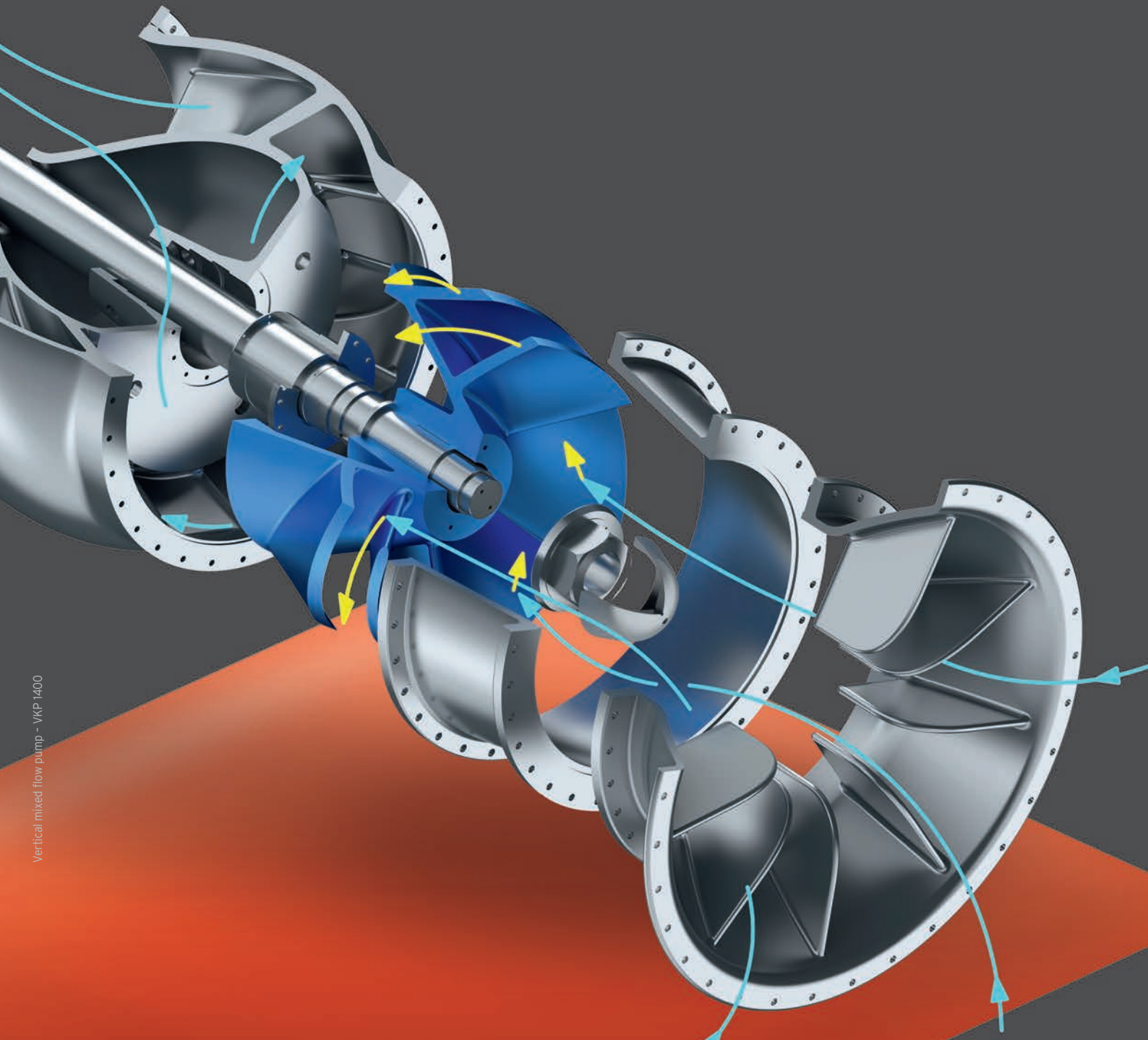


KÖSTER

Engineering works and foundry



Vertical mixed flow pump - VKP 1400

Pumps

●●● **KÖSTER - Our Products**
customised - durable - low-maintenance



Pumps	Winches	Swimming pool technology	Castings and machining	Steel hydraulic construction
--------------	----------------	---------------------------------	-------------------------------	-------------------------------------

Axial and mixed flow pumps for water and aqueous media	Manual and electric winches for lifting and moving any kind of load	Wave generators mechanically (with oscillating wings) or pneumatically driven	Consulting Development Construction	Flood gates Overflow weirs Flood barriers
Capacity from 100 l/s to 8,000 l/s	Special requirements -	In particular for public and private pools and spas, professional training pools, research institutions	Casting pattern making	Gate valves (circular up to DN 1,800)
Delivery head from 1 m to 30 m (static lift)	Special fields of application		Foundry	Non return flaps (circular up to DN 2,000)
Material and type (up to special hydraulics) are specified according to project	customised design - compact construction	Lifting floors (height adjustable intermediate floors) Pool partitions Counter-current systems	Steel and sheet metal processing	Made to order - using materials such as black steel, stainless steel, cast iron and wood
			Surface treatment	
			Installation	
			Warehousing and logistics	

●●● **Legal notice**

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Design, concept: NORDNORDWEST.com

➔ **Pumps**
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Right reserved to make technical changes

→ A company with history Innovation based on tradition

150 Years of experience - family-oriented with a global approach

Friedrich Köster GmbH & Co. KG was founded in 1861 under the name Maschinenfabrik und Eisengießerei J. M. Voss. The company has been family-owned for seven generations and as such accords direct credibility to values such as continuity, a sense of tradition, adaptability and innovative spirit. In the course of its history, KÖSTER was often the first manufacturer on the market to supply technical solutions for changing realities and has successfully managed to adapt its product range to - sometimes drastic - changes on the market and to sell its products worldwide.

Inspirations for the present - with a focus on the future

In the beginning KÖSTER produced agricultural machinery such as ploughs, land rollers, straw cutters and threshing machines. When industrialization led to a general increase in energy consumption, KÖSTER started developing wind engines for fixed power generation installations, which were also used for irrigation and drainage of low-lying land. As electrification advanced KÖSTER concentrated on developing and manufacturing propeller pumps for irrigation and drainage as well as deep well and tapered propeller pumps.

Our pump division today benefits from over 100 years of experience which it puts to good use in the production of propeller and mixed flow pumps for high and low delivery rates with low to medium delivery head which we supply as tailor-made machines perfectly adapted to the special requirements of our customers.

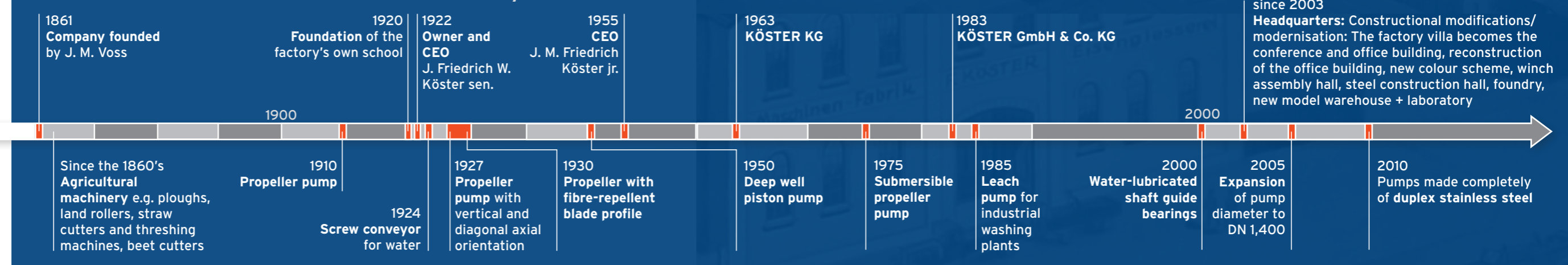
A multitude of KÖSTER developments have already been patented. The fibre-repellent blade profile, which even today continues to dominate its respective market segment, is just one impressive example of the significant influence of a KÖSTER development.



Fixed wind engine for generating electricity - innovation by KÖSTER- in the age of industrialization



KÖSTER - Milestones from 1861 until today





Tested Quality with certification

The KÖSTER quality management system was originally awarded DIN ISO EN 9001:2008 certification in 1995 and has been repeatedly recertified up to now.

KÖSTER is a specialist welding company. Our welding work is certified in compliance with DIN EN 1090-2 up to execution class EXC3 (dynamically stressed construction parts). We also hold the corresponding EU certification up to this execution class for a "factory production control system for load-bearing steel structures". We monitor the quality of our welding processes and are certified in compliance with DIN EN ISO 3834-2.

The KÖSTER foundry is approved as a materials manufacturer and certified accordingly by among others Germanischer Lloyd (GL), Lloyds Register (LR) and Buero Veritas (BV).

→ Project development in dialogue down to the very last detail

You, our customers, are the experts when it comes to the use of your pumps. We are the specialists for their development, construction and manufacture.

Large pumps are long-term capital assets that we construct with our technical know-how. But development comes before construction. We, the pump consultants at KÖSTER, design the machine in dialogue with you, our customers, so that you get exactly the right pump for your needs.

Together with you we determine the required duty point, the capacity and the delivery head of your pump. We also mutually define the properties of the machine in dependency on the composition of the medium to be conveyed. We clearly define the interface to the structure where the pump is to be operated and submit to you all the versions that would be expedient for your construction project.

KÖSTER constructs special machines with an in-house production depth that has become one of its kind on the market. Once you have placed your order with us we get down to actual production. All our customers can participate in the constructive development of their pumps at KÖSTER - right down to the very last detail.

Whether you are a planner, builder-owner or user, whether it is references, questionnaires, dimension drawings, tender texts or a personal consultation you are interested in: please feel free to contact us.

The primary intention of this catalogue is to provide some basic concepts that will come in useful for your talks with our pump consultants. Together we will first put your project into concrete terms, so we can then go and bring it about.

We would be more than glad to provide you with any information expedient for your individual project over and above what you will find in this catalogue.



Picture above:
The head office of KÖSTER - the office building with a view of the foundry

Picture left:
The propeller, the "heart of the pump"

➔ **References and Projects**
satisfied customers, worldwide

Pump technology made by KÖSTER - in operation worldwide

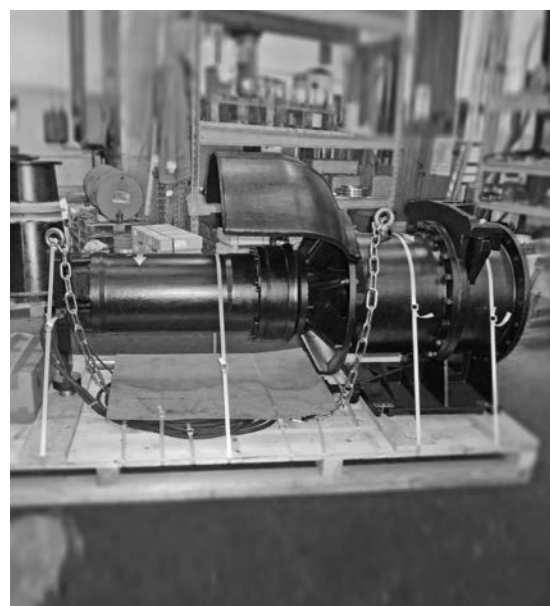
A multitude of reference projects bear impressive testimony to the various fields of application of our pumps. At the same time, they are proof of our global sphere of action.



Pump Station Luneplate
VP 900 vertical propeller pump
2,600 l/s 3.6 m 160 kW



Pump Station Avedore Holme (Copenhagen, Denmark)
VPH 800 vertical propeller pump, suspended
1,700 l/s 8.0 m 200 kW



Pump Station Aalbeek Siel
HUP 600 horizontal submersible motor pump
1,200 l/s 3.0 m 55 kW



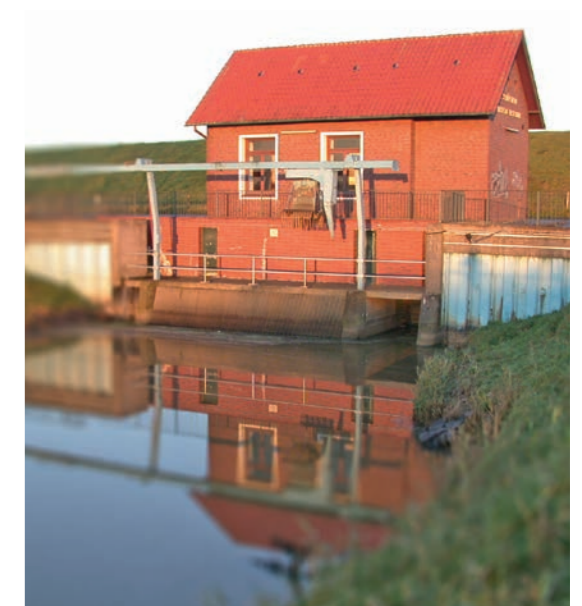
Large pump for the pump station Dahme
VP 1200 vertical propeller pump
4,000 l/s 3.4 m 220 kW



Dock pump on the Persian Gulf
VKP 1400 vertical mixed flow pump
6,670 l/s 20 m 1,800 kW



Pump Station Brunsbüttel-Nord
VPH 1400 vertical Propeller pump, suspended
6,000 l/s 6.0 m 560 kW



Pump Station Haselau
VP 1000 vertical propeller pump
3,400 l/s 5.0 m 250 kW



1.0

KÖSTER Pumps effectively good

So the Vertical Propeller pump with an outlet connection of 500 mm is therefore named VP 500.

KÖSTER names its pumps according to the series and the nominal diameter of the flange on the discharge side from which the pumping medium is discharged from the pump.

The hydraulic heart of a propeller pump consists of the impeller (propeller) and the diffuser. The propeller is equipped with three to six impeller blades. The seven to eleven blades of the diffuser are twisted three-dimensionally. The impeller gives the pumping medium the necessary pressure, but also generates an undesired whirl. The energy bound in this whirl is for the most part converted back into pressure between the diffuser blades.

The drive: our pumps are normally powered by a directly coupled electric motor. In cases where a high level of reliability is demanded or where there is no power supply available, we also use diesel motors with an angular gear. In other special applications an electric motor with a reduction gear can also be used to drive a pump.

Pumping media: suitable pumping media for our pumps include all aqueous fluids that have no long fibre, plait-forming, clogging or solid contents. Examples include surface, water, stormwater runoff, combined sewer overflow, cooling water, activated and return activated sludge in sewage treatment plants as well as leach.

Materials used: the materials used for KÖSTER pumps are for the most part metallic: black steel and stainless steel in various alloys including shipbuilding steel S235JR and on to high-alloy duplex stainless steel 1.4539; grey cast iron EN-GJL-250 to EN-GJS-400 from our own in-house foundry, corrosion-resistant aluminium bronze 2.0975.01 as well as cast steel and stainless steel.

Non-metallic materials: such as special hard rubber, elastomer-polymer composites or extremely hard ceramics made of silicon carbide are used in particular for the pumping-medium-lubricated bearings. Seals can be made of inorganic silicon carbide or plastics such as NBR, PTFE (Teflon) or can be organic and made of braided Ramie fibres.

Environmental performance: KÖSTER pumps cause virtually no particulate emissions from oil or greases. Acoustic emissions are also significantly minimised. We supply a spare part for every worn out pump component which we then replace, even after decades of service life. We use completely damaged machines as raw material in our foundry. Our special machines leave hardly any "ecological footprint" and have long been highly advanced where environmental questions are concerned.

1.01 Edge through experience

1.02 The basic types of the different series

1.03 Stable position on the market thanks to innovation

1.01 Edge through experience

Quality derived from knowledge

For over a hundred years KÖSTER has been developing, engineering and producing pumps with maximum in-house production depth. The quality of our products is the result of the interaction of technical expertise, state-of-the-art production technology and excellent materials from our own in-house foundry.

As one of the pioneers in this sector, Friedrich Köster recognised the great potential of a special type of rotary pump and so pressed ahead with the development of the propeller pump.

In the world of pump manufacture the name KÖSTER has stood, right up to the present day, for experience and the reliability and durability of its machines, whose service life is virtually equal to that of the structures surrounding them. KÖSTER pumps undergo continuous further development and are therefore always state-of-the-art.

1.02 The basic types of the different series

From grey cast iron to duplex stainless steel

In its corporate pump division KÖSTER focuses on two related products: axial or propeller pumps and mixed flow pumps.

KÖSTER pumps have a wide-spread range for delivery heads of from virtually zero up to 30 m and capacities from 100 l/s steplessly up to 8,000 l/s.

The delivery rate is determined by the diameter of the impeller, which is between 200 mm and 1,400 mm in our closely graduated program. The construction form of the pump is adapted to the interface to the respective structure.

Our pumps can be used for a multitude of different pumping media. From surface water right on through to aggressive aqueous media such as the hot caustic soda solutions from large industrial washing plants.

The materials used to produce our propeller pumps differ accordingly, of course. These range from grey cast iron right through to high alloy duplex stainless steel, which can even withstand the brine in seawater desalination plants.

KÖSTER Pumps Basic Types

	VP	VPH	IBP	VTP	HUP	VKP
Hydraulic type	axial	axial	axial	axial	axial	mixed flow
Size DN (mm)	200 - 1,200	250 - 1,400	300 - 1,200	350 - 1,350	250 - 1,200	350 - 1,400
Delivery head (m)	1 - 10	1 - 10	1 - 10	1 - 10	1 - 10	10 - 30
Capacity (l/s)	50 - 5,000	100 - 8,000	200 - 4,500	200 - 6,000	200 - 4,500	200 - 7,000
Motor power (kW)	5.5 - 500	5.5 - 800	5.5 - 400	7.5 - 600	7.5 - 600	30 - 2,000
Rotor assembly extractable	yes	no	optional	-	no	no
Reverse operation optional	yes	yes	yes	no	yes	yes
Orientation of the pump shaft ¹	V	V	V/H	V	H	V
Driving motor ²	E/D	E/D	E	T	T	E/D
Installation of the motor	dry	dry	dry	submerged	submerged	dry
Shaft guide bearing ³	F/G/K/E	F/G/K/E	F/G/K/E	ohne	ohne	F/G/K/E

1) V = vertical, H = horizontal

2) E = electric motor, D = diesel motor, T = submerged motor IP 68

3) F = grease lubricated slide bearing, G = rubber shaft bearing, K = ceramic bearing, E = elastomer-polymer composite

Should interfaces to the structure, properties of the pumping medium or any other project-related aspects require it, we realise every other construction that deviates from these basic types in our different pump series.

1.03 Stable position on the market thanks to innovation

Technical finesse

KÖSTER is the inventor of the fibre-repellent blade profiles. These clean themselves passively. This development, which up until the present day has remained the market standard, was patented for KÖSTER as long ago as 1930.

When dismantled the blades of the propeller of our pumps can be loosened and shifted in order to adjust the capacity and the delivery head of the pumps.

KÖSTER pumps also offer the unique option of reverse operation. This allows any foreign matter that has penetrated to be propelled out of the pump in the reverse direction to pumping. This active self-cleaning of the pump means that most failures can be remedied without the need of dismantling the pump.

2.01	VP	Vertical propeller pump
2.02	VPH	Vertical propeller pump, suspended
2.03	VKP	Vertical mixed flow pump
2.04	VTP	Vertical submersible motor propeller pump
2.05	HUP	Horizontal submersible motor propeller pump
2.06	IBP	Inline elbow pump
2.07	DIP	Double-elbow inline pump
2.08	UWP	Recirculation propeller pump
2.09	NPR	Low-pressure recirculation pump



2.0 Series versatile use

Due to the shape of the impeller, which is similar to that of a ship's propeller, all propeller pumps have similar hydraulic properties. However, their fields of operation and their applications vary greatly depending on the requirements of the operator.










The housing of the pump is adapted to its area of application. Many large pumps simply lift the water; they pump the water out of one very large reservoir and discharge it into another one. That is why the inlet and outlet of the vertical pump housing is "open". There is no or only a very short discharge pipe, the delivery head sometimes only reaches the installation height of the pump.

Other pumps draw the pumping medium from a pipe and discharge it in the same way, often already pressurised, frequently horizontally as part of a pressure pipeline.

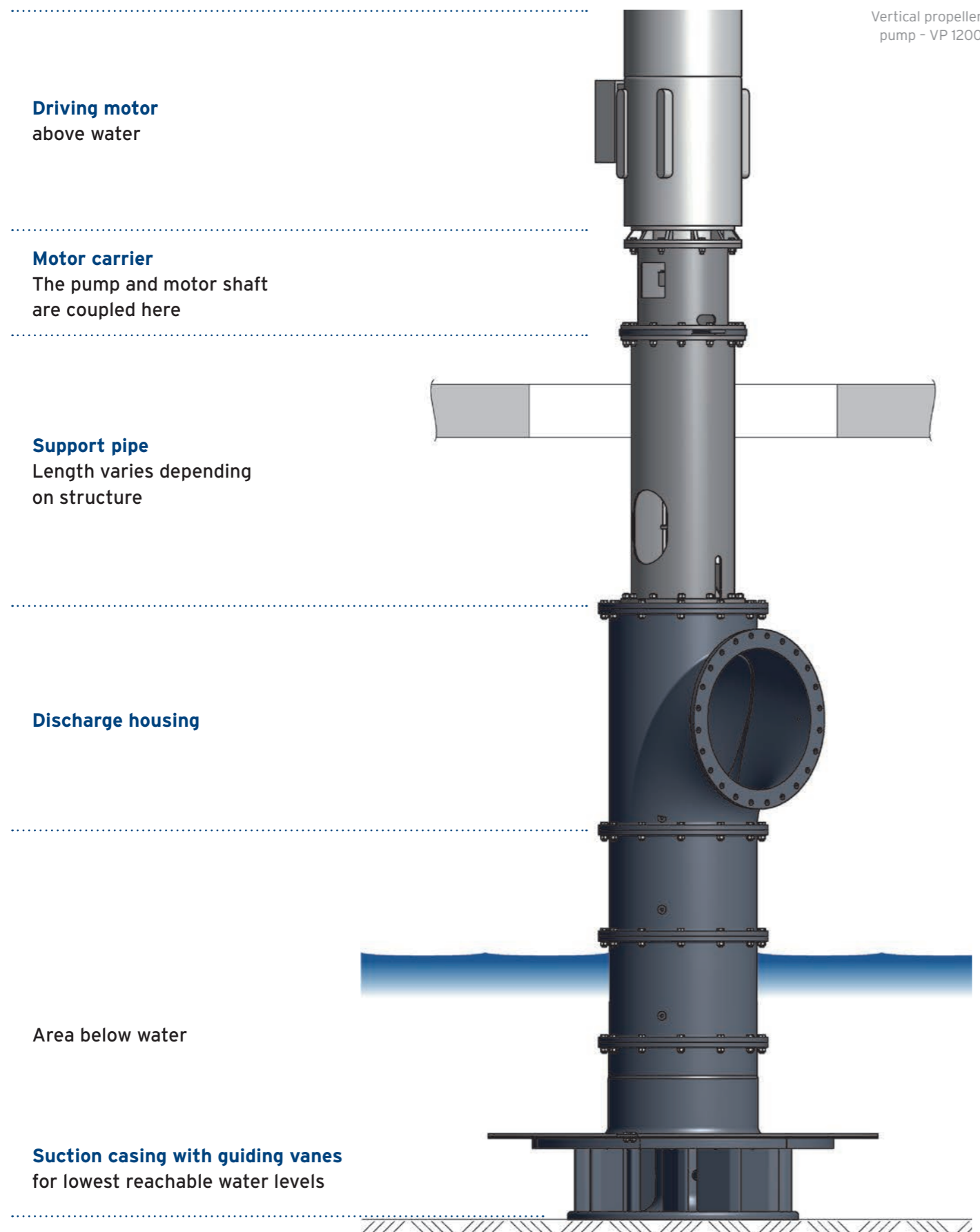
An electric motor, which functions from almost every installation position, is usually used to drive the pump. If there is no power supply available or none is desired, the pump can be driven by a diesel motor. This only works with a horizontal shaft, so an angular gear is necessary here.

The shape and material of the impeller blades are adapted to the special properties of the pumping medium.

Selected fields of application

 Agricultural irrigation and drainage	 Industrial use	 Emptying of docks and polders
 Stormwater runoff / combined sewer overflow	 Feeding of cooling towers	 Filling of lock chambers
 Recirculation / circulation	 Water treatment for seawater desalination plants	 Flood protection and inland drainage

2.01 VP Vertical propeller pump



Vertical propeller pump - VP 1200

Driving motor
above water

Motor carrier
The pump and motor shaft
are coupled here

Support pipe
Length varies depending
on structure

Discharge housing

Area below water

Suction casing with guiding vanes
for lowest reachable water levels

Particularly suited for pumping stations

This vertical tubular casing pump stands on the bed of the pumping chamber. It transmits its own weight, the water load on in the propeller and the weight of the motor to the bed via its housing and housing base.

This type of pump provides high capacities at low heights and is used in pumping stations for irrigation and drainage, for precipitation and combined sewer overflow, in waterworks and in industrial water supply systems.

It achieves the lowest pumpdown level of all propeller pumps and is suitable for the conveyance of pure or pre-treated, predominantly chemically-neutral fluids at temperatures of up to 60°C.

Characteristics

- > The pump base is designed as an inlet guide vane and stands on the concrete bed of the pumping chamber (deep pump-down level). This means the building construction need not be so deeply integrated into the subsurface and this in turn leads to a significant reduction of building costs
- > The pump running gear (shaft, shaft casing, impeller, bearing star) can be extracted completely from the tubular housing making repair work, for example, far simpler
- > The propeller blades fixed to the hub of the propeller can be adjusted individually allowing subsequent adjustment of the duty point of the pump
- > The complete submerged part of the pump (pump base, tubular housing, discharge housing) is made of grey cast iron and therefore extremely resistant to corrosion
- > The pump can operate in the reverse direction for a short time (approx. 20 seconds). This frees the impeller of any foreign matter. This in turn means that approx. 80% of all failures arising from clogged impellers are remedied without having to dismount the pump
- > Shaft and shaft guide bearings are separated from the rising flow of water by a sturdy tubular casing
- > We offer the shaft guide bearings with pumping medium lubrication and supply them in three different material pairs. Grease lubrication is also possible
- > Depending on requirements we produce the propeller blades and shaft in different materials, these range from grey cast iron to super duplex stainless steel
- > A large shaft diameter and sufficient intermediate bearing ensure extremely smooth running
- > A discharge housing segment ensures streamlined deflection of the pumping media
- > The coating system differs according to customers demand and is always applied in several layers by hand

* grease lubricated slide bearing, G = rubber shaft bearing, K = ceramic bearing, E = elastomer-polymer composite

Technical data

VP
Vertical propeller
pump

Hydraulic type
axial

Size DN (mm)
200 - 1,200

Delivery head (m)
1 - 10

Capacity (l/s)
50 - 5,000

Motor power (kW)
5.5 - 500

Rotor assembly extractable
yes

Reverse running mode optional
yes

Orientation of the pump shaft
vertical

Driving motor
electric or diesel

Installation of the motor
dry

Shaft guide bearing*
F/G/K/E

Particularly suitable applications



2.02 VPH Vertical propeller pump, suspended

Motor carrier
The pump and motor shaft are coupled here

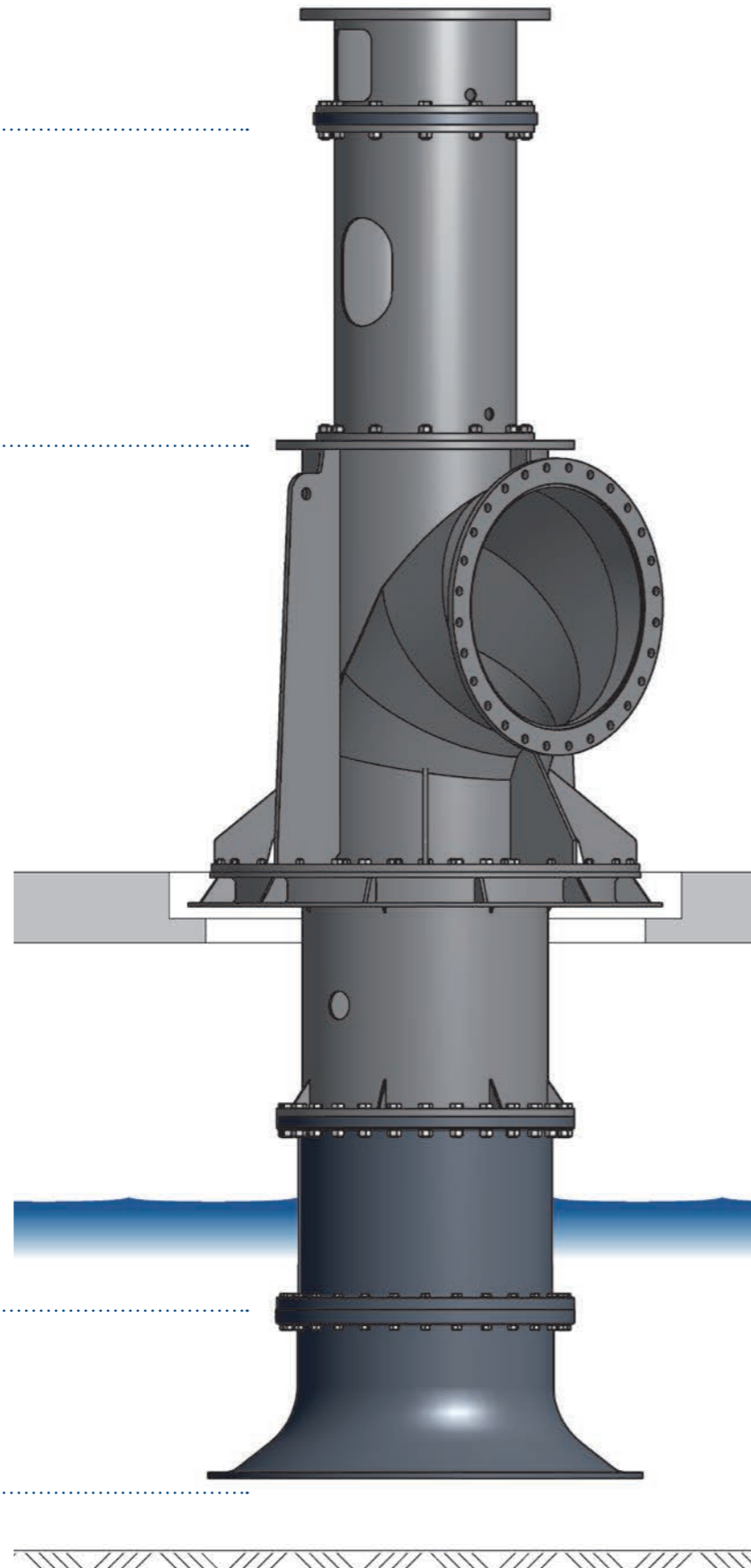
Support pipe
Length varies depending on structure

Discharge housing

Support frame - connection element between the structure and the pump

Riser pipe
Adapts to structure below the floor

Suction bell
hydraulically optimised



Vertical propeller pump, suspended - VPH 1400 (shown without motor)

For the highest delivery rates

This vertical tubular casing pump has supports or is installed on a reinforced concrete floor with a supporting frame. Its use is recommended in cases where there is no solid pumping station bed to accommodate the vertical version (VP) or the bed is too deep down.

This propeller pump achieves the highest delivery rate of all KÖSTER pumps. It is suitable for the conveyance of pure or pre-treated, predominantly chemically-neutral fluids at temperatures of up to 60°C.

This type of pump is used primarily in pumping stations for irrigation and drainage, for precipitation and combined sewer overflow, in waterworks and in industrial water supply systems.

Characteristics

- > The propeller blades fixed to the hub of the propeller can be adjusted individually allowing subsequent adjustment of the duty point of the pump
- > The discharge housing can be arranged both above or below the floor
- > The pump can operate in the reverse direction for a short time (approx. 20 seconds). This frees the impeller of any foreign matter. This in turn means approx. 80% of all failures arising from clogged impellers are remedied without having to dismount the pump
- > We offer the shaft guide bearings with pumping medium lubrication and supply them in three different material pairs. Grease lubrication is also possible
- > Depending on requirements we produce the propeller blades and shaft in different materials, from grey cast iron to super duplex stainless steel
- > A multiple segmented discharge housing is used for streamlined deflection of the pumping medium
- > An hydraulically optimised suction bell accelerates the pumping medium with minimum turbulence
- > A large shaft diameter and sufficient intermediate bearing ensure extremely smooth running
- > The coating system differs according to customer demand and is always applied in several layers by hand

* F = grease lubricated slide bearing, G = rubber shaft bearing, K = ceramic bearing, E = elastomer-polymer composite

Technical data

VPH
Vertical propeller pump, suspended

Hydraulic type
axial

Size DN (mm)
250 - 1,400

Delivery head (m)
1 - 10

Capacity (l/s)
100 - 8,000

Motor power (kW)
5.5 - 800

Rotor assembly extractable
no

Reverse running mode optional
yes

Orientation of the pump shaft
vertical

Driving motor
electric or diesel

Installation of the motor
dry

Shaft guide bearing*
F/G/K/E

Particularly suitable applications



2.03 VKP Vertical mixed flow pump

Motor carrier
The pump and motor shaft are coupled here

Discharged housing
with reinforcing ribs

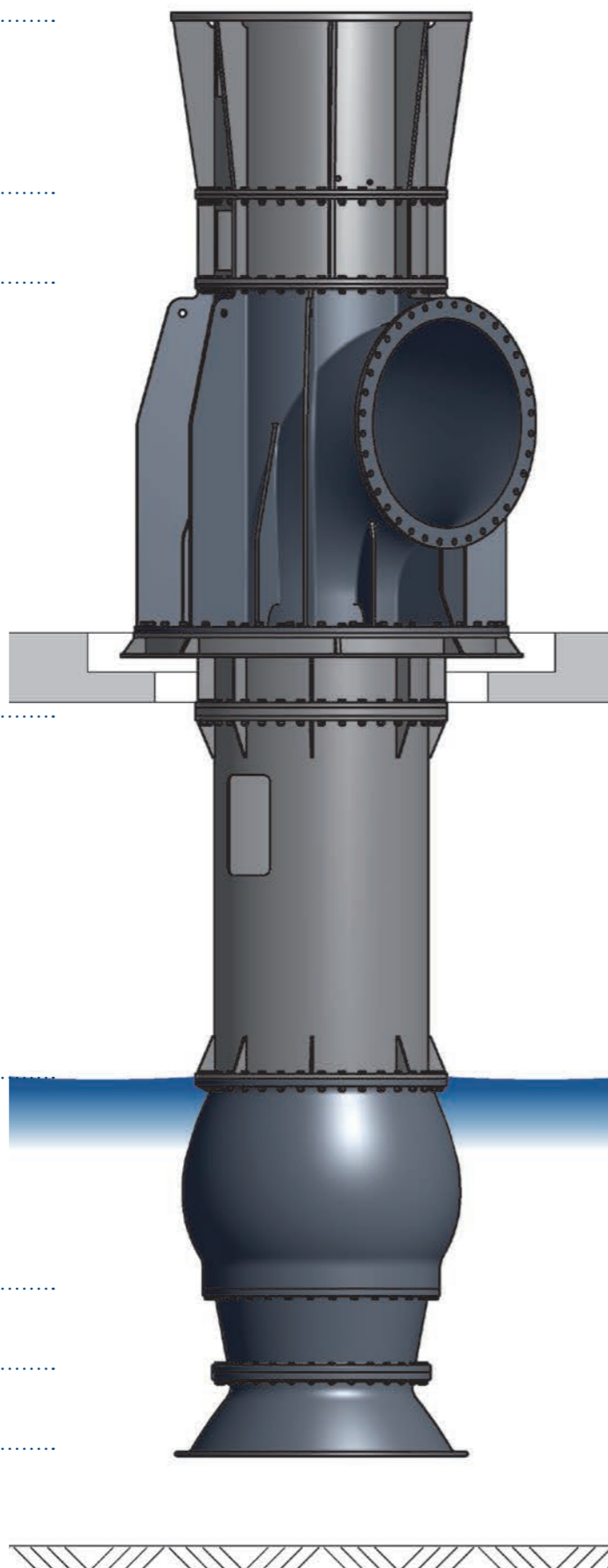
Support frame -
connection element
between the structure
and the pump

Riser pipe
adapts to structure below the floor

Guide vanes housing

Impeller housing

Suction bell



Vertical mixed flow pump - VKP 1400
(shown without motor)

For docks, locks and cooling towers

The construction of vertical, single-stage mixed flow pumps is very similar to that of propeller pumps. However, due to the different shape of their impellers, mixed flow pumps can lift very large volumes of water to delivery heads of up to 30 m.

Impeller and diffuser are submerged in the pumping medium. The open impeller has a fixed, cast-on blading.

Mixed flow pumps convey pure or lightly contaminated fluids, typically in pumping stations for precipitation and combined sewer overflow, hydroelectric power plants and other power plants, in docks and locks as well as in industrial water supply systems.

Characteristics

- > The open, mixed-flow impeller with fixed blades is made of corrosion- and cavitation-resistant materials
- > The discharge housing can be arranged both above or below the floor
- > Impeller and guide vanes are designed using the latest CFD (Computational Fluid Dynamics) software
- > A large shaft diameter and sufficient intermediate bearing ensure extremely smooth running
- > We offer the shaft guide bearing with pumping medium lubrication and supply it in three different material pairs. Grease lubrication is also possible
- > The coating system differs according to customers demand and is always applied in several layers by hand

Technical data

VKP
Vertical mixed flow pump

Hydraulic type
mixed flow

Size DN (mm)
350 - 1,400

Delivery head (m)
10 - 30

Capacity (l/s)
200 - 7,000

Motor power (kW)
30 - 2,000

Rotor assembly extractable
no

Reverse running mode optional
yes

Orientation of the pump shaft
vertical

Driving motor
electric or diesel

Installation of the motor
dry

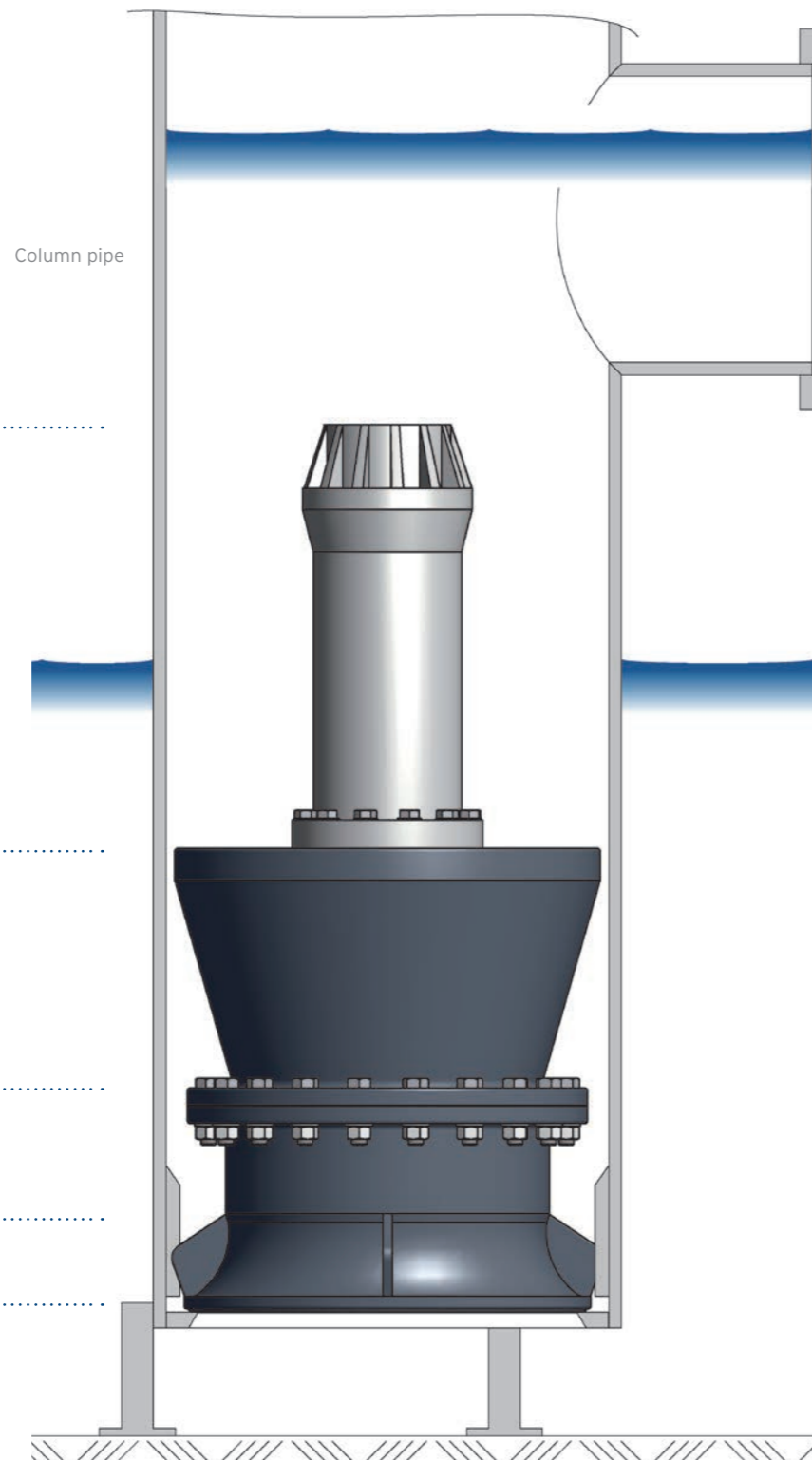
Shaft guide bearing*
F/G/K/E

Particularly suitable applications



* F = grease lubricated slide bearing, G = rubber shaft bearing, K = ceramic bearing, E = elastomer-polymer composite

2.04 VTP Vertical submersible motor propeller pump



Vertical submersible motor propeller pump - VTP 550

Fast installation - barely audible operation

This single-stage underwater pump operates in a steel column pipe. For this purpose the very compact block unit is set into the column pipe and arrests itself without the need of screws. As its motor is submerged, this type of pump needs no overground building. A control cabinet in the open air is sufficient. The arrangement of the motor under water dampens the noise generation.

The propeller diameters of the different pump sizes require shaft pipes with diameters of between 600 and 1,800 mm.

This type of pump is suitable for the conveyance of pure or pre-treated, predominantly chemically-neutral fluids at temperatures of up to 60°C. So the pumping medium should as far as possible be free of any coarse, fibrous contents, because reverse movement is structurally not possible. This type of pump is used typically in pumping stations for irrigation and drainage, for precipitation and combined sewer overflow, for recirculation, in flood protection systems and inland drainage as well as in industrial water supply systems.

Characteristics

- > The pump is driven by a submerged three-phase asynchronous motor (Protection Class IP68)
- > The propeller is arranged on the shaft of the motor and overhung
- > The angles of the blades are pre-set, but can be changed manually
- > The desired delivery head is determined by the number of propeller blades (3-6)
- > The blade geometry is fibre-repellent and self-cleaning
- > The active components of the motor are seated in permanently-lubricated, generously dimensioned roller bearings that have a long service life
- > There are two mechanical sealings arranged in tandem and assembled between the motor housing and the shaft that prevent any water from penetrating the motor
- > KÖSTER produces the column pipe for this pump in different designs and materials

Technical data

VTP
Vertical
submersible motor
propeller pump

Hydraulic type
axial

Size DN (mm)
350 - 1,350

Delivery head (m)
1 - 10

Capacity (l/s)
200 - 6,000

Motor power (kW)
7.5 - 600

Pump extractable
yes

Reverse running mode
optional
no

Orientation of the pump shaft
vertical

Driving motor
submersible motor

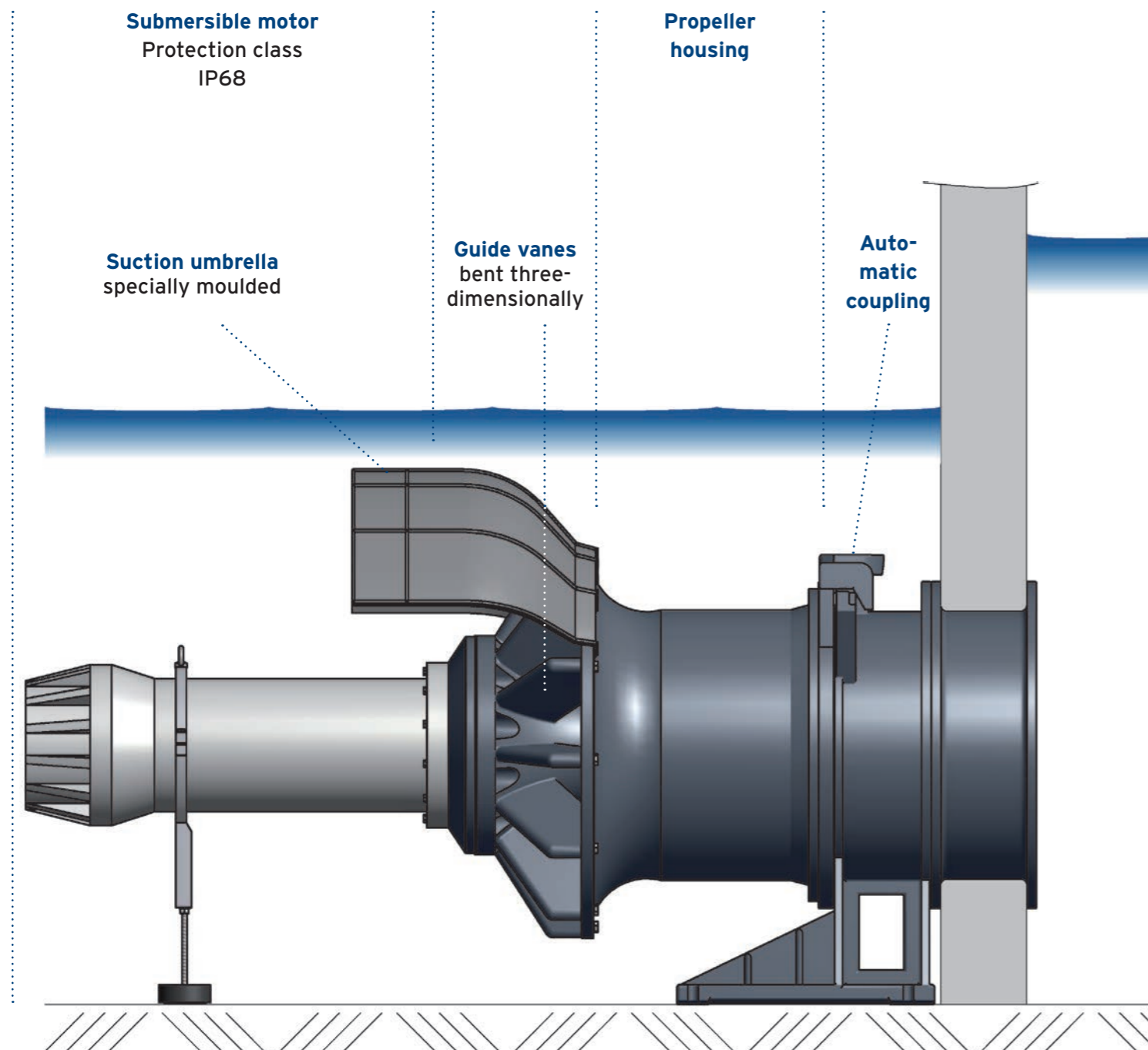
Installation of the motor
submerged

Shaft guide bearing
none

Particularly suitable applications



2.05 HUP Horizontal submersible motor propeller pump



Horizontal submersible motor propeller pump - HUP 600

With no deflection losses

This single-stage horizontal underwater pump has an automatic coupling to the discharge pipe. It can be mounted and dismantled while the pump chamber is flooded. The pump is guided here on a special rod.

Due to the horizontal orientation of the pump, the pumping medium flows in the discharge pipe without being deflected by the pump. The motor is installed on the suction side so the motor cables lie in the quiet body of water and are not mechanically stressed by turbulent flows.

This type of pump is suitable for the conveyance of pure or pre-treated, predominantly chemically-neutral fluids at temperatures of up to 60°C and is used typically in pumping stations for irrigation and drainage, for precipitation and combined sewer overflow, for recirculation, in flood protection systems and inland drainage as well as in industrial water supply systems.

Characteristics

- > The pump is driven by a submerged three-phase asynchronous motor (Protection Class IP68)
- > The propeller is arranged on the shaft of the motor and overhung
- > The pump is installed horizontally and couples automatically with the discharge pipe
- > The angles of the blades are pre-set, but can be changed manually
- > The desired delivery head is determined by the number of propeller blades (3-6)
- > The blade geometry is fibre-repellent and self-cleaning
- > The active components of the motor are seated in permanently-lubricated, generously dimensioned roller bearings that have a long service life
- > There are two mechanical sealings integrated in the motor housing that reliably prevent any pumping media from penetrating the motor

Technical data

HUP
Horizontal submersible motor propeller pump

Hydraulic type
axial

Size DN (mm)
250 - 1,200

Delivery head (m)
1 - 10

Capacity (l/s)
200 - 4,500

Motor power (kW)
7.5 - 600

Pump extractable
yes

Reverse running mode
optional
yes

Orientation of the pump shaft
horizontal

Driving motor
submersible motor

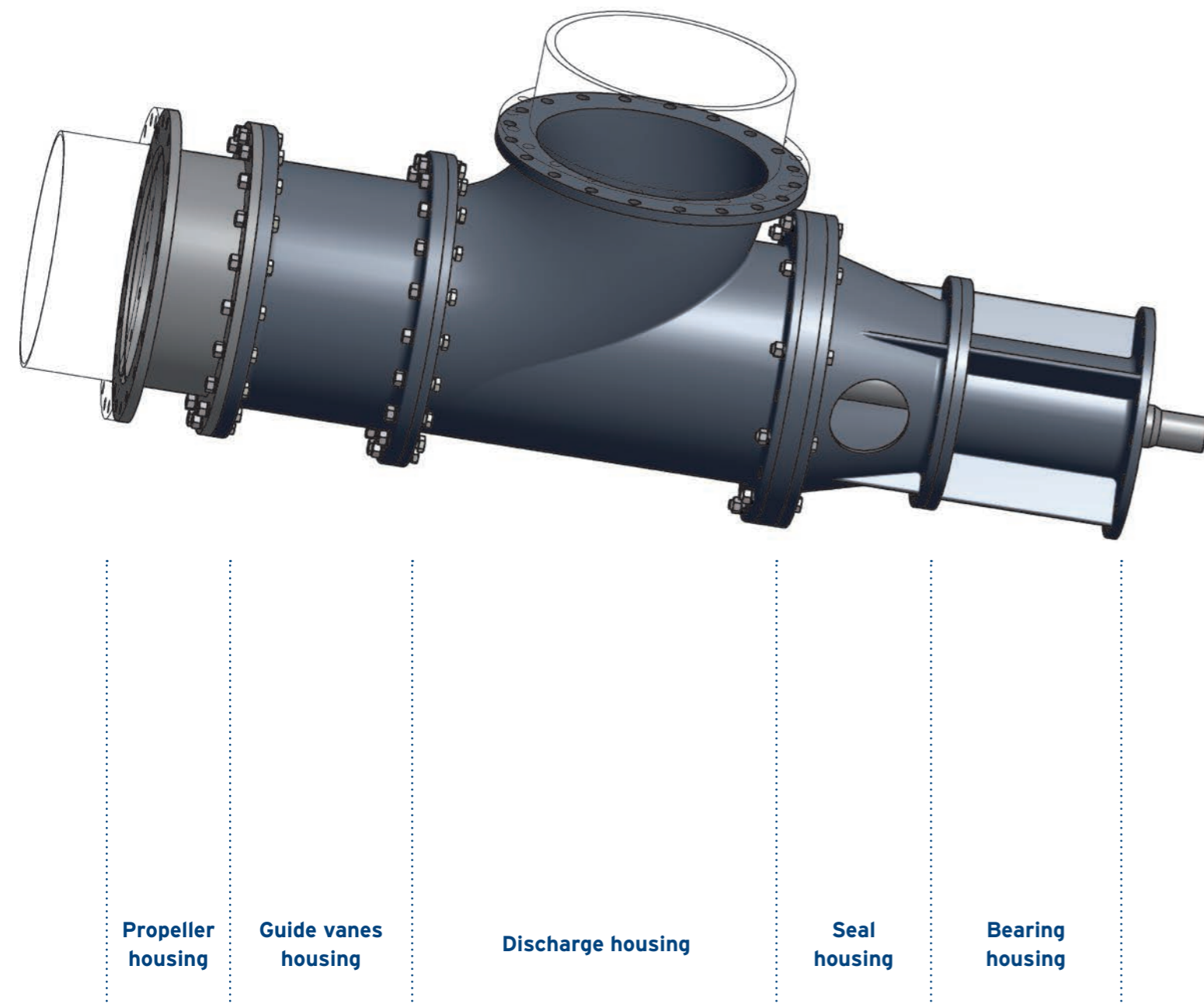
Installation of the motor
submerged

Shaft guide bearing
none

Particularly suitable applications



2.06 IBP Inline elbow pump



Inline elbow pump - IBP 500
(shown without motor)

Fits into pipe systems

This propeller pump can be installed in pipe systems horizontally or vertically. It is therefore recommended for plant construction, because the pumping medium in this case already flows via a pipe system. This type of pump has an optional back pull-out design, a feature that makes maintenance and cleaning work a lot easier.

This recirculation pump is suitable for the conveyance of water and aqueous fluids such as leaches, dilute acids, brines in closed pipe systems of industrial plants. This type of pump is used primarily in wastewater treatment plants, in which biological treatment is carried out after the activated sludge process, in which the flows (return activated sludge, recirculation) are moved permanently "in a circuit". It is equally suited for use as a so-called booster pump, where it simply increases the pressure in a pipeline.

Characteristics

- > The horizontal axle of the motor is flange-mounted, as a rule in construction type IMB3 and Protection Class IP55
- > The rotor assembly (shaft, shaft casing, impeller, bearing star) can be optionally extracted completely from the tubular housing. The pipe does not have to be opened
- > The sturdy bearing housing has roller bearings with an extremely long service life
- > The propeller blades fixed to the hub of the propeller can be adjusted individually allowing subsequent adjustment of the duty point of the pump
- > We offer the shaft guide bearings with pumping medium lubrication and supply them in three different material pairs. Grease lubrication is also possible
- > Depending on requirements we produce the propeller blades and shaft in different materials, from grey cast iron to super duplex stainless steel
- > The coating system differs according to customers demand and is always applied in several layers by hand

Technical data

IBP
Inline elbow pump

Hydraulic type
axial

Size DN (mm)
300 - 1,200

Delivery head (m)
1 - 10

Capacity (l/s)
200 - 4,500

Motor power (kW)
5.5 - 400

Rotor assembly extractable
optional

Reverse running mode
optional
yes

Orientation of the pump shaft
vertikal oder horizontal

Driving motor
electric

Installation of the motor
dry

Shaft guide bearing*
F/G/K/E

Particularly suitable applications



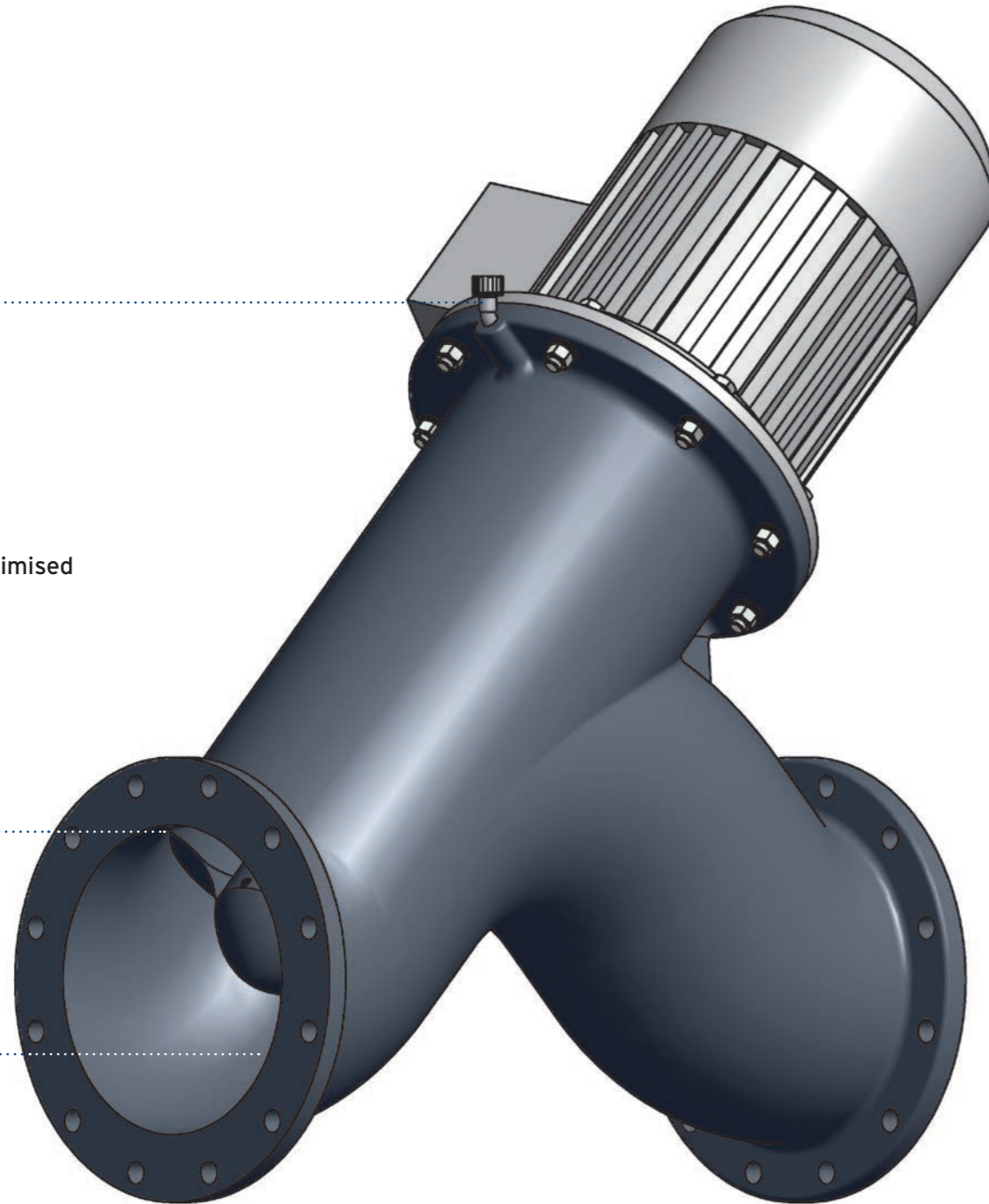
* F = grease lubricated slide bearing, G = rubber shaft bearing, K = ceramic bearing, E = elastomer-polymer composite

2.07 DIP Double-elbow inline pump

Driving motor

Pump housing
hydraulically optimised

Impeller



Double-elbow inline
pump - DIP 300

Freely positionable

This circulation pump conveys aqueous fluids in the chemical industry, in plant constructions, for the treatment and purifying of drinking water and wastewater. It provides high capacities at low heads, the reason why propeller hydraulics are used.

Thanks to its short overall length and parallel flanges, the double-elbow inline pump from KÖSTER is ideally suited for installation in every straight pipeline.

No pipes with a 90° bend angle are needed, so there are no compromises where hydraulic or structural requirements or questions of structural layout are concerned.

Characteristics

- > The pump hydraulics operate with very low loss of efficiency without guide vanes housing. So no fibres or plait-forming contents can get entangled
- > The hydraulically-optimised pump housing is made of grey lamellar graphite cast iron (EN-GJL-250), the impeller is made in one piece from spheroidal graphite cast iron (EN-GJS-400)
- > The propeller and the housing are designed using the latest CFD (Computational Fluid Dynamics) software and are university-tested
- > The pump can operate in the reverse direction for a short time (approx. 20 seconds). This frees the impeller of any foreign matter. This in turn means approx. 80% of all failures arising from clogged impellers are remedied without having to dismount the pump
- > The propeller is arranged on the shaft of the motor
- > The industrial motor is designed for continuous operation
- > A mechanical sealing is integrated in the motor housing that reliably prevent any pumping media from penetrating the motor

Technical data

DIP
Double-elbow
inline pump

Hydraulic type
axial

Size DN (mm)
as of 300

Delivery head (m)
0.5 - 3

Capacity (l/s)
as of 100

Motor power (kW)
as of 4

Rotor assembly
extractable
no

Reverse running mode
optional
yes

Orientation of the
pump shaft
diagonal

Driving motor
electric

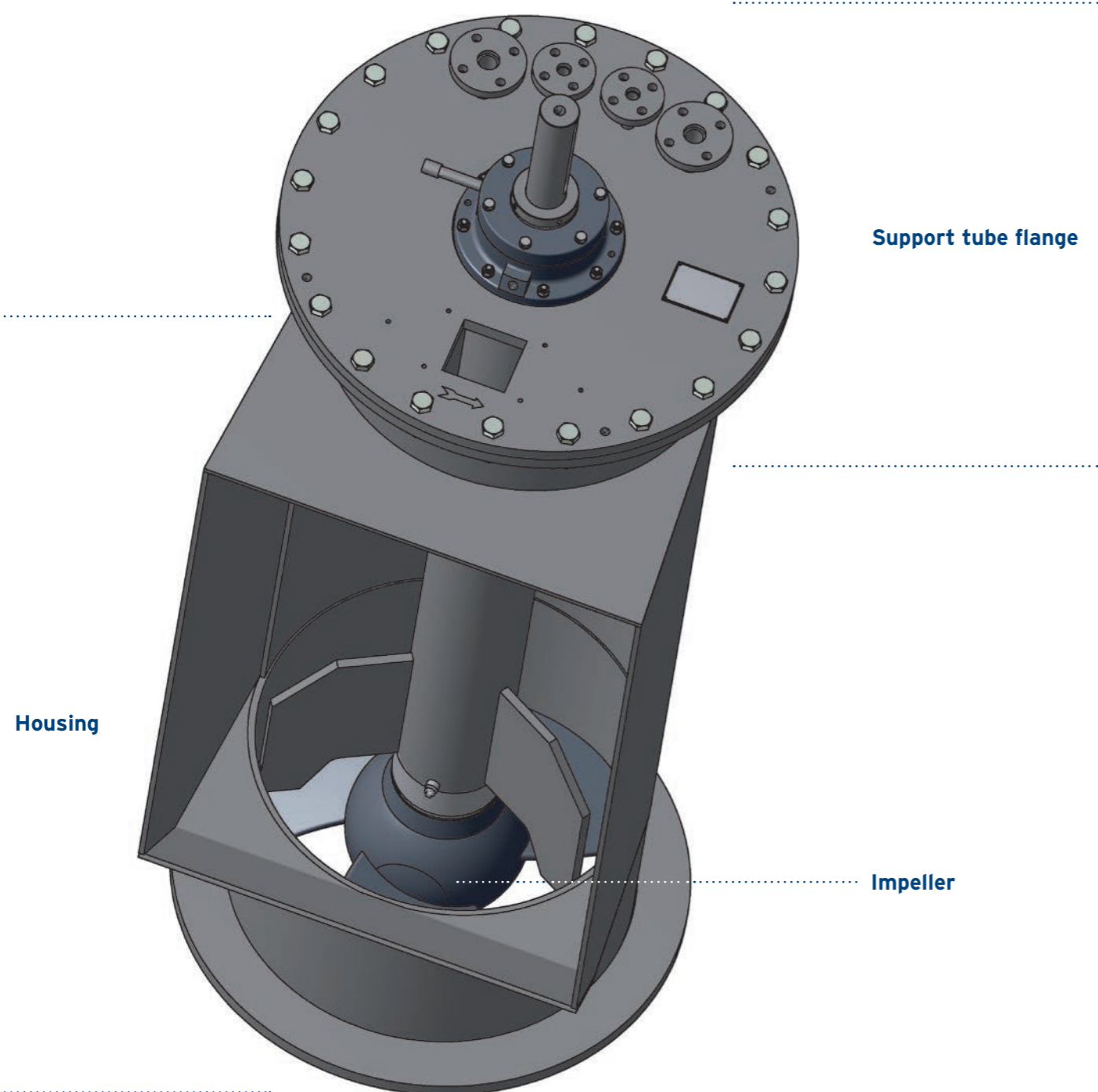
Installation of the
motor
dry

Shaft guide bearing
none

Particularly suitable
applications



2.08 UWP Recirculation propeller pump



Recirculation propeller pump - UWP 600
(shown without motor)

In variable sizes - customised

This type of pump is an impressive example of the individual customer-orientated pump development at KÖSTER - right down to the last detail. It is developed in accordance with the individual specifications of a customer.

The UWP is intended for the conveyance of aggressive, boiling hot sodium leach. For this reason all the materials used are light copper-free metals; the slide bearings, for example, are made of silicon carbide. The UWP can handle pumping media that contain cellulose fibres of varying sizes and chemicals.

The extremely tight tolerances in the complex welding processes used in the production of the pump housing ensure that the running gear of the pump can be replaced in any installations.

There are four flush nozzles in the support tube flange for the dosing of chemicals, such as stabilisers or defoamers. These substances are required in various processes. They are added to the pumping medium directly upstream of the pump impeller. The turbulence here guarantees that even the smallest doses are distributed immediately and evenly in the pumping medium.

The weld seams of the housing are effected in visible quality, the entire pump construction including the generously dimensioned bearings can withstand three-shift operation even under the toughest conditions.

Characteristics

- > The rotor assembly (shaft, shaft casing, impeller, bearing star) can be extracted completely from the tubular housing and can be replaced. The pipe does not have to be opened
- > In most installations the pump runs in three-shift operation
- > The propeller blades are made of spheroidal graphite cast iron
- > The sleeve bearings are made of extremely hard and chemically inert silicon carbide

Technical data

UWP
Recirculation
propeller pump

Hydraulic type
axial

Size DN (mm)
as per customer
specifications

Delivery head (m)
up to 2

Capacity (l/s)
800

Motor power (kW)
7.5

**Rotor assembly
extractable**
yes

Reverse running mode
optional
no

**Orientation of the
pump shaft**
vertical

Driving motor
as per customer
specifications

**Installation of the
motor**
dry

Shaft guide bearing
ceramic bearing

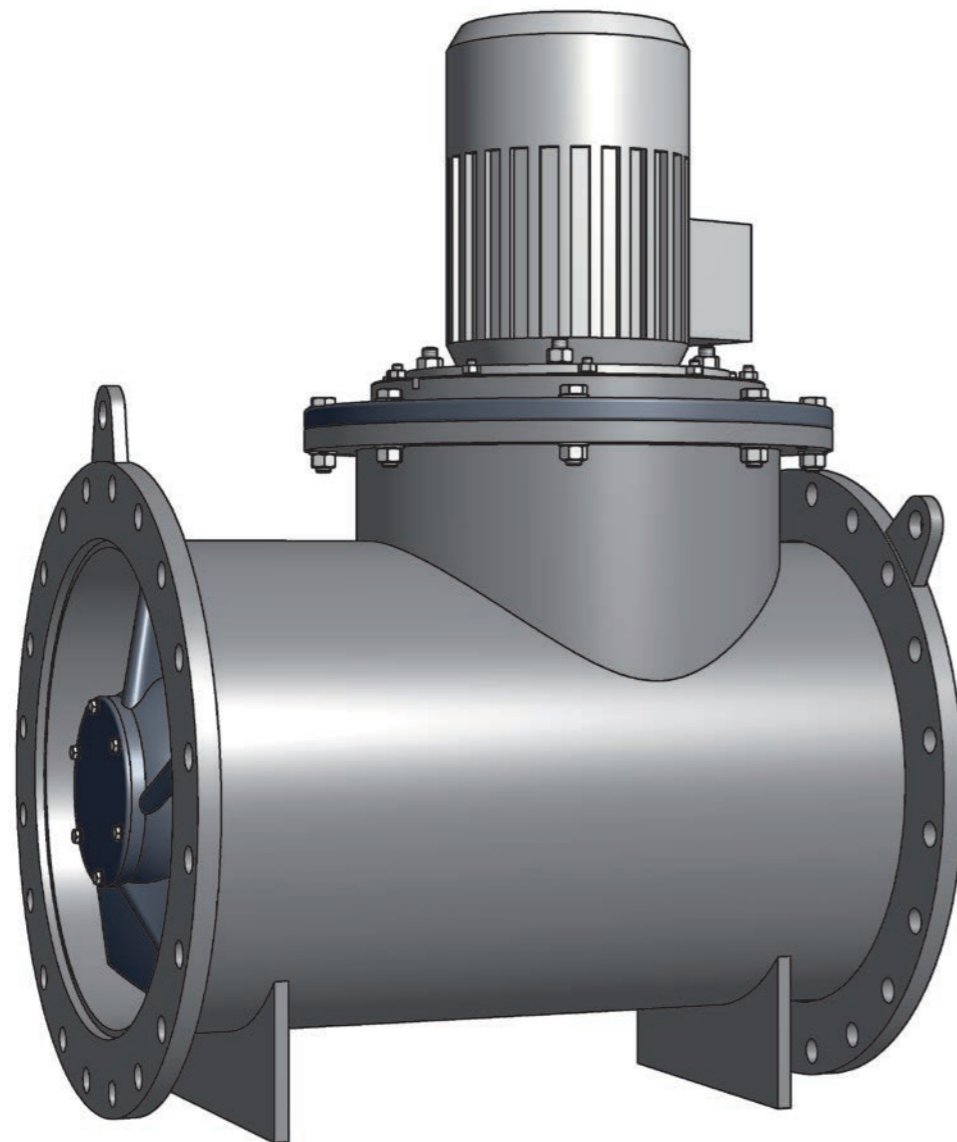
**Particularly suitable
applications**



2.09 NPR Low-pressure recirculation pump

Driving motor

Pump housing
with Impeller



Keeps fluids moving

This short horizontal propeller pump was used originally in the treatment of wastewater, where the fluid had to be conveyed from one tank in the treatment plant to another neighbouring one.

The special requirements of wastewater technology led to the construction of this pump for extremely low delivery heights (up to maximum 1.5 m) and with two different installation positions. All that is needed for installation under water with a submersible motor and an automatic quick coupling is a guide rod and coupling claws on the discharge side of the flange.

The important point for the version to be flanged into a dry pipe, i.e. above water, is that in addition to the high level of availability, the rotor assembly remains extractable. The angular gear and propeller are therefore designed in such a way that they can be completely swivelled out of a mounted pipe connection while the pump housing remains in the straight pipe line.

This type of pump is used typically in the tertiary (biological) treatment of wastewater as well as in plant construction and process engineering. Users in the field of plant and process engineering use this pump to boost the pressure of the pumping medium in order to compensate the losses that arise in long pipe lines due to wall friction.

In addition to active sludge and nitrification / denitrification, the NPR also conveys precipitation, surface and river water, pre-treated wastewater as well as industrial process water at temperatures of up to 60°C and other aqueous fluids.

Characteristics

- > The rotor assembly (propeller and angular gear) can be completely extracted from the pump housing
- > The angles of the blades are pre-set, but can be changed manually
- > The propeller is overhung
- > The propeller blades are fibre-repellent
- > The shape of the blades has been hydraulically optimised
- > The pump is driven by a standard or submersible motor with an angular gear
- > The watertight gearbox with its over-dimensioned, oil-lubricated roller bearings is protected from the pumping medium by two mechanical sealings

Technical data

NPR
Low-pressure
recirculation pump

Hydraulic type
axial

Size DN (mm)
300, 500, 800

Delivery head (m)
bis 2

Capacity (l/s)
up to 1,700

Motor power (kW)
up to 22

**Rotor assembly
extractable**
yes

**Reverse running mode
optional**
yes

**Orientation of the
pump shaft**
horizontal

Driving motor
electric

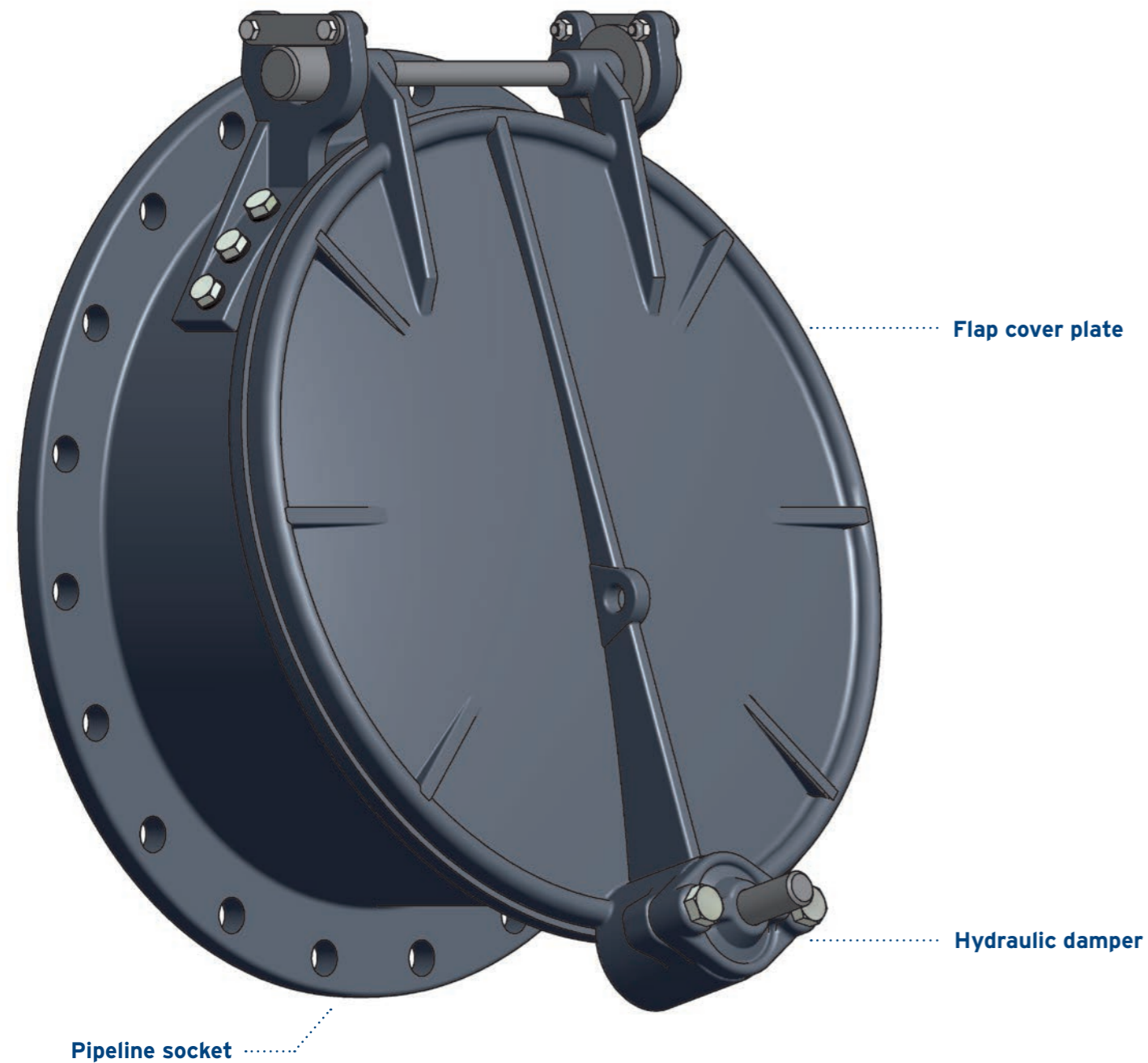
**Installation of the
motor**
dry / submerged

Shaft guide bearing
roller bearing

**Particularly suitable
applications**



3.01	Non return flap
3.02	Flat gate valve
3.03	Fittings and moulded parts



Non return flap - Type FB

3.0 Accessories from our own foundry

As a system supplier KÖSTER manufactures everything from a single source, from the smallest single part to the complete machine. This also applies to the accessories for large pumps described below that we have developed ourselves.

3.01 Non return flap

The type FB non return flap from KÖSTER opens if there is pressure on the inside and close when pressure is equalised or higher on the outside. They are used preferably at the end of the pressure pipe line of pumps in order to prevent the backflow of water when the pump is switched off.

The patented hydraulic damper prevents the flap cover banging thus preventing damage to the seal on the inside of the flap.

KÖSTER produces extremely stable non return flaps in corrosion-resistant grey cast iron.

Characteristics

- > Made of extremely robust and durable grey cast iron
- > Integrated hydraulic damper
- > The standard nominal widths are between 200 and 1,800 mm, we also produce other sizes and cross-section designs on request
- > Installation is expedient below the water level, but above water level is also possible
- > The preset pressure level is PN 0.6, but is adapted to every customer requirement
- > The coating system and flange connection dimensions depend on customer specification; connectors and seals can be supplied with delivery

3.02 Flat gate valve

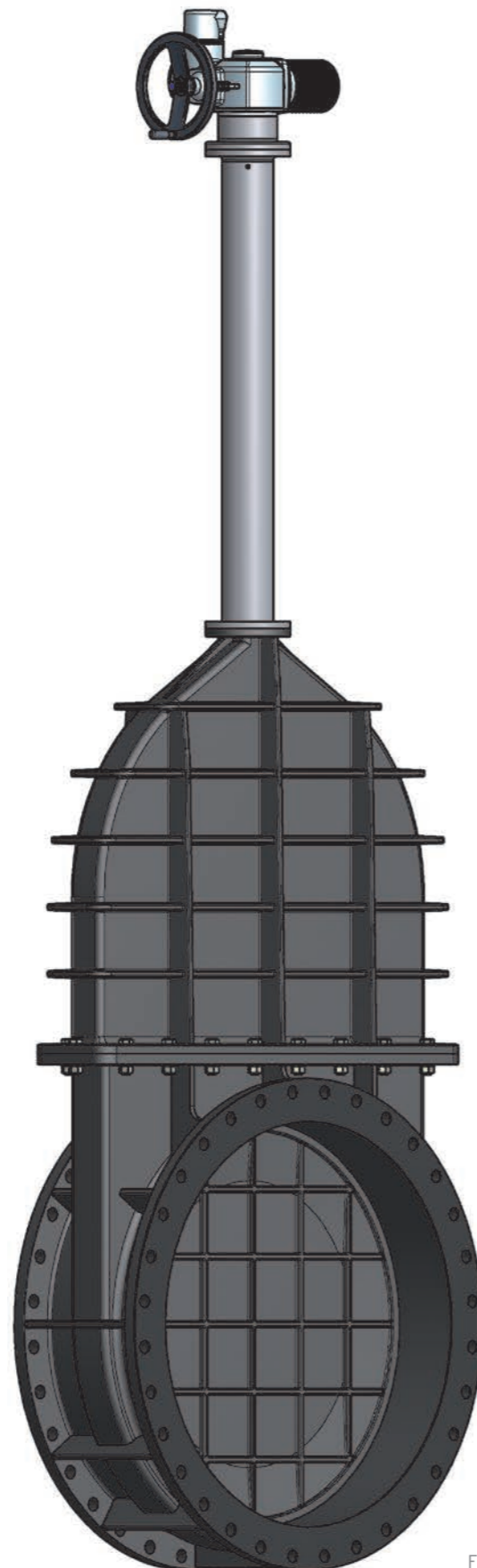
KÖSTER flat gate valves are used as shut-off devices in pipe lines, as emergency or supplementary locks in the pressure pipe lines of low pressure pumps, for shutting off downstream undersluices, container outlets, culverts, canals etc. They are suitable for all low-pressure systems that do not require an absolutely tight closure.

The sealing surfaces of the gate and the counter surfaces of the housing are planar and ensure a tightness that increases when pressure rises.

The flat gate valve is activated immediately, even after the longest downtimes, due to the play of the gate valve cover in its housing.

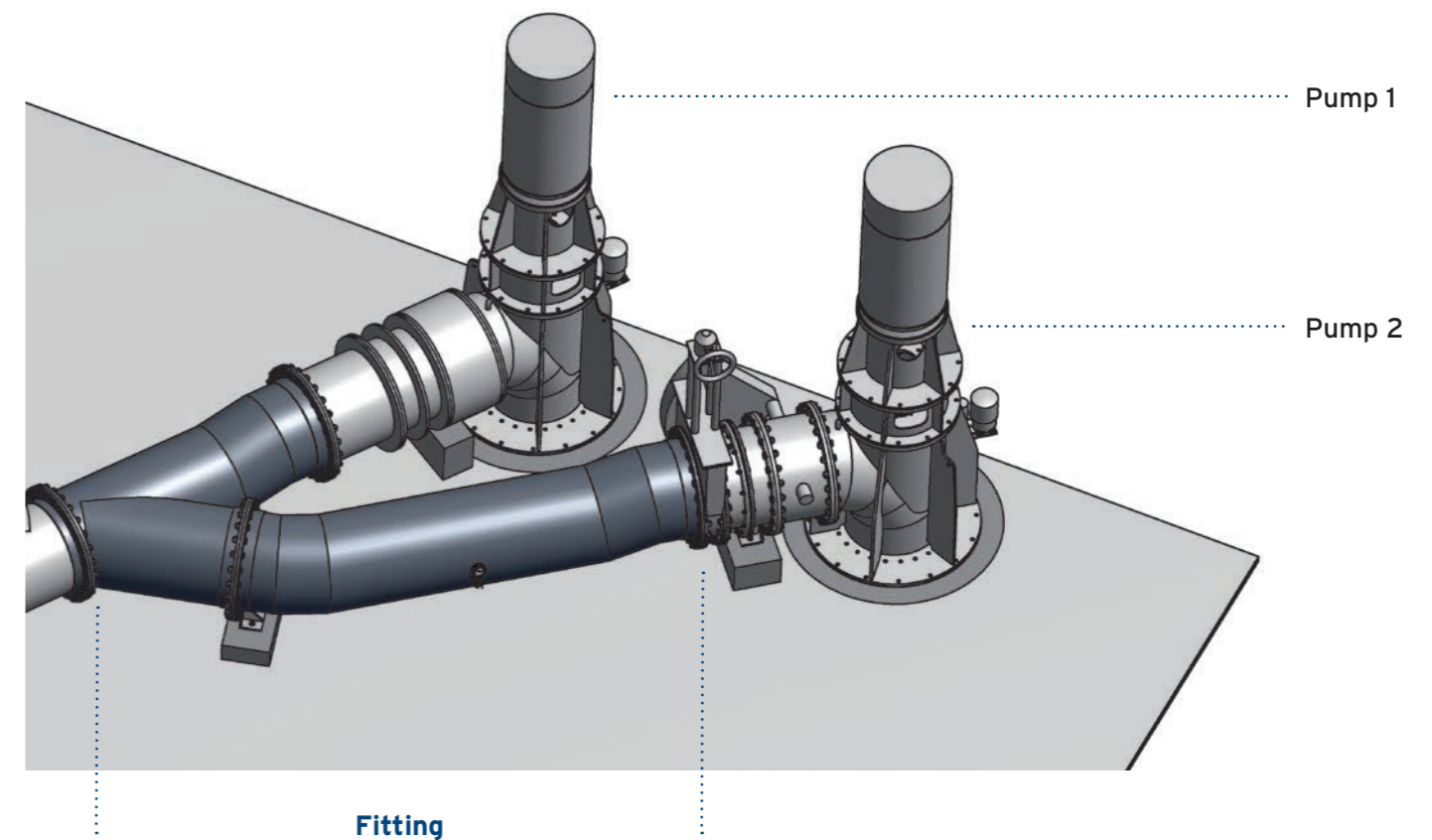
Other characteristics

- > Sizes are between 200 and 1,600 mm
- > The entire pipe diameter is free when the gate valve is open
- > Permissible operating pressure for fluids is between 0.6 and 1.0 bar
- > The gate valve can be activated optionally by handwheel, electric drive or square fitting
- > The coating system differs according to customer demand and is always applied in several layers by hand



Flat gate valve
- Typ AB

3.03 Fittings and moulded parts



This fitting shows a typical example of the individual and precision-fit production at KÖSTER. In this case here the pressure lines of two pumps in one existing pump system. All in different heights, direction and diameter. They are connected via a so-called Y-piece.

We are producing this fitting, including all pipe segments, diameter changes and support devices, in our own steel construction workshop.

KÖSTER special parts production

- > Floor plates and floor plate frames
- > Supporting frames
- > Moulded pipe parts
- > Wall ducts
- > Consoles
- > Conical connection pieces (floor level, coaxial, summit level)
- > Special models on request



4.0 Spare Parts

It is a basic fact that every machine part might have to be replaced after a long service life. All the individual components of our machines are clearly identifiable, every pump is numbered and all components are listed in the documentation (parts list).

Spare parts are normally available from stock for ten years at the most. KÖSTER, however, replaces old pump parts today even if they are over 100 years old.

And we can guarantee that, because we not only process materials, we also produce them ourselves. Our modern foundry supplies top quality spare parts for pumps. Our outstanding depth of production is of particular benefit to our customers.

No problem at KÖSTER

Spare parts are needed in cases of wear, i.e. deterioration of components in a system linked with the number of operating hours. This use can be preventative and take place regularly, but it can also be event-driven.

Components prone to wear are those exposed to friction, i.e. roller and sliding bearings and housing seals. Pumping media contaminated with solid particles can lead to abrasions in the hydraulics, while aggressive chemical fluids can cause these to corrode.

Spare parts are also needed when damage is caused by the impact of external factors. Such damage often occurs unexpectedly and can affect quite literally every component - from the propeller hub cap to the pipe housing.

We can deliver every part - over decades

Thanks to the depth of production mentioned above and our order archive, that goes back decades, KÖSTER is in a position to produce and supply every single pump component. Here too, KÖSTER places the highest demands on the quality of the materials and resilience.

Our offer also includes complete component assemblies, and can even extend to integrating completely new pump inner workings into existing housing parts that are still in use.

5.01	Delivery and Installation
5.02	Retrofitting and boosting performance
5.03	Pump Rentals
5.04	Maintenance - Refurbishment - Repair



5.0 KÖSTER Service all-inclusive

KÖSTER supports owner-builders and planners through the entire project cycle.

KÖSTER is always ready-to-hand with its expertise, from the very first idea of erecting a pump station, to support with the planning and on through to consultations when it comes to the selecting of materials. The determination of the design and construction before the placement of an order and subsequent delivery and installation by our field engineers are closely dovetailed processes.

And what is more, maintenance, repair work and retrofitting - even decades after delivery - are included as a matter of course in our scope of performance.

We also offer this service for the pumps of other manufacturers, of course.

5.01 Delivery and Installation

Professional

KÖSTER pumps are robustly constructed and produced with great care. If used for their intended purpose, reliability and durability are their outstanding features.

Our well trained and experienced workforce know our high-quality pumps inside out. For this reason we recommend you trust our specialists with the work of installing your pump on site and getting it ready for operation.

Our service and installation vehicles are "rolling workshops" and equipped in such a way that virtually all work required within the scope of an installation - even if unscheduled - can be carried out without problem. This ensures timely conclusion of the operation as planned.

Our field engineers are well used to working closely and effectively with other trades on the site of large building projects and to supplying a top quality service even under difficult spatial conditions or when under time pressure.

5.02 Retrofitting and boosting performance

Competent

The water management framework plan often changes after a pump has been put into operation. Development areas arise years afterwards, roads and roofage expand the sealed surfaces and as a result the effluent flow. The time might come when a control has to be retrofitted, the duty point of a pump changed or the motor power boosted.

KÖSTER pumps have variable propellers that are widely adaptable and that can be replaced in part or in whole even if a pump has been in operation for many years.

The capacity and delivery head, that together constitute the duty point, can be subsequently increased or decreased. In this way investments that have already been made in the pump and its corresponding structure are not lost.

5.03 Pump Rentals

Water-tight

Pumps are only needed for a limited time in many projects. For just such cases KÖSTER holds available for rental several large submersible motor propeller pumps with capacities of up to approx. 5,000 l/s including shaft pipe and connection cable

Our pumps can be used to help

- > in cases of flooding, high water
- > as coverage during periods of repair
- > store water in large excavation pits
- > with the renaturation of abandoned quarries
- > as a backup to ensure a minimum pumping capacity or minimum inland water levels
- > drain polders



5.04 Maintenance - Refurbishment - Repair

Reliable

KÖSTER pumps require extremely low maintenance. Even when used in continuous operation they often operate fault-free for years on end.

Nevertheless, in order to maintain their asset value we recommend to refurbish our first-class pumps every 10 to 20 years, depending on the operational load to which they are exposed.

Should despite all such care an event of damage occur, repair is carried out appropriately and in relation to the actual damage.

KÖSTER also carries out maintenance and repair work for third-party products, with the same care and the same demand placed on quality and subsequent operational reliability that it applies to the production of its own pumps.

Engineering works and foundry

Pumps

Winches

Swimming pool technology

Castings and machining

Steel hydraulic construction

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