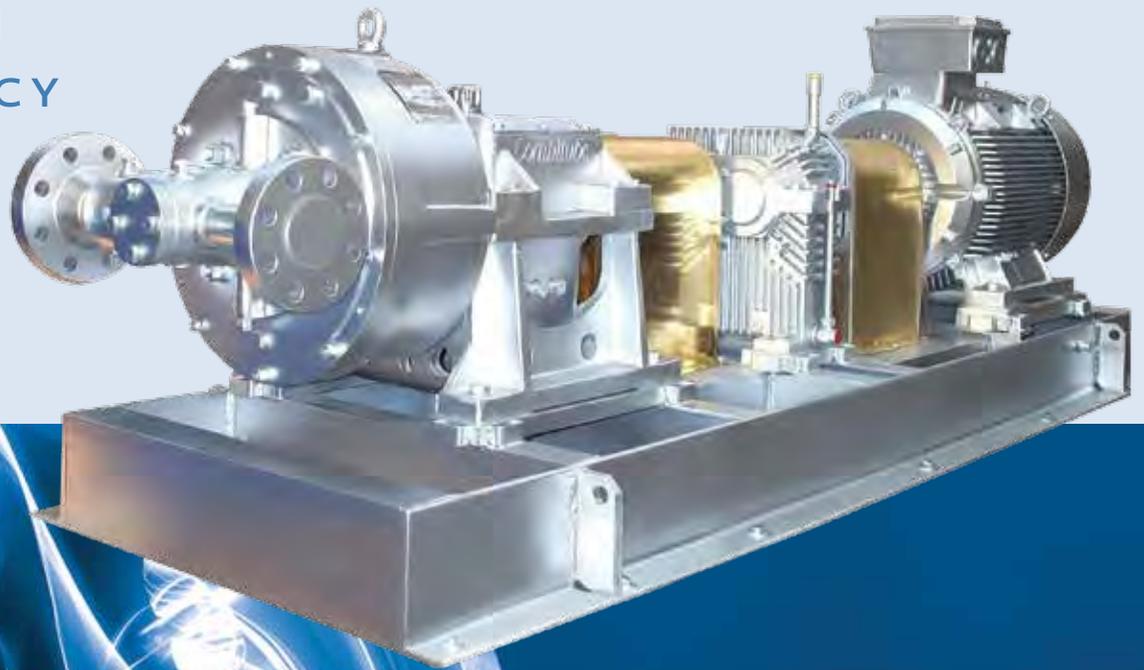




Specialist for Pumping Technology

INNOVATION
EFFICIENCY
QUALITY



Combitube

Low Flow, High Head, Pitot Tube Pumps

For more than 60 years the name Ruhrpumpen™ has been synonymous worldwide with innovation and reliability for pumping technology

Ruhrpumpen is an innovative and efficient centrifugal pump technology company that offers operators of Pump Systems a wide range of quality products. Ruhrpumpen is committed to global excellence with a complete range of Pumps, Fire Pump packages and related products, such as Decoking systems & tools to support the core markets; namely Oil & Gas, Petrochemical, Power, Heavy Industry, Mining and Water Services. The broad product line complies with the most demanding quality specifications and go beyond stringent industry standards such as API, ANSI, the Hydraulic Institute, Underwriter's Laboratories, Factory Mutual and ISO 9001.

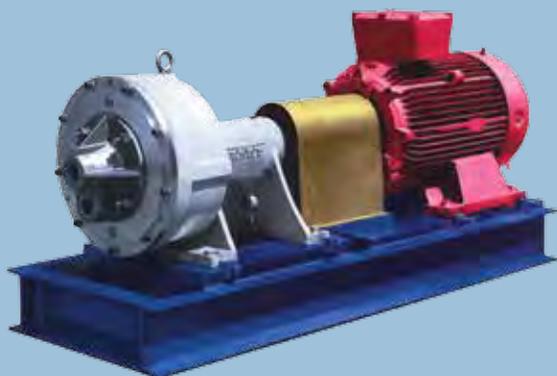
Ruhrpumpen is a vertically integrated company with its own foundry, machine shop, pump design & manufacturing plants and service centers. With strategically located manufacturing plants, operating offices and service centers in many parts of the world, Ruhrpumpen truly is a global pump company which also has the strength to focus on the local necessities of each client.

Pitot Tube Centrifugal Pumps

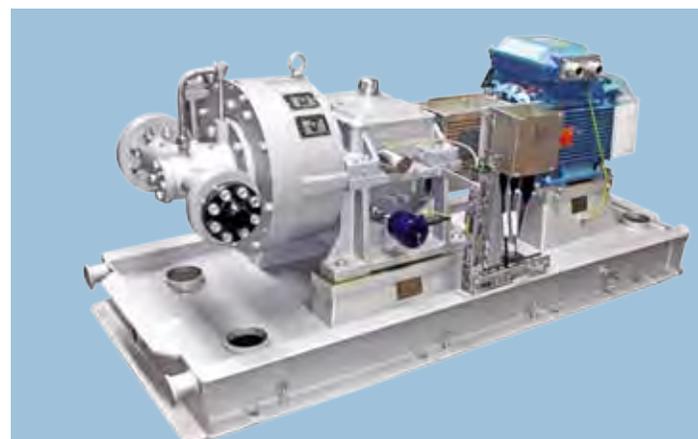
The Combitube pumps can operate reliably at any point on the performance curve unlike centrifugal pumps which naturally have a more restricted operating range down to Minimum Safe Flow.

Combitube pumps are single stage pitot tube pumps which are designed for low flow, high head applications. The pitot tube design produces a stable, pulsation free flow. The ability of the pump to operate with a low flow, makes the pump suitable for a wide range of applications, such as those applications where the flow required varies continuously. There are no axial thrust problems, the minimum flow limit is the thermal stable flow. The main characteristic of this pump is its no impeller technology.

The Combitube pump range has been designed to incorporate the best features of pitot tube technology whilst improving the overall design, reducing part complexity and cutting life cycle costs. This results in the benefits of lower maintenance, a reduced requirement for spare parts, enhanced reliability and therefore reduced "life-cycle" costs. All of which lead to increased customer satisfaction, and give an enhanced ownership experience.



GREASE LUBRICATED



OIL LUBRICATED

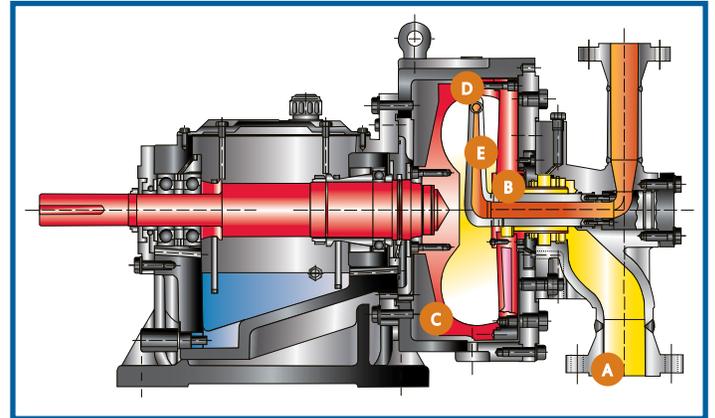
Operation

Liquid enters the pump via the suction line (A), which acts as the distribution manifold, which has been specifically designed to maximise interchangeability. The liquid then passes over the mechanical seal (B), which is only under suction pressure, and enters the rotor cover where it is accelerated to a speed identical to the rotor speed (C).

The liquid ring travels at the same peripheral speed as the rotor and this moving fluid annulus develops a velocity head.

A stationary, airfoil-shaped pitot tube (D) is placed inside the rotor assembly, and has a circular opening located close to the inside of the rotor. The pitot tube works in two ways: firstly, the liquid enters the pitot tube at high velocity under the centrifugal pressure created by the rotor and secondly, much of the high velocity energy is converted into pressure as the liquid passes along the diffuser section (E) of the pitot tube.

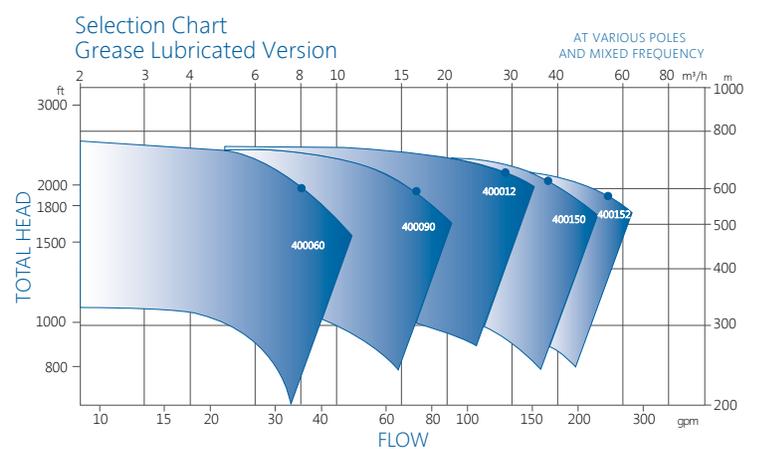
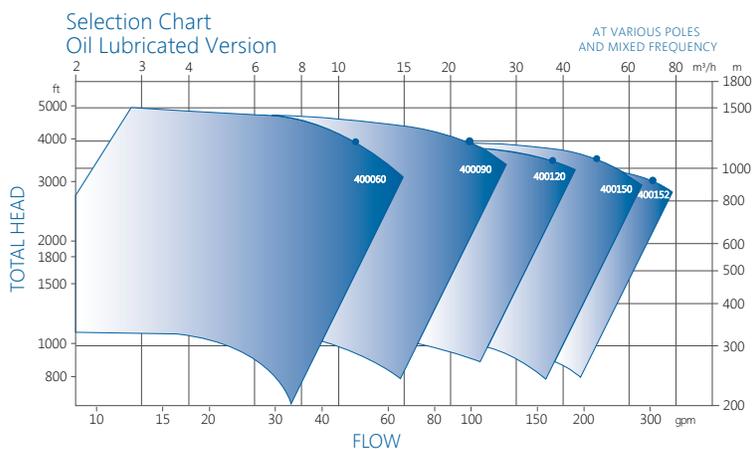
Using this operating principle, high discharge pressures can be obtained in a single stage process. The pump generates a pulsation free flow and has a stable Head curve over a wide flow range.



When the liquid contains suspended particles; locating a filter in the suction line is recommended.

NOTE: It is recommended that the pressures before and after the suction filter are monitored. This will ensure that a blocking filter can be cleaned, before any excessive pressure drop causes damage to the pump.

Performance Range



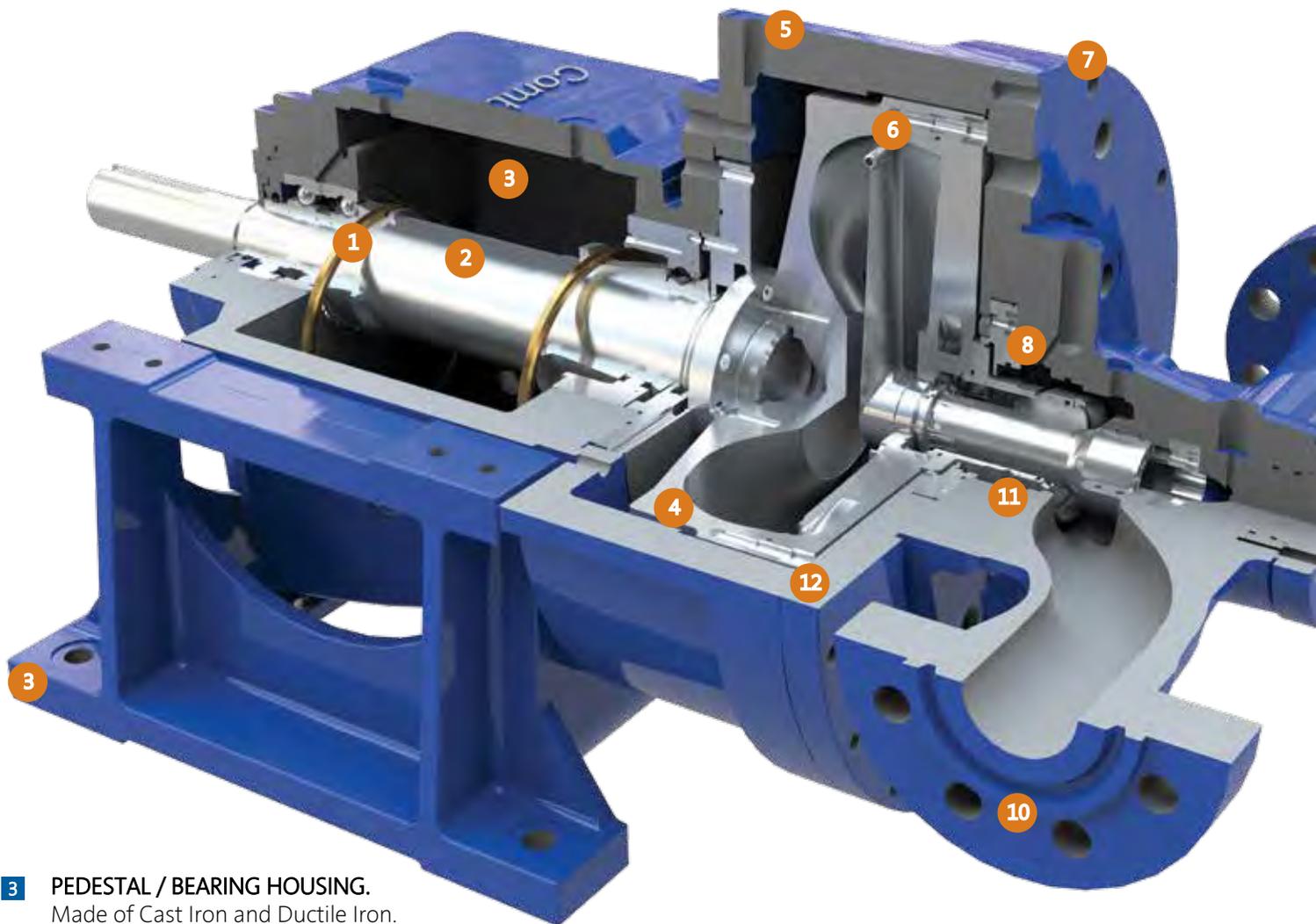
NOTE: The Oil Lubricated version has a more extended operating range than the Grease Lubrication version. Contact a Ruhrpumpen representative for more information.

Characteristics

OIL LUBRICATED VERSION

- 1 OIL RING.**
Time-proven oil-ring lubrication.
- 2 SHAFT.**
Made of carbon steel.

- 7 ROTOR CASING COVER.**
Made of Steel.
- 8 SEAL PLATE.**
Made of Stainless Steel, Duplex and Hastelloy.



- 3 PEDESTAL / BEARING HOUSING.**
Made of Cast Iron and Ductile Iron.

- 4 ROTOR.**
Made of Carbon Steel, Stainless Steels, Duplex or Hastelloy. Performance (H,Q) managed by rotational speed.

- 5 ROTOR CASING.**
Made of Cast Iron and Cast Steel upon request.

- 6 PITOT TUBE.**
Made of Stainless Steel or Hastelloy .

- 9 DISCHARGE.**

- 10 SUCTION.**

- 11 SEAL HUB.**
Made of Stainless Steel, Duplex and Hastelloy.

- 12 ROTOR COVER.**
Made of Carbon Steel, Stainless Steels, Duplex or Hastelloy.

Description

PRODUCT DESCRIPTION

- Single stage, pitot tube pumps.
- Oil or grease lubrication possible.
- Counter clockwise when viewed from motor end.
- Single or double mechanical seal for shaft sealing.
- Materials of construction available: Carbon Steel, Stainless Steel, Duplex or Hastelloy. For bearing housing and Rotor Casing, Ductile and Cast Iron, Cast Steel.
- Sealing of the casing via an O-Ring made from FKM (e.g. Viton®). Other materials up on request.
- Oil cooling coil could be provided.
- Designed for mounting horizontally.
- Threaded or flange connections.
- Heavy duty mechanical construction.
- Bearing arrangement available for V-belt in oil lubricated version.
- Rugged wet-end.
- In-line inlet and discharge flanges.

BROAD APPLICATION RANGE

INDUSTRIES.

- Chemical
- Pulp and Paper Industry
- Food Industry
- Brewing Industry
- Steel Manufacturing
- Metal plating
- Automotive production
- Desalination
- Transportation
- Oil extraction
- Cogeneration of "On Site" power

TYPICAL APPLICATIONS.

- Reactor feed, boiler feed
- Felt cleaning, edge cutting, condensate injection
- High pressure cleaning in food processing, packaging
- Filter press cleaning
- Descaling, high pressure showers for quenching
- High pressure coolant feed
- Leak testing engine injector testing
- Reverse Osmosis
- High pressure cleaning of tanks, trucks and trains
- Injection for secondary recovery
- Boiler feed, desuperheating

GREASE LUBRICATED PERFORMANCE DATA

Capacity	Up to 65 m ³ /h	286 gpm
Head	Up to 680 m	2,231 ft
Pressure	Up to 85 bar	1,230 psi
Temperature	Up to 100 °C	212°F
Speed	4,300 min ⁻¹	4,300 rpm

OIL LUBRICATED PERFORMANCE DATA

Capacity	Up to 80 m ³ /h	352 gpm
Head	Up to 1,480 m	4,856 ft
Pressure	Up to 160 bar	2,320 psi
Temperature	Up to 200 °C	390 °F
Speed	6,000 min ⁻¹	6,000 rpm

Note: For pump operations outside this range, please contact a Ruhrpumpen Representative.



Features & Benefits

FEATURES.

- Wide operating range.
- Multistage pump performance with single stage, centrifugal pump robustness and simplicity.
- Pulsation free operation.
- Seal only subject to suction pressure.
- No contact between pumped medium and pump lubricant.
- Modular construction, designed to maximize interchangeability and minimize stocking & "Life-cycle" costs.



BENEFITS.

- Hydraulically Stable.
- Handles wide variations in flow (from 20% to 110% of BEP flow).
- Wide application in oil extraction and oil processing.
- Suitable for applications in Ex-zone 1.
- Extended MTBF, low cost operation and easy maintenance compared with reciprocating pumps and high speed pumps.
- No dampers or relief valves required. Reduced cost investment because no pulsation.
- Reduced seal costs, a much simpler design & significantly lower maintenance costs than high speed and multistage pumps.
- Wide range of applications.
- Isolated bearing pedestal to minimize bearing contamination.
- Easily modified performance by changing the pitot tube.
- Sloping sump ensures clean oil.
- Wide range of rotational speeds.
- High performance seal availability.



Seize-Proof and "Wet – Dry Isolation"

The Combitube will not seize because there are no close-clearance areas like in conventional multistage & high speed pumps. The Combitube design isolates the fluid fully from the power frame thereby providing enhanced safety, compared with small multistage & high speed pump designs.

Other Ruhrpumpen Products

ANSI Horizontal Process Pump

Single stage, radially split casing with flanged connections, enclosed impeller, foot mounted. Municipal, General Industry, Irrigation, Fire Service and Pressure Equipments.



Heavy Duty, Double Suction, Vertical Process Pump

Heavy Duty, Double Suction, Vertical Process Pump (type VS2).

Cooling towers and other applications requiring large volumes of liquid with relatively high head. Raw water intake.



Single Stage Horizontal Pump

Overhung, radially split, flanged connections, enclosed impeller, mechanical seal. Standard design meets API latest edition (type OH2). Petrochemical, Oil & Gas, Steel Industry, Automotive, Power Generation, Water Treatment, Pharmaceutical and General Process.



Vertical Barrel Pump

Low NPSH "Shockless Entry" first stage impeller (single or double suction), Single or multi-stage. Standard construction materials according to API latest edition (type VS6).

Condensate, Power Plants, Municipal, Hydrocarbons, Pipeline and Refineries.





-  USA, TULSA & ORLAND
-  MEXICO, MONTERREY
-  BRAZIL, RIO DE JANEIRO
-  ARGENTINA, BUENOS AIRES
-  GERMANY, WITTEN
-  EGYPT, SUEZ
-  INDIA, CHENNAI
-  CHINA, CHANGZHOU

Represented by:

