> Our technology. Your success. Pumps • Valves • Service



Fresh Water for the Future Desalination Made Efficient



02

Meet the water experts

Tap into a reliable single source

KSB knows water – with extensive experience in pumping water and fluids for industry, utilities, mining, building services and the energy sector. And KSB is a recognised world leader in innovative, expertly engineered products for desalination systems. KSB offers a solutions-oriented approach to desalination, delivering reliable end-to-end quality that endures. With cutting-edge technology and tailored service that starts right from the planning stage, KSB helps you provide water security – today and tomorrow.

Three paths to fresh water

KSB provides reliable solutions to support the three standard methods of extracting fresh water from the sea:

- In RO (Reverse Osmosis), seawater is pumped at very high pressure through selectively permeable membranes, separating salts from the water.
- MSF (Multistage Flash) is a rapid evaporation process, in which seawater is flashed into steam and then condensed.
- In MED (Multiple Effect Distillation), seawater passes through evaporators and is condensed at low temperatures and pressures at multiple stages.

Whatever method is applied, KSB is able to leverage extensive experience in all kinds of applications to optimise operations, maximise performance and minimise energy and maintenance costs.



Reverse osmosis process with KSB products





SalTec® N System – efficient RO for reliable drinking water supplies

As easy as one, two, three: the key components.

SalTec[®] N System provides the pressure required to force seawater to pass through selectively permeable membranes, recovering energy in the process and adapting to changing conditions as required. Its three key components are:

- 1 The HGM-RO and Multitec-RO high-pressure pumps supply seawater to the membranes at the required pressure. Their robust ring-section design is ideal for extreme applications, and their efficiency helps ensure minimal energy consumption. Anti-corrosive super duplex materials stand up to demanding conditions.
- 2 The SalTec[®] N pressure exchanger boosts efficiency by directly converting the energy of brine in order to power the desalination process. Super duplex stainless steel materials ensure wetted parts are corrosion-resistant. The pressure exchanger automatically adapts to transient conditions to maintain uninterrupted operation.
- 3 The RPH-RO booster pump matches system pressure to varying operating conditions. This volute casing pump includes a special mechanical seal for high system pressures. The extremely rigid rotor support reduces shaft deflection, ensuring a long service life. Thanks to super duplex materials, RPH-RO offers unprecedented robustness, performance and reliability.



SalTec[®] N System is KSB's all-in-one solution for SWRO applications. The system precisely calibrates and integrates all components, ensuring life cycle costs stay as low as possible. Expertly engineered KSB pumps deliver unparalleled reliability and efficiency, making SalTec[®] N System a ready-to-run and refreshingly cost-effective solution.



SalTec® N System – perfectly matched

The efficient interaction of SalTec[®] N System's hydraulic components is unparalleled in the industry. Balanced integration means better performance. So SalTec[®] N System saves energy and reduces the price of water.

Optimum system efficiency

High-pressure pump, pressure exchanger, booster pump – KSB customises all these components using the best, proven materials for round-the-clock availability and lowest possible energy consumption.

High flexibility

All components of SalTec® N System have a wide performance range, ensuring flexible and reliable system operation, even in harsh climates and under varying conditions.

Low energy and life cycle costs

All key SalTec[®] N System components (high-pressure pump, pressure exchanger, booster pump) are designed for continuous high efficiency – ensuring both reduced energy input and lower life cycle costs.

Robust design

All components of SalTec[®] N System are able to handle solid particles in the water for short periods, for example during commissioning. In extreme situations, any damage to the components can quickly be repaired on-site with standard tools.

Personal service

Each customer can draw on the expertise of a personal service representative who provides individual support for each project and all of its components from start to finish.

The SalTec® N System solution – perfectly smooth

KSB optimises the interaction of every component of SalTec[®] N System – for a smoothly operating all-in-one solution. This markedly reduces interface losses and simplifies the plant designer's job, because all components have already been matched and integrated during design and construction.





The SalTec® N System equation – perfectly balanced

Efficient

Virtually loss-free energy recovery means that pressure exchanger systems achieve much higher efficiency than turbine-based solutions. SalTec[®] N System increases this efficiency even further, thanks to the smooth interaction of perfectly matched components from a single source.

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Innovative

The unique pressure exchanger technology rounds off and completes a system of rugged components that have proven their worth in seawater desalination over many years. The innovative SalTec[®] N System is the energy recovery system for RO processes of the future – and available today.

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Profitable

The SalTec[®] N System quite simply reduces the price of water. KSB thus enables cost-effective and reliable drinking water production in medium to large-scale systems with train outputs starting from 7,000 m³/day (400 m³/h brine flow capacity) – perfect service concepts included.

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The individual solution to the most challenging tasks: HGM-RO

KSB's HGM-RO high-pressure pump is top of the range – and the best choice for even the toughest conditions. Developed specifically for reverse osmosis applications, HGM-RO meets all the requirements involved in the process.

Seawater is a challenging medium. So we decided to build this pump using duplex and super duplex stainless steel. And we developed a compact design ensuring that HGM-RO can comfortably handle high osmotic pressures. Starting the pump places minimum demands on membrane and material. Top HGM-RO quality enables round-the-clock drinking water production of more than 30,000 m³/day per desalination train. Continuous optimisation ensures the best possible efficiency and low energy consumption. Smooth operation, increased service life and straightforward maintenance are further hallmarks of this premium pump.

HGM-RO meets the highest demands – and is the first choice for seawater desalination.



Your benefits

Service-friendly design

- Compact design
- Low space requirement thanks to internal bearings and axial inflow
- Ease of assembly and dismantling
- Straightforward installation: ready-to-use pump set (plug & run) without monitoring systems/pressure gauge

High operating reliability and long service life

- Designed to be used in large plants (up to 1,500 m³/h per pump)
- High-quality components for efficient seawater treatment
- Optimum vibration characteristics ensured by short bearing span
- Low NPSH value thanks to axial inflow with suction impeller

Cost-efficient design

- Tailored to meet individual needs
- Low life cycle costs: no need for auxiliary media or additional supply lines
- Ease of maintenance and low spare parts costs
- Low energy costs because of excellent efficiency



The standard solution for large and medium-sized plants: Multitec-RO

Expertise pays off. KSB has years of experience in suppyling equipment for RO plants and provides an economic standard solution for their special needs. Made of duplex and super duplex stainless steel, Multitec-RO is ideal for stationary or floating installations in hotels, large ships, transportable containers and medium-sized plants. Optimum efficiency keeps energy costs down. A wear-resistant plain bearing and just one discharge-side shaft seal make for easy servicing.

Multitec-RO pumps are economical, reliable and corrosion-resistant – the individual standard for demanding customers.



Your benefits

Service-friendly design

- Compact design
- Straightforward installation: ready-to-use pump set (plug & run) without monitoring systems/pressure gauge

High operating reliability and long service life

- Designed to be used in large- to medium-scale plants
- Suitable for low osmotic pressures
- High availability ensured by short bearing span (fluid-lubricated bearings)
- Low NPSH value thanks to axial inflow with suction impeller

Cost-efficient design

- Ease of maintenance and low spare parts costs
- Just one mechanical seal on the drive end means low maintenance costs



Cross-sectional views

HGM-RO, pump sizes ≤ 6



HGM-RO, pump sizes > 6



Multitec-RO, pump sizes ≤ 100



Multitec-RO, pump sizes > 100





Hydraulic selection chart 50 Hz: Multitec-RO / HGM-RO

Flow rate Q



Hydraulic selection chart 60 Hz: Multitec-RO / HGM-RO

Flow rate Q

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Corrosion is a major factor in the selection of equipment used in seawater. Therefore, extensive materials know-how is indispensable for the successful implementation of projects. Backed up by its Competence Center Materials, KSB has an excellent international position in this field. Drawing on more than a century of experience, we develop our own application-specific materials and engage in materials research geared to generating maximum customer benefit. We also have a comprehensive range of equipment for analysing materials and fluids, determining the technological properties of materials and components, performing non-destructive tests and examinations and supporting quality assurance. Combined with the expertise of other specialist departments, this gives us a huge toolbox from which to pick and choose, together with our partners, the optimal solution for our customers' every application.



Materials laboratory



In our quest for optimal solutions, we provide comprehensive advice and guidance on materials technology, material selection and damage appraisal, including on-the-ground

Solidification simulation

Right on target with ring-section design

The benefits of radially split high-pressure pumps from KSB are hard to match. We have consistently improved this design principle, aiming to minimise life cycle costs. Our Multitec-RO and HGM-RO high-pressure pump series ensure top efficiency and the easiest of maintenance.

Reduced costs for construction work

- Compact design
- Flexible connection nozzles
- "Plug & run" installation

Minimum operating costs

- Excellent NPSH value
- Optimum efficiency

Low monitoring requirements

- Reliable lubrication system for the bearings
- No monitoring of vibrations or bearing temperature required

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Minimum maintenance costs

- Robust and extremely reliable ring-section design
- Duplex and super duplex stainless steel: corrosion-resistant and extremely durable
- Easy-to-replace mechanical seal
- Can be dismantled and reassembled from either side

4-in-1 technology: SALINO[®] Pressure Center

The new high-pressure pump unit for reverse osmosis (RO) systems demonstrates that outstanding cost-effectiveness and a pioneering approach to environmental protection need not be mutually exclusive. And it achieves this with an extremely compact design offering valuable benefits based on a unique principle: 4-in-1 technology.

SALINO[®] Pressure Center is ideal for use in small- and medium-sized desalination systems in the oil and gas industry, in the tourism sector, on ships, in general industry applications and in agriculture.

Your benefits

Economically efficient

- Low investment and maintenance costs thanks to 4-in-1 technology: the SALINO[®] Pressure Center combines the functions of high-pressure pump, pressure exchanger, booster pump and electric motor.
- Low operating costs thanks to maximum energy efficiency: SALINO[®] offers potential energy savings of up to 75 % compared with systems without energy recovery.
- Low space requirement thanks to the reduced number of components.
- Plug & desalt: the system's compact design allows straightforward handling.

Environment-friendly and clean

• Equipped with a hydraulic system for water applications, the axial piston pump is lubricated by the fluid handled, i.e. seawater, and functions entirely without oil.

Reliable and safe

• Time-tested technology for high-pressure applications.





Global success from a single source – KSB

On different continents, on different seas, in changing conditions and all year round, KSB keeps its customers satisfied.

1 Dubai – Palm Jumeirah Seawater Desalination Plant



Palm Jumeirah, a palm tree-shaped group of artificial islands, is one of Dubai's most ambitious building projects. The 5-by-5 km archipelago has been designed by top architects and planners, and when completed will be one of world's most exclusive addresses, featuring luxury resort hotels, private homes, marinas and upmarket retail shopping. Drinking water for guests, residents and service personnel comes from two seawater desalination plants using reverse osmosis – from KSB.

Technical data:

2 x 3 HGM-RO 6/3 high-pressure pumps (RO), 2 x 3 RPH-RO 250-401 booster pumps (ERS), 2 x 3 Omega 200-670B filtered seawater pumps (RO)

2 Singapore – SingSpring Seawater Desalination Plant



With a total of 10 trains, the SingSpring seawater desalination plant near Singapore is the largest desalination plant in the region. 136,380 m³ of pure drinking water – the equivalent of 10 % of the island's overall demand – are produced here on a daily basis. KSB delivered ahead of schedule, keeping building costs at an absolute minimum – thanks to the system's compact design, flexible connection nozzle and plug & play installation. With on-going service close at hand, KSB ensures continuing smooth operations and the long-term reliability of the plant and its vital output.

Technical data:

10 HGM-RO 6/3 high-pressure feed pumps (RO), 6 Omega V300-435A filtered water pumps (ERS), 10 RPH-RO 250-401 booster pumps (ERS), 10 Omega V200-670A filtered water pumps (RO), 4 KRTK 600-710 intake pumps



Malta – Pembroke Reverse Osmosis Plant



The Water Services Corporation (WSC) produces more than half of the annual water demand of Malta's 400,000 inhabitants and the over 1 million tourists who visit every year. When their Pembroke Reverse Osmosis Plant needed upgrading, WSC placed great value on cutting water costs. KSB's solution based on durable products and an effective energy recovery concept helped achieve savings on energy and maintenance costs. This and the consistently high efficiency of SalTec System with its perfectly matched components (high-pressure pump, pressure exchanger, booster pump) have contributed to a significant reduction in life cycle costs, which translates into lower water production costs.

Technical data:

2 x SalTec pressure exchanger, 1 HGM-RO 4/5 high-pressure pump, 1 RPH-RO 100-230 booster pump, 2 HGM-RO 4/6 high-pressure pumps

Australia – Sydney Water Corp. Seawater Desalination Plant



The Sydney Water Corporation Ltd. provides water services to more than four million people in and around Sydney, Australia. The Sydney seawater desalination plant on Botany Bay alone produces 250 mega litres per day of pure drinking water. The technical and commercial decision-makers at Sydney Water chose KSB, in large part because we are the only supplier to consistently use the design principle of radially split high-pressure pumps for reverse osmosis applications. Their corrosion-resistant super duplex stainless steel design makes for an extraordinarily long life cycle, even when handling seawater.

Technical data:

13 HGM-RO 8/3 1st pass RO high-pressure pumps, 7 RDLO 350-690A 2nd pass RO high-pressure pumps, 13 Omega V250-600B 1st pass RO booster pumps, 13 Omega V250-480A ERS booster pumps

Quality at every stage of desalination

RO core hydraulic components

For seawater desalination by reverse osmosis, remember: Efficient + Innovative = Profitable. That's your clean water, and your profit.

HGM-RO



Design: Horizontal, radially split, product-lubricated, multistage ring-section pump with radial impellers and plain bearings. Axial or radial single-entry inlet. Materials: Super duplex stainless steel (standard) or duplex stainless steel (optional). Max. capacity: 1,700 m³/h Max. total head: 950 m

Multitec-RO

High-pressure pump



Design: Horizontal, multistage pump in ring-section design. Axial suction nozzle, total nozzle can be turned in steps of 90°. Closed radial impellers.
Materials: Super duplex stainless steel (standard) or duplex stainless steel (optional).
Max. capacity: 850 m³/h
Max. total head: 1,000 m

SalTec® N



Design: Specially developed for use in RO seawater desalination systems.
Materials: Super duplex stainless steel
Capacity per system: From 7,000 m³/day (from 400 m³/h brine flow capacity)
Fluid handled: Seawater with up to 45,000 ppm TDS

RPH-RO



Design: Horizontal, radially split volute casing pump, dry-installed. Materials: Super duplex stainless steel Max. capacity: 4,150 m³/h Max. total head: 270 m

SALINO[®] Pressure Center

High-pressure pump with integrated energy recovery



Design: Horizontal, product-lubricated axial piston pump with integrated energy recovery.
Materials: Forged duplex stainless steel (standard) or forged super duplex stainless steel (optional).
Max. capacity: 23 m³/h (feed flow)

Max. total head: 1000 m

Seawater supply pumps

Rugged KSB seawater supply pumps take care of the first crucial step, extracting seawater and transporting it to the pre-treatment stage.

SEZ / PHZ / PNZ

Cooling water pump



Design: Vertical tubular casing pump with mixed flow impeller (SEZ), mixed flow propeller (PHZ) or axial propeller (PNZ), single-stage, with maintenance-free Residur shaft bearings, pull-out design available, total nozzle arranged above or below floor.

Materials: Super duplex stainless steel (standard) or duplex stainless steel, carbon steel (optional).

Max. capacity: 80,000 m³/h

Max. total head: 100 m

SNW / PNW





Design: Vertical tubular casing pump with mixed flow impeller (SNW) or axial propeller (PNW), single-stage, with maintenance-free Residur shaft bearings, total nozzle arranged above or below floor. **Materials:** Duplex stainless steel, carbon steel.

Max. capacity: 9,000 m³/h

Max. total head: 50 m

UPA

Submersible borehole pumps 8" - 16"



Design: Single or multistage, single-entry centrifugal pumps in ring-section design. For vertical and horizontal installation. Mixed flow hydraulic systems, stage casings connected by means of stud bolts. Suction casings fitted between pump and motor, equipped with strainer to protect the pumps from coarse particles in the fluid. Pumps available with or without check valve, threaded or flanged end.

Materials: Super duplex stainless steel (standard) or duplex stainless steel, bronze (optional).

Max. capacity: 2,200 m³/h

Max. total head: 480 m

Amarex KRT

Submersible motor pump



Design: Vertical, single-stage submersible motor pump in close-coupled design, various impeller types, for wet or dry installation, stationary and transportable version. ATEX-compliant version available.

Materials: Super duplex stainless steel (standard) or duplex stainless steel (optional).

Max. capacity: 10,080 m³/h

Max. total head: 100 m

Distribution, seawater supply and process pumps

KSB distribution pumps ensure the water arrives where it is needed – fast and ready for consumption every day, and always on time.

Omega & RDLO



Process and auxiliary pumps.

KSB treatment pumps deliver top performance and energy savings in the RO treatment process between pre-treatment and post-treatment.

Etanorm / Etanorm-R



KWP / KWP-K

Non-clogging impeller centrifugal pump / close-coupled unit	Design: Horizontal, radially split volute casing pump in back pull-out or close- coupled design, single-stage, single-entry, available with various impeller types: non-clogging, open multi-vane, free-flow. ATEX-compliant version available. Materials: Super duplex stainless steel (standard) or duplex stainless steel, CeramikPolySiC (optional). Max. capacity: 18,000 m ³ /h
	Max. total head: 100 m

MegaCPK

Standardised chemical pump with two bearing bracket variants	Design: Horizontal, radially split volute casing pump in back pull-out design to EN 22858 / ISO 2858 / ISO 5199, single-stage, single entry, with radial impeller.	
	Also available as variant with "wet" shaft, conical seal chamber, heatable volute casing. ATEX-compliant version available.	
	Materials: Grey cast iron, cast steel, stainless steel, duplex stainless steel, super duplex stainless steel, special materials	
	Max. capacity: 1,160 m³/h (50 Hz)	1,400 m³/h (60 Hz)
	Max. total head: 162 m (50 Hz)	233 m (60Hz)

Specialised valves for RO desalination from KSB

Clever and maintenance-free KSB valves make certain you are in control of your water at all stages of the desalination process.

ISORIA

Centered disc butterfly valve



Design: Centered disc butterfly valve with elastomer liner. With lever, manual gearbox, pneumatic, electric or hydraulic actuator. Wafer type body (T1), semilug type body (T2), full-lug type body (T4), U-section body with flat faces (T5). Body types T2, T4 and T5 are suitable for downstream dismantling and deadend service with counterflange. EN, ASME, JIS connections possible.

Materials: Body – cast iron, ductile iron. Disc – rubber coated, stainless steel, aluminum bronze, duplex stainless steel.

Sizes: DN 40 - 1000

Max. operating pressure: 10 / 16 / 20 / 25 bar

MAMMOUTH

Centered disc butterfly valve



Design: Centered disc butterfly valve with elastomer liner, with manual gearbox, electric, hydraulic actuator or counter weight. U-section / double flanged body with flat faces (T5). EN, ASME, JIS connections possible.

Materials: Body – ductile iron. Disc – rubber coated, stainless steel, aluminum bronze, duplex stainless steel. Sizes: DN 1050 – 4000

Max. operating pressure: 6 / 10 / 16 / 20 / 25 bar

DANAÏS

High-performance offset disc butterfly valve



Design: Double-offset butterfly valve with plastomer seat ring (also in fire-safe design) or metal seat ring. With lever or gearbox, pneumatic or electric or hydraulic actuator; wafer type body (T1) or full-lug type body (T4). Body type T4 is suitable for dead-end service and downstream dismantling. EN, ASME, JIS connections.

Materials: Body – cast stainless steel. Disc – stainless steel.

Max. capacity: DN 50 - 1200

Max. operating pressure: 25 bar

SERIE 2000 - PN 16





Technology that makes its mark

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