

► Our technology. Your success.

Pumps • Valves • Service



Flood control from KSB – the optimum solution for every challenge



When water levels are rising, KSB's experience and expertise won't leave you out of your depth

KSB stands for many years of project experience and the widest product range on the market

This extensive portfolio of flood protection solutions enables KSB to provide wet-installed or dry-installed pumps for all required flow rates and heads. As well as offering a range of ground-breaking standard solutions, we are also happy to cater to your individual needs and provide all peripheral sub-systems and additional equipment required for your project. Further support is available via comprehensive consulting, model testing and computational analyses all based on years of experience in engineered business. And our global service network means we are on site quickly to provide help wherever you need it.

KSB offers optimised pump solutions and competent consulting for all flood control projects:

- On rivers: for retention tanks and low-lift pumping stations and sluice systems
- On coasts: for flood barriers and low-lift pumping stations
- In urban regions and cities: for retention tanks and pumping stations

We also provide solutions for urban projects to prevent contamination caused by floods in:

- Combined sewage retention tanks
- Combined sewage tunnel systems
- Combined sewage pumping stations



Major flooding has a severe impact on people and their environment, and factors such as rapid climate change have actually led to an increase in serious floods in recent decades. KSB is tackling this problem with a combination of optimised system solutions, extensive project experience and expertise in waste water engineering continuously refined over 100 years.

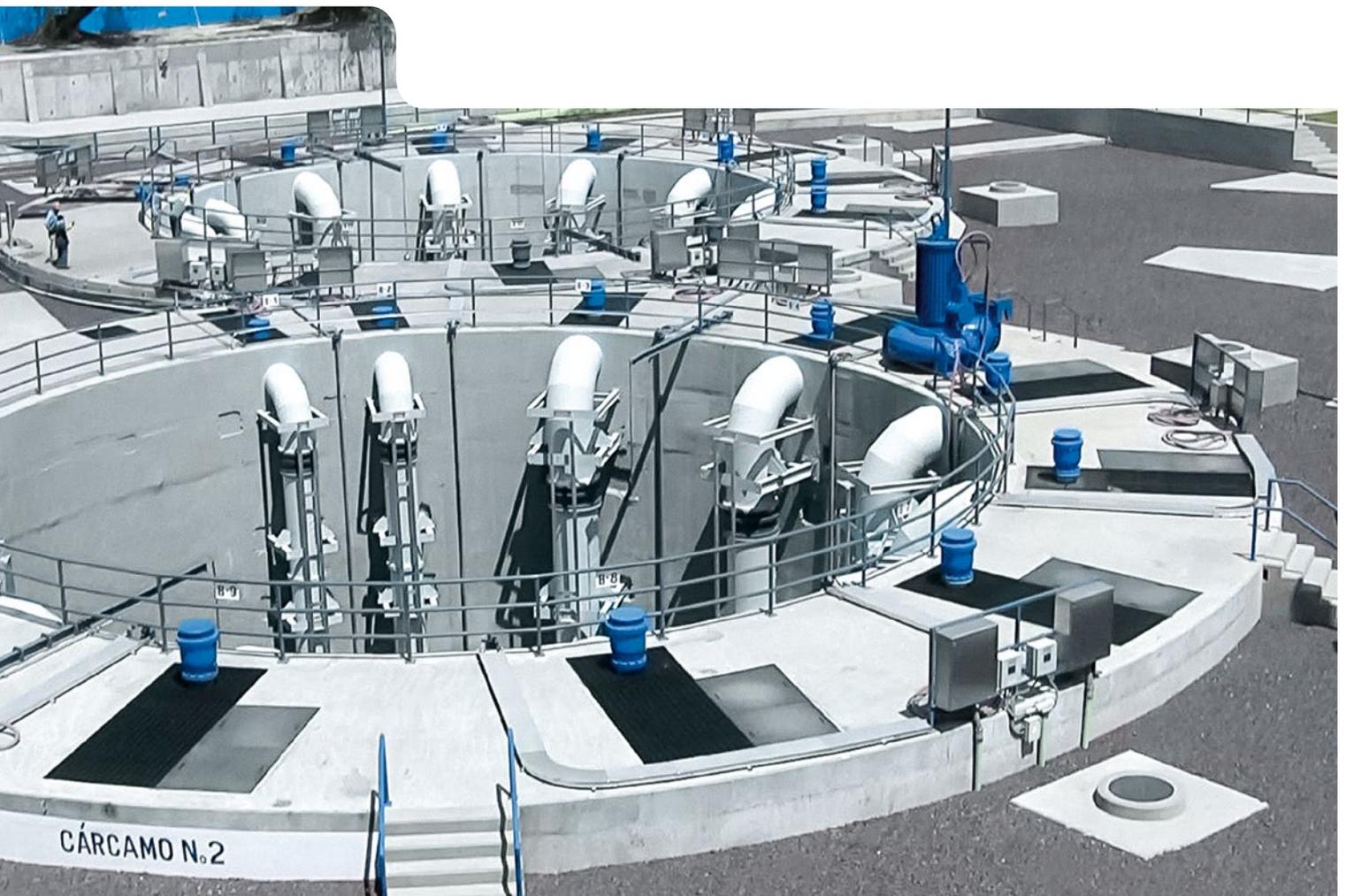


The La Caldera project – flood protection for a megacity

The Mexico City urban area is located in a mountain valley at an altitude of 2,300 metres. Unfortunately, the geographic and hydrological characteristics of the region mean that its population of well over 20 million people suffer frequent flooding which causes stormwater to mix with waste water and sewage. Efforts to provide sustainable protection for 1.5 million residents in one particularly badly affected district saw Mexico embark on the largest infrastructural construction project in its history – La Caldera – in cooperation with KSB.

La Caldera is a pumping station which has been working together with a combined sewer system to drain and pump away stormwater and waste water from this part of Mexico City and the surrounding region since October 2010. The performance requirements placed on the pumping station in terms of flow rate, head, efficiency and maximum power input are demanding, but a capacity of 40 m³/s leaves it well capable of meeting them with absolute reliability.

KSB's involvement in this project went far beyond the mere provision of the components. Right from the beginning KSB supervised every step and was on hand to advise the project managers and cooperate closely with project staff on both pump construction and pump sump design. All pumps and accessory systems were delivered in budget, on schedule, and in complete fulfilment of the requirements specified. The customer benefited from KSB's comprehensive engineering expertise through the provision of crucial support services:



- All piping calculations with regard to torsional stresses and natural frequencies
- CFD analyses to optimise the intake structure design
- Physical model testing to optimise the intake structure design
- Commissioning
- Performance tests on site

La Caldera – an example of all-round project success courtesy of KSB.

Scope of supply and system data:

- 16 x KRT K 700-900/H 680 10 UNG-S
Q = 2,000 l/s, H = 26.55 m, P = 912 HP, V = 4,160 Volt
- 8 x KRT K 400-630/H 340 8 UNG-S
Q = 1,000 l/s, H = 28.83 m, P = 500 HP, V = 4,160 Volt
- 24 control and monitoring units with the respective distribution boxes to NEMA 4x

Project El Caracol – the next logical step

As a result of the positive experience with KSB, another station of the same design was planned and implemented in the east of the valley. 20 KRT submersible motor pumps were installed capable of pumping 40,000 litres of combined sewage per second from the largest drainage tunnel in the world up to a height of 45 m. To achieve this, KSB produced the biggest pump sets ever manufactured at its production facility in Halle (Saale), Germany.

Scope of supply and system data:

- 20 x KRT K 700-902/Z120010UNG1-S
- Q = 2 m³/s, H = 44 m, P = 1,150 kW, M = 14t



The St. Germans project – drainage at the most demanding level

A large area of the farmland in the drained Great Level marshland region in the UK is extremely prone to flooding due to its location – up to three metres below sea level. The Middle Level Commissioners hired KSB to help protect the reclaimed land against flooding and to keep the groundwater at a constant level.





Scope of supply:

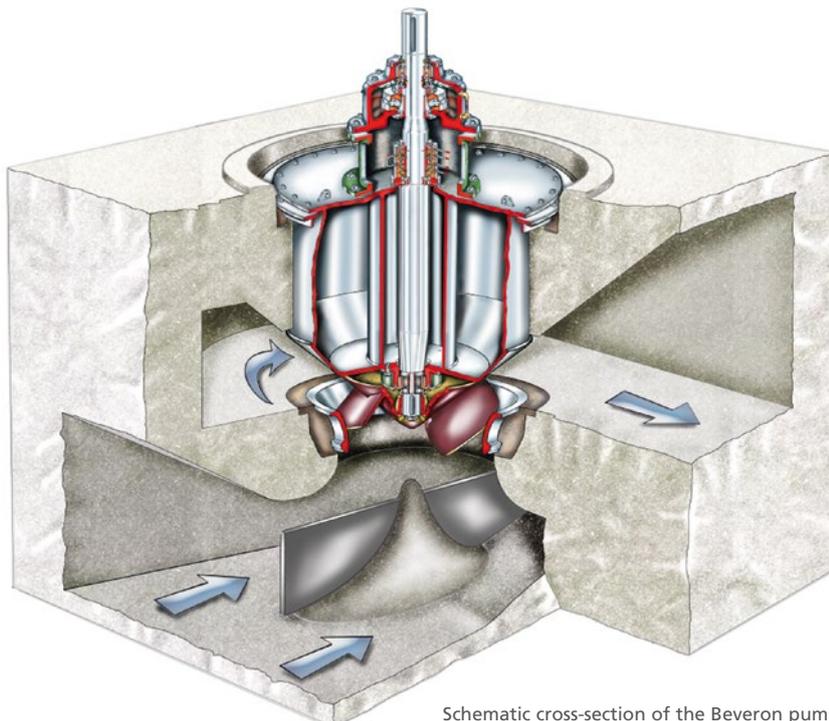
- 6 x concrete volute casing pump BEVERON 210
- Pump, gear, drive
- Formwork for intake and concrete volute
- Installation of the pump sets including formwork, supervision of the concreting process and commissioning of the pump sets

System data:

- Total flow rate: $Q = 100 \text{ m}^3/\text{s}$
(varies between $10 \text{ m}^3/\text{s}$ and $100 \text{ m}^3/\text{s}$)
- Rated head: $H = 4.84 \text{ m}$
(varies between 0 m and 8.6 m)

To protect the farmland against flooding, the hi-tech St. Germans pumping station systematically drains water into the Great Ouse River shortly before it flows into the sea. The volume of water represents a particular challenge as it varies according to the seasons, while the surface level of the water fluctuates with the tide. By using variable speed pumps designed to always run at their optimum operating point, the station is able to adjust continuously to the resultant changes in required head and flow rate.

The project posed multiple challenges for KSB. Extensive analysis and consulting services were required during the preliminary phase, and the list of priorities for component configuration included not only efficiency and reliability, but also safe and environmentally friendly operation. The ideal solution involved integrating six BEVERON 210 concrete volute casing pumps, a task which encompassed formwork, installation of the pump sets, supervision of the concreting process and commissioning.



Schematic cross-section of the Beveron pump's intake and concrete volute

Flood control from KSB – a big help even at small scale

Creating new drainage strategies: Marienschleuse pumping station

In the past, the Am Stapp region has suffered from a lack of unhindered gravity drainage to the Rhine resultant of subsidence caused by mining. In order to prevent flooding, the water which accumulates must be pumped into the Rhine by the Marienschleuse pumping station. KSB provided all pumps, valves and control systems for the project as well as carrying out the pumping station design and the requisite hydraulic and transient flow analyses.



Scope of supply and system data:

- 2 x Sewatec K 350-630/3H
Q = 400 l/s, H = 37.5 m, P = 250 kW
- 2 x Sewatec K 500-632/3H
Q = 800 l/s, H = 34.3 m, P = 355 kW
- 2 x Sewatec E 150-401/3H
Q = 100 l/s, H = 20 m, P = 37 kW
- Complete piping from DN 150 to DN 800 including control gate valves and all other valves required
- Complete hydraulic system design and transient flow analysis

Protecting agriculture: Kosarzyn pumping station

Three years after the extreme flood of 1997, the old tubular casing pumps of the pumping station at the confluence of the Nysa were replaced with powerful AMACAN submersible pumps from KSB – with a total flow rate of 12,000 l/s. The result: maximum reliability, cost-effective operation, straightforward servicing and low life cycle costs.



Scope of supply and system data:

- 4 x AMACAN submersible pump in discharge tube, PA4 1200-870/15012 UAG1
Q = 3,000 l/s, H = 4 m, P = 150 kW

Expertise and first-class services for your project

With over 100 years of manufacturer's know-how in waste water engineering and a team of specially trained experts, we will gladly help you to plan your project and provide you with advice and assistance every step of the way. For example, we offer project-related support concerning

- Pump selection
- Selection of additional equipment
- Selection of alternative drive technology, e.g. diesel drives
- Consulting on energy-efficient systems

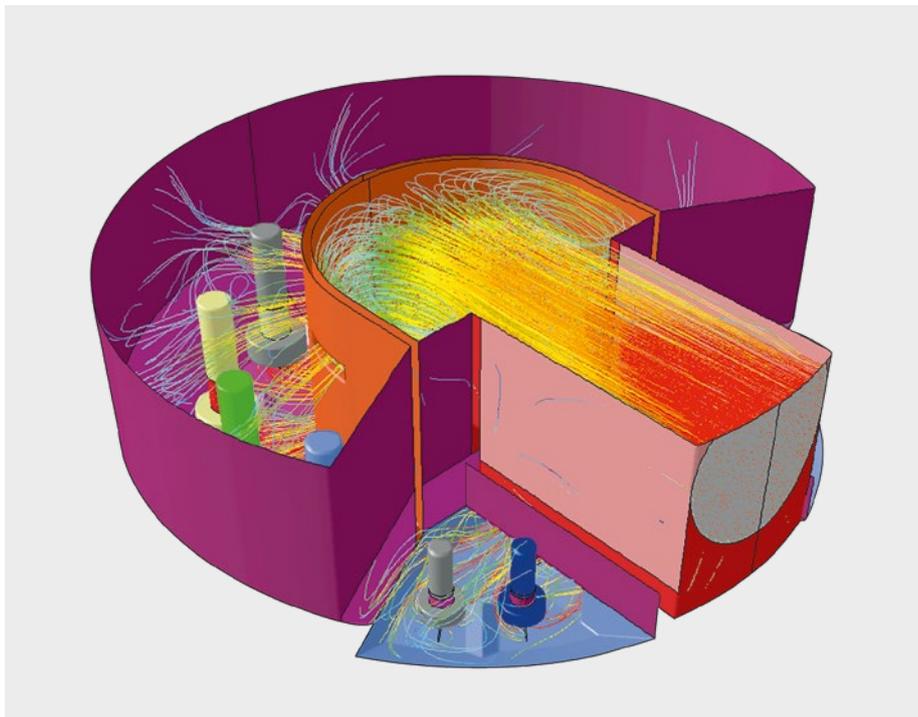
And we will gladly assist you with:

- Optimising the pump station design
- Optimising the intake and outlet structure
- Model testing and CFD simulations
- Piping calculations, hydraulic and transient flow analyses
- Commissioning and performance tests

Thanks to innovative research, for example in the areas of hydraulics and materials technology, our pumps fulfil the highest quality standards.

Our global sales and service network means we are always somewhere near you and can offer swift assistance when required.

CFD simulation



Comprehensive solutions for reliable **flood control**

KSB flood control solutions set the benchmark for robustness, durability, energy efficiency and variety:

- The broadest product portfolio on the market
- Virtually all project sizes and flow rates covered
- Pump systems for dry and wet well installation
- Standard systems and engineered solutions
- Suitable peripheral sub-systems and additional equipment

Dry-installed pumps

Motor or complete pump set not submerged

SNW / PNW	SEZ	BEVERON	Sewatec	SPY/SPN
				
Q max.: 9,000 m ³ /h H max.: 60 m	Q max.: 80,000 m ³ /h H max.: 120 m	Q max.: 108,000 m ³ /h H max.: 27 m (higher heads on request)	Q max.: 10,000 m ³ /h H max.: 93 m	Q max.: 21,600 m ³ /h H max.: 50 m
Discharge nozzle arranged above or below floor	Discharge nozzle arranged above or below floor	Discharge nozzle arranged below floor		

Wet-installed or dry-installed pumps

Wet-installed pumps

Complete pump set submerged

Additional equipment for handling untreated waste water

Amarex KRT	Amacan P	Amacan S	Amajet	Amamix	Amaprop 1000
					
Q max.: 10,000 m ³ /h H max.: 120 m	Q max.: 25,200 m ³ /h H max.: 12 m	Q max.: 46,000 m ³ /h H max.: 55 m	Q max.: 195 m ³ /h	Speed: 475-1,400 rpm 50 Hz 585-1,750 rpm 60 Hz	Speed: 166-208 rpm 50 Hz 158-200 rpm 60 Hz
	Also available with channel impeller, Q max.: 5,400 m ³ /h, H max.: 30 m			Propeller diameter: 630 mm max.	Nominal propeller diameter: 1,000 mm max.

These are maximum values achieved by KSB's products; this data may differ for other variants of these products.

We will be pleased to discuss the specific requirements of your project with you in person to find the right solution for you.



Technology that **makes its mark**

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