# HEAVY DUTY PUMPS

## PRODUCTS

ASPHALT

BITUMEN

CRUDE OIL

FUEASPHALT

BITUMEN

CRUDE OIL

FUEL OIL

## APPLICATIONS

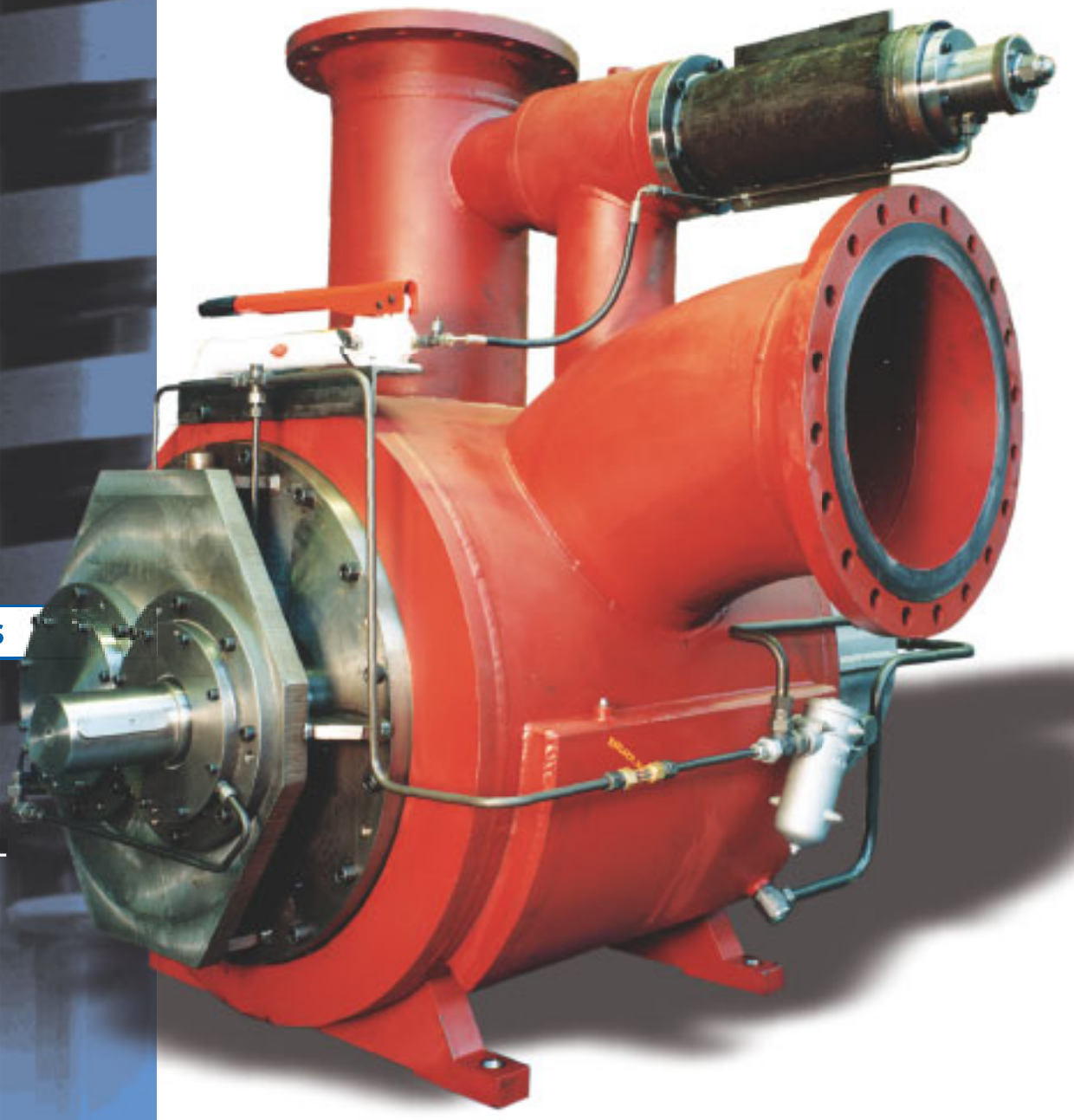
OFFSHORE

CHEMICAL AND

PETROCHEMICAL

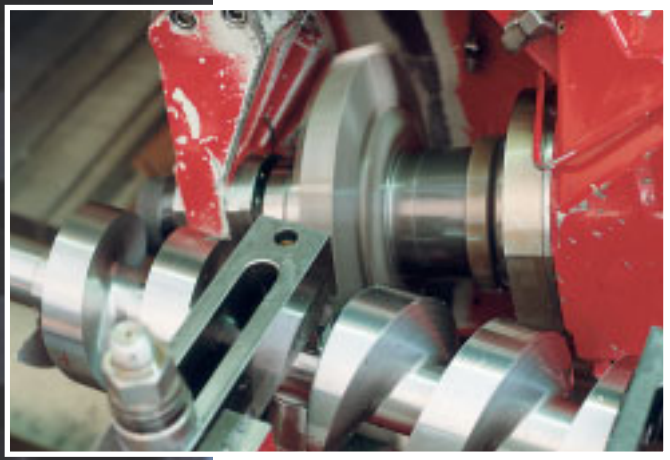
INDUSTRIES

TANKFARMS



MEMBER OF THE COLFAX GROUP

HOUTTUIN B.V.

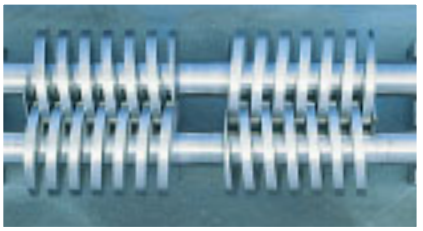


## Overload protection

For protection against overloading a built-on spring loaded relief valve can be supplied or separately mounted in the discharge line.

## Introduction

The engineered pump is specially designed for heavy duties which means handling liquids with low and high viscosities, pressure up to 80 bar and temperature up to 400°C, also suitable for more or less abrasive products which may cause extraordinary wear of the pump components.
The design is flexible, each pump being tailor made or part of a small series, designed and constructed entirely according to the customer's specifications.



## Working principle

The Houttuin double entry twin geared screw pump is a selfpriming, rotary positive displacement pump.
The two screwshafts which are working together are rotating in the pump casing with a replacable liner. Because of the special screw profiles the liquid is being pumped with minor backflow. In addition to the foregoing plus the fact of the exact design and manufacturing of the screw profile the pump has very good suction qualities (NPSH) and a high efficiency.

## Design

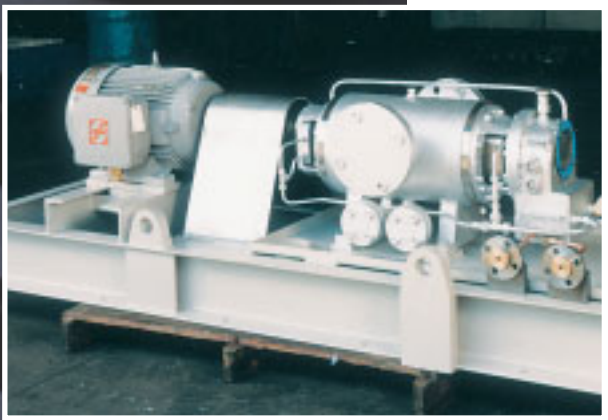
According to the specifications of the end-user complete with all details of the liquid to be pumped e.g. temperature, viscosity, pressure, capacity etc. the exact dimensions and profile of the screwshafts are calculated on our advanced CAD-system.
This means the optimum proportion between diameter, length and pitch of the screwshafts combined with the shortest bearing span; this results in the best outlines of the spindles having minimum deflection. Also the fact that the screwshafts are machined out of one solid piece of material contributes to the strength of the shafts.

The screwshafts are allocated on both sides in either ball or roller bearings and axially fixed at one end. Due to the double suction design the hydraulic axial forces are eliminated, therefore the axial bearings are only for fixing the position of the screwshafts.
The torque from the driving spindle to the driven shaft is being transferred by timing gears which are located in a separate housing and are oilsplash lubricated.
The rigid design of the screwshafts and their exact location in the casing of the pump due to the bearings complete with the setting of the timing gears results in free running of the rotors, so no rotor to rotor and no rotor to casing contact. No metallic contact means no wear. Even dry running is possible for a short period. All parts which are in contact with the liquid being pumped are made out of materials which are most suitable for the duty.
The pump casing is made either of cast or fabricated steel and can be adapted to all the requirements of the customer.
All quality requirements such as ASME, NACE etc. can be fulfilled.

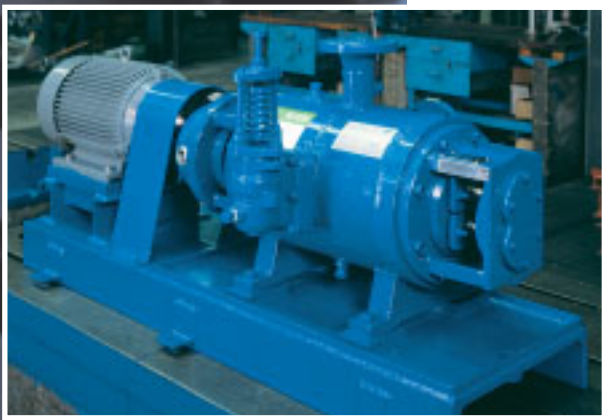
The pump is equipped with a replacable liner which gives an advantage in the event of extensive wear due to abrasive duties.
The pump is built according international standards such as API 676 and adapts API 682 for mechanical seal arrangements.
The pump is suitable for direct drive by an electric or hydraulic motor, diesel engine or turbine.

## PUMP MATERIALS

| Screwshafts | Cast liner | Fabricated Casing &Covers |
|---|---|---|
| Carbon Steel | Cast Iron, Surface hardened | Carbon Steel |
| Carbon Steel, Surface hardened | Nodular Cast Iron, Surface hardened | Stainless Steel |
| Stainless Steel, Surface hardened | Wear resisting alloyed Castings | Duplex Stainless Steel |
| Duplex Stainless Steel | Stainless Steel | Super Duplex Stainless Steel |
| Super Duplex Stainless Steel | Duplex Stainless Steel | |



**Field of Application:** Fertilizer Plant/Burner Feed Pump
**Product:** Carbon Oil with 5% Solids
**Temperature:** 250°C (482°F)
**Viscosity:** 30-300 cSt (140-1,375 SSU)
**Diff. head:** 29,7-32,3 bar (431-468 psi)
**Driven by means of:** E-motor; 1480 rpm
**Absorbed Power:** 56-68 kW (75-91 hp)
**Capacity:** 34-27 m3/h (150-119 US gpm)
**Material execution:** Hardened Stainless Steel Screwshafts; Cast Wear Resisting Alloy Steel Liner; Fabricated Duplex Stainless Steel Pump Casing & Covers
**Shaft sealing:** four single Mechanical Seals to API 682-Plan 02/62
**Extra feature:** Integral Lube Oil Circulating System for Bearings and Timing Gears



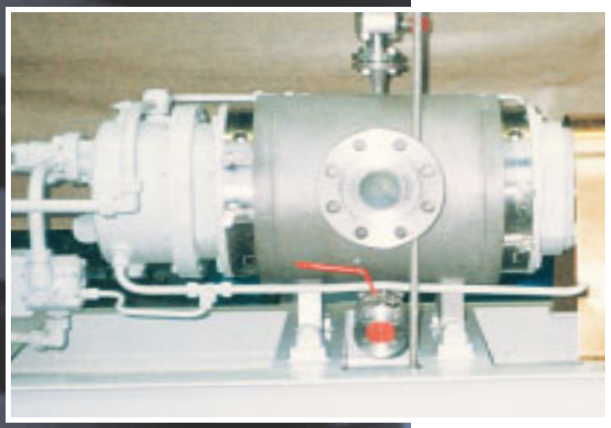
**Field of Application:** Chemical Process Industry/Process Injection Pump
**Product:** Water and Glykol Mixture
**Temperature:** 80°C (176°F)
**Viscosity:** 1 cSt (32 SSU)
**Diff. head:** 42 bar (609 psi)
**Driven by means of:** E-motor; 1780 rpm
**Absorbed Power:** 100 kW (134 hp)
**Capacity:** 32 m3/h (141 US gpm)
**Material execution:** Hardened Stainless Steel Screwshafts; Cast Wear Resisting Alloy Liner; Fabricated Stainless Steel Pump Casing & Covers
**Shaft sealing:** four dual BTB Mechanical Seals



**Field of Application:** Chemical Process Industry/Polymer Solution Transfer Pump
**Product:** High-grade Synthetic Fiber Pulp Emulsion
**Temperature:** 168°C (334°F)
**Viscosity:** 0,11-11.000 cP; 22.000 cP max.
**Diff. head:** 9,2 bar (133 psi)
**Driven by means of:** E-motor with Frequency Converter; 500- 700 rpm
**Absorbed Power:** 3-8 kW (4-11 hp); 11kW (15 hp) max.
**Capacity:** 5 m3/h (22 US gpm)
**Material execution:** Stainless Steel Screwshafts; Cast Iron Liner; Fabricated Carbon Steel Pump Casing & Covers
**Shaft sealing:** four dual BTB Mechanical Seals to API 682-Plan 53



**Field of Application:** Storage Plants & Tank Farms/Transfer Pump
**Product:** Heavy Fuel Oil
**Temperature:** 18°-37°C (64°-99°F)
**Viscosity:** 700 cSt (3206 SSU)
**Diff. head:** 14,5 bar (210 psi)
**Driven by means of:** Diesel Engine and two-speed Gearbox
**Absorbed Power:** up to 630 kW (845 hp)
**Capacity:** up to 1.240 m3/h (5,460 US gpm)
**Material execution:** Stainless Steel Screwshafts; Cast Iron Liner; Fabricated Carbon Steel Pump Casing & Covers
**Shaft sealing:** four single Mechanical Seals
**Extra feature:** Integral Lube Oil Circulating System for Bearings and Timing Gears



**Field of Application:** Oil Exploration Onshore/ Transfer Pump for Wet Crude Emulsion
**Product:** Wet Crude Oil Sweet; up to 5% Sand; Salt Water
**Temperature:** 25°-35°C (77°-95°F)
**Viscosity:** 150-800 cSt (700-3,700 SSU)
**Diff. head:** 12 bar (174 psi)
**Driven by means of:** E-motor and Torque Converter 940-1480 rpm
**Absorbed Power:** 167 kW at 150 cSt (224 hp at 700 SSU)
**Capacity:** 320 m3/h (1,409 US gpm)
**Material execution:** Hardened Stainless Steel Screwshafts; Cast Wear Resisting Alloy Liner; Fabricated Carbon Steel Pump Casing & Covers.
**Shaft sealing:** four single Mechanical Seals to API 682-Plan 02



**Field of Application:** Fuel Oil Storage facility/ Transfer Pump for Heavy Fuel Oil
**Product:** Heavy Fuel Oil Low Sulfur High Pour Point
**Temperature:** 60°-70°C (140°-158°F)
**Viscosity:** 49-452 cSt (225-2,080 SSU)
**Diff. head:** 36 bar (522 psi)
**Driven by means of:** E-motor; 1780 rpm
**Absorbed power:** 350-450 kW (469-603 hp)
**Capacity:** 250-270 m3/h (1,100-1,189 US gpm)
**Material:** Stainless Steel Screwshafts; Cast Iron Liner; Fabricated Carbon Steel Pump Casing & Covers
**Shaft sealing:** four single Mechanical Seals
**Extra Feature:** Integral Lube Oil Circulating System with Aircooler for Bearings and Timing Gears

**Field of Application:** Oil Refineries/Furnace Burner Feed Pump
**Product:** Fuel Oil Residue
**Temperature:** 160°-180°C (320°-356°F)
**Viscosity:** 25-300 cSt (118-1,400 SSU)
**Diff. head:** 46 bar (674 psi)
**Driven by means of:** E-motor; 1480 rpm
**Absorbed Power:** 178-216 kW (238-290 hp)
**Capacity:** 70 m3/h (308 US gpm)
**Material execution:** Hardened Stainless Steel Screwshafts; Nodular Cast Iron Liner; Fabricated Carbon Steel Pump Casing & Covers
**Shaft sealing:** four single Mechanical Seals
**Extra feature:** Integral Lube Oil Circulating System for Bearings and Timing Gears



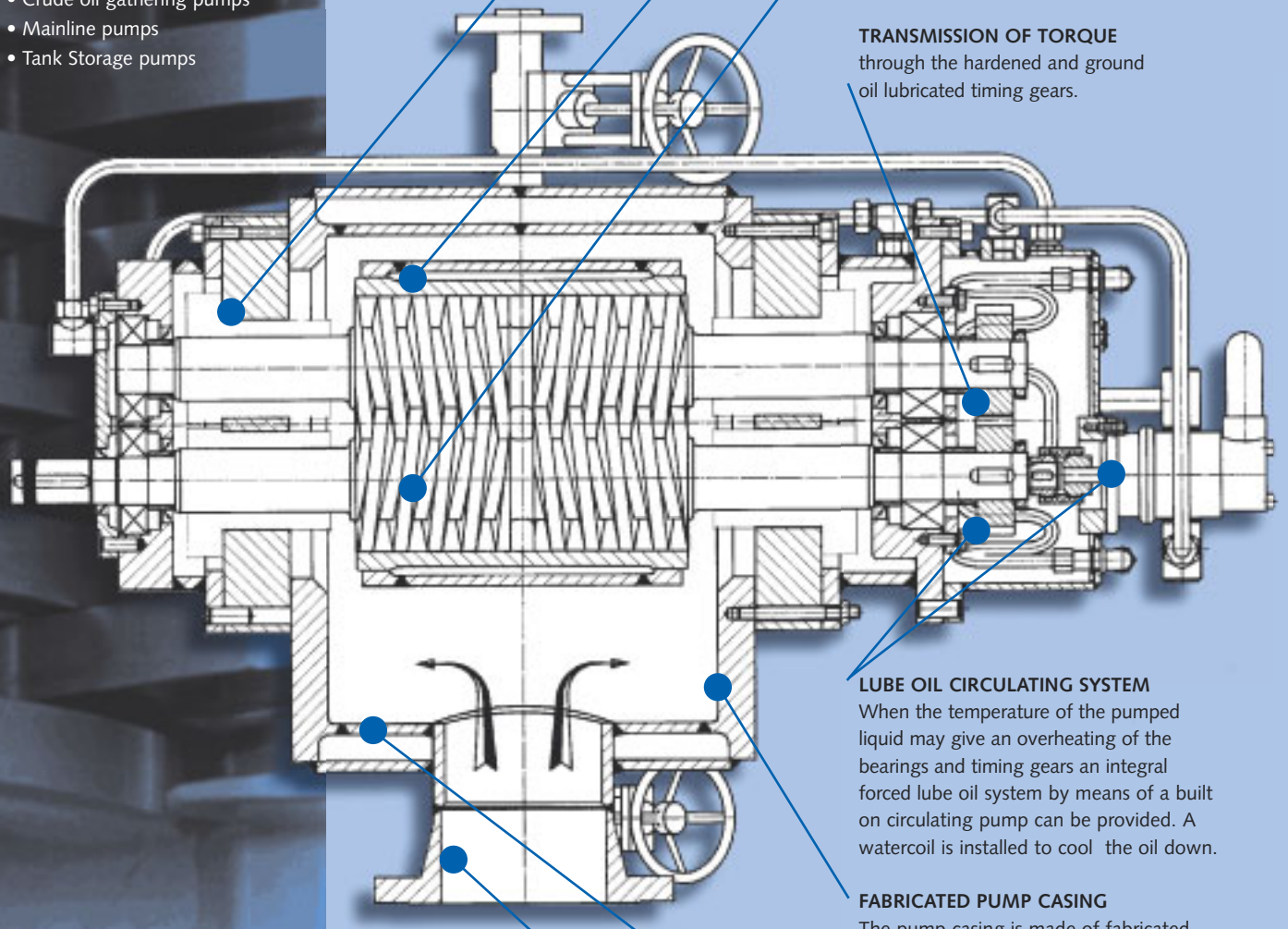
**Field of application:** Oil Exploration Offshore/Test Separator Water Pump
**Product:** Produced Water
**Temperature:** 113°C (235°F)
**Viscosity:** 0,23 cSt
**Diff.head:** 17 bar (246.5 psi)
**Driven by means of:** E-motor; 1750 rpm
**Absorbed Power:** 86 kW (117 hp)
**Capacity:** 80 m3/h (352 US gpm)
**Material execution:** Super Duplex Stainless Steel Screwshafts; Cast Super Duplex Stainless Steel Liner; Fabricated Super Duplex Stainless Steel Pump Casing & Covers.
**Shaft sealing:** four dual Mechanical Seals to API 682-Plan 02/53

## APPLICATION

According to material and pump construction all kinds of non-lubricating viscous, neutral, poisonous, aggresive, abrasive, cold or hot products can be transported, also fluids with a certain contents of gas or air.

In the chemical, petro-chemical and tar industry as:

- Burner feed pump at refineries, pumping low viscosity oils or residues
- Crude oil gathering pumps
- Mainline pumps
- Tank Storage pumps



**SHAFT SEALING**
the pump can be fitted with all kinds of mechanical sealing arrangements e.g.:
- single or double mechanical seals
- with flushing or quenching
- with heating or cooling

**REPLACEABLE LINER**
The pump is equipped with a replaceable liner which is convenient in the event of extensive wear due to abrasive duties.

**RIGID SCREWSHAFTS**
According to the application the pump can be supplied with a heating jacket enclosing the entire pump casing.

**TRANSMISSION OF TORQUE**
through the hardened and ground oil lubricated timing gears.

**LUBE OIL CIRCULATING SYSTEM**
When the temperature of the pumped liquid may give an overheating of the bearings and timing gears an integral forced lube oil system by means of a built on circulating pump can be provided. A watercoil is installed to cool the oil down.

**FABRICATED PUMP CASING**
The pump casing is made of fabricated steel and can be adapted to all requirements of the customer .
All quality requirements such as ASME, NACE etc. can be fulfilled.

**HEATING JACKET**
According to the application the pump can be supplied with a heating jacket enclosing the entire pump casing.

**SUCTION AND DISCHARGE FLANGES**
The flanges available according to all international standards can be executed in line or in L-position.

## PERFORMANCE DATA

| | |
|---|---|
| Capacity | Q up to 2.000 m3/h (8,800 US gpm) |
| Viscosity range | V 0,6 to 100.000 cSt (32 to 466,000 SSU) |
| Temperature of pumped liquid | T up to 400°C (752°F) |
| Difference pressure | Δ P up to 80 bar (1,160 psi) |

For the exact performance data as function of the viscosity of the liquid to be pumped and the pump speed, please ask for the individual characteristics.

# PERFORMANCE DIAGRAMS TOTAL PUMP PROGRAM*)

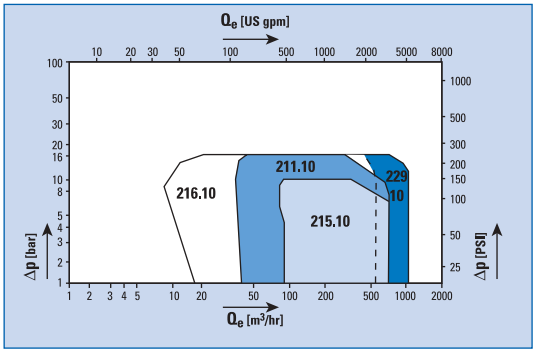
*) The diagrams show the performance range of the different pump series in our pump program and are for information only.

## STANDARD PUMPS

### With Internal Bearings

for lubricating liquids

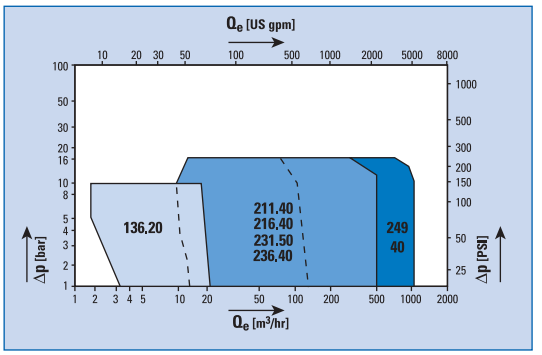
viscosity range : 20 - 760 cSt
: 98 - 3500 SSU




### With External Bearings

for non-lubricating liquids

viscosity range : 0,6 - 1500 cSt
: 32 - 7000 SSU

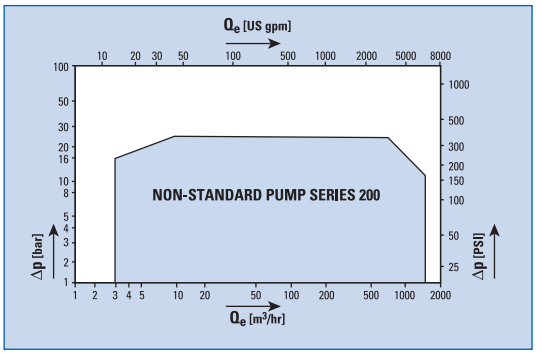



## NON-STANDARD PUMPS

### With Internal and External Bearings

for lubricating and
non-lubricating liquids

viscosity range : 0,6 - 100.000 cSt
: 32 - 466.000 SSU

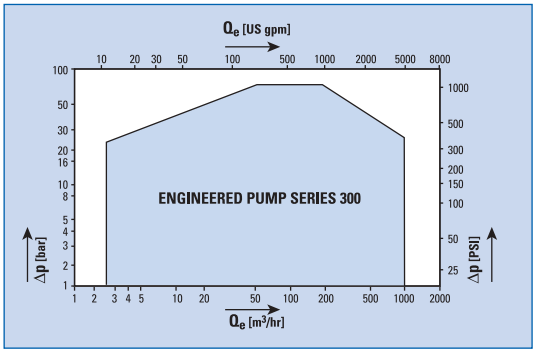



## ENGINEERED PUMPS

### With Internal and External Bearings

for lubricating and
non-lubricating liquids

viscosity range : 0,6 - 100.000 cSt
: 32 - 466.000 SSU

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