

► Our technology. Your success.

Pumps • Valves • Service



Fresh Water for the Future Desalination Made Efficient



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. KSB is a recognized 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

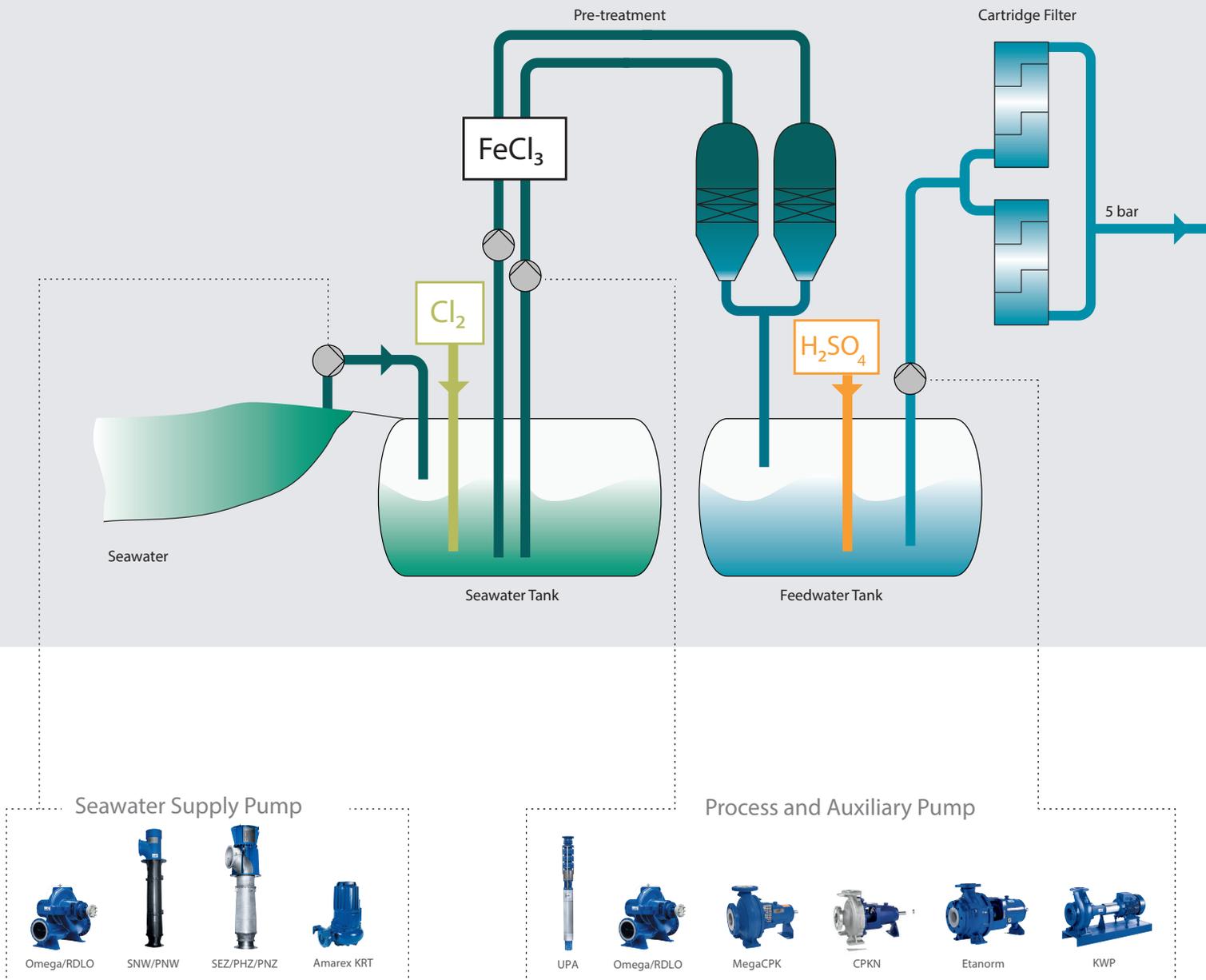
KSB provides reliable solutions to support the three standard methods of extracting fresh water from the sea:

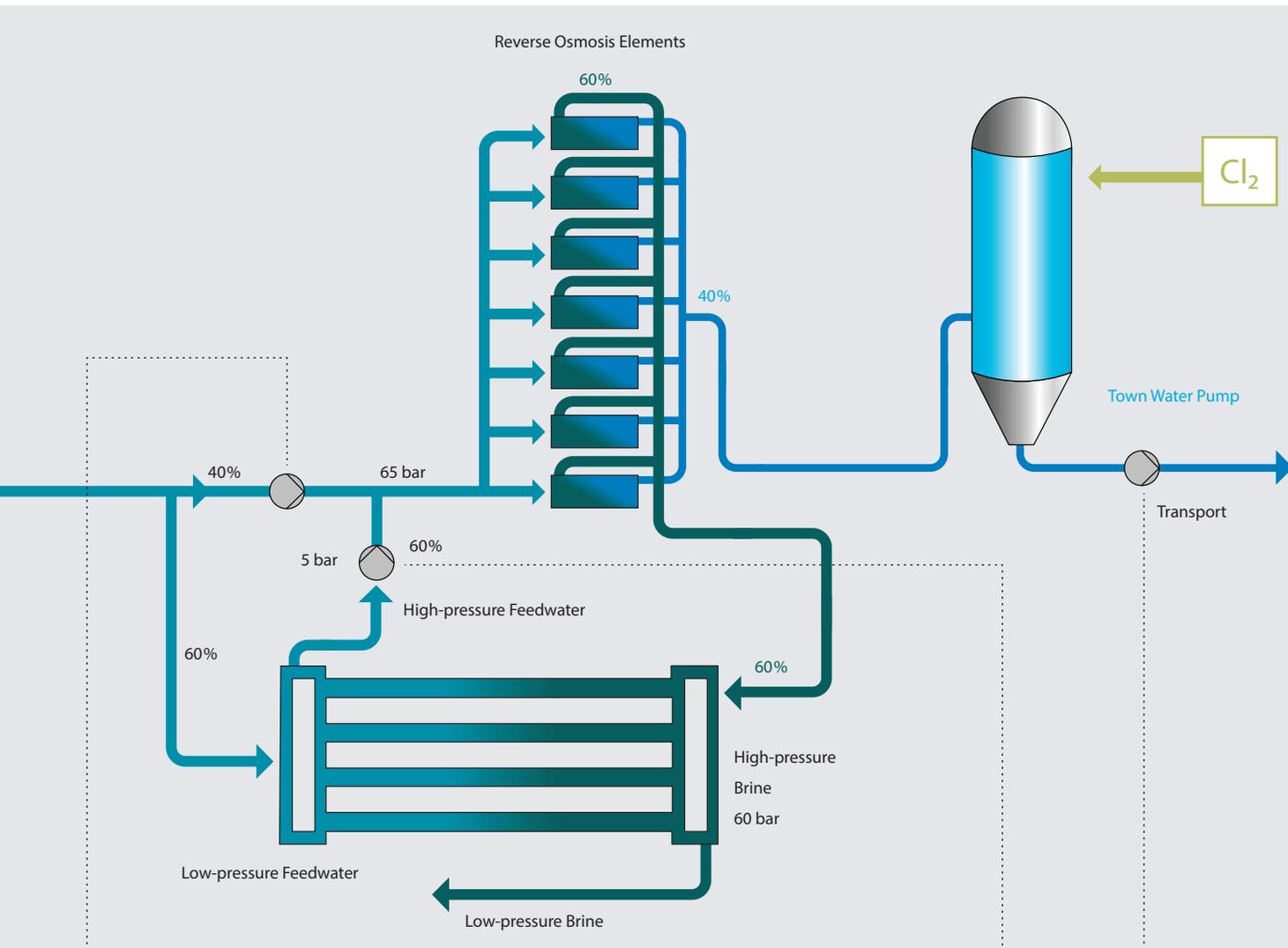
- In RO (Reverse Osmosis), seawater is pumped at very high pressure through selectively permeable membranes, separating salts from the water.
- MSF (Multistage Flash) is a rapid evaporation process, in which seawater is flashed into steam and then condensed.
- In MED (Multiple Effect Distillation), seawater 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 optimize operations, maximize performance and minimize energy and maintenance costs.



Reverse osmosis process with **KSB products**





High-Pressure Pump

HGM-RO Multitec-RO

Booster Pump

RPH-RO

Distribution Pump

Omega/RDLO

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. We built 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 30,000m³/day/132,086 gpm per desalination train. Continuous optimization ensures the best possible efficiency and low energy consumption. Smooth operation, increased service life and straightforward maintenance are further benefits of this premium pump.

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

Your benefits

Service-friendly design

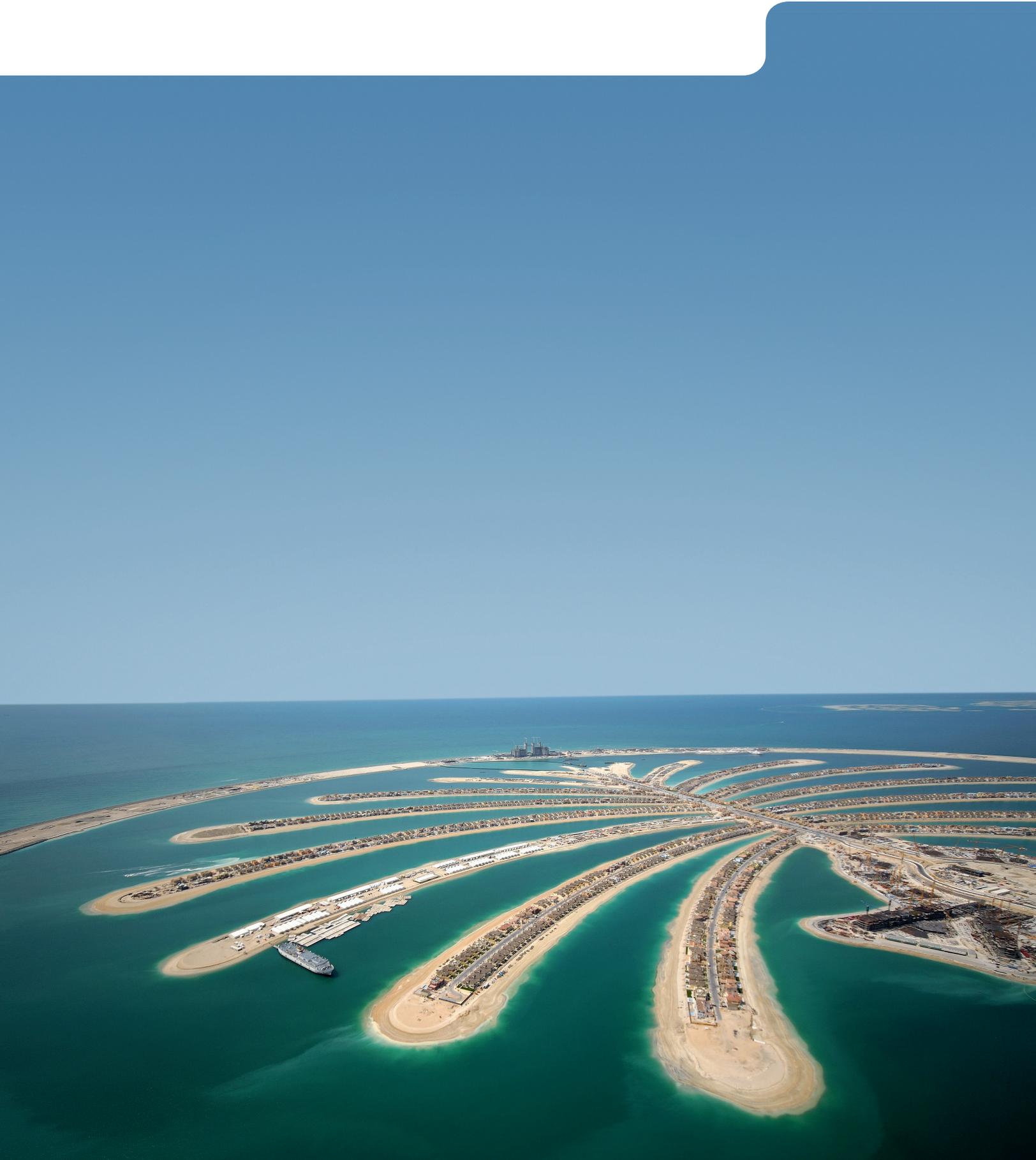
- Compact design
- Low space requirement thanks to internal bearings and axial inflow
- Ease of assembly and dismantling
- Straightforward installation: ready-to-use pump set (plug & run) without monitoring systems/pressure gauge

High operating reliability and long service life

- Designed to be used in large plants (up to 1,500m³/h/6,604 gpm 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

KSB has years of experience in supplying 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

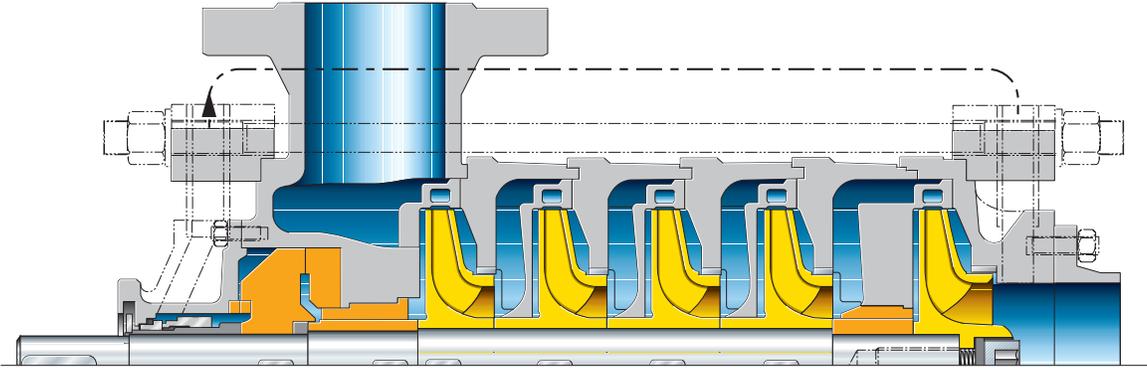
Cost-efficient design

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

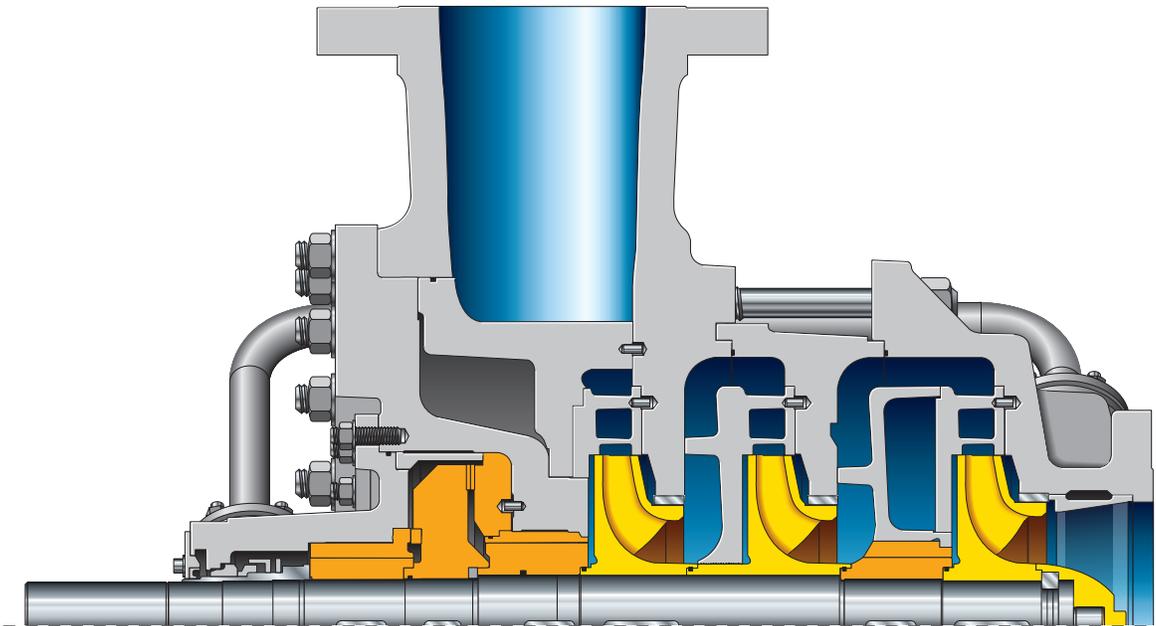


Cross-sectional views

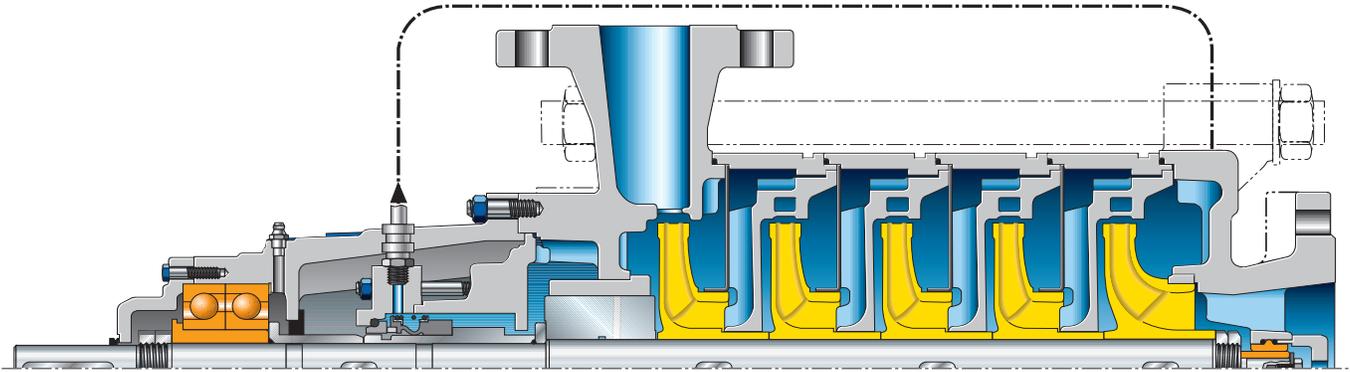
HGM-RO, pump sizes ≤ 6



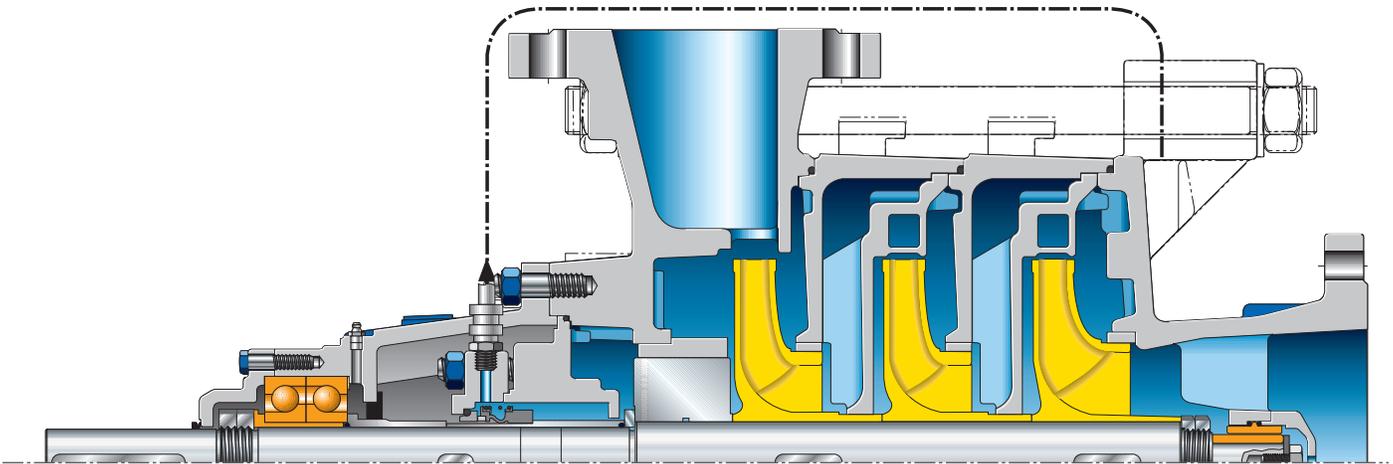
HGM-RO, pump sizes > 6



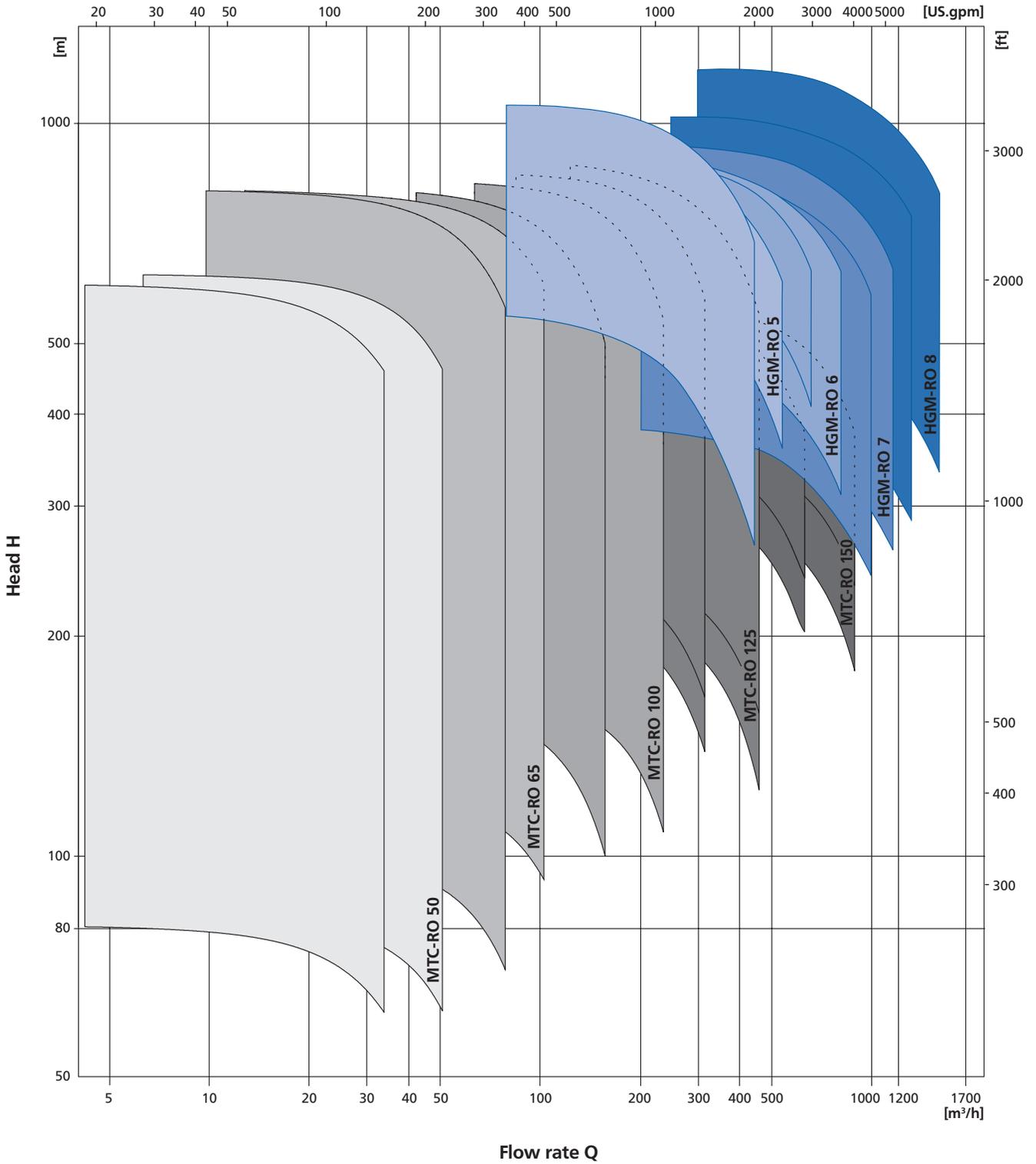
Multitec-RO, pump sizes ≤ 100



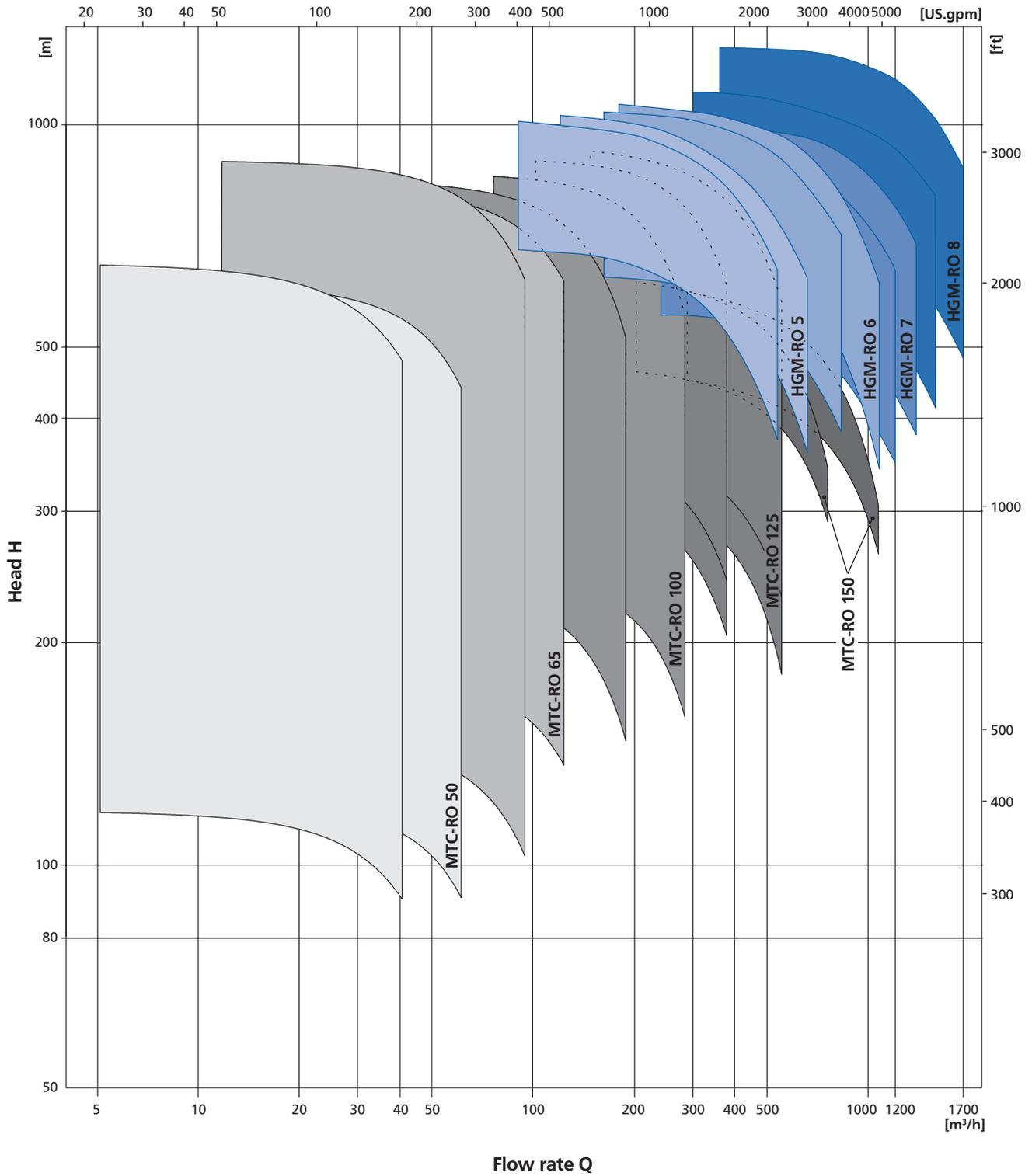
Multitec-RO, pump sizes > 100



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



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



Materials expertise

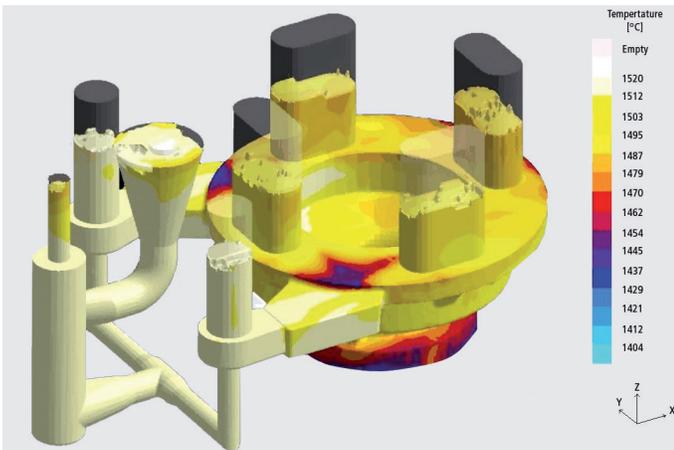
Corrosion is a major factor in the selection of equipment used in seawater. Therefore, extensive materials know-how is indispensable for the successful implementation of projects. Backed up by its Competence Center Materials, KSB has an excellent international position in this field. Drawing on more 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 analyzing 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 pool from which to pick and choose, together with our partners, the optimal solution for our customers' every application.



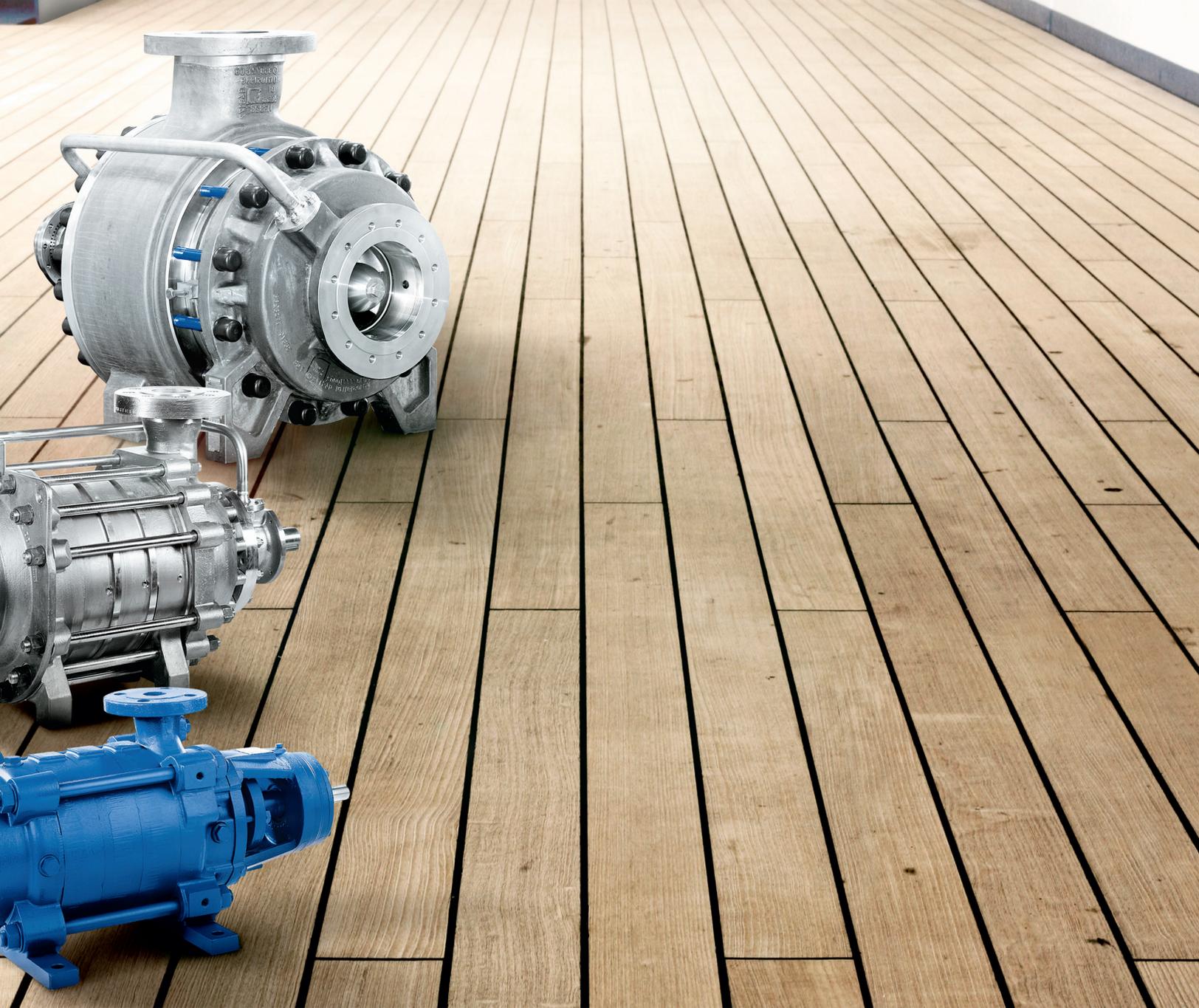
Materials laboratory

In recent years, KSB has demonstrated its materials expertise in many ways, for example by developing its own classes of materials (e.g. NORI® materials) and coatings for numerous applications. Our innovations are not limited to seawater desalination projects, but are used across all industrial sectors, water and waste water, mining and energy engineering.



Solidification simulation

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



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 minimize 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

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. This is achieved because of an extremely compact design offering valuable benefits based on a unique 4-in-1 technology principle.

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 because of its 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 due to maximum energy efficiency: SALINO® offers potential energy savings of up to 75% compared with systems without energy recovery.
- Low space requirement due 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 up-market 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



3 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

4 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 liters 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

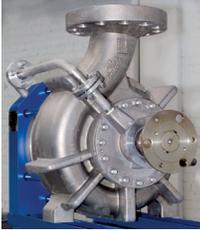
Quality at every stage of desalination

RO core hydraulic components

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

HGM-RO

High-pressure pump



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/7,485 gpm

Max. total head: 950 m/3,117 ft.

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.

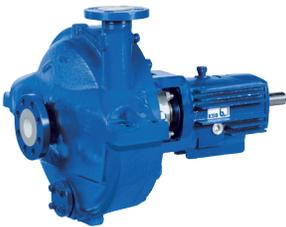
Materials: Super duplex stainless steel (standard) or duplex stainless steel (optional).

Max. capacity: 850 m³/h/3,742 gpm

Max. total head: 1,000 m/3,281 ft.

RPH-RO

Booster pump



Design: Horizontal, radially split volute casing pump, dry-installed.

Materials: Super duplex stainless steel

Max. capacity: 4,150 m³/h/18,272 gpm

Max. total head: 270 m/886 ft.

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/101 gpm (feed flow)

Max. total head: 1000 m/ 3,281 ft.

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/352,229 gpm

Max. total head: 100 m/328 ft.

SNW / PNW

Cooling water pump



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/39,626 gpm

Max. total head: 50 m/164 ft

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/9,686 gpm

Max. total head: 480 m/1,575 ft.

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/44,381 gpm

Max. total head: 100 m/328 ft.

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

Axially split volute casing pump DN 80-700



Design: Single-stage, axially split volute casing pumps for horizontal or vertical installation with double-entry radial impeller. Mating flanges to DIN, ISO, BS or ANSI.

Materials: Super duplex stainless steel (standard) or duplex stainless steel, CR steel, cast iron, nodular cast iron, bronze (optional).

Max. capacity: 18,000 m³/h/79,252 gpm

Max. total head: 240 m/787 ft.

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

Standardized pump



Design: Horizontal, long-coupled, single-stage volute casing pump (pump size 125-500) with ratings and main dimensions to EN 733, in back pull-out design, with replaceable shaft sleeves / shaft protecting sleeves and casing wear rings. ATEX-compliant version available.

Materials: Grey cast iron, nodular cast iron, cast stainless steel, bronze, cast steel.

Max. capacity: 1,900 m³/h/8,366 gpm

Max. total head: 160/525 ft.

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 m³/h/79,252 gpm

Max. total head: 100 m/328 ft.

MegaCPK

Standardized 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: 1,400 m³/h/6,164 gpm

Max. total head: 233 m/764 ft.

Specialized 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), semi-lug 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 dead-end service with counterflange. EN, ASME, JIS connections possible.

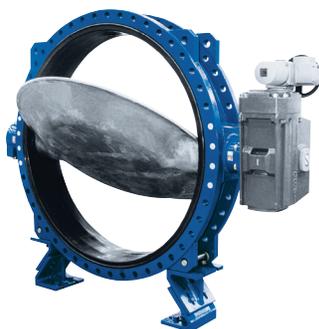
Materials: Body – cast iron, ductile iron. Disc – rubber coated, stainless steel, aluminum bronze, duplex stainless steel.

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

Dual disc swing check valve



Design: Dual disc swing check valve, pressure class PN 16. Maintenance-free. EN, ANSI, JIS connections possible.

Materials: One-piece body made of grey cast iron. Metal/elastomer seated. Aluminum bronze.

Max. capacity: DN 50 – 600

Max. operating pressure: 16 bar



Technology that **makes its mark**



KSB, Inc.
4415 Sarellen Road
Henrico, VA 23231
www.ksbusa.com