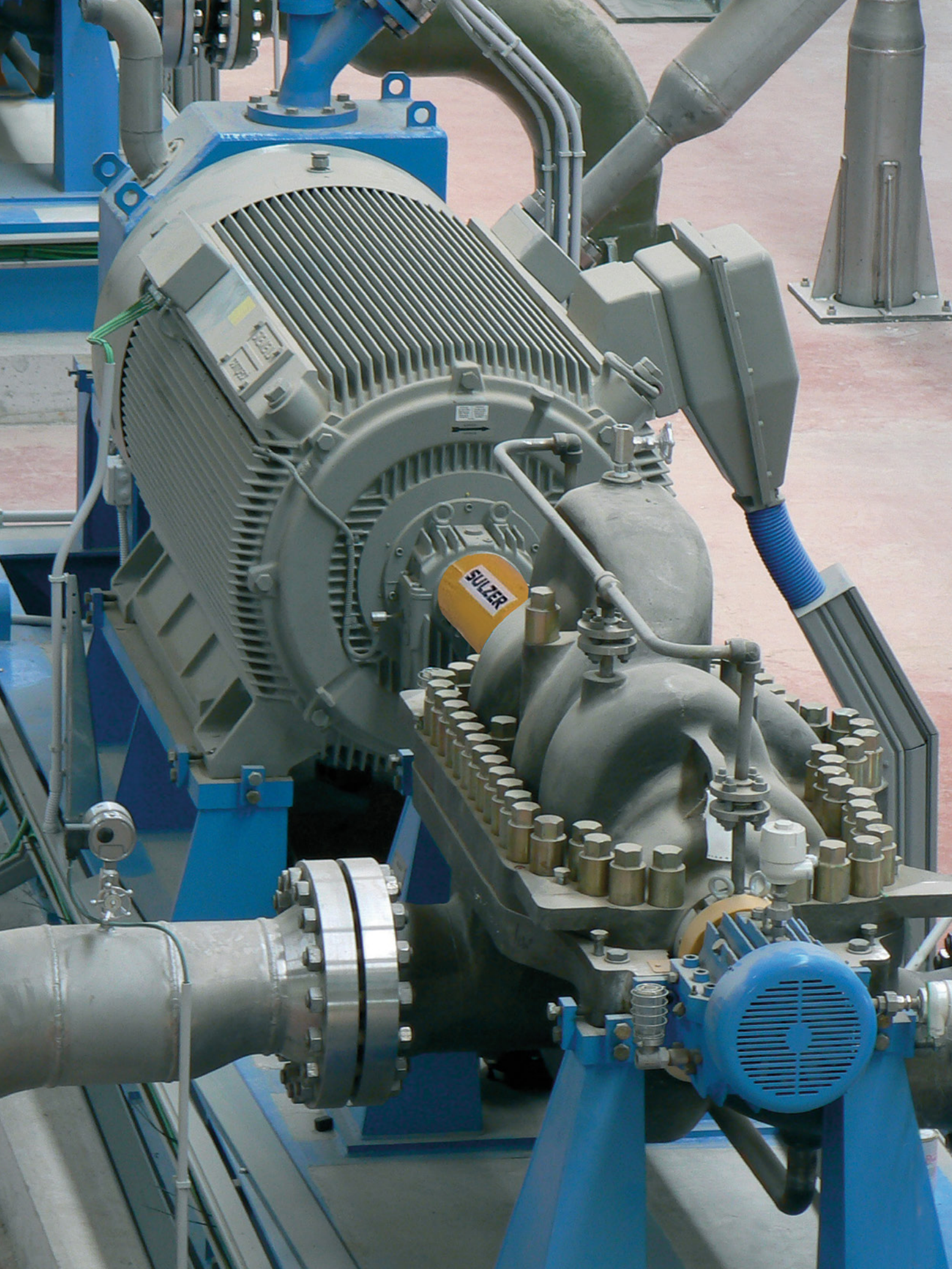


Pumping Solutions for Desalination and Water Reuse





Experience and Proven Technology

As a global leader in pump design and manufacture, Sulzer is recognized for delivering the excellent product quality and performance reliability for the most critical applications in Desalination and Water Reuse. Based on our experience and proven technology we help you operate your plants more efficiently. We share our expertise with you and create for you enduring and economical solutions.



Desalination

Sulzer is your full-range supplier of pumps for sea or brackish water desalination plants using Reverse Osmosis (RO) or Multi Effect Distillation (MED) technology. Our innovative technological solutions and equipment support the sophisticated processes which convert salty water into potable water for human consumption, irrigation or industrial use.

Water reuse

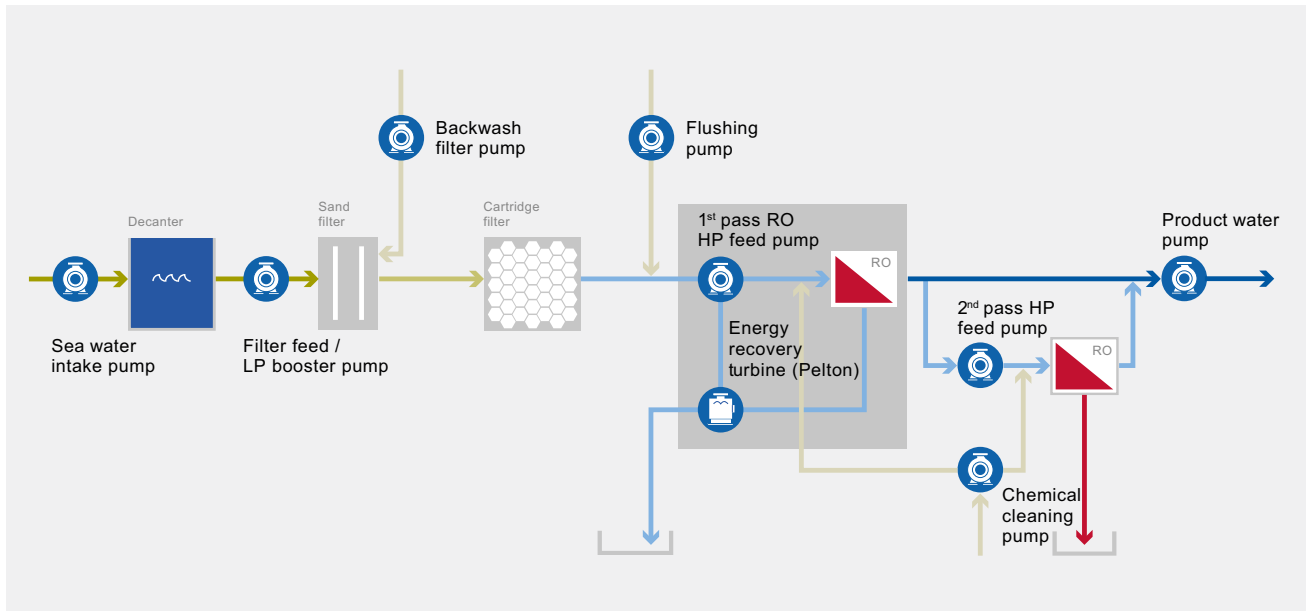
Our pumps suitable for Water Reuse applications for the industry or in municipal applications help you increase sustainably your water resources. Sulzer has always been at the forefront of pre-engineered and engineered designs, using the widest range of materials to produce safe, efficient and reliable pumps.

About Sulzer

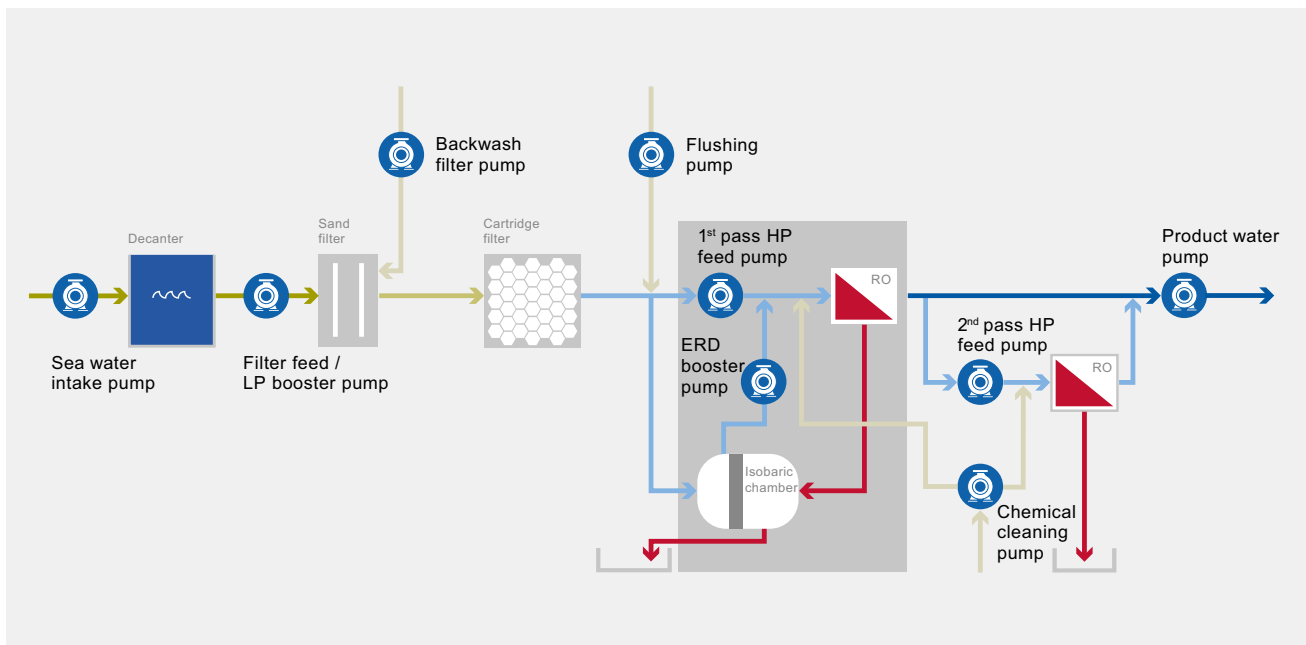
Sulzer is recognized for state-of-the-art product quality, performance reliability and technical innovation. We provide a full line of pumps, equipment and related technologies to the Oil and Gas, Hydrocarbon Processing, Power Generation, Pulp and Paper, Water and Wastewater and General Industries. Combining global capabilities, local market understanding and application expertise we support customers with more than 150 locations around the world, including manufacturing facilities, sales offices and service centers close to our customers.

Whatever the Process, We Have the Pumping Solutions

Typical Seawater Reverse Osmosis Plant (SWRO)



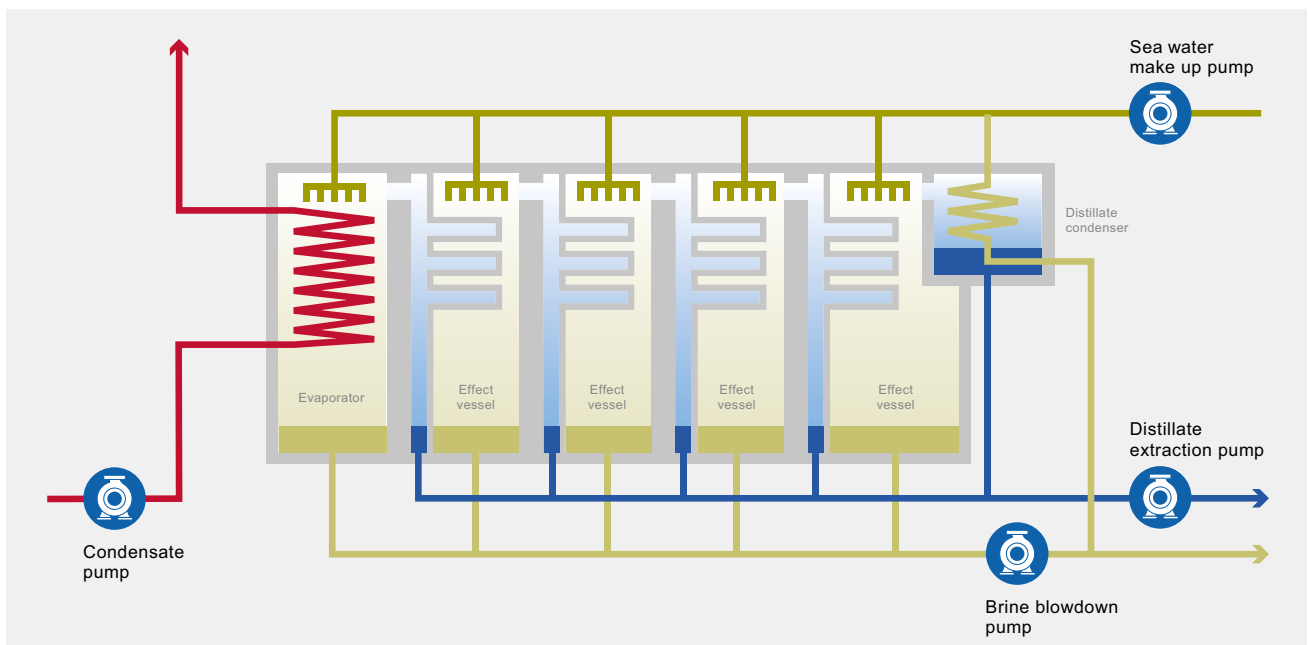
with Pelton Turbine as energy recovery device



with Isobaric Chamber as energy recovery device



Typical multi-effect-distillation plant



Our Comprehensive Product Portfolio

Sulzer offers a wide range of pumps for seawater reverse osmosis plants as well as multi-effect-distillation plants. The table below offers an overview of the product offering and shows in what part of the desalination process the pumps can be used.

Product types		Water intake	Filter feed/ LP booster	HP feed	ERD booster	Filter backwash	Chemical cleaning	Product transfer	MED applications
End suction pumps	A	✓	✓			✓	✓	✓	✓
	CPT	✓	✓			✓	✓	✓	✓
	ZE		✓					✓	✓
	ZF				✓				
Axially split pumps	SMD	✓	✓					✓	✓
	ZPP	✓	✓						
	HSB/HPDM			✓					
Multistage pumps	MBN / MBN-RO			✓					
	MC			✓					
	MSD / MSD-RO			✓				✓	
Vertical pumps	SJM	✓	✓						
	SJT	✓	✓						
	STR	✓	✓						

Product Overview

End suction pumps

AHLSTAR A

FEATURES AND BENEFITS

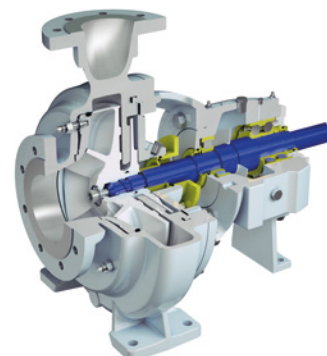
- AHLSTAR pumps save energy, sealing water and environment
- Designed to meet the EN ISO 5199 reliability standard, these pumps also comply to EN 22858 (ISO 2858) standard
- The modular interchangeability of parts and components enables low spare parts inventory
- The pump range offers the lowest total cost shaft seal concept, with dynamic seal, mechanical seals and packing
- Every AHLSTAR is designed for fast and easy installation, maintenance and service

KEY CHARACTERISTICS

Capacities	11,000 m ³ /h / 48,400 USgpm
Heads	160 m / 525 ft
Pressures	16 / 25 bar, 230 / 360 psi, depending on material and size
Temperatures	180°C / 355°F

APPLICATIONS

- Clean and lightly contaminated liquids
- Viscous liquids
- Fibrous slurries
- Large solids containing liquids
- Gas containing liquids and self-priming applications
- Desalination



CPT END SUCTION SINGLE STAGE CENTRIFUGAL PUMP ANSI B73.1

FEATURES AND BENEFITS

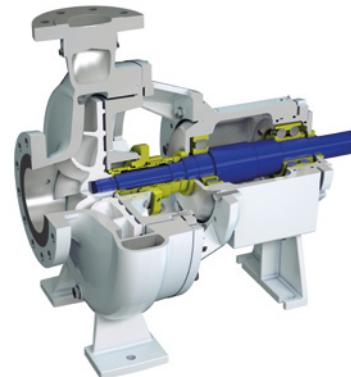
- Exceeds standard requirements of ANSI/ASME B73.1 standards
- Suitable for the most demanding industrial applications
- Unique, patented and superior design features minimize life cycle costs
- Quick and easy installation, safe operation, easy maintenance and service

KEY CHARACTERISTICS

Capacities	up to 1,600 m ³ /h / 7,000 USgpm
Heads	up to 220 m / 720 ft
Pressures	up to 26 bar / 375 psi
Temperatures	up to 260°C / 500°F

APPLICATIONS

- Clean and lightly contaminated liquids
- Viscous liquids
- Fibrous slurries
- Large solids containing liquids



ZE AND ZF END SUCTION PUMPS ISO 13709 / API 610 TYPE OH2

FEATURES AND BENEFITS

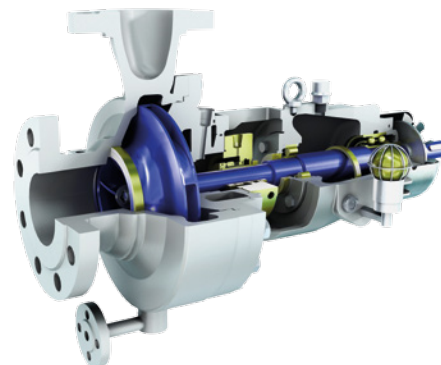
- Designed for hot and cold process applications
- Modular construction to provide maximum interchangeability

KEY CHARACTERISTICS

Capacities	up to 2,600 m ³ /h / 11,440 USgpm
Heads	up to 300 m / 1,000 ft
Pressures	up to 100 bar / 1,450 psi
Temperatures	up to 425°C / 800°F

APPLICATIONS

- Boosting
- Refinery, petrochemical and chemical process applications
- Desalination
- Boiler feedwater booster
- Condensate extraction
- HTF oil circulation



Axially split pumps

SMD AXIALLY SPLIT CASING DOUBLE SUCTION PUMP

FEATURES AND BENEFITS

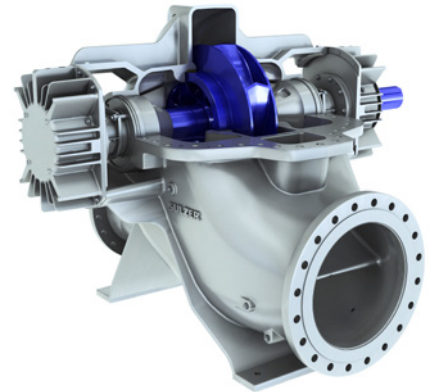
- Optimum hydraulic fit with high efficiency maintained over a wider flow range
- Exceptionally low Net Positive Suction Head Required (NPSHR) value not only at the best efficiency point but also on overload
- Maintenance-friendly features; excellent interchangeability of parts
- Horizontal and vertical constructions

KEY CHARACTERISTICS

Capacities	up to 16,000 m ³ /h / 70,000 USgpm
Heads	up to 260 m / 850 ft
Pressures	up to 34 bar / 490 psi
Temperatures	up to 140°C / 280°F

APPLICATIONS

- Water intake, transport and supply
- Desalination
- Water treatment
- District heating and cooling
- Industrial water applications



ZPP DOUBLE SUCTION AXIALLY SPLIT SINGLE STAGE PUMP

FEATURES AND BENEFITS

- Exceeds requirements of international ISO 5199 standard
- Unique, patented and superior design features minimize life cycle costs
- Quick and easy installation, reliable operation, easy maintenance and service

KEY CHARACTERISTICS

Capacities	up to 30,000 m ³ /h / 132,000 USgpm
Heads	up to 160 m / 525 ft
Pressures	up to 25 bar / 362 psi
Temperatures	up to 120°C / 250°F

APPLICATIONS

- Clean and lightly contaminated liquids
- Viscous liquids
- Low-consistency fibrous slurries
- Low-pressure pulsation pumping applications



HSB HORIZONTAL AXIALLY SPLIT SINGLE STAGE BETWEEN BEARING PUMP ISO 13709 / API 610 TYPE BB1

FEATURES AND BENEFITS

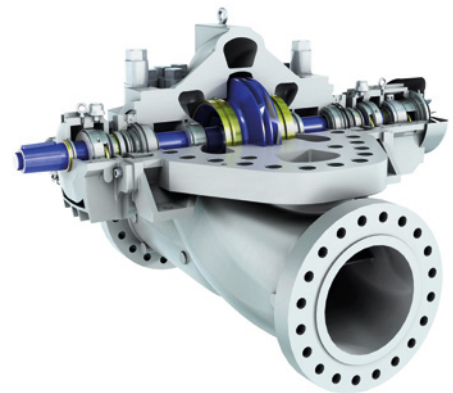
- Staggered vane, double suction impeller on larger sizes for reduced vibration
- Custom hydraulics to meet both current and future requirements with a simple rotor / volute changes
- Ball-ball, sleeve-ball and sleeve-pivot shoe bearings are available
- High-speed designs available for remote gas turbine-driven applications

KEY CHARACTERISTICS

Capacities	up to 10,000 m ³ /h / 45,000 USgpm
Heads	up to 550 m / 1,800 ft
Pressures	up to 150 bar / 2,200 psi
Temperatures	up to 205°C / 400°F

APPLICATIONS

- Crude oil pipelines
- Heavy duty auxiliary applications
- Medium pressure applications in desalination and water transport



HPDM AXIALLY SPLIT VOLUTE CASING PUMP

FEATURES AND BENEFITS

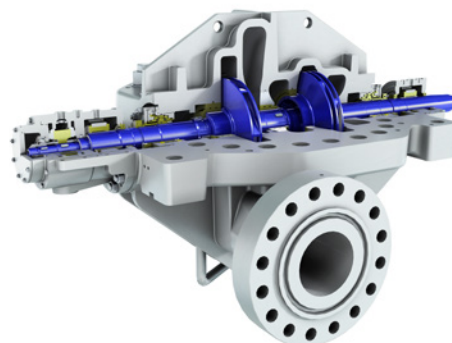
- Optimum technical solution due to a tailor-made design for each application
- Wide range of proven hydraulics allows high efficiency and suction performance
- Sturdy design with generous safety margins for long life of reliable service with minimum maintenance
- Proven experience backed by extensive list of references
- Technical support provided to customers from the early phases of the project design, allowing sound and cost-effective solutions for each application

KEY CHARACTERISTICS

Capacities	1,000 to 20,000 m ³ /h / 4,400 to 88,000 USgpm
Heads	up to 700 m / 2,300 ft
Pressures	up to 175 bar / 2,500 psi
Temperatures	up to 70°C / 160°F

APPLICATIONS

- Water transport
- Transport of crude oil
- Any other high flow, high head application



Multistage pumps

MBN MEDIUM PRESSURE STAGE CASING PUMP

FEATURES AND BENEFITS

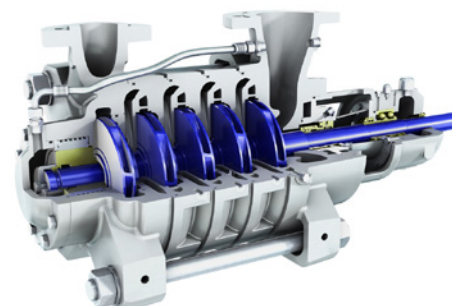
- Simple construction to minimize dimensions and reduce investment and maintenance costs
- High quality investment cast impellers and diffusers for better efficiency
- Fast and easy impeller mounting
- Bearing unit can be serviced without disassembling the pumps
- Wide range of materials including duplex stainless steel grades

KEY CHARACTERISTICS

Capacities	up to 700 m ³ /h / 3,080 USgpm
Heads	up to 900 m / 2,950 ft
Pressures	up to 100 bar / 1,450 psi
Temperatures	up to 180°C / 355°F

APPLICATIONS

- Boiler feedwater
- Desalination
- Auxiliary services



MBN-RO MULTISTAGE RING SECTION PUMP

FEATURES AND BENEFITS

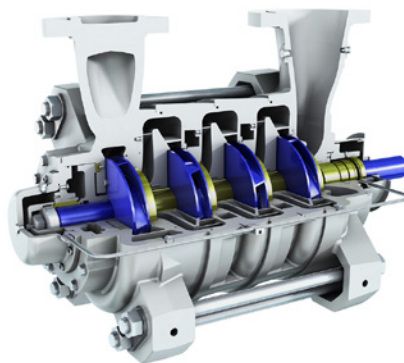
- Top of its class efficiency to ensure lowest specific power consumption per produced cubic meter of water in desalination applications
- Different hydraulics can be fitted in the same pump frame, allowing flexibility, modularity and future retrofitting
- All parts typically subject to maintenance both Drive End (DE) and Non-Drive End (NDE) bearings, balancing disc, mechanical seal) are accessible and can be replaced on site, without removal of suction and discharge piping

KEY CHARACTERISTICS

Capacities	up to 1,100 m ³ /h / 4,800 USgpm
Heads	up to 900 m / 2,950 ft
Pressures	up to 100 bar / 1,450 psi
Temperatures	up to 90°C / 194°F

APPLICATIONS

- High pressure membrane feed in Seawater Reverse Osmosis (SWRO) applications
- Clean water pumping stations
- Any other high pressure application with clean liquids and low temperature



MC HIGH PRESSURE STAGE CASING PUMP

FEATURES AND BENEFITS

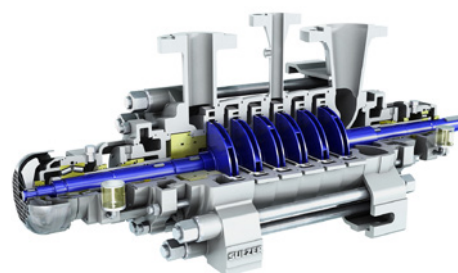
- Modular hydraulics for high efficiency in a wide range of operating conditions
- Large branch sizes for optimized inlet flow, low noise level and higher allowable forces and moments
- Unaffected by rapid temperature variations
- Easy access for cleaning to the seal cooling chambers
- Stiff shaft design for critical speeds above the maximum operating speed

KEY CHARACTERISTICS

Capacities	up to 1,000 m ³ /h / 5,000 USgpm
Heads	up to 1,750 m / 5,500 ft
Pressures	up to 180 bar / 2,610 psi
Temperatures	up to 180°C / 355°F

APPLICATIONS

- Boiler feedwater
- Fuel injection and NOx abatement



MSD AND MSD2 AXIALLY SPLIT MULTISTAGE PUMPS ISO 13709 / API 610 TYPE BB3

FEATURES AND BENEFITS

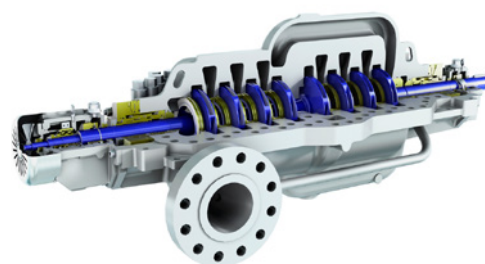
- Broadest hydraulic coverage of any BB3 type multistage pump in the market
- Axially split casing means rotor balance is not disturbed when rotor is installed
- Opposed impellers balance axial thrust, saving lube system costs on most applications
- Double suction, first-stage available on most sizes for reduced Net Positive Suction Head (NPSH)
- High speed option for gas turbine drive

KEY CHARACTERISTICS

Capacities	up to 3,200 m ³ /h / 14,000 USgpm
Heads	up to 2,900 m / 9,500 ft
Pressures	up to 300 bar / 4,400 psi
Temperatures	up to 205°C / 400°F

APPLICATIONS

- Refined product pipelines
- Water injection
- CO₂
- Desalination and water transport
- Boiler feedwater
- Nuclear safety services



MSD-RO AXIALLY SPLIT MULTISTAGE PUMP

FEATURES AND BENEFITS

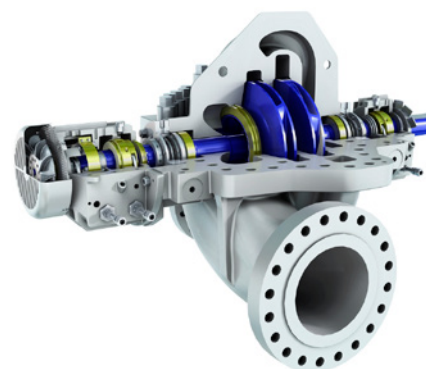
- Hydraulic configuration with two single suction impellers offers a compact design, with extremely low Net Positive Suction Head (NPSH) values and top of its class efficiency
- Special opposed, dynamically balanced impeller design for ideal axial thrust balance, increasing the overall pump efficiency by avoiding the use of balancing line
- Reduced wear parts clearances by using PEEK or honeycomb to increase pump efficiency

KEY CHARACTERISTICS

Capacities	up to 1,600 m ³ /h / 7,000 USgpm
Heads	up to 730 m / 2,395 ft
Pressures	up to 90 bar / 1,305 psi
Temperatures	up to 60°C / 140°F

APPLICATIONS

- High pressure membrane feed pump in Seawater Reverse Osmosis (SWRO)
- Water transport



Vertical pumps

SJT VERTICAL TURBINE PUMP

FEATURES AND BENEFITS

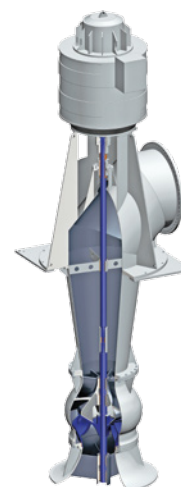
- Optimized hydraulics for high efficiency
- Packed stuffing box for reliable sealing and simple maintenance; mechanical seal is optional
- Rubber-lined product-lubricated bearing in bowls and columns for long maintenance-free periods; other bearing materials are also available
- Can be built to ISO 13709 / API 610 requirements

KEY CHARACTERISTICS

Capacities	up to 62,000 m ³ /h / 270,000 USgpm
Heads	up to 110 m per stage / 350 ft per stage
Pressures	up to 64 bar / 930 psi
Temperatures	up to 50°C / 122°F

APPLICATIONS

- Cooling water
- Nuclear safety services
- Auxiliary services
- Water intake and irrigation



STR VERTICAL TURBINE PUMP

FEATURES AND BENEFITS

- Closed impellers with balancing holes as standard, with open impeller for higher specific speeds
- Line shaft connections with muff coupling able to transmit all the driver torque to the complete pump rotor
- Bowl and impeller removable wear rings to ensure proper maintenance and longer pump life cycle
- Oversized integrally mounted bearing housing with axial and radial bearings for trouble free operation

KEY CHARACTERISTICS

Capacities	up to 22,000 m ³ /h / 97,000 USgpm
Heads	up to 200 m / 420 ft
Pressures	up to 25 bar / 362 psi
Temperatures	up to 65°C / 149°F

APPLICATIONS

- Desalination (sea water intake, brine backwash, etc.)
- Irrigation
- Water treatment
- Water transport
- Cooling water
- Fish farms
- Flood control
- Dry docks



SJM VERTICAL MIXED FLOW PUMP

FEATURES AND BENEFITS

- Optimized hydraulics for high efficiency
- Packed stuffing box for reliable sealing and simple maintenance; mechanical seal is optional
- Rubber lined product lubricated bearing in bowls and columns for long maintenance-free periods; other bearing materials are also possible
- Spacer coupling allows servicing the seal area and thrust bearing as needed

KEY CHARACTERISTICS

Capacities	up to 58,000 m ³ /h / 250,000 USgpm
Heads	up to 25 m per stage / 82 ft
Pressures	up to 18 bar / 260 psi
Temperatures	up to 50°C / 122°F

APPLICATIONS

- Cooling water
- Nuclear safety services
- Auxiliary services
- Water intake and irrigation



References

Magtaa SWRO desalination

Customer: Hyflux Ltd. Singapore

Country of installation: Algeria

The largest desalination plant using SWRO technology with a through-put of 500,000 m³/day required the most efficient pumps in a very short delivery period. Sulzer could deliver on time using its global network of manufacturing facilities.



Service	Quantity	Pump type	Capacity (m ³ /h)	Head (m)
Seawater intake	5	SJM-BR 1200	15,9	35
RO high pressure	25	HSB 14x14x20B	1,95	301.5
Treated water booster	4	ZPP 62-700	6,944	48
Treated water line 1	3	ZE 400-8728	2,917	106
Treated water line 2	5	SMN 402-800	3,75	222
Treated water line 3	7	ZE 400-7630	2,8	175
RO CIP	2	A 51-300	1,8	40
RO flushing	4	A 51-300	1	40
RO flushing	8	A 42-200	850	25
Ultrafiltration backwash	12	A 51-250	1,2	25

Tarragona and Vilaseca water reuse

Customer: Veolia Water Iberia, Spain

Country of installation: Spain

Recycled water from a wastewater plant is additionally treated by means of Ultrafiltration (UF) and Reverse Osmosis (RO) technologies and pumped to industrial areas for reuse. Highly efficient pumps are needed to support the water sustainability of this industrial area.



Service	Quantity	Pump type	Capacity (m ³ /h)	Head (m)
Filter backwash	3	A 41-400	1,788	22
Ultrafiltration/RO feed	3	A 31-125	560	57
Ultrafiltration backwash	3	A 31-150	525	30
First pass high pressure RO	2	ZE 200-5400	552	215
Second pass high pressure RO	2	A 32-125	414	124
Flushing and cleaning	3	A 21-80	180	42
Product water	3	A 31-100	400	95

Jubail Marafiq MED plant

Customer: SIDEM (Veolia Group), France

Country of installation: Saudi Arabia

The MED desalination plant of Jubail Marafiq is part of the IWPP with a capacity of 2,750 MW power and 800,000 m³/day of water through-put. This is the largest MED plant ever built and required highly efficient, low NPSH pumps.



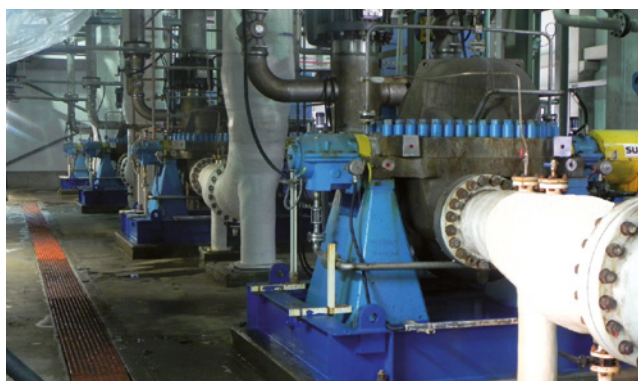
Service	Quantity	Pump type	Capacity (m ³ /h)	Head (m)
Distillate extraction	27	A 53-250	1,238	65
Brine blowdown	27	A 63-500	2,823	25
Seawater make up	27	A 60-500	4,022	28

Hadera SWRO plant

Customer: IDE Technologies, Israel

Country of installation: Israel

Hadera is the second biggest SWRO plant in Israel built considering Pressure Center Concept Design allowing the lowest specific consumption, with a capacity of 274,000 m³/d. Sulzer supplied state-of-the-art pumps designed for best efficiency and highest performance.



Service	Quantity	Pump type	Capacity (m ³ /h)	Head (m)
High pressure	8	MSD-D 14x14x19A/2	2,71	610
High pressure	2	HPDM 400-580N	3,9	380
Common low pressure booster	8	ZPP 52-6000	5,337	39
Low pressure booster to HPP	8	SMN 402-620	3,05	132
2nd pass	10	ZE 400-7630	1,972	131
3rd stage	10	ZE 300-7630	1,255	145
3rd stage booster	8	ZE 150-3315	332	103
4th stage	4	ZE 300-6560	1,13	100
ERD booster	10	ZF 300-5400	1,1	40

Al Dur SWRO plant

Customer: Degrémont, France

Country of installation: Bahrain

SWRO plant of Al Dur is part of the IWPP complex with 1,234 MW of power and 218,000 m³/d of water production with Pelton turbines as energy recovery devices. Sulzer offered top class efficiency together with proven experience in pelton turbine technology.



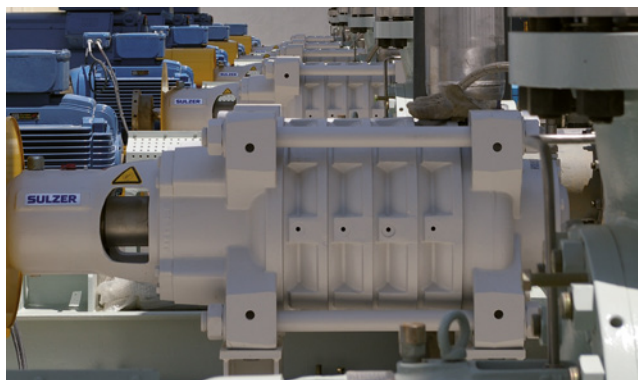
Service	Quantity	Pump type	Capacity (m ³ /h)	Head (m)
High pressure with Pelton turbine	16	MSD 8x10x15N/4s CHS 2/370-95	980 568	739 732
Lime water	3	A 31-125	540	57
Permeate pumps to lime saturators	3	A 31-150	365	16
Cleaning	4	A 31-150	531	71
Flushing	2	A 32-100	180	93
Flushing	2	A 53-150	531	105
Waste lime water	3	A 32-150	85	25
Backwash	2	A 44-200	510	14
ERD booster	10	ZF 300-5400	1,1	40

Uramin SWRO plant

Customer: Keyplan Ltd., South Africa

Country of installation: Namibia

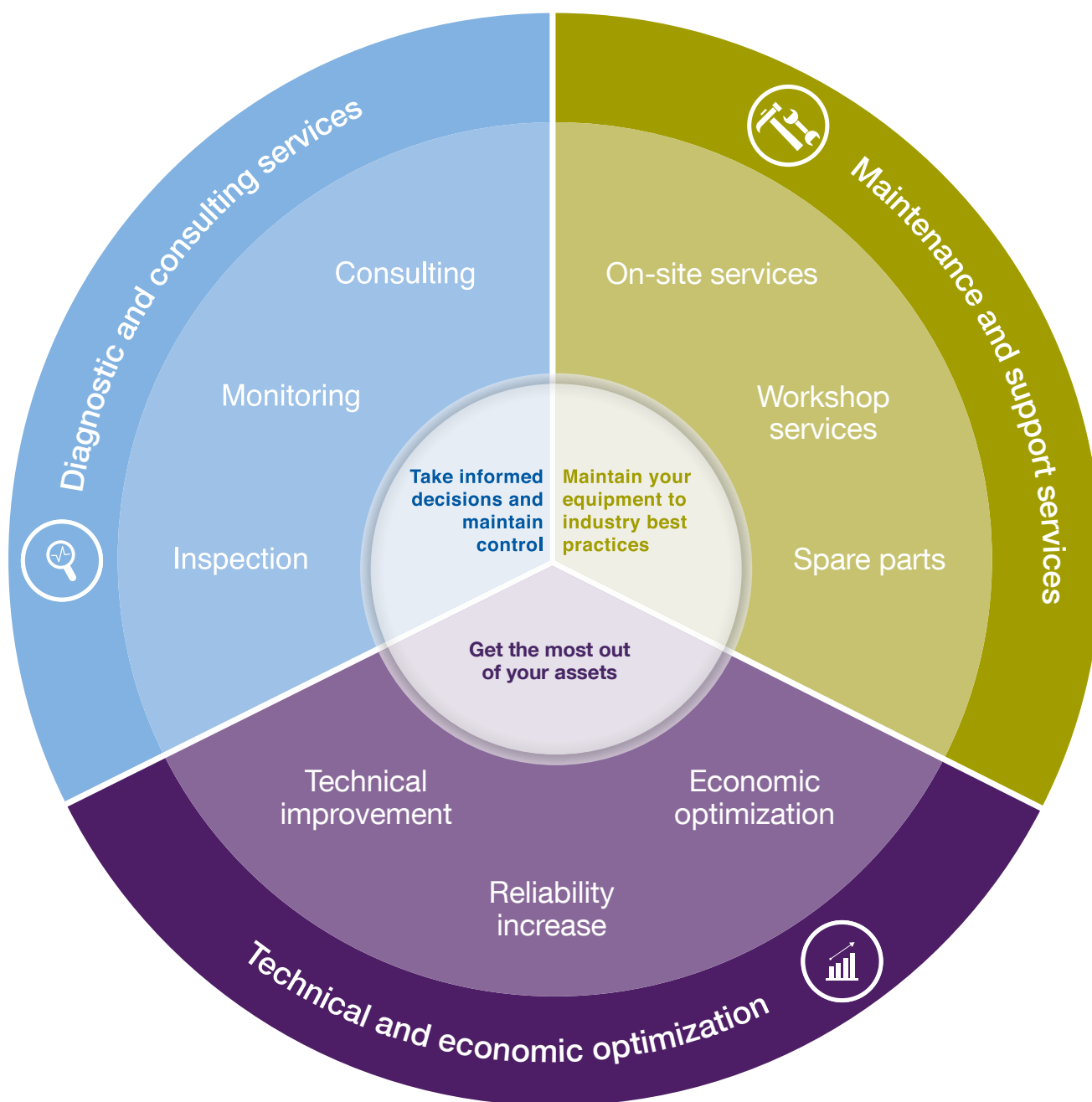
SWRO plant with a capacity of 55,000 m³/h built to provide water to an Uranium mine in Namibia; no other water resources were available. Sulzer supplied complete packages based on configured products to provide optimum fit.



Service	Quantity	Pump type	Capacity (m ³ /h)	Head (m)
High pressure	9	MBN 100-300/6	292	627
Seawater intake	5	A 55-300	1,59	30
Ultrafiltration backwash	3	A 43-250	1,6	42
Ultrafiltration feed	11	A 41-200	780	21
Low pressure booster	9	A 42-150	640	70
ERD booster	9	ZF 200-3400	343	50
CIP	1	A 32-125	320	42
CIP	1	A 44-150	580	66

Your Ideal Service Partner

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