ROTATING RIGHT

SEEPEX PROGRESSIVE CAVITY PUMPS FOR THE OIL & GAS INDUSTRY

Solutions for complex fluid handling applications in the oil and gas industry:

	Pump type for extreme low NPSH values available:				seepex repre-sentatives worldwide:	5	5
novative trofit mping lution	B	E	O	2	-	1	2
	N						
	Company provi-ding special solutions for fluids handling	S	E	E	P	E	X
					Gas fractions (%) a multi-phase pump can handle:	9	9

A partner with global capabilities.

seepex is a leading global supplier of products and services for fluids handling and processing.

Oil, gas, treatment chemicals or whatever your specific conveying problem might be, we have the solution or we will find one. We can handle oil, produced water, drilling mud cuttings, condensates or multiphase fluids with up to 99% gas. We are your ideal partner for all your fluid handling projects.

The first seepex progressive cavity pump was built in 1972 in Bottrop, Germany. Today, nearly 300 of our 420 worldwide employees work here on the development, manufacturing and distribution of pumping solutions for oil and gas production, the environment and many other industries. We have state-of-the-art manufacturing facilities and warehouses in Europe, Asia and North America and distributors in every major country. Our goal is to develop optimal technical and economical solutions for your conveying problems. In order to find those, our highly qualified engineers are supported by our laboratories for basic research, product development and planning teams, as well as information technology specialists.

Consultation, development, project management and support throughout the whole life cycle form the basis of our application expertise. Using our modular pump system we can design a pump precisely adapted for each application. This ensures lower energy consumption, reduced maintenance costs, increased operational safety, better utilization of capacity and higher productivity and profits for our clients.

The result is customised solutions that prove our competence and leadership. The following fluid handling solutions demonstrate our success in onshore and offshore applications.

seepex offers you these products and services – through a worldwide sales and service network that reacts flexibly and quickly.

Special pumping solution No. 1:

Oil / Water Separation

Effective separation of oil and produced water, both onshore in a refinery and offshore on a platform or FPSO (Floating Production Storage Offloading vessel) is a critical operation to allow operators to comply with stringent OSPAR* and other environmental regulations.

A highly engineered pump skid with two seepex BN 35-24 LP Flare Drum pumps, is the solution for a complex pumping problem that has an NPSH available of only 0.54 m (less than 2 ft). Unlike other pump manufacturers, seepex did not decline to offer a solution for this benchmark in suction capability requirements, but felt challenged to prove its unrivalled engineering capabilities. Delivered in accordance with stringent client specifications, these pumps are equipped with double mechanical seals and sealing systems to API plan 53M.

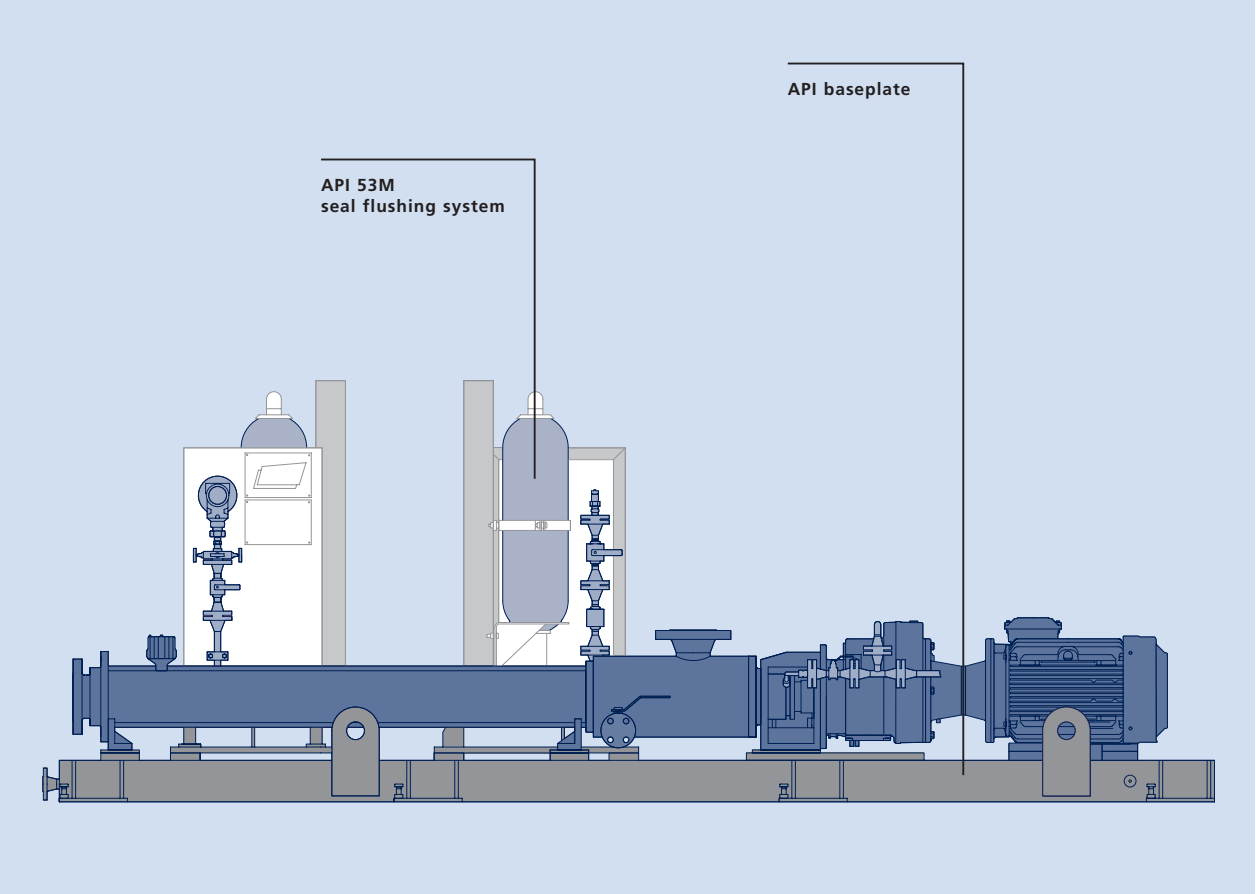
The qualities of the seepex pump are preferred by oil water separation equipment manufacturers making hydrocylones, induced air flotation systems and any technology where the gentle low shear pumping action is required to feed or take reject oil process streams away. Causing the least damage to the oil droplet and with high volumetric efficiencies, the seepex pump plays a vital role in optimising the efficiency of separation equipment.

Flow control of the seepex pump is simple with flow being proportional to pump speed. Further points of shear such as flow control valves can be eliminated from the system. Whether it is a skimmed oil pump or a nutshell filter feed pump, the characteristics such as low NPSH requirements, the ability to handle solids and to handle a wide temperature range make the seepex pump a great choice for your process.

A wide variety of specially engineered elastomers and extensive application experience ensures that seepex pumps will be compatible with your process.

* Convention for the Protection of the Marine Environment of the North-East Atlantic

LP Flare Drum Pump (BN 35-24)



Special pumping solution No. 2:

Transfer and Process Pumps

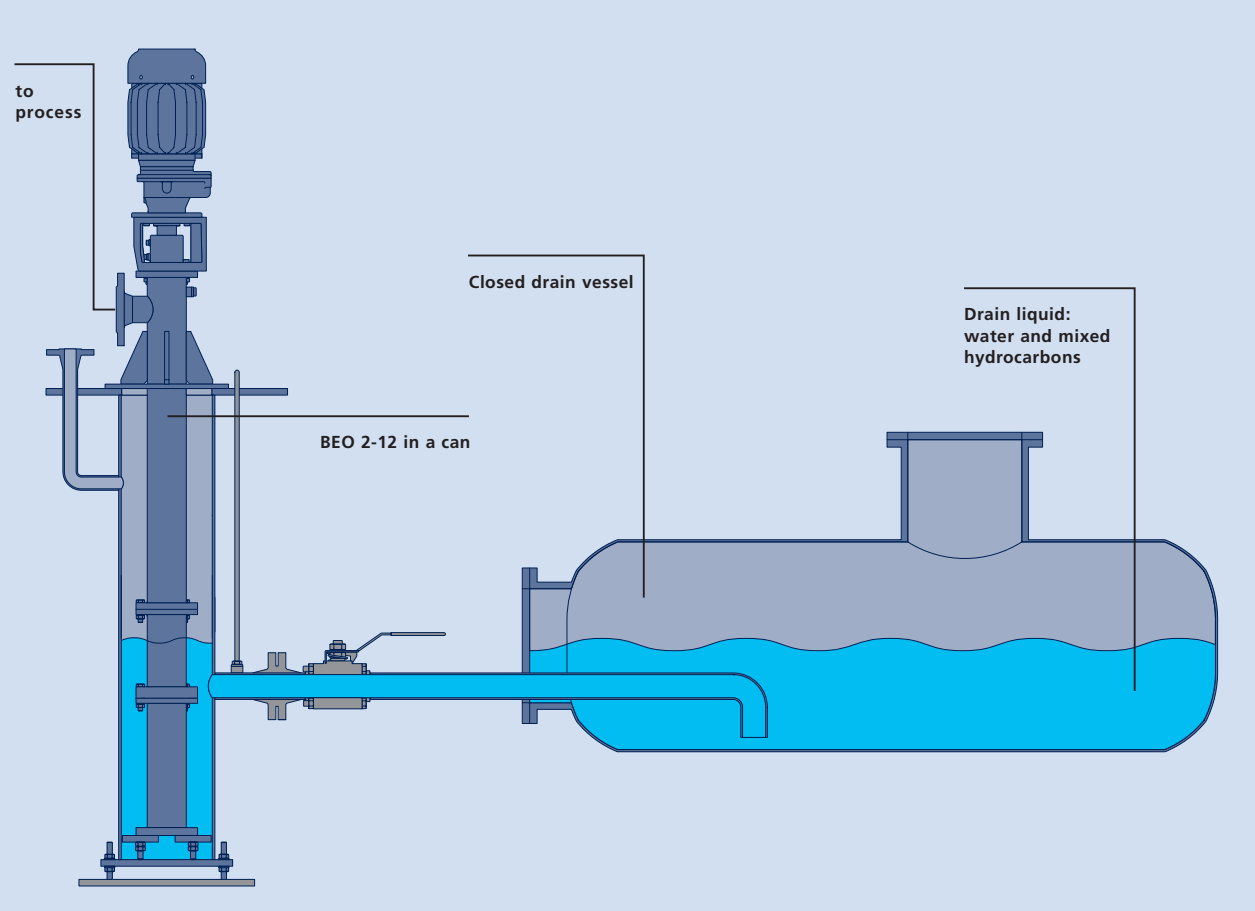
This vertical BEO 2-12 canned pump is designed for pumping water and mixed hydrocarbons with high vapour pressure from a closed drain. The customer contacted seepex with an application where the NPSH available was far too low for a standard horizontal pump. Due to the installation restrictions (space requirements) on site, a canned pump was the choice of our application engineers to solve this problem.

The canned design increases the effective NPSH available at the pump inlet by allowing a static height of liquid volume to act on the suction end and therefore keeping lighter hydrocarbon fractions at a pressure higher than their vapour point. This eliminates the cavitation risk and minimizes the amount of entrained gas in the fluid.

The versatility of the seepex progressive cavity pump means that we can confidently offer a pump suitable for all your transfer and process applications. With horizontally mounted pumps and semi submersible vertical pumps with flows ranging from 0.1 l/h to 500 m³/h (2200 gpm) and up to 48 bar (720 psi) differential pressures in standard configuration, there are sizes for all situations. Our flexible modular design can be adapted to meet any retrofit requirements often associated with refinery applications. Applications such as closed drains, LP/HP Flare Knock Out Drums and the like necessitate low NPSH requirements of a pump and the seepex pump handles these applications with ease.

High pressure injection of products such as TEG is performed without the pulsation and noise of reciprocating machines. The adaptable and flexible design also means that the requirements of any rotating equipment specification can be met including special mechanical seal designs, use of exotic alloys and extensive test or certification requirements.

Vertical canned pump (BEO 2-12)



Special pumping solution No. 3:

Multiphase Pumping
Multiphase Pumping involves to the transfer of solids, liquids and gases from the well head to a processing station without separation in a single pipeline. The extremely high cost of installing and operating separation equipment at each well site and transferring fluids through multiple pipelines, makes multiphase pumping a cost effective and efficient conveying alternative.

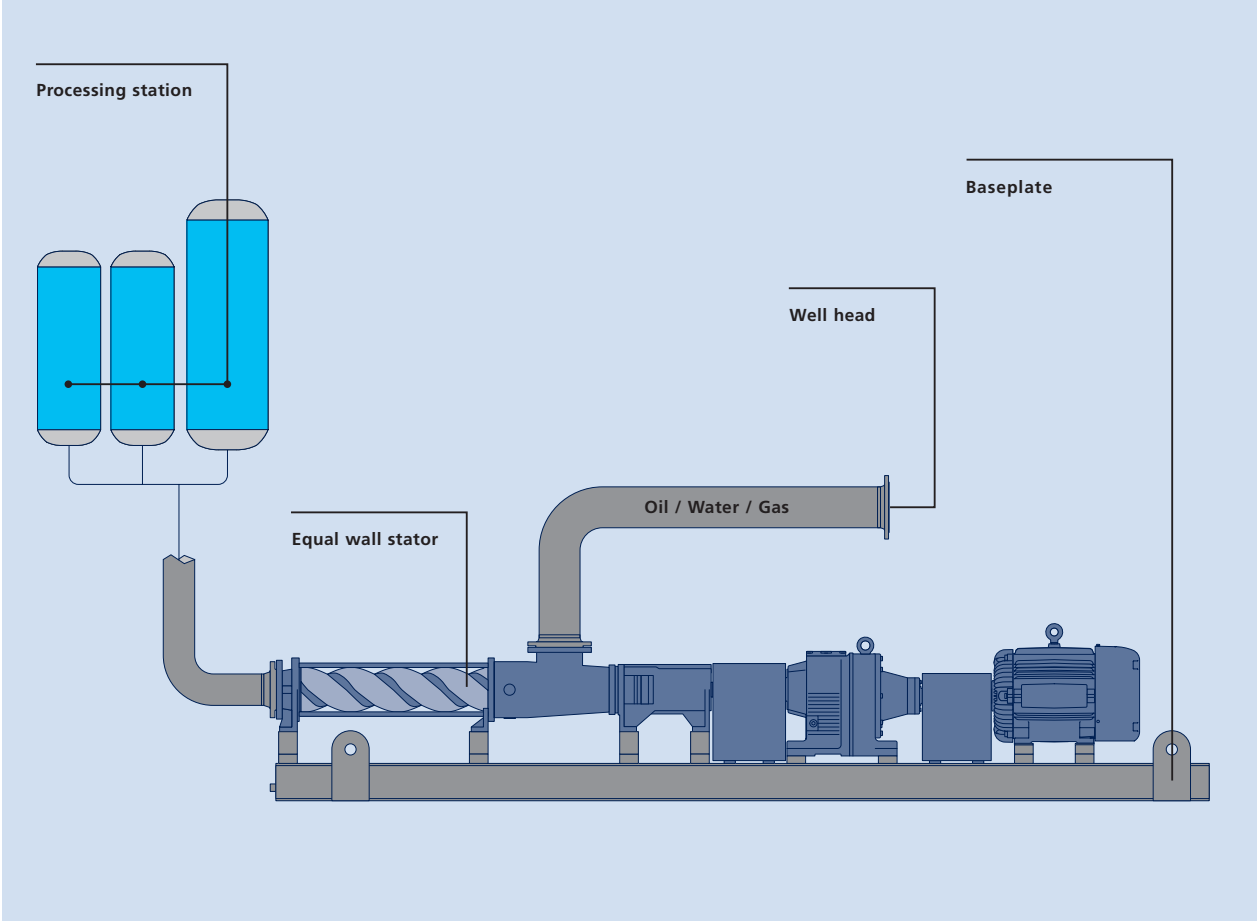
The seepex progressive cavity multiphase pump NS 70-12V with equal wall stator routinely handles 99 % gas fractions. It handles slugs with ease and does not emulsify or degrade the liquid and gaseous phases during transportation. In comparison with other progressive cavity pumps, the seepex Multiphase Pump handles higher flow rates due to the availability of a wide range of pumping elements. The seepex stator runs cooler due to efficient heat dissipation permitting the handling of higher compression ratios. Our pumps are specially suited for applications that require flow rates below 100,000 equivalent barrels of oil and gas per day. They can handle differential pressures up to 300 psi. With suitable mechanical seals they are able to operate at very high suction pressures.

If your application requires higher flow rates or pressure capabilities, seepex has the experience operating these pumps in series or parallel for appropriate applications.

Helping oilfield operators to lower their well head pressures not only increases fluid production but increases the life of a well. The seepex multiphase pump program offers a range of pumps that can make a difference. Pumps capable of handling 99 % gas fractions are manufactured by making only minor modifications to the standard modular design. Utilising the standard modular design ensures a system with hundreds of thousands of hours of operating experience that can be proposed for all scenarios. There is no requirement for prototypes as with other multiphase pump technologies.

Believing that the control and monitoring of pumps in multiphase applications is a critical path to successful operation, seepex offers the full package to meet any specification.

Multiphase pump NS 70-12V



Other fluid handling applications for our pumps:

- **Drilling Mud and Drilling Waste Management**

Whether it is oil or water based mud or heavy cuttings, seepex pumps work well in solids control processes. Drilling mud, water or oil based, has an important function such as working to cool and lubricate down hole drill bits, or transporting cuttings to the surface. By varying the weight and viscosity, the muds are blended specifically for the drilling conditions. The seepex pump plays a vital role in the transportation of the drilling muds or abrasive fluids around the system. The compact design of the seepex pump and the fact that flow rates are relatively unaffected by changes in head or solids content, makes it a good choice for use on supply boats with pumps used as mud cargo transfer pumps or to circulate mud around cargo tanks to ensure a homogenous mixture.

Cuttings that have been transported to the surface with the drilling mud have to be processed to separate the cuttings from the mud. Waste management equipment benefits from the seepex pump´s ability to handle a wide range of flow characteristics. Our extensive applications experience ensures that we select the right pump for the individual application.

seepex pumps of group T are designed to handle highly viscous or non-flowable products. These pumps incorporate an open hopper and feed auger on the inlet side of the pump, and other devices to enhance product feeding. Open Hopper pumps are used to take cuttings from directly under the shale shaker and are used to feed extractor dryers. Centrifuges are fed with recovered mud and the process benefits from the steady feed characteristics of the seepex pump even with changing viscosities, specific gravities, and pressures.

- **Coal Bed Methane**

seepex offers a wide range of specially engineered pumps for Coal Bed Methane Applications and Total Water Management Systems for transportating and disposal of Produced Water.

CBM Downhole Pump designs and construction materials are carefully matched to the well conditions for the efficient removal of high volumes of water from depths up to 4000 feet (1200 m). seepex CBM Downhole Pumps cover a range of flow rates up to 500 bbl/day/100 rpm and are available with special elastomers for superior performance in high water cut environments.

High efficiency variable speed drive heads offer lower operating and maintenance costs. The full range of seepex BN, NS and MD pumps are ideal for surface transfer and reinjection of produced water.

- **Condensate Pumping**

When it comes to pumping liquids and gas condensates, a pump is required to have some very special characteristics, to deal with elevated and changing temperatures, high vapour points and the likelihood of solids and chloride-based brine from formation water.

The seepex pump is well suited for this difficult environment. Equipped with enormous field and test data, pumps can be selected for applications with NPSHA of just 0.5 m with robust drive train designs that allow good service life even in high vacuum conditions. Special alloys are used to withstand potentially corrosive conditions. Equal wall stator technologies allow the pump to maintain higher operating efficiencies across a wide range of temperatures and pressures.

The seepex modular pump system.

seepex makes progressive cavity pumps with a characteristic feature: the conveying elements are formed by the intersecting geometries of a helical rotor and a double internal helical stator. They are integrated in a modern quality management system which satisfies the highest technical specifications, and are manufactured exclusively with the most modern production technologies.

Each pump is designed to comply with the unique requirements of the industry sector, application and the product being pumped. This has been the basis for the development of our modular pump system. There are 8 product groups in all and 27 ranges with capacities of from 0.1 l/h to 500 m^3/h (1cc/min. to 2200 GPM) and differential pressures of up to 48 bar (720 psi).

Whether you need to transport extremely viscous media, precisely meter the smallest quantities, maintain the highest levels of hygiene, or resist the erosion caused by abrasive solids – there is solution for the most extreme applications.

When investing in a pump system, the purchase costs only constitute a small proportion of the total investment. Consideration must be given to the life cycle costs of the entire system. Installation and commissioning costs, energy consumption, maintenance and repair costs, the expense of idle equipment and production downtimes must be kept as low as possible in the interests of efficiency and productivity.

You can achieve this through the high technical standards inherent in our pumps. The application specific construction and our extensive service program enhance each phase of the life of the pump.

seepex progressive cavity pumps provide in general:

Wide application range
They are particularly suitable for handling products that contain entrained gases and solids that can be abrasive and even aggressive with all degrees of viscosity. They can be used on fluids with temperatures from -20 °C to +180 °C (0 °F to +360 °F and can transport products with a capacity of 1.0 l/h up to 500 m^3/h (1 cc/min. to 2200 GPM), independent of discharge pressure or the solids content of the product. Differential pressures of up to 48 bar (720 psi), and higher in special cases, are available.

Gentle, precise and trouble-free
Handling sensitive products often requires a pump with specific characteristics incorporating low shear rates, accurate metering/flow together with minimum pulsation. seepex progressive cavity pumps incorporate all these qualities. Additionally they have no check valves to clog and the cavities within the pump progress from the suction to the discharge without changing their shape.

Low NPSH Characteristics
Typical for seepex: Very low NPSHr characteristics. NPSHr values as low as 0.5 m have been supplied with reliable operation. These characteristics result in excellent self priming capabilities.

Versatile
Integration of a seepex progressive cavity pump into a customer's facility is easily accomplished, as they can be installed horizontally, vertically or in almost any position. Pump flow is reversible with shaft rotation. Versatility can be further extended by supplying vertical canned designs to assist and increase NPSHr.

Service-friendly
seepex progressive cavity pumps are designed to be very service-friendly. The drive shaft plug-in connection, the universal joints, the sealing arrangements and external flanges with thru-bolt construction all contribute to the service-friendly character of our designs. It is a guiding principle of all seepex designs.

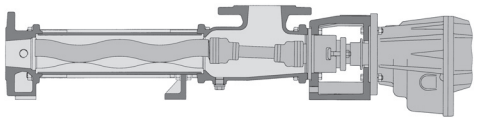
Economical
seepex guarantees state of the art products, the highest quality of all components, optimised design and manufacturing capabilities to increase efficiencies resulting in long life and low operating costs.

The product groups for your oil and gas production:

Range BN/NS

BN Range pumps with direct flange-mounted drives (block design) can be used in almost all areas of industry to convey thin to high viscosity materials with or without solids. NS Range pumps feature a drive casing with free shaft end for universal configuration of drives through flexible couplings or V-belts.

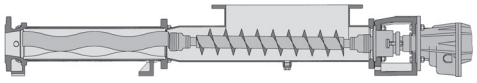
> Conveying Capacity: 0,05–500 m³/h (0.132–2,200 USGPM), Pressure: up to 48 bar (700 psi)



Range BT

seepex BT range pumps have a rectangular inlet hopper with a cylindrical compression zone and auger feed screw. The length of the hopper inlet is customized according to customer needs. These pumps are used to convey highly viscous products.

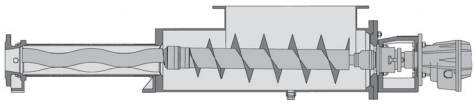
> Conveying Capacity: 0,1–200 m³/h (0.44–880 USGPM), Pressure: up to 36 bar (540 psi)



Range BTE

seepex BTE range pumps have a rectangular feed hopper with enlarged removable compression zone and an auger with enlarged diameter and pitch. The hopper length can be matched to the individual operating conditions.

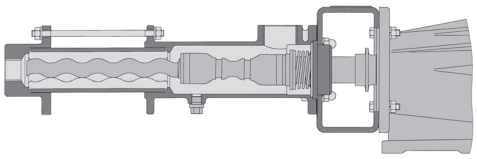
> Conveying Capacity: 0,5–100 m³/h (2.2–440 USGPM), Pressure: up to 36 bar (540 psi)



Range MD

MD range pumps are used for pumping and dosing small quantities. They are especially suited for low-pulsation transport of low to highly-viscous or adhesive media as well as media containing solids and chemically aggressive media with a high dosing accuracy.

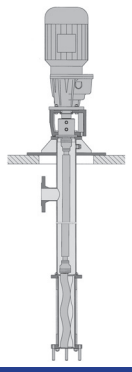
> Conveying Capacity: 0,2–1000 l/h (0.053–264 USGPH), Pressure: up to 24 bar (360 psi)



Range BE (variant U)

seepex semi-submersible pumps of range BE are used to empty tanks, drums, reservoirs and pits when limited space is available, or when the danger of cavitation is present. They can also be supplied in a can to further increase the NPSHr.

> Conveying Capacity: 30 l/h–300 m³/h (0.132–1,320 USGPM), Pressure: up to 12 bar (175 psi)

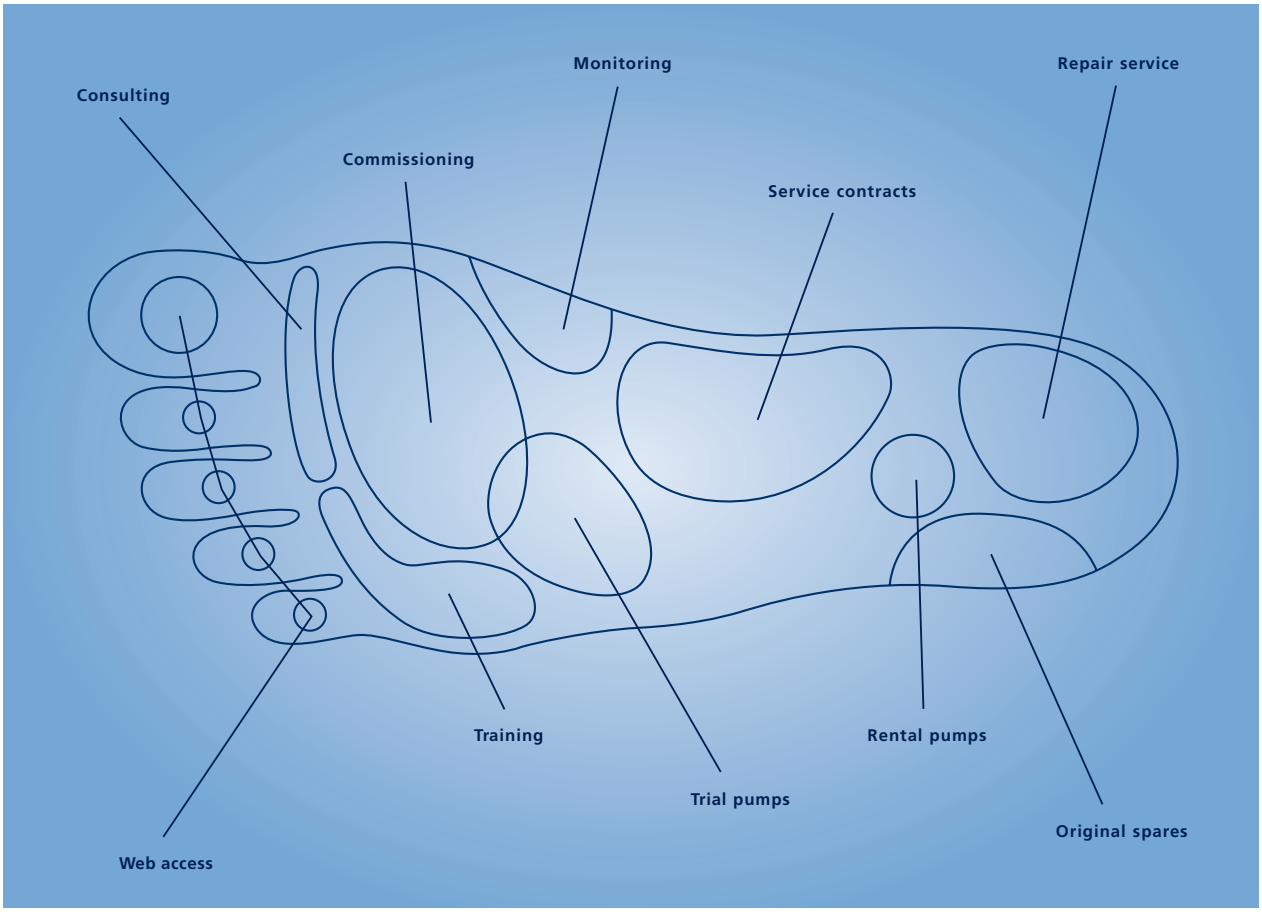


What is good about good service.

seepex pumps are designed to solve problems. They function with a high degree of reliability with minimum maintenance. The reason for this is our 10-point program developed to serve the global operations of our customers and guarantee lasting customer satisfaction. We have an extensive range of services that encompass all phases of a pump's life and make an important contribution to minimizing life cycle costs.

Our 24 hour Helpline with global coverage offers a 10-point program that incorporates our competent application technology consultations, planning help with the installation and commissioning of pumps, condition monitoring, service contracts, repair service, the fastest possible delivery of spare parts, rental pumps, trial pumps, training (maintenance and ATEX), and our interactive website.

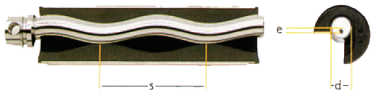
For all your pump application needs, please contact a seepex office near you, or visit our website at www.seepex.com.



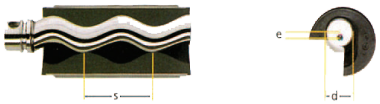
User Advantages

Rotor - Stator-Geometries

seepex 6L - conventional geometry comparison



6L-Geometry

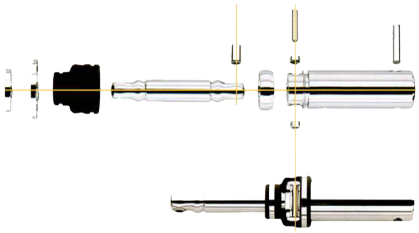


Conventional Geometry

smaller rotor diameter
+ reduced eccentricity
+ increased pitch length
= 6L-Geometry with 20 % lower sliding velocity

- Improved service life (+35-50%) due to lower sliding velocity and longer sealing line
- Better pressure stability due to wider sealing line
- Reduced thrust loads on universal joints and bearings due to smaller rotor diameter and lower eccentricity
- Thrust loads of the conventional design exceed the thrust loads of the 6L-Geometry by approx. 50 %
- Smooth and almost pulsation-free operation
- The "stretched cavities" have a positive influence on vibrations, turbulences, pulsation and shear rates

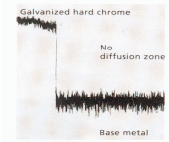
seepex Universal Joint Design



Benefits

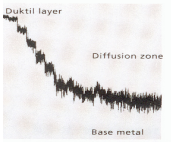
- Only 4 hardened and wear resistant universal joint components (1 coupling rod bush, 2 guide bushes, 1coupling rod pin)
- Positively sealed, gas and liquid tight elastomer universal joint sleeve
- Optional stainless steel universal joint sleeve protector with unconditioned - 10.000 h/24 months guarantee on the protected universal joint
- Simple and cost-effective to maintain
- Streamlined design, thus improved NPSH conditions
- Simple and cost-effective to maintain

seepex has The Optimum Rotor Surface



Conventional hard chrome plating

No diffusion zone between the base metal and the galvanically applied chrome plating
(Hardness up to 600 Vickers)



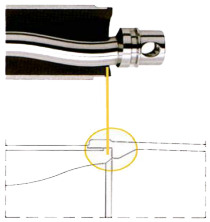
seepex Duktil high density chrome plating

The duktil coating diffuses deep into the base material
(Hardness up to 1250 Vickers)

Benefits of the high quality seepex rotor surface

- Reduced starting and operating torque
- Improved efficiencies
- Smoother operations
- Increased service life
- The hardness of the coating is 1250 Vickers versus 180 of the base material
- The adhesion to the base material is excellent with no surface fissures

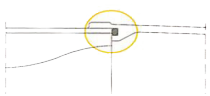
seepex Molded to size stators



seepex molded to size stators are shrink compensated and have cast-on sealing surfaces.

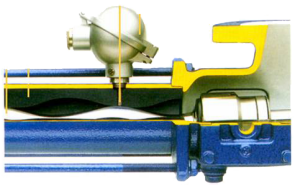
High manufacturing standards guarantee low torque requirements and high efficiencies.

A wide variety of elastomers is available.



Cut-to-size stators with separate gaskets or joints
- unthinkable for seepex

seepex Optional TSE Dry Run Protection



Benefits

- Universal solution for all applications protects pump and stator against damages caused by frictional heat due to lack of liquid pumped
- Highly efficient low cost dry running protection system

TSE controller for panel mounting

Complete IP55 (NEMA 4) pump control panel with incorporated TSE controller

Head Office:
6120 Davies Road
Edmonton, AB
T6E 4M9

Phone: (780) 485-2010 • Toll Free: (866) 707-7867
Fax: (780) 485-1938
• Calgary • Drayton Valley • Lethbridge
www.rotatingright.com