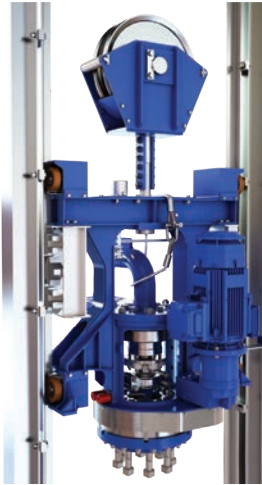
Performance Range

Capacity	up to 400 m ³ /h up to 1760 gpm
Head	up to 4000 m up to 13120 ft
Temperature	up to 150 °C up to 302 °F
Speed	acc. to requirement

Higher heads on request.



Cutting System Components

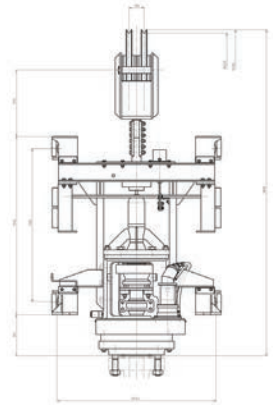


Freefall Arrestor

Ruhrpumpen has developed freefall arrestor retrofit designs which can most times be installed without interruption to your decoking operations.

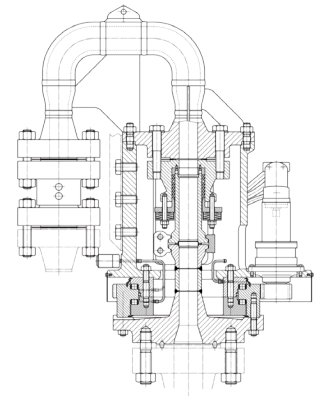
Features

- Operational testing easily performed on a routine basis
- Arrestor cables and cable guides eliminated
- Cable grippers are eliminated
- TÜV (UL/FM equivalent) approved with over 5,000 installations



Drill Stem Drive

Our drill stem drive (DSD) can normally be installed without interruption to decoking operations. The DSD fits within the existing swivel envelope (+/- 3") and can be adapted to existing crossheads without modification to the control limit switches or mechanical stops. Additionally, should time permit, the connection to the drill stem can be revised from a unibolt coupling to a flanged connection or FlangeLok or equal connection.



Coke Cutting Tool

Ruhrpumpen's patented design combines a drilling and cutting tool.

Basic design

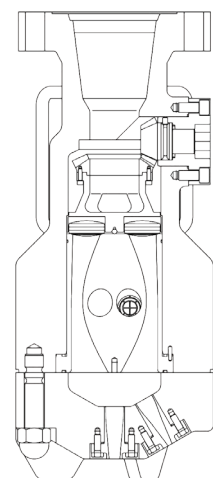
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- Low lift force
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Switching device

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- At the top of the tool

Nozzles, Cutting

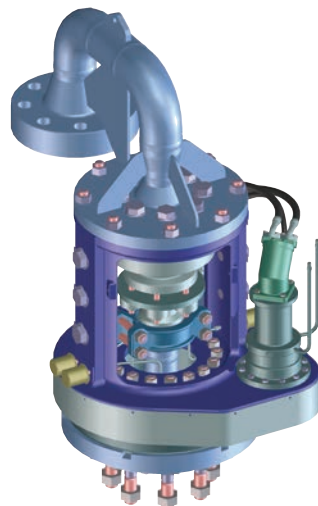
- 0°
- 10° up both periphery nozzles



electric



pneumatic



hydraulic



+65 years creating the pumping technology that moves our world

Ruhrpumpen is an innovative and efficient pump technology company that offers highly-engineered and standard pumping solutions for the oil & gas, power generation, industrial, water and chemical markets. We offer a broad range of centrifugal and reciprocating pumps that meet and exceed the requirements of the most demanding quality specifications and industry standards such as API, ANSI, UL, FM, ISO and Hydraulic Institute.

