Expertise you can trust.
Pumps, Valves and Services for Nuclear Power Stations.
Reliability through expertise. All around the world.

For 140 years we have been offering our customers innovative, all-inclusive solutions in the field of pumps, valves and hydraulic systems. We have about 80 years of experience in the development of products for fossil-fuelled power stations and have been developing pumps and valves for nuclear power stations for more than 40 years. We have consistently brought our entire wealth of knowledge and experience to bear right from the very start in order to develop efficient, technically advanced solutions.

That makes us one of the world's market leaders – and an ideal partner for nuclear power plant operators, consultants, planners and engineering contractors. Our pumps, valves, drives, actuators and automation products are being used successfully around the globe.

When it comes to complex tasks in the field of power plant technology, we offer the complete range of engineering services from designing units and systems to providing support throughout the entire processing and commissioning phases. You receive everything from a single source: development, consultancy, order processing and service.

We put all our strengths at your disposal: more than 14,000 highly qualified KSB employees, over 120 service centres and 29 production facilities around the world. Safe, economical and environmentally friendly.

x = Number of nuclear power stations equipped with KSB products
Exemplary solutions: our reference projects.

KSB pumps and valves are in use in nuclear power plants around the world. Some key criteria for our customers include fulfilment of the very highest safety requirements, highly efficient operation as well as comprehensive on-site service.

**Isar 2, Germany**

In the ISAR 2 power plant, a pressurised water reactor produces, with the help of one of the biggest generators in the world, a net output of 1,410 MW. KSB supplied the complete pump package, i.e. reactor coolant pumps, feed water pumps, condensate pumps, high-pressure injection pumps and safety injection pumps, as well as numerous valves, among them gate and bellows-type valves in the feed water and live steam systems. All maintenance inspection work is planned and carried out by our experienced service specialists. This guarantees reliability, safety and quality.

**Olkiluoto 3, Finland**

The first third-generation European pressurised water reactor in unit 3 supplies a net output of 1,600 MW. KSB feed water pumps with booster pumps contribute to the new safety concept with their vibration-damping properties, high levels of availability and particularly long service lives. KSB valves, including feed water heater safety valves (DN 650, DN 700) and damped non-return valves, are employed in the feed water and condensate systems. 20 pumps and more than 1,000 valves are in use. After positive experiences with units 1 and 2, KSB was chosen again for the expansion.

**Palo Verde, USA**

Currently the most powerful nuclear power plant in the United States, Palo Verde has three pressurised water reactors generating an electric output of 3,700 MW. 12 reactor coolant pumps and 24 shut-off valves from KSB play a major role in the power plant’s efficient operations. During acceptance testing in KSB’s in-house facility, the agreed efficiency levels were achieved and even exceeded. Extraordinary expertise as well as sophisticated, reliable products were key factors in the decision to award the contract to KSB.

**Angra 2, Brazil**

Unit 2 of Brazil’s largest nuclear power plant is equipped with a pressurised water reactor with an electric output of 1,350 MW. In addition to four reactor coolant pumps, further KSB pumps operate in almost all of the safety and auxiliary systems. More than 5,000 KSB valves are employed in these systems, as well as in the primary cooling circuits and the secondary water and steam circuits. KSB service engineers supervised the commissioning of the plant and perform regular maintenance work to help ensure its safe operation. KSB has its own office on-site.
**Qinshan 1, 2–3, 2–4, China**

Three pressurised water reactors generate an electric output of 1,610 MW. KSB reactor coolant pumps ensure safety and reliability with a specially developed seal concept. Working in conjunction with booster pumps, KSB feed water pumps provide efficient, non-cavitating operation. Other pumps are in use in the safety and auxiliary systems. Numerous KSB gate, globe and non-return valves are in place in the secondary circuits. Sophisticated, high-quality products were key factors in the decision to award the contract to KSB.

**Ulchin, South Korea**

KSB delivered products to ASME Code standards for four power plant units with pressurised water reactors. These generate a total electric output of nearly 3,900 MW. 16 reactor coolant pumps are in use, including hydraulic systems and mechanical seals, 14 pumps for safety and auxiliary systems, as well as bellows-type valves with hand-wheels and electric actuators. The customer awarded the contract to KSB on the basis of its references in South Korea. KSB products are also in demand in South Korean APR 1,400 power plants.
Innovation through research and development at KSB.

Innovative products and business ideas are the result of global research and development by the KSB Group. KSB’s technological strengths lie in hydraulic engineering, materials technology and automation. Every year, we invest more than € 40 million in research and development, the latest simulation software, in-house test bays and other testing facilities. On request, our developers gladly draw on these resources to perform preliminary calculations on mechanics, seismic calculations or sound emission and frequency analyses to help our customers meet the requirements posed by highly challenging, safety-relevant applications such as those in nuclear power plants.

Energy efficiency and reliability for our customers.

Modern pumps and valves have to be energy-efficient above all else. With this in mind, KSB not only optimises individual components but also entire hydraulic systems with the greatest precision. By designing all components according to the customer’s specifications, KSB provides highly efficient hydraulic systems with highly efficient drives. This enables customers to minimise life cycle costs and maximise performance. We work closely with scientific facilities to research new materials and technologies in order to create state-of-the-art equipment offering the highest component reliability. Antimony-free KSB mechanical seals for reactor coolant pumps, for instance, improve the operating reliability of power plants thanks to the following features:

- Redundant sealing systems make for a high level of plant availability
- Standardised components help minimise spare parts stocks
- Longer operating periods help reduce waste volumes

In order to reduce radiation inside nuclear power plants, KSB uses cobalt-free hard-facing materials for its valves, which for about 20 years we have been researching, developing and optimising in collaboration with Siemens KWU.
KSB technology in operation: pressurised water reactor circuit.
KSB technology in operation: boiling water reactor circuit.
A Reactor Internal Pump
B Reactor Water Clean-up Pump
C Reactor Core Isolation Cooling
D High Pressure Core Spray Pump
E Low Pressure Core Spray Pump
F Residual Heat Removal Pump
G Control Rod Drive Pump
H Main Feedwater Pump
I Booster Pump
J Condensate Extraction Pump
K Cooling Water Pump
L Component Cooling Water Pump
M Essential Service Water Pump

1 Instrument valve
2 Small Globe valve with and without bellow seal (NUCA)
3 Diaphragm valve
4 NUCA-S valve
5 Globe valve with and without bellow seal
6 Gate valve
7 Swing check valve
8 MSIV

Turbine Island
Certified excellence: our quality standards.

KSB’s integrated management system for quality, the environment, as well as occupational health and safety has been certified to ISO 9001, ISO 14001 and OHSAS 18001. Challenging, safety-relevant applications demand highly effective concepts. The certified high quality of our products and solutions is a must. Throughout our global production network and wherever we perform our services, we always work in accordance with the latest quality standards, as confirmed by our numerous approvals and certificates.

For pumps and valves in nuclear power stations, we are certified to the German KTA / AVS nuclear engineering codes and the US ASME Code. Wherever we deliver our products, we have all the approvals needed to ensure that we can meet the various requirements of our customers.

Excerpt from our certificates and qualifications:

- ISO 9001
- ISO 14001
- OHSAS 18001
- IAEA 50-C-Q
- KTA 1401, 1408.3, 3201.3
- AVS D 100/50
- Gost-R
- ASME Section III (Cl.1,2 & 3, N-, NPT-, NS-stamp)
- ASME Material Organization
- DIN 18800-7 / ASME Section IX
- RCC-M
- EN473 / SNT-TC 1A
- AD-HP0, HP100R
- Pressure Equipment Directive
- TRD 201, TRR 100
- HAF 604
Solutions put to the test.

At our state-of-the-art test facilities such as those at the KSB headquarters in Frankenthal and in Shanghai, we offer testing in accordance with a variety of requirements. We ensure compliance with all contractually guaranteed data through standard and special inspections and tests, a performance test of the pump at full load in our test facility, or a string test of the entire pumps and valves set provide a solid basis for success. The speed, pressure and temperature used for testing are equivalent to those found under real conditions.

State-of-the-art technology: KSB production facilities.

We use state-of-the-art production facilities to further strengthen our position as a leading manufacturer of pumps and valves for nuclear power plants. Our production capacities for large pumps, which include an integrated pump test bed with a 20 MW motor, ensure perfectly coordinated processes: from welding technology and mechanical production to the assembly of complete pump and valve sets, testing and shipment.

Production and test facility for large pumps, Frankenthal.
KSB expertise for nuclear power stations.

1. Frankenthal, Pegnitz, Germany
2. La Roche-Chalais, France
3. Echternach, Luxembourg
4. Moscow, Russia
5. Pune, India
6. Shanghai, China
7. Johannesburg, South Africa
8. Richmond, Virginia, USA
9. Angra, Brazil
10. São Paulo, Brazil

KSB production sites

KSB sales/service sites

Test facility for reactor coolant pumps, Shanghai.
Quality and reliability for every application.

Our pumps and valves for primary and secondary circuits as well as auxiliary circuits ensure high performance around the world:
- Customised
- Economical, safe, reliable
- From a single source

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Pumps for nuclear islands.

**RER** Reactor coolant pump

**Design:**
Vertical, single-stage reactor coolant pump with forged annular casing plated on the inside, with diffuser, either with own pump thrust bearing or supported by motor bearing.

**Applications:**
Reactor coolant recirculation in nuclear power stations (PWR).

**Technical data:**
- DN: max. 800
- Q [m$^3$/h]: max. 40,000
- H [m]: max. 140
- p [bar]: max. 175
- T [°C]: max. +310
- n [min$^{-1}$]: max. 1,800

Higher values available upon request. Available in 50 and 60 Hz.

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**RSR** Reactor coolant pump

**Design:**
Vertical, single-stage reactor coolant pump, with cast double volute casing, supported by motor bearing.

**Applications:**
Reactor coolant recirculation in nuclear power stations (PWR, PHWR).

**Technical data:**
- DN: max. 600
- Q [m$^3$/h]: max. 9,000
- H [m]: max. 215
- p [bar]: max. 125
- T [°C]: max. +310
- n [min$^{-1}$]: max. 1,800

Higher values available upon request. Available in 50 and 60 Hz.
**Design:**
Vertical, single-stage reactor coolant pump. Sealless design with integrated wet rotor motor and integrated flywheel. Product-lubricated bearings, no oil supply systems required.

**Applications:**
Main coolant circulation in third-generation nuclear power stations.

**Technical data:**
- DN: max. 710
- Q [m³/h]: max. 22,000
- H [m]: max. 111
- p [bar]: max. 155
- T [°C]: max. +350
- n [min⁻¹]: max. 1,800

Higher values available upon request. Available in 50 and 60 Hz.
**LUV Nuclear** Reactor coolant/reactor water clean-up pump

**Design:**
Vertical pump with integrated motor, single-entry, one to three stages. Suitable for very high inlet pressures and temperatures. Integrated wet rotor motor to VDE. Product-lubricated bearings, no need for oil supply systems. Design to ASME Section 3, KTA, etc.

**Applications:**
As reactor water clean-up pump in boiling water reactors, reactor coolant pump in boiling water and pressurised water reactors, and as recirculation pump in test facilities.

**Technical data:**
- DN: 40 - 600
- Q [m$^3$/h]: max. 7,000
- H [m]: max. 300
- p [bar]: max. 320
- T [°C]: max. +430

Higher values available upon request. Available in 50 and 60 Hz.

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**PSR** Reactor internal pump

**Design:**
Vertical pump set integrated in the reactor pressure vessel, glandless pump with leak-free, low-maintenance wet rotor motor.

**Applications:**
Reactor coolant recirculation in boiling water reactors (BWR/ABWR).

**Technical data:**
- DN: max. 600
- Q [m$^3$/h]: max. 9,000
- H [m]: max. 45
- p [bar]: max. 75
- T [°C]: max. +300
- n [min$^{-1}$]: max. 2,000

Higher values available upon request. Available in 50 and 60 Hz.
RHM Pump for safety-related and auxiliary systems

**Design:**
Horizontal, multistage barrel pull-out pump.

**Applications:**
Core flooding, emergency cooling and residual heat removal systems, volume control systems, high-pressure charging, control rod drive systems, high- and medium-pressure safety injection systems, auxiliary feed water systems, start-up and shutdown feed water systems.

**Technical data:**
- DN max. 150
- Q [m³/h] max. 300
- H [m] max. 2,100
- p [bar] max. 220
- [T °C] max. +180
- n [min⁻¹] max. 8,000

Higher values available upon request. Available in 50 and 60 Hz.

RVM Pump for safety-related and auxiliary systems

**Design:**
Vertical, multistage barrel pull-out pump.

**Applications:**
Core flooding, emergency cooling and residual heat removal systems, volume control systems, high-pressure safety injection systems.

**Technical data:**
- DN max. 85
- Q [m³/h] max. 50
- H [m] max. 2,000
- p [bar] max. 200
- [T °C] max. +100
- n [min⁻¹] max. 6,000

Higher values available upon request. Available in 50 and 60 Hz.

RHR/RVR Pump for safety-related and auxiliary systems

**Design:**
Horizontal or vertical annular casing pump with forged pressure boundary and diffuser.

**Applications:**
Core flooding, emergency cooling and residual heat removal systems, ancillary systems, acid feed systems and low-pressure feed systems.

**Technical data:**
- DN max. 500
- Q [m³/h] max. 6,000
- H [m] max. 190
- p [bar] max. 63
- [T °C] max. +200
- n [min⁻¹] max. 3,600

Higher values available upon request. Available in 50 and 60 Hz.
Pumps for turbine islands.

**RHD** Main feed water pump

**Design:**
Horizontal, single-stage, double-entry feed water pump, cast and forged variant.

**Applications:**
Handling of feed water in steam generation systems of nuclear power stations.

**Technical data:**
- DN: 250 – 400
- Q [m³/h]: max. 6,500
- H [m]: max. 1,000
- p [bar]: max. 150
- T [°C]: max. +210
- n [min⁻¹]: max. 6,500

Higher values available upon request. Also available in 60 Hz.

**YNK** Feed water booster pump

**Design:**
Horizontal, radially split, single-stage, double-entry boiler feed booster pump (booster system) with single or double cast steel volute casing.

**Applications:**
Handling of feed water in power stations and industrial facilities.

**Technical data:**
- DN: 200 – 600
- Q [m³/h]: max. 4,500
- H [m]: max. 370
- p [bar]: max. 40
- T [°C]: max. +210
- n [min⁻¹]: max. 1,800

Higher values available upon request. Also available in 60 Hz.

**CHTC** Start-up feed water pump

**Design:**
Horizontal, high-pressure barrel-type pump with radial impellers, single- and double-entry, multistage, with flanges/weld end nozzles to DIN and ANSI.

**Applications:**
Handling of feed water and condensate in power stations and industrial facilities, generation of pressurised water for bark peeling machines and descaling equipment.

**Technical data:**
- DN: 125 – 300
- Q [m³/h]: max. 1,450
- H [m]: max. 4,200
- p [bar]: max. 420
- T [°C]: max. +200
- n [min⁻¹]: max. 7,000

Higher values available upon request. Also available in 60 Hz.
**HGC Feed water pump**

**Design:**
Horizontal, radially split, multistage ring-section pump with radial impellers, single- or double-entry.

**Applications:**
Handling of feed water and condensate in power stations and industrial facilities, generation of pressurised water for bark peeling machines, descaling equipment, snow guns, etc.

**Technical data:**
- DN 40 – 300
- Q [m³/h] max. 1,450
- H [m] max. 4,200
- p [bar] max. 420
- T [°C] max. +200
- n [min⁻¹] max. 7,000

Higher values available upon request. Also available in 60 Hz.

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**WKTA/WKTB Condensate pump**

**Design:**
Vertical, multistage, can-type ring-section pump with radial and mixed flow impellers. Single- and double-entry suction impellers, flanges to DIN or ANSI. The can is arranged in a pit below the installation floor. The pump is connected with the structure by means of a baseplate.

**Applications:**
Handling of condensate in power stations and energy systems.

**Technical data:**
- DN 150 – 300
- Q [m³/h] max. 1,800
- H [m] max. 340
- p [bar] max. 40
- T [°C] max. +100
- n [min⁻¹] max. 1,800

Higher values available upon request. Also available in 60 Hz.

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**SEZ/PHZ/PNZ Cooling water pump**

**Design:**
Vertical tubular casing pump with open mixed flow impeller (SEZ), mixed flow propeller (PHZ) or axial propeller (PNZ). Pump inlet with bellmouth or suction elbow, pull-out design available, discharge nozzle arranged above or below floor, flanges to DIN or ANSI standards available.

**Applications:**
Handling of raw, pure, service and cooling water in industry, water supply systems, in power stations and seawater desalination plants.

**Technical data:**
- Q [m³/h] max. 65,000
- H [m] max. 100
- T [°C] max. +40
- n [min⁻¹] max. 980

Higher values available upon request. Also available in 60 Hz.
## Auxiliary pumps.

### RPH Process pump

**Design:**
Horizontal, radially split volute casing pump in back pull-out design to API 610, 9th edition, or ISO 13709 (heavy duty), with radial impeller, single-stage, single-entry, centreline pump feet; with inducer, if required. ATEX-compliant version available.

**Applications:**
Refineries, petrochemical and chemical industries, power stations.

**Technical data:**
- **DN:** 25 – 400
- **Q [m³/h]:** max. 4,150
- **H [m]:** max. 270
- **p [bar]:** max. 51
- **T [°C]:** max. +450

Also available in 60 Hz.

### CPKN Standardised chemical pump with reinforced bearing bracket

**Design:**
Horizontal, radially split volute casing pump in back pull-out design to EN 22 858 / ISO 2858 / ISO 5199, single-stage, single-entry, with radial impeller. Also available as variant with "wet" shaft, conical seal chamber, heatable volute casing (CPKNO-CHs) and/or semi-open impeller (CPKNO). ATEX-compliant version available.

**Applications:**
Handling of aggressive liquids in the chemical and petrochemical industries as well as in refinery and fire-fighting systems, handling of brine.

**Technical data:**
- **DN:** 25 – 400
- **Q [m³/h]:** max. 4,150
- **H [m]:** max. 185
- **p [bar]:** max. 25
- **T [°C]:** max. +400

Also available in 60 Hz.

### Secochem Ex Standardised chemical pump with canned motor and explosion protection

**Design:**
Horizontal, sealless volute casing pump in back pull-out design with fully enclosed canned motor, low noise emission, with radial impeller, single-stage, single-entry, casing connecting dimensions to EN 22 858 / ISO 2858. Design to ATEX.

**Applications:**
Handling of aggressive, flammable, explosive, toxic, volatile or valuable liquids in the chemical and petrochemical industry, in environmental engineering and the general industry.

**Technical data:**
- **DN:** 25 – 100
- **Q [m³/h]:** max. 300
- **H [m]:** max. 150
- **p [bar]:** max. 25
- **T [°C]:** max. +130

Also available in 60 Hz.
### KWP  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 impeller, open multi-vane impeller, free-flow impeller. ATEX-compliant version available.

**Applications:**
Handling of pre-treated sewage, waste water, all types of slurries without stringy substances and pulps up to 5% bone dry.

**Technical data:**
- DN: 40 – 900 (max. 1,000)
- Q [m$^3$/h]: max. 1,500 (max. 1,800)
- H [m]: max. 100
- p [bar]: max. 10
- T [°C]: max. +280
- n [min$^{-1}$]: max. 2,900

Also available in 60 Hz.

### Amarex KRT Submersible motor pump DN 40 to DN 700

**Design:**
Vertical, single-stage submersible motor pump, for wet installation, stationary and transportable design. Amarex N pumps are floodable, single-stage, single-entry close-coupled units which are not self-priming. ATEX-compliant version available.

**Applications:**
Handling of all types of waste water, especially untreated sewage containing long fibres and solid substances, fluids containing gas/air, as well as raw, activated and digested sludge, dewatering/water extraction, drainage of rooms and surfaces subject to a flooding risk.

**Technical data:**
- DN: 40 – 700
- Q [m$^3$/h]: max. 10,800
- H [m]: max. 100
- T [°C]: max. 60
- n [min$^{-1}$]: max. 2,900

Also available in 60 Hz.
# Valves for nuclear islands.

## ZTN Gate valves

**Design:**
Weld end gate valve with bolted or pressure seal bonnet, forged or welded body, non-rotating stem, wedge-type or with parallel discs, made of carbon steel or stainless steel.

**Actuators:** hand-wheel, electric, pneumatic.

**Applications:** Reactor cooling, safety feed, feed water, live steam, cleaning and condensate systems.

**Technical data:**
- $p$ [bar]: max. 320
- $DN$: 80 – 700
- $T$ [$^\circ$C]: max. +400

## STAAL AKDN Gate valves

**Design:**
Weld end gate valve with bolted bonnet, low-weight die-forged or forged, welded body, non-rotating stem, wedge-type or with parallel discs, made of carbon steel or stainless steel.

**Actuators:** hand-wheel, electric.

**Applications:**
Auxiliary systems, safety feed, feed water, live steam, cleaning and condensate systems.

**Technical data:**
- $p$ [bar]: max. 40
- $DN$: 80 – 1,000
- $T$ [$^\circ$C]: max. +200

Higher values upon request.

## ZXNB Bellows-type Globe valves

**Design:**
Weld end bellows-type globe valve designed to meet safety-related requirements, straight-way / angle / two way pattern, made of carbon steel or stainless steel.

**Actuators:** hand-wheel, electric, pneumatic.

**Applications:**
Reactor cooling, moderator, safety feed, feed water, live steam and cleaning systems.

**Technical data:**
- $p$ [bar]: max. 210
- $DN$: 65 – 300
- $T$ [$^\circ$C]: max. +365

Higher values upon request.
ZXNVB Small globe valves/Instrumentation valves

**Design:**
Butt weld / socket weld end globe valve with gland packing or bellows, straight-way pattern, made of carbon steel or stainless steel.

**Applications:**
Reactor cooling, moderator, safety feed, feed water, live steam and cleaning systems.

**Technical data:**
- p [bar] max. 210
- DN 4 – 25
- T [°C] max. +365

NUCA / -A, types I, II, IV,V Globe and lift-check valves

**Design:**
Butt weld / socket weld end globe valve with gland packing or bellows, straight-way pattern, made of carbon steel, stainless steel or nickel.

**Applications:**
Reactor cooling, moderator, safety feed, feed water, live steam and cleaning systems.

**Technical data:**
- p [bar] max. 320
- DN 10 – 50
- T [°C] max. +400

**Actuators:**
- hand-wheel,
- electric, pneumatic.

NUCA-F (safety-related) Globe valves

**Design:**
Butt weld/socket weld end bellows-type globe valve designed to meet safety-related requirements, straight-way pattern, made of carbon steel or stainless steel; integrity maintained after limit switch failure of actuator.

**Applications:**
Reactor cooling, moderator, safety feed, feed water, live steam and cleaning systems.

**Technical data:**
- p [bar] max. 210
- DN 10 – 50
- T [°C] max. +365

**Actuators:**
- hand-wheel,
- electric, pneumatic.

NUCA-S (safety-related) Globe valves

**Design:**
Weld end bellows-type globe valve designed to meet safety-related requirements, straight-way pattern, made of carbon steel or stainless steel; operability maintained after limit switch failure of actuator.

**Applications:**
Reactor cooling, moderator, safety feed, feed water, live steam and cleaning systems.

**Technical data:**
- p [bar] max. 210
- DN 10 – 50
- T [°C] max. +365

**Actuators:**
- electric.
**ZYNB / ZYN** Y-type Globe valves with or without bellows

**Design:**
Weld end globe valve with gland packing or bellows designed to meet safety-related requirements, Y-type valve, made of cast or forged, carbon steel or stainless steel.

**Actuators:** electric.

**Applications:**
Residual heat removal systems in nuclear applications.

**Technical data:**
- $\text{p [bar]}$ max. 62
- $\text{DN}$ 300 – 400
- $\text{T [°C]}$ max. +365

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**MXN** Diaphragm valves

**Design:**
EPDM rubber soft-seated flanged or weld end diaphragm valve made of carbon steel, stainless steel or rubber-lined modular cast iron.

**Actuators:** hand-wheel, electric, pneumatic.

**Applications:**
Cleaning systems, condensate and cooling water systems, auxiliary systems.

**Technical data:**
- $\text{p [bar]}$ max. 12
- $\text{DN}$ 10 – 200
- $\text{T [°C]}$ max. +100

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**RYN** Lockable non-return valves with or without bellows

**Design:**
Weld end non-return Y-type globe valve with gland packing or bellows, made of carbon steel or stainless steel.

**Actuators:** hand-wheel, electric, pneumatic.

**Applications:**
Feed water and live steam systems.

**Technical data:**
- $\text{p [bar]}$ max. 210
- $\text{DN}$ 65 – 300
- $\text{T [°C]}$ max. +365

Higher values upon request.

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**RJN** Non-return valves, damped

**Design:**
Weld end non-return valve with individually selectable damping characteristic, made of carbon steel or stainless steel.

**Applications:**
Feed water and live steam systems.

**Technical data:**
- $\text{p [bar]}$ max. 140
- $\text{DN}$ 80 – 600
- $\text{T [°C]}$ max. +300
# ZRN Swing check valves

**Design:**
Weld end swing check valve with bolted cover, internal hinge pin, forged body, made of carbon steel or stainless steel.

**Applications:**
Safety feed, feed water, live steam and condensate systems.

**Technical data:**
- $p$ (bar): max. 320
- DN: 50 – 600
- $T$ ($^\circ$C): max. +400

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# CLOSSIA Butterfly valves

**Design:**
Double-offset butterfly valve, metal/metal-seated, maintenance-free. Carbon steel body with one flanged and one weld end connection. Safety actuator with manual, pneumatic or electric actuation, quick closing time.

**Applications:**
Nuclear power stations, reactor containment, quick closing time.

**Technical data:**
- $p$ (bar): max. 10
- DN: 250/500/750/1,000
- $T$ ($^\circ$C): -20 to +170

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# DANAÏS MT 2 Butterfly valves

**Design:**
Double-offset butterfly valve with plastomer or metal seat ring (fire-safe design); without gland packing, maintenance-free. With lever or gearbox, pneumatic, electric or hydraulic actuator. Body made of cast steel, carbon steel or stainless steel. With wafer type body (T1), full-lug type body (T4) or single-piece double-flanged body (T7) with flat or raised faces. Body types T4 and T7 can be used for dead-end service. EN, ASME, JIS connections. Certification to TA-Luft.

**Applications:**
Nuclear power stations, steam, vacuum service and all applications requiring offset disc butterfly valves.

**Technical data:**
- $p$ (bar): max. 50
- DN: 50 – 600
- $T$ ($^\circ$C): -50 to +260

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# Mammouth Butterfly valves

**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.

**Applications:**
Nuclear power stations, water supply, water treatment, cooling circuits, fire fighting systems.

**Technical data:**
- $p$ (bar): max. 25
- DN: 1,050 – 4,000
- $T$ ($^\circ$C): 0 to +65
**ISORIA Butterfly valves**

**Design:**
Centered disc butterfly valve with elastomer liner. With lever, manual gearbox, pneumatic, electric or hydraulic actuator. Semi-lug type body (T2) or U-section body with flat faces (T5). Body types T2 and T5 are suitable for downstream dismantling and dead-end service with counterflange. EN, ANSI, JIS connections possible.

**Technical data:**
- p [bar]: max. 10
- DN: 32 – 1,000
- T [°C]: -10 to +130

**Applications:** Shut-off service for liquids only.

---

**Serie 2000 Check valves**

**Design:**
Twin plate check valve, single-piece body made of carbon steel or stainless steel, metal/elastomer or metal-seated; maintenance-free. EN, ASME, JIS connections possible.

**Technical data:**
- [PN bar]: max. 10/16
- DN: 20 – 500
- T [°C]: -10 to +130

**Applications:** Shut-off service for liquids only; steam cycles.

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**SISTO-20NA Diaphragm valves**

**Design:**
Weld-end diaphragm valve, soft-seated shut-off valve. Shut-off and sealing to atmosphere by diaphragm; manual, electrical or pneumatic operated made of carbon steel or stainless steel.

**Technical data:**
- p [bar]: max. 20
- DN: 08 – 150
- T [°C]: max. +100

**Applications:**
Cleaning systems, condensate and cooling water systems, waste water systems.

---

**SISTO-DrainNA Small globe valves**

**Design:**
Soft-seated shut-off valve with weld ends or hose connection, shut-off and sealing to atmosphere by diaphragm, with operating key, made of stainless steel.

**Technical data:**
- [PN bar]: max. 16
- DN: 15 and 25
- T [°C]: max. +100

**Applications:**
Heating installation systems.
**SISTO-KRINA** Lift-check valves

**Design:**
Soft-seated floating ball valve with weld ends or flanges. Made of stainless steel.

**Applications:**
Waste processing, system ventilation

**Technical data:**
- $p \text{ [bar]} = \text{max. 16}$
- $\text{DN} = 25 – 100$
- $T \text{ [°C]} = \text{max. +100}$

---

**SISTO-RSNA** Swing check valves

**Design:**
Swing check valve with or without lining, soft-seated, in straight-way pattern with slanted seat with internal hinge pin and soft rubber coated disc. Made of carbon steel or stainless steel.

**Applications:**
Waste water systems

**Technical data:**
- $p \text{ [bar]} = \text{max. 16}$
- $\text{DN} = 25 – 300$
- $T \text{ [°C]} = \text{max. +100}$

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**Valves for turbine islands.**

**ZTS** Gate valves

**Design:**
High pressure weld end gate valve with pressure seal bonnet, forged body from carbon steel, non-rotating stem, wedge type.

**Actuators:**
hand-wheel, electric, pneumatic, hydraulic.

**Applications:**
Feed water and live steam systems.

**Technical data:**
- $p \text{ [bar]} = \text{max. 600}$
- $T \text{ [°C]} = \text{max. 650}$
- $\text{DN} = 50-550$

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**ZJCSM/RJCSM** 3-way valves

**Design:**
High pressure weld end pre-heater 3-way valve with pressure seal bonnet, quick closing, system media operated, with blocking stem, forged body from carbon steel.

**Applications:**
Feed water systems.

**Technical data:**
- $P \text{ [bar]} = \text{max. 600}$
- $T \text{ [°C]} = \text{max. 450}$
- $\text{DN} = 100 - 800$
### Shut-off valves

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<td><strong>SICCA 150-300 GLC</strong></td>
<td><strong>STAAL 40 AKD/AKDS</strong></td>
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<tr>
<td><strong>NORI 40 ZXL/ZXS</strong></td>
<td><strong>NORI 40 ZXLF/ZXSF</strong></td>
<td><strong>SICCA 800 GLF</strong></td>
<td><strong>SICCA 800 GTF</strong></td>
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| Medium-pressure applications | **PN 63-160** | **T up to 550 °C** | | |
|-------------------------------|---------------|-------------------|---|
| **NORI 160 ZXL/ZXS** | | **SICCA 600 GLC** | **STAAL 100 AKD/AKDS** |
| **NORI 160 ZXLF/ZXSF** | | **SICCA 900 GLC** | **AKGS-A** |
| | | **SICCA 800 GLF** | **SICCA 800 GLC** |

<p>| High-pressure applications | <strong>PN 250-600</strong> | <strong>T up to 650 °C</strong> | | |
|----------------------------|----------------|------------------|---|
| <strong>NORI 320 ZXSV</strong> | <strong>NORI 500 ZXSV</strong> | <strong>SICCA 900-2500 GLC</strong> | <strong>ZTS</strong> |
| <strong>NORI 320 ZXLF/ZXSF</strong> | <strong>NORI 500 ZXL/ZXSR</strong> | <strong>SICCA 800-2500 GLF</strong> | <strong>SICCA 1500-2500 GTC</strong> |
| | | | <strong>SICCA 1500 GTF</strong> |</p>
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