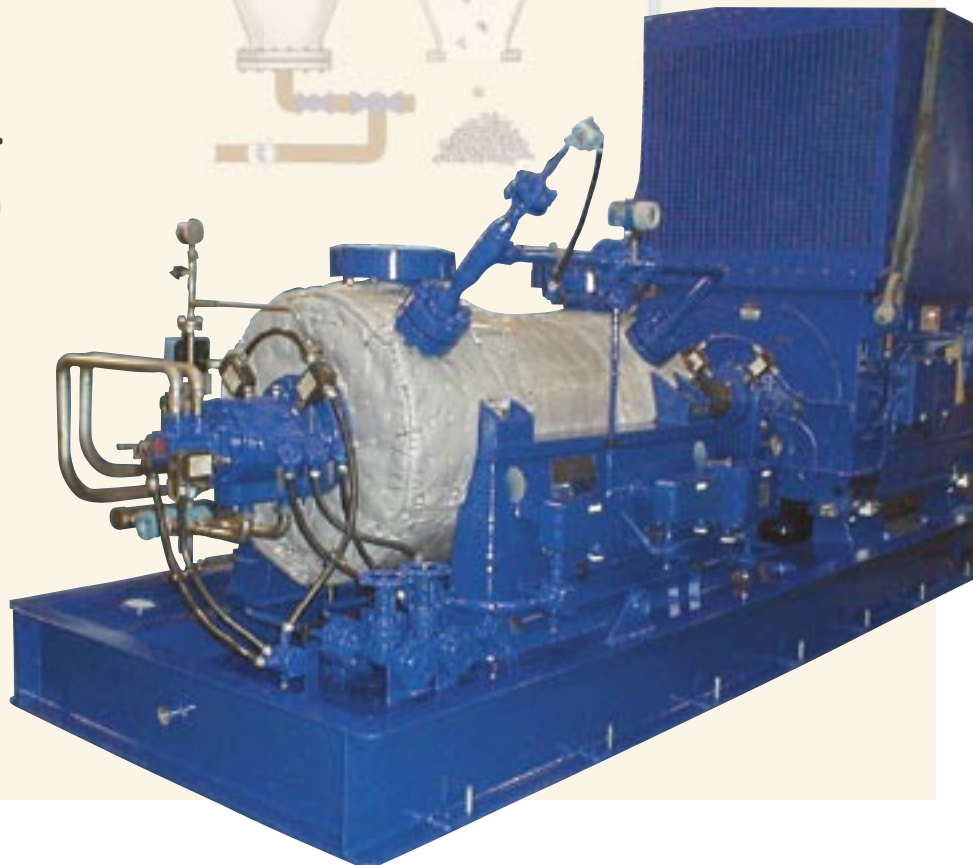
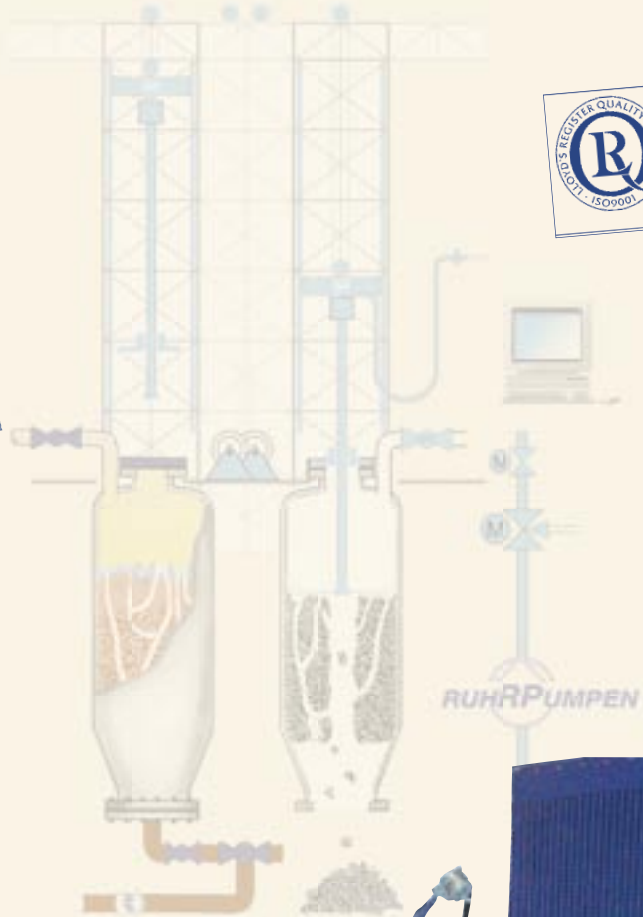
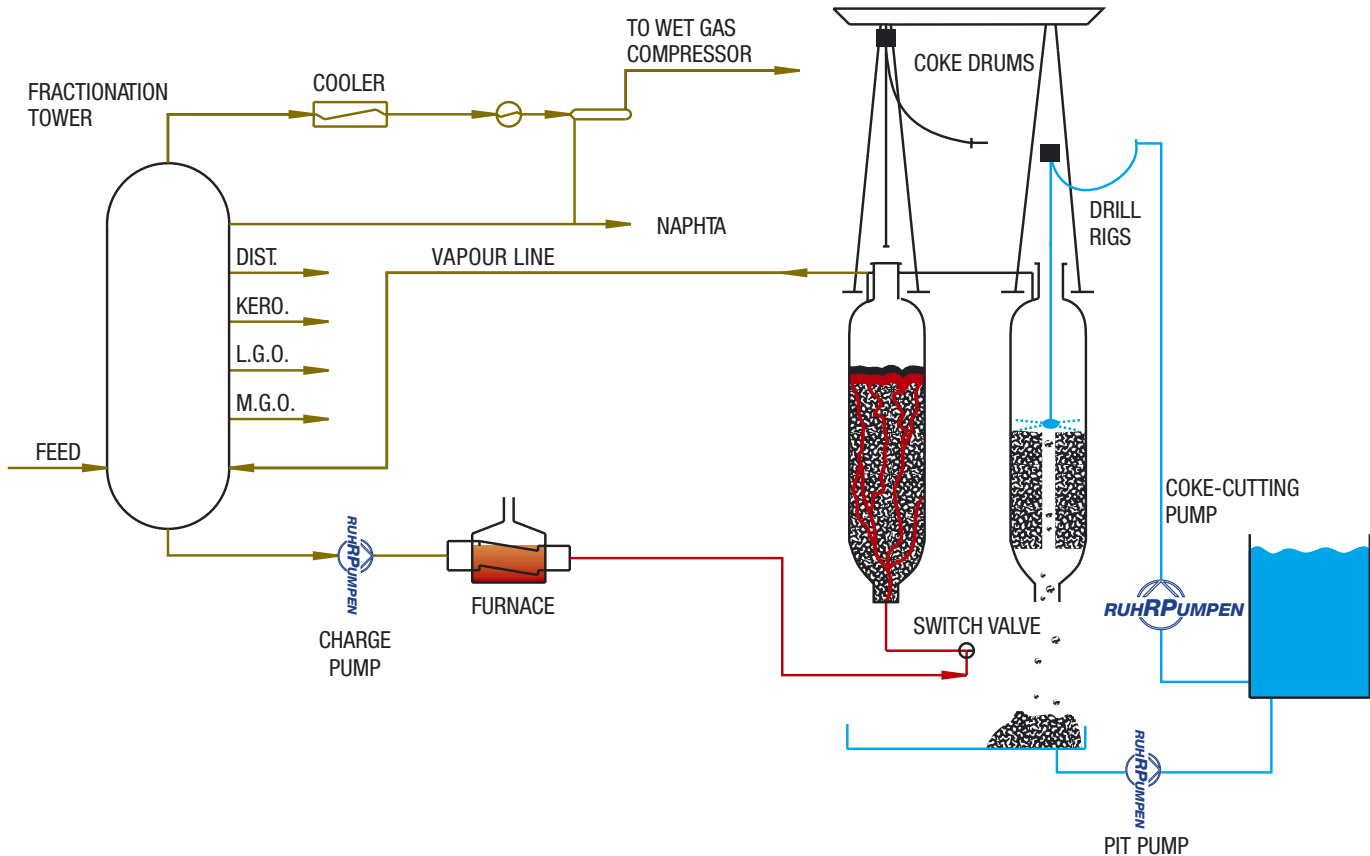


# Hydraulic Decoking System

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



## COKER-DECOKER-ARRANGEMENT



### Hydraulic Decoking

After the Delayed Coking, removing the coke out of the drums is essential to continue the refinery process and to produce coke in a good quality.

The full drum is stripped, cooled down and decoked. The coke is cut out of the drum using high pressure water. The water pressure typically ranges from 200 (2,900) to 320 (4,640 PS.I.) bar.

A high pressure barrel pump is used as the Coke-Cutting-Jet-Pump. The components of the RUHRPUMPEN – Hydraulic Decoking System are shown in the overview in this brochure.

The decoking procedure starts with the boring of an initial hole from the top to the bottom. In the cutting cycle the coke is cut out horizontally.

The tools used are special boring and cutting tools as well as combined tools for both cycles.

### RUHRPUMPEN – Hydraulic Decoking System

The knowledge of RUHRPUMPEN in the refinery service combined with many years of experience in calculation and design of complete Hydraulic Decoking Systems as well as revamps of existing systems gives the basis for the RUHRPUMPEN – Hydraulic Decoking System.

The heart piece is a high pressure barrel pump, designed for pumping cutting water up to 320 bar (4,640 PS.I.) and a flow up to 400 m<sup>3</sup>/hrs (1,760 gpm). The pump and the lube oil system are designed according to API 610.

The implementation of proven equipment for this service including the Decoking Control Valve, High Pressure Gate Valves, High Pressure Water Hoses, hydraulic or pneumatic driven Winches and Drill Stem Drives form a reliable system.

A Control Unit for the whole system results in a high level of safety for operators and the equipment.

The System responsibility over the whole cycle of design, manufacturing, installation, start up, operation and service ensure the highest safety and reliability to the users. If you want to have more information please contact us.

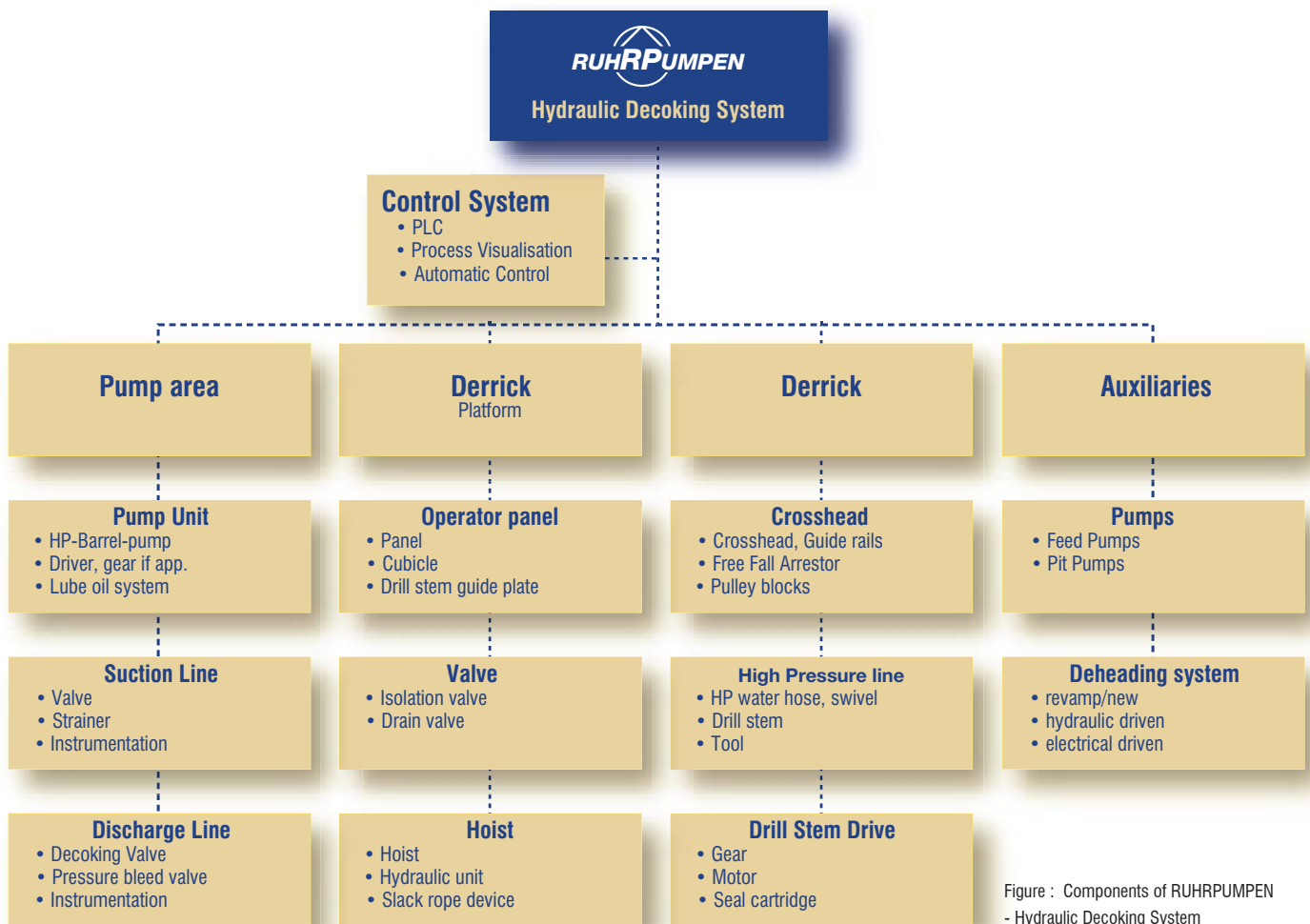


Figure : Components of RUHRPUMPEN - Hydraulic Decoking System

## Delayed Coking

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 Coking Process is shown in the figure on the left side. The fresh coker feed coming into

the fractionation tower and the conditioned coker feed being pumped out from the bottom to the furnace. Furnace effluent then goes 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 continue 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.

## Design Features

**System, calculated, designed and manufactured for the demands of the Customer**

### Ambient conditions

-40°C (-40°F) to +50°C (+122°F) moist to dry

### Water

normal water, seawater

### Area Classification

According to standard of refinery

### Winch

Hydraulic (preferred) or pneumatic driven  
Hydraulic Unit for winch 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 an axial bearing for high load

### Tools

Combination Drilling and Cutting Tool

### Control Unit

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

## Centrifugal Process Pumps in barrel-type design Multi-Stage

RUHRPUMPEN use their ADC Barrel pump for the Hydraulic Decoking service. The ADC pumps line can pump fluids up to 400 m<sup>3</sup>/h (1,760 gpm) and a height of 4.000 m (13,120 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 stiff construction. They are built according to the API 610, last Edition. There are special modifications for the 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.

### Description:

Horizontal, multi-stage, single suction barrel-type centrifugal pump, with radially split casing, centreline mounted, axial thrust balancing by means of balance piston, shaft sealings by means of mechanical seal or soft packing, with or without cooling, bearing brackets on both sides. Complete pull out version available.

**Flanges:** Top/Top; Side/Top.

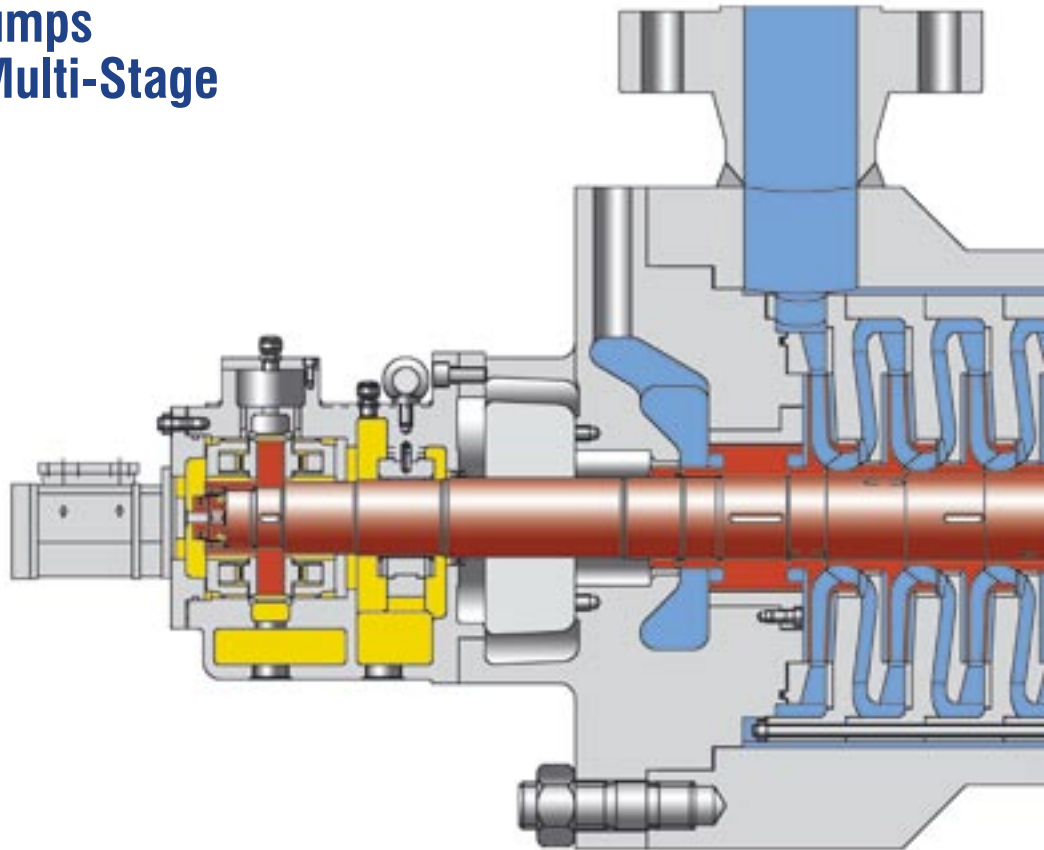
Design according to API 610.

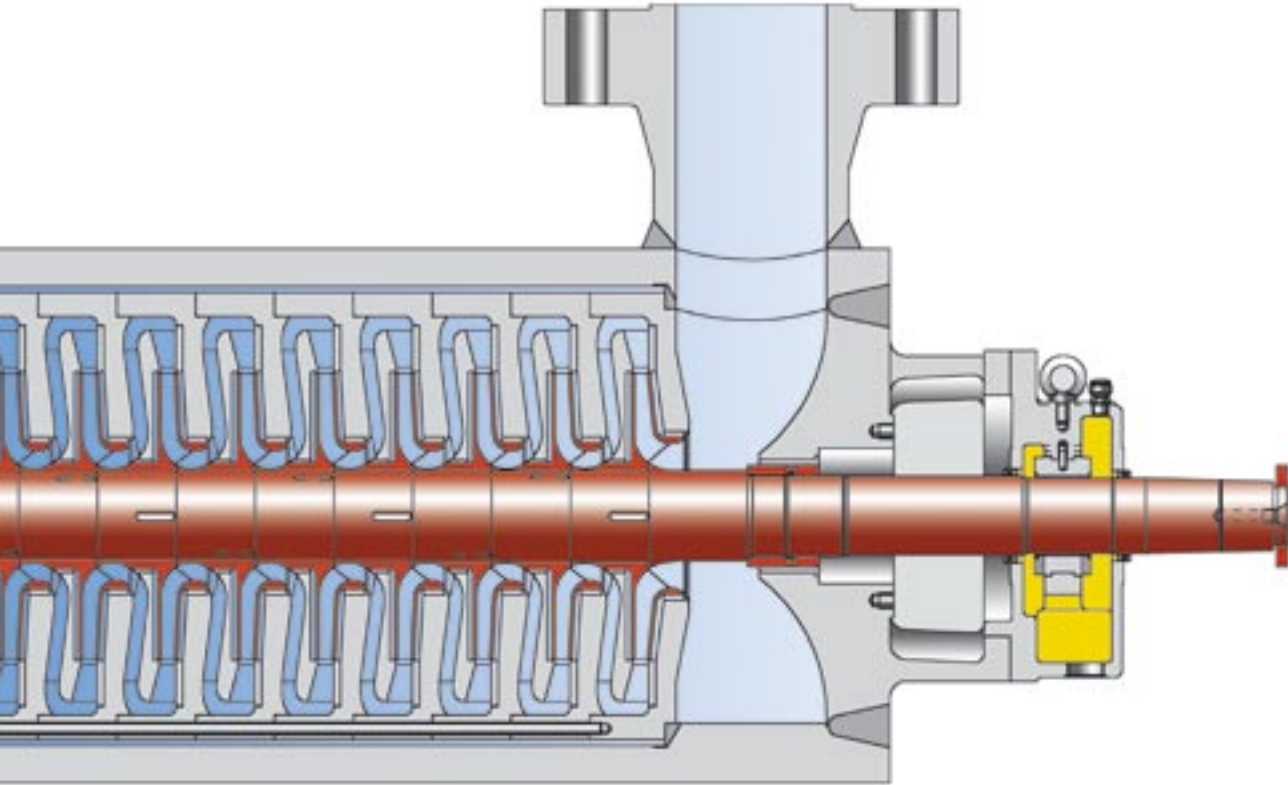
### Bearings:

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.

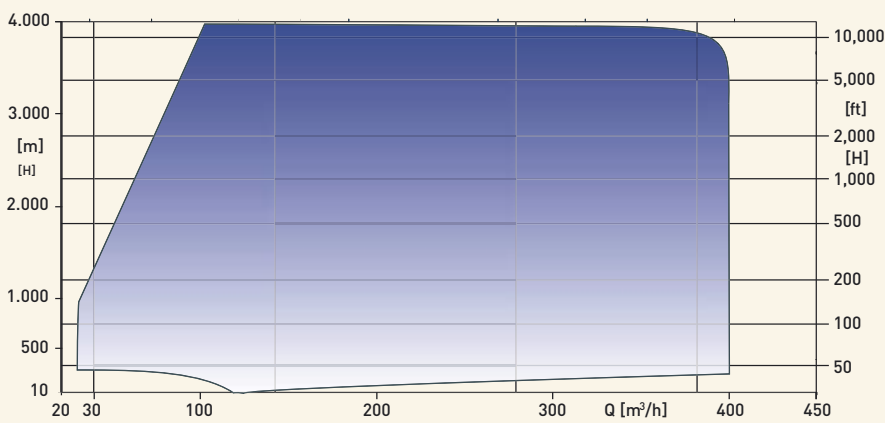
### Standard Materials:

**Casing** forged carbon or alloy steel  
**Impeller** cast steel, alloy steel  
**Pump shaft** alloy steel  
 Other materials on request.





**Selection Chart A/ADC**



## Barrel-Pump

### Application:

- High pressure cutting water

### Performance Range

Capacity Q up to 400 m³/h  
up to 1,760 gpm

Head H up to 4,000 m  
up to 13,120 feet

Temperature t up to 150° C  
up to 302° F

Speed acc. to requirement

**Higher heads on requirement.**

## 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 Design

#### Standard components of heavy duty industry

- Main gear, grease lubricated
- Auxiliary gear, oil lubricated
- Packing cartridge
- Engine with hydraulic, electric or pneumatic drive

#### High torque at the drill stem

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

#### Control

- 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
- 7800 psi

##### Functional test

- 15 rpm at 350 bar/5200 psi

##### Measurement

- Torque
- Leakage



## Hoist Hydraulic Driven

### Performance

#### Pull Force

- 4.500 kg (9,912 lb)
- Compact design
- Low noise

#### Pull speed (Hoist)

- up to 70 m/min (230 ft/min)



## RP-Combination Cutting Tool

### Basic design

- Slim tool
- Low lift force
- Low torque
- Long/Short version

### Switching device

- Manual/Automated
- At the top of the tool

### Valves

- Ballshape valves
- No seals
- Pressure operated



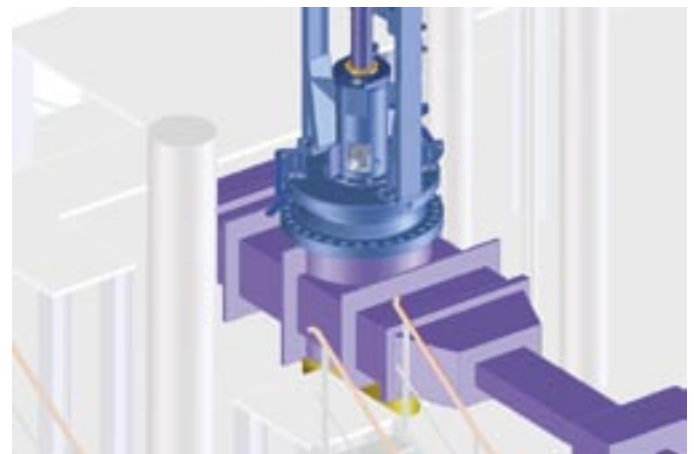
Short Tool in service, during switching mode.



## RP-Topdeheading (Both Versions are built)



Bolted Flange design, hydraulic driven.



Double gate valve, electrical driven with RP-guide plate.  
Tool in switching mode in dome.

For over 50 years the name **RUHRPUMPEN** has been synonymous world-wide with innovation and reliability for pumping technology.



with innovations for the future

## Other RUHRPUMPEN Products



### SVN 8 Type API 610 Process Pump

Overhung OH2 Type, for service in an Ethylene Plant in Middle East.



### A Type API 610 High Pressure Decoking Pump

Double Casing Barrel BB5 Type, Coke-Cutting Pump in a Refinery in South America.



### ZM Type API 610 Pipeline Pump

Axially Split Single Stage BB1 Type, for Main Pipeline Pump operation in PR China.



### ZMS Type API 610 High Pressure Pipeline Pump

Axially Split Two Stage BB3 Type, for Main Pipeline Pump operation in Middle East.



### TR/VLT Type API 610 Vertical Booster Pump

Vertical Double Casing (CAN) VS7 Type, for Booster Pipeline Pump operation in Near East.

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