

► Our technology. Your success.

Pumps • Valves • Service



## Tubular Casing Pumps by KSB



# Securing water extraction today and tomorrow.

## **Reliable performance in long-term operation.**

Their applications are varied: provision of seawater for desalination systems, transport of cooling water in power stations and industrial plants, water extraction for flue gas desulphurisation, or water extraction and drainage in low-lift pumping stations. But the demands made on tubular casing pumps are invariably high. In long-term operation, they have to supply large amounts of water safely and reliably.

## **Tailored to your needs.**

Our modular design system enables us to offer you exactly the tubular casing pump you need, perfectly matched to your system conditions. Each pump is individually selected to achieve a particularly high efficiency and excellent NPSH characteristics. This will improve the efficiency of the system as a whole.

## **Quality from a single source.**

At KSB, sales, production, development and service interlock like cogwheels. The resulting products are sure to meet our customers' specifications. We are able to guarantee that product quality, safety and reliability are always to the same high standards. On this basis, KSB not only offers technically advanced solutions, but also the advice and project support you need to make your project a success. Simply think of us as your one-stop supplier.

## **KSB – your partner for successful projects.**

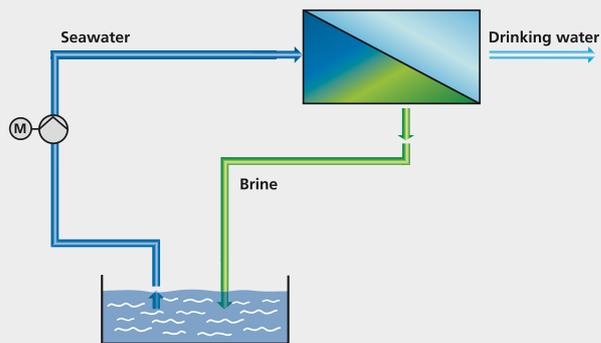
As one of the world's leading manufacturers of pumps, valves and systems, KSB knows the ins and outs of water extraction. Drawing on more than 140 years of experience, we are constantly demonstrating the quality of our technical solutions, also in the field of water supply. Services we provide include performance and acceptance testing of pumps in our in-house test bays.

As well as expertise in all things „pumps“, we can also give you all the assistance you need in planning your system: Complex tasks like that call for close cooperation, and we support you all of the way, from the pre-project phase through every step of the project, to maintenance, service and after sales.



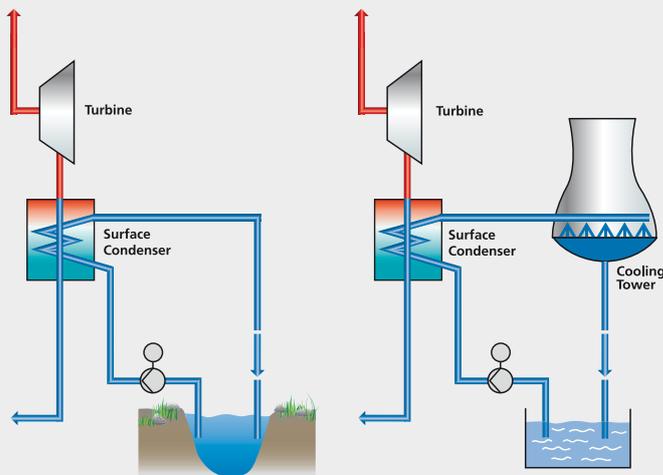
# Reliable water extraction for a multitude of applications.

Tubular casing pumps from KSB ensure a high level of system availability:



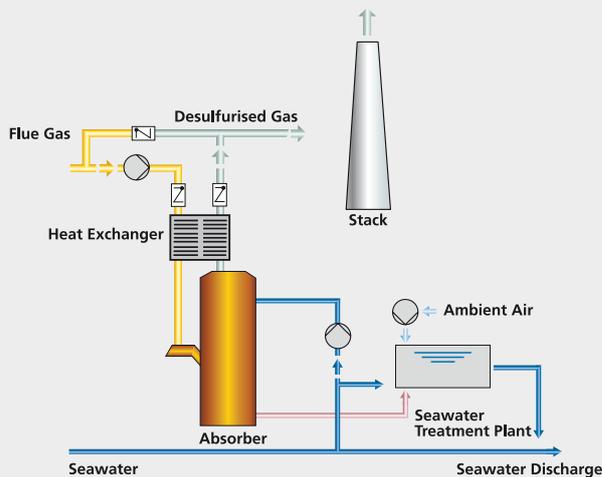
## Seawater desalination

A reliable supply of safe drinking water is vital for arid regions. Our tubular casing pumps are used to pump up huge amounts of water from the sea which is then turned into one of our most precious resources: drinking water.



## Cooling water circuits

Power stations and industrial systems need large amounts of water to cool their processes.

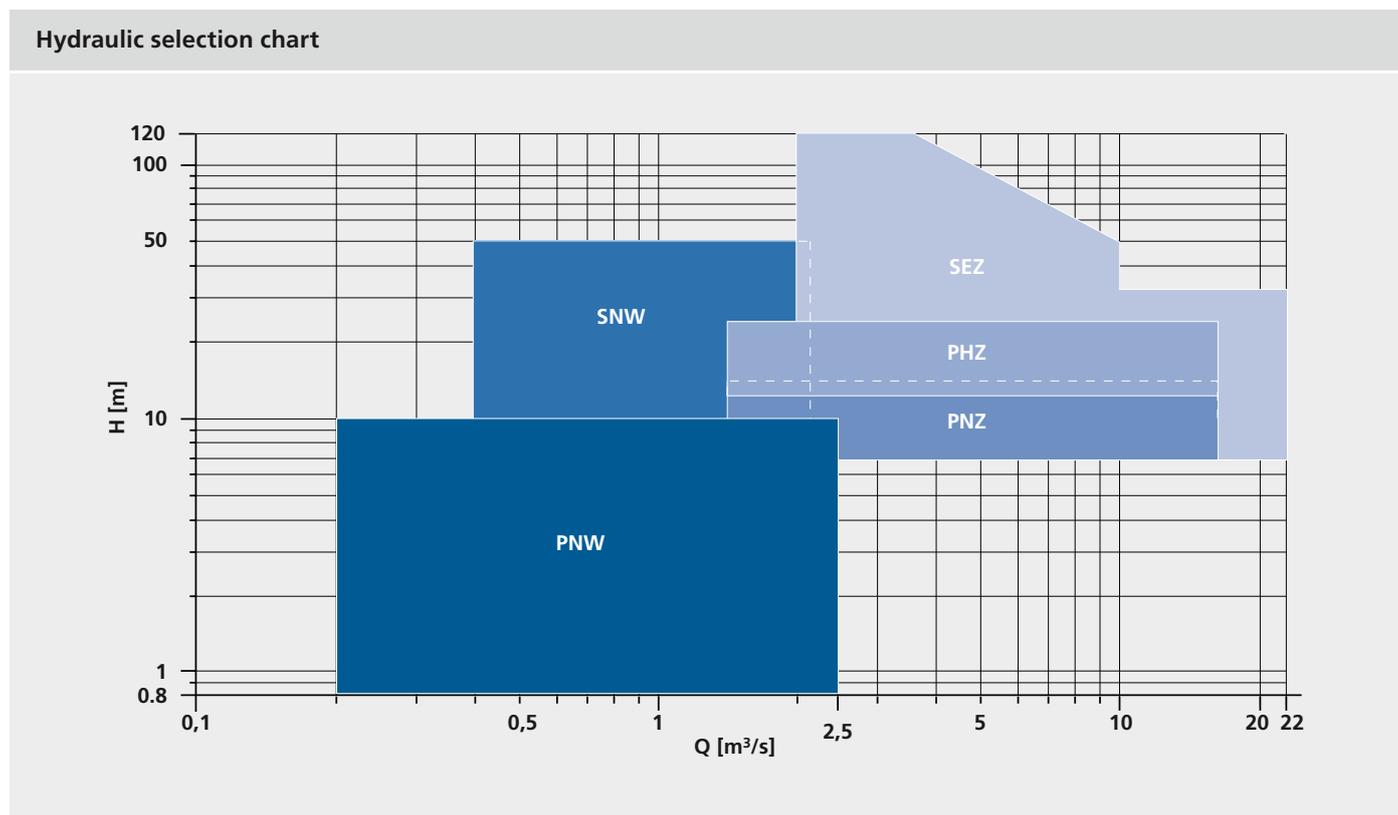


## Flue gas desulphurisation

Coal-fired power stations, waste incineration and various other industrial plants emit flue gas into the environment. Our tubular casing pumps reliably provide the necessary water for flue gas desulphurisation.

# The right pump for every job.

Our specialists select the right tubular casing pump for your job from the hydraulic selection chart.



# KSB tubular casing pumps. The modular design system for more efficiency.

Tubular casing pumps from KSB are modular in design. This means that we can select the hydraulic system, design, materials, types of installation and control system to exactly meet your requirements. And an optimally designed pump will reduce the life cycle costs of your installation.

## Variants: pull-out or non-pull-out.

KSB's tubular casing pumps can be supplied in two design variants.

The **pull-out design** is easier to service and maintain: During dismantling and re-assembly, the entire rotor can be withdrawn for inspection and maintenance. This minimises downtime for maintenance work and reduces life cycle costs (LCC).

By contrast, the investment for **non-pull-out type pumps** is considerably lower because a number of components can be dispensed with. This reduces both the weight of the pump and the initial costs.



**Pull-out type pump**

## Hydraulic system: three different impellers to choose from.

We offer three types of impeller designed to meet the specific performance data of your system. The pump will come equipped with the hydraulic system to match your application. In addition, our casting quality standards are exceptionally high. This enables us to guarantee a high-grade surface finish and a high-precision geometry – prerequisites for a constantly high efficiency.



Non-pull-out type pump



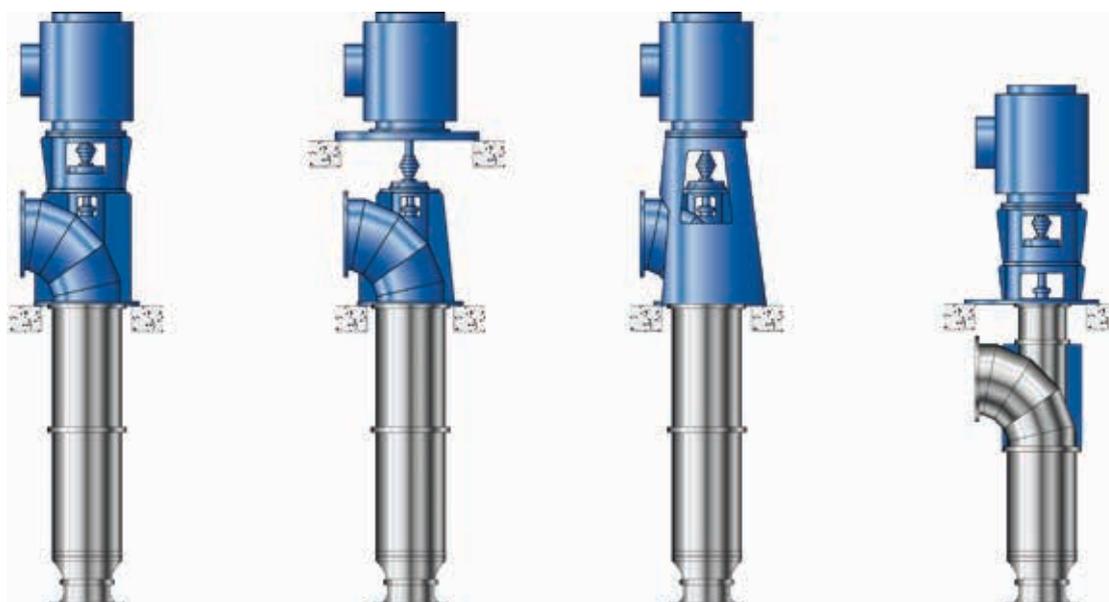
## Materials: resistance characteristics are key.

Choosing the right materials plays an important part in a system's economic viability. Depending on the fluid pumped, materials may have to be resistant to abrasion and corrosion.

Fluid pumped	Standard material variant 01 "Black"	Standard material variant 03 "Duplex"	Standard material variant 04 "Superduplex"
Fresh water ≤ 28 °C	Pump casing: Cast iron/steel Impeller: CrNi steel Shaft: Carbon steel		
Seawater ≤ 35 °C		Pump casing: Duplex Impeller: Duplex Shaft: Duplex	
Seawater 35 °C – 40 °C			Pump casing: Superduplex Impeller: Superduplex Shaft: Superduplex

## Installation options: four times as flexible.

The design of the intake structure dictates the design of the pump supplied by KSB. Tubular casing pumps can be supplied for four different types of installation. During the pre-project phase, our KSB specialists will help you work out which of these is best suited for your intake structure.



Above floor installation  
(stool type)

Double deck installation

Reinforced above floor  
installation (lantern type)

Below floor installation

## Control: three options to boost efficiency.

### Pre-swirl control

Controlling the approach flow to the impeller by means of pre-swirl control equipment is particularly suitable for applications involving significant variations of head in combination with a relatively constant rate of flow, for example to compensate for tidal flow or for combined operation (cooling tower/fresh water). The pre-swirl controller can be adjusted either during pump operation or during a standstill. Pre-swirl control equipment will considerably improve pump efficiency at any discharge head and flow rate, and make the pump run more smoothly.

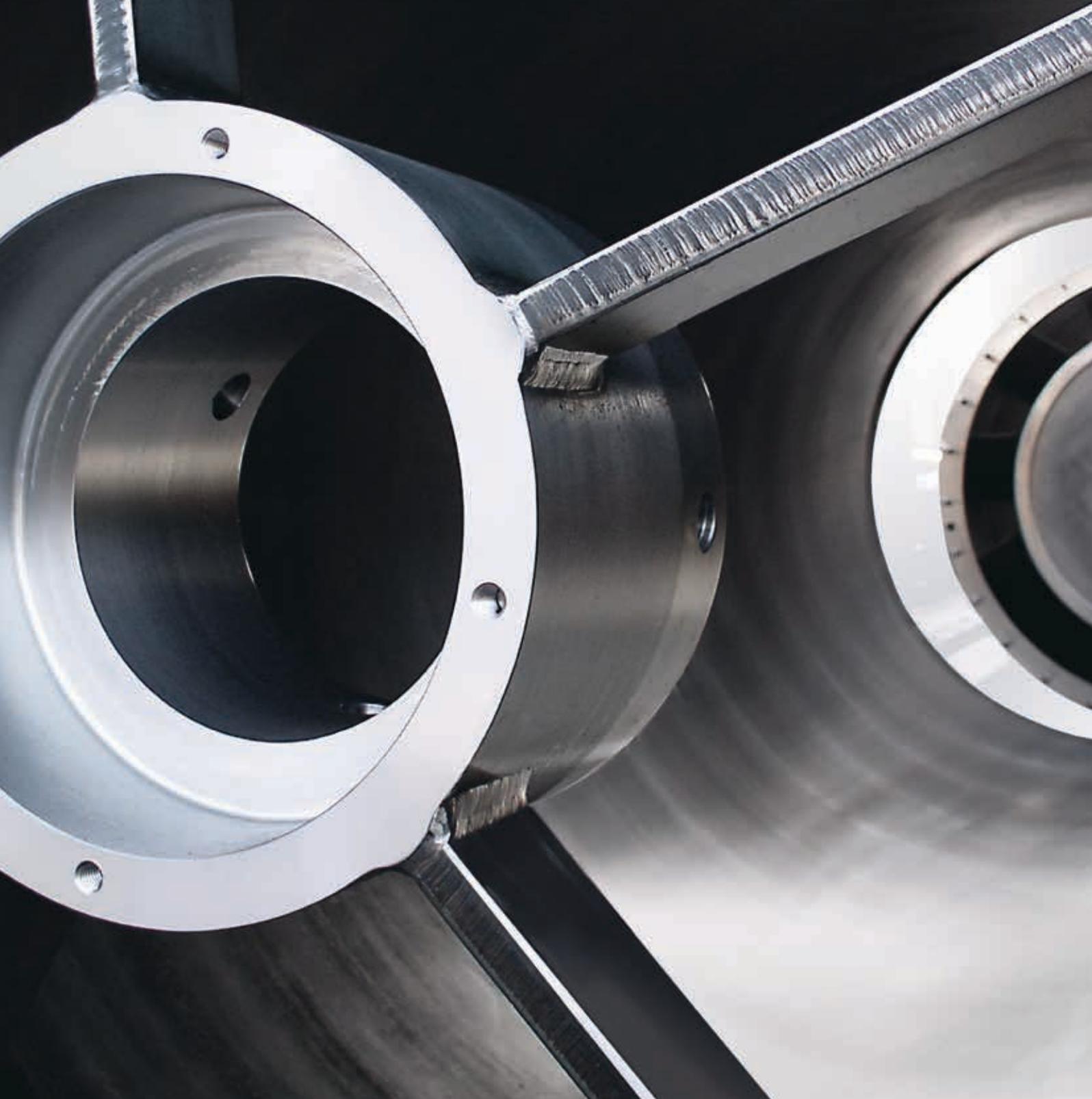
### Blade pitch adjustment

Blade pitch adjustment is the control method of choice for pumping conditions characterised by minor changes in head and major variations in flow rate. The infinitely variable blade pitch angle can either be adjusted by means of an electro-mechanical adjustment gear or manually. With either method, it does not matter whether the pump is running or not. The operating point can be precisely adjusted to achieve the best possible efficiency.

### Speed control

Speed control is ideally suited for systems characterised by fluctuating flow rates and high energy costs. Variable speed systems can be used in all applications where the pump driver is either an electric motor or a diesel engine. Speed control is the best method of “fine-tuning” the pump so that it runs at its best efficiency point.

**A bundle of efficiency:  
the KSB engineering package.**



## The package

An optimally designed intake structure plays a decisive part in reducing the life cycle costs of your plant. After all, only if intake structure and pump are a perfect match and both are ideally suited for the site conditions will the reliable operation of your system be secured in the long term. To make sure of this, KSB has devised the KSB Engineering Package in compliance with internationally accepted guidelines.

## Your benefits

The intake structure configuration is optimal, if the pump gives the same reliable performance over a long period of operation. The pump's inlet conditions are a crucial factor for operating reliability. The intake chambers have to be carefully designed and built to support even and vortex-free flow of water to the impellers. Only optimised inflow conditions and well-chosen intake chamber dimensions will ensure long-term availability and trouble-free operation.

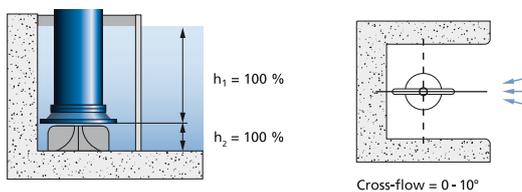
To make sure of this, we not only give you all the advice you need, we also subject intake structures to extensive functional trials and operating reliability tests. It goes without saying that this also covers the inlet geometry, a verification of the flow profile by means of CFD analysis and an assessment of flow characteristics on the basis of physical model testing. As a rule, we base all calculations on extreme conditions.

## The bottom line

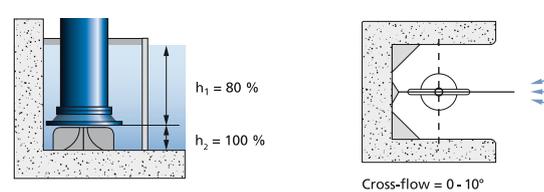
With KSB-optimised intake structures, the minimum suction head or minimum submergence will suffice. So building floors can be built less deep and pumps can be kept shorter. This reduces both civil engineering and pump costs.

### Standard Intake Chambers

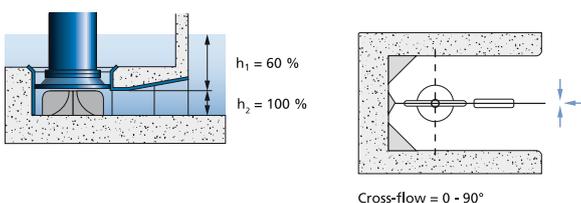
Open intake chamber, unlined



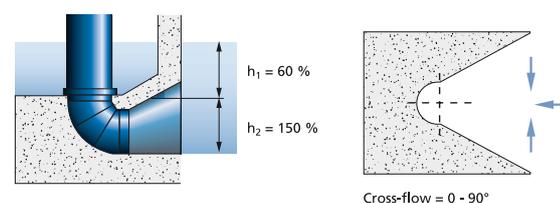
Open intake chamber, lined



Covered chamber



Kaplan elbow



## Extremely durable: Residur® ceramic bearings.

KSB has more than twenty years' experience of using Residur® ceramic bearings. Unlike conventional water- or grease-lubricated bearings, Residur® bearings are lubricated by the pumped fluid itself. This means they are maintenance-free and do not need additional coolants or lubricants. The bearings are chemically and mechanically resistant to all fluids and solid particles, and thus help maintain the constantly high pump efficiency. Residur® ceramic bearings play an important part in keeping life cycle costs down.

Compared with conventional bearing types, a Residur® ceramic bearing will have paid for itself after a mere three years. By the way, retrofitting of KSB Residur® ceramic bearings on older tubular casing pumps is possible at any time.

**Your benefit: Maximum product life at minimum life cycle costs.**



### Tried and tested quality.

Year on year, we invest several millions of euros in research and development, the latest simulation software, in-house test bays and other testing facilities. After all, especially in highly complex and safety-relevant applications, stability and seismic calculations, as well as sound emission and frequency analyses are of the greatest importance. For us, your reliable partner, they are a matter of course.

We aim to contribute to your success. So we test the products we have developed for you under real operating conditions in our own test bays. For example, we have a special test rig for tubular casing pumps where we can simulate specified operating points. This procedure is a routine part of our quality control management programme, and is another case in point for our expertise and innovative technologies.







## KSB tubular casing pumps at a glance.

### SEZ

Max. flow rate*	22 m <sup>3</sup> /s
Max. head*	120 m
Max. fluid temperature	40 °C
Max. speed	980 rpm

### PHZ

Max. flow rate*	18 m <sup>3</sup> /s
Max. head*	25 m
Max. fluid temperature	40 °C
Max. speed	980 rpm

### SEZT

Max. flow rate*	22 m <sup>3</sup> /s
Max. head*	120 m
Max. fluid temperature	40 °C
Max. speed	980 rpm

### SNW

Max. flow rate*	2,4 m <sup>3</sup> /s
Max. head*	50 m
Max. fluid temperature	60 °C
Max. speed	980 rpm

### PNZ

Max. flow rate*	18 m <sup>3</sup> /s
Max. head*	15 m
Max. fluid temperature	40 °C
Max. speed	980 rpm

### PNW

Max. flow rate*	2,5 m <sup>3</sup> /s
Max. head*	10 m
Max. fluid temperature	60 °C
Max. speed	980 rpm

\* Higher pump heads and flow rates on request.



## Technology that **makes its mark**

### Contact:

#### Energy

Dr. Sven Baumgarten  
sven.baumgarten@ksb.com  
Tel. +49 (6233) 86-31 70

#### Water and Industry

Björn Behrends  
bjoern.behrends@ksb.com  
Tel. +49 (6233) 86-22 00

The KSB-newsletter –  
dont' miss out, sign up now  
[www.ksb.com/newsletter](http://www.ksb.com/newsletter)



**KSB Aktiengesellschaft**  
Johann-Klein-Straße 9  
67227 Frankenthal (Germany)  
[www.ksb.com](http://www.ksb.com)