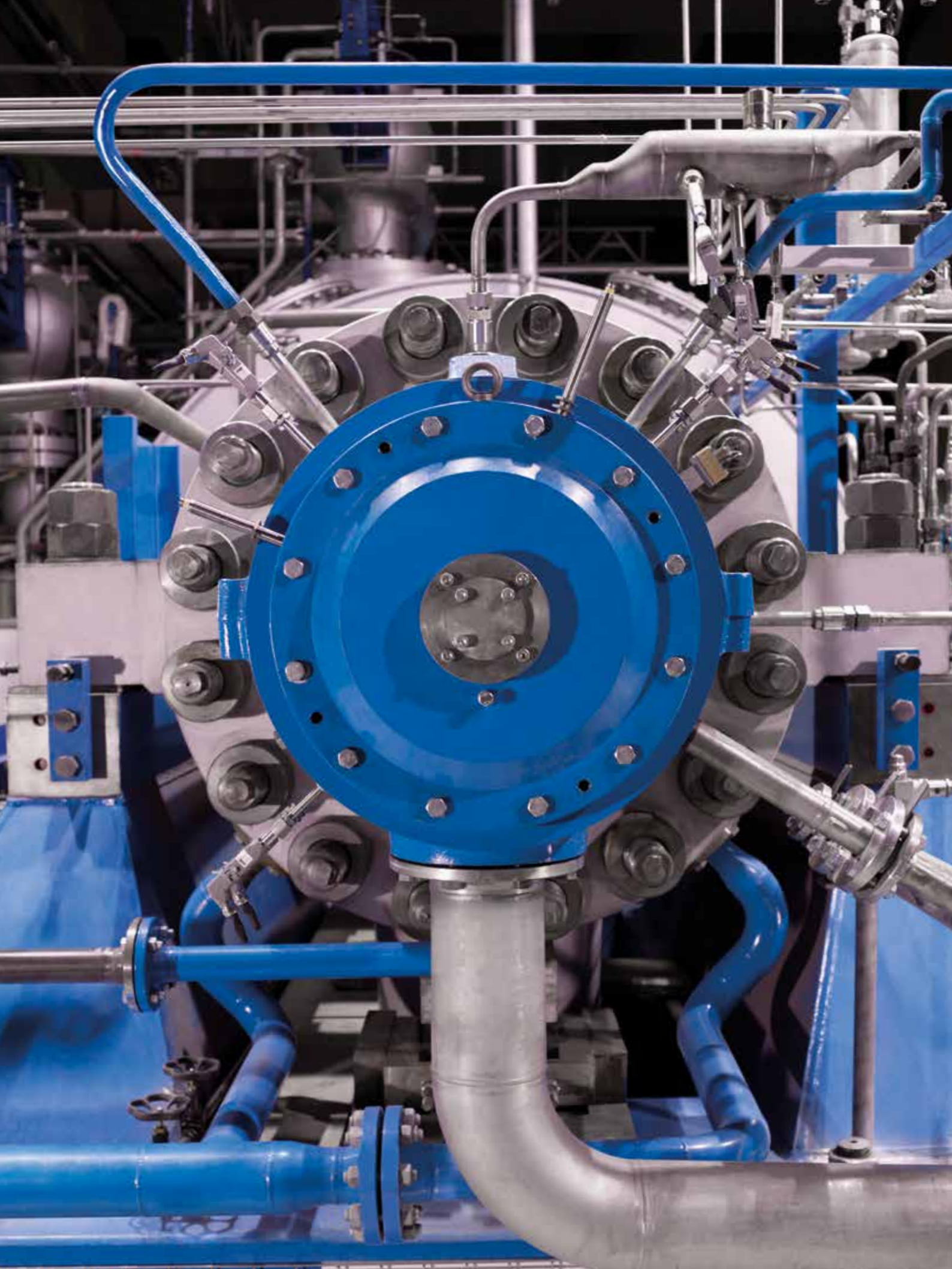


Cutting-edge pumping solutions for the fossil fuel-fired power generation





The Sulzer advantage

Driven by the need to reduce emissions, fossil-fuel power producers are striving to more and more plant efficiency. Be it coal-fired or gas-fired power plants, Sulzer develops the right pumping solutions to answer every efficiency requirement.

Designed to your needs

- Sulzer works closely with its customers to develop and design the optimum pumping solution
- Because reliability of a pumping system is often dependent on its design, Sulzer's experienced team of engineers dedicates their know-how to each customer's success

Focused on efficiency

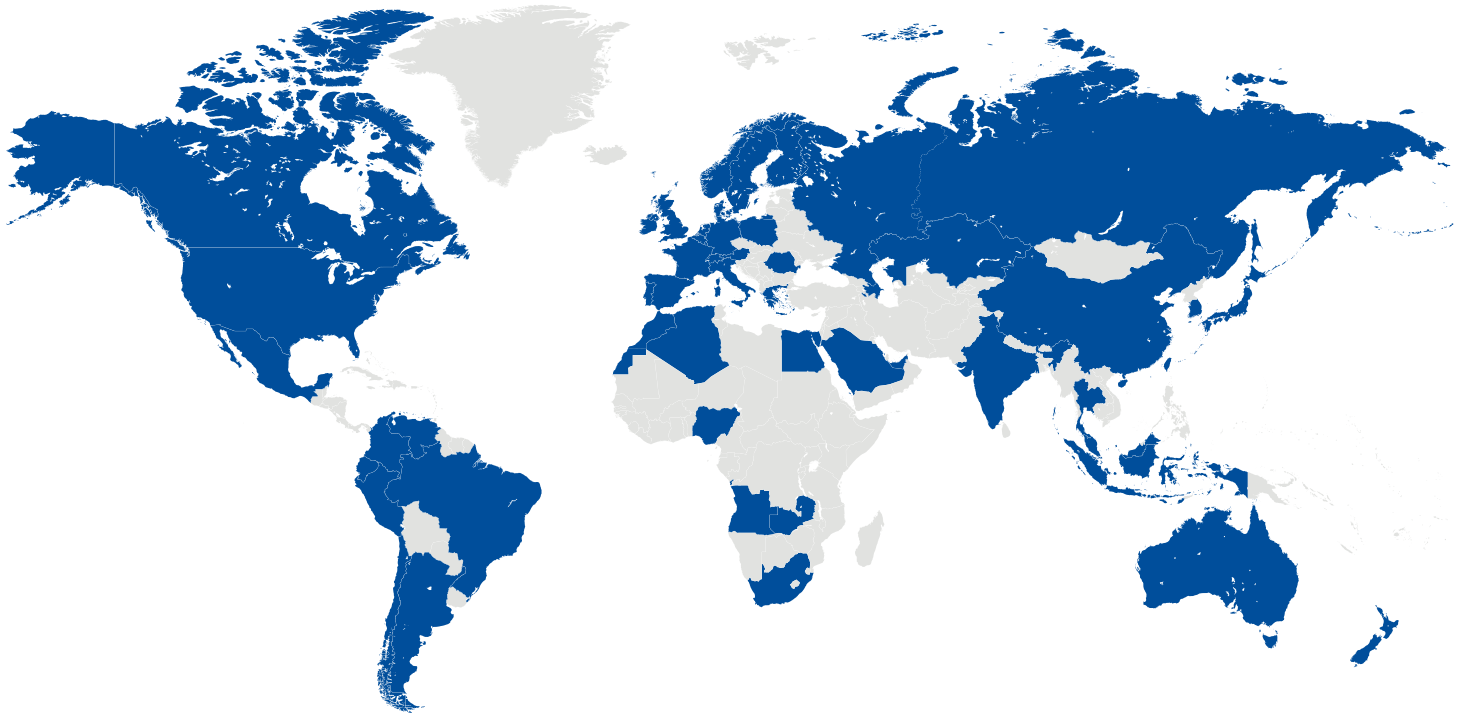
- Selecting the right pump is one key factor for boosting operational efficiency; Sulzer is the specialist to provide efficient pumping solutions
- Thanks to leading-edge products, Sulzer contributes to improve customers' equipment efficiency

Improvement of environmental footprint

- Sulzer's high efficient pumps and services contribute to reduce overall emissions
- Sulzer aims at maintaining the balance between economic success, sound social responsibility and environmentally friendly solutions in short- and long-term decision making

Our footprint spans across the globe

- All Sulzer manufacturing plants design, produce and test vertical and horizontal pumps dedicated to fossil fuel-fired power applications

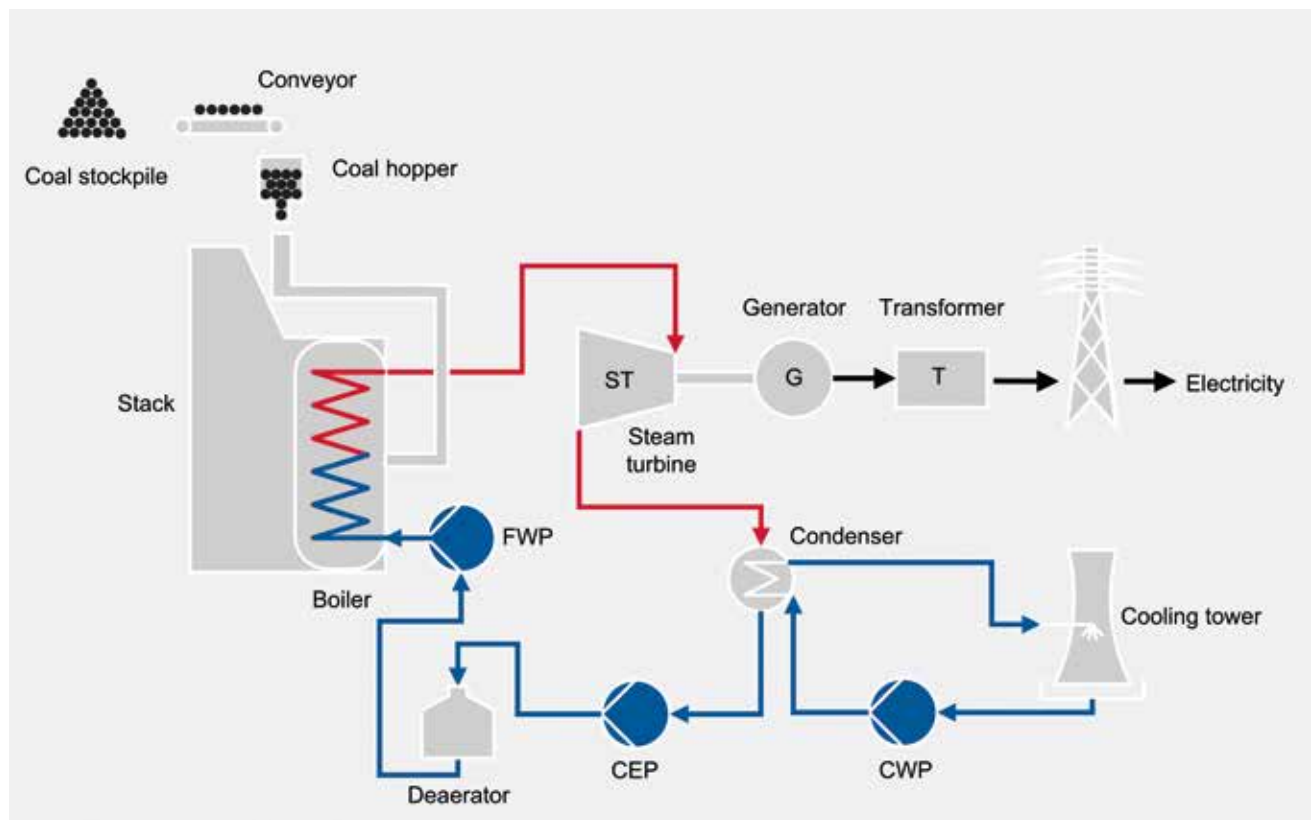


You set out the challenge, we provide the solution

With a range of well proven products for all applications we are always ready to push the boundaries. Through innovation and time trusted experience we will rise to your challenge. Be it higher pressures, higher operating temperatures, higher efficiencies, we are ready.

Coal- and oil-fired power plant

Mineral fuels coming from natural origin (hard coal, bituminous coal, lignite, etc.) or industrial derived (heavy fuel oil from petroleum) are combusted in burners to generate either subcritical or supercritical steam in appropriate boilers. The steam is directly sent to a turbine/generator unit to produce electricity, then passed through a condenser to convert it into demineralized water again. Sulzer supports these processes with Feed Water Pumps (FWP), Condensate Extraction Pumps (CEP), Cooling Water Pump (CWP), make-up and other auxiliary pump services.

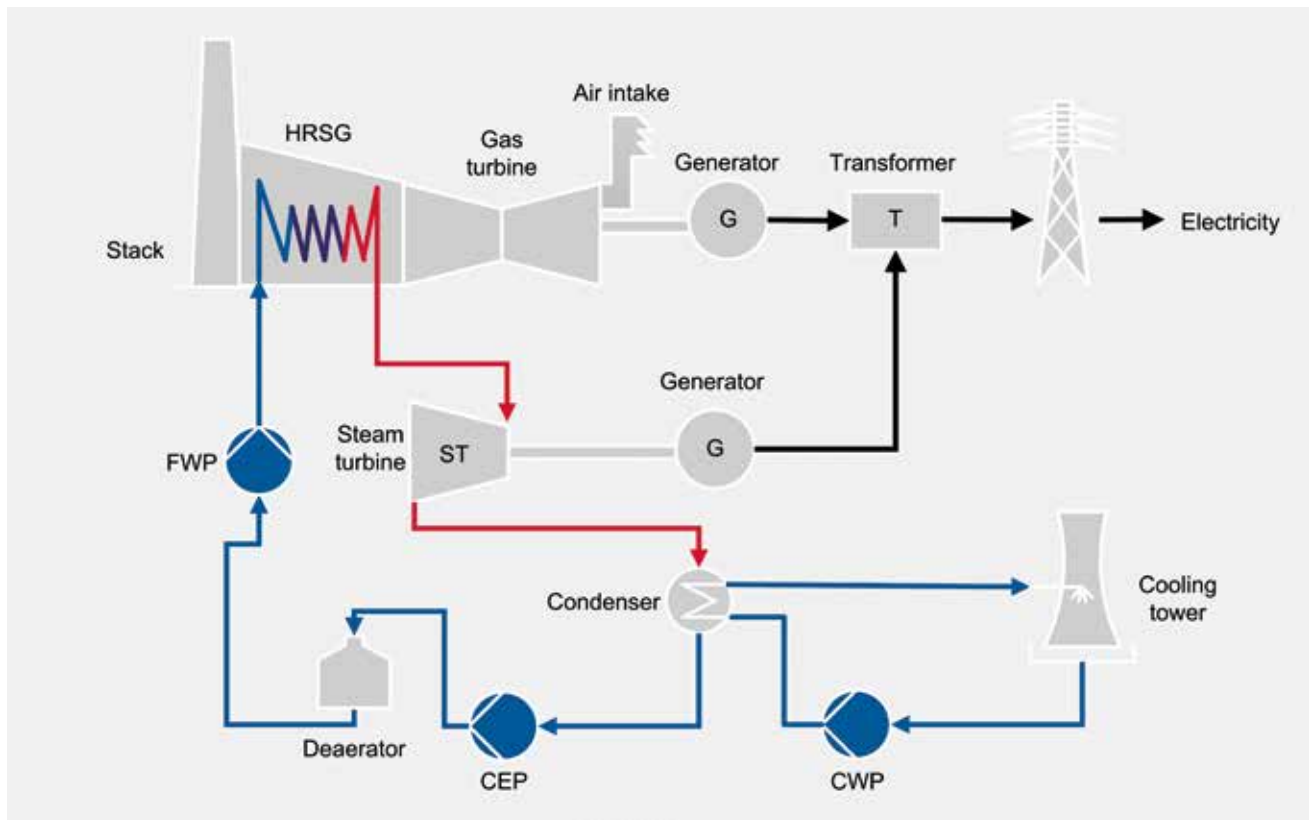


FWP = Feed Water Pump
CEP = Condensate Extraction Pump
CWP = Cooling Water Pump

Note: the oil-fired power plant process scheme is similar to the coal-fired power plant one, replacing the coal feed system by fuel tanks.

Gas-fired combined cycle power plant

Natural gas is combusted in a gas turbine burner which drives a generator to produce electricity. The hot exhaust gases coming from the gas turbine are sent to a Heat Recovery Steam Generator (HRSG) to generate steam. The steam is directly sent to a turbine/generator unit to produce additional electricity, then passed through a condenser to convert it into demineralized water again. Sulzer supports this process with Feed Water Pumps (FWP), Condensate Extraction Pumps (CEP), Cooling Water Pumps (CWP), fuel injection pumps, NOx abatement pumps, make-up and other auxiliary pump services.



HRSG = Heat Recovery Steam Generator
FWP = Feed Water Pump
CEP = Condensate Extraction Pump
CWP = Cooling Water Pump



Our comprehensive product portfolio

| Power plant type | Applications | | | | |
|---|-------------------------|-------------------------------------|--|--|-----------------|
| | Feed Water Pumps (FWP) | | Condensate Extraction Pumps (CEP) | Cooling Water Pumps (CWP) | Auxiliary pumps |
| | Main feed pumps | Booster pumps | | | |
| | Pump type | | | | |
| HPT GSG CP ME MD MC MSD | HZB BBS ZE PRE | SJD (CEP) ZE PRE MC BBS | SJT/SJM CWP SJT SJM SMD HSA ZPP | ZE/ZF PRE/PRER/PRETR AHLSTAR SNS CPE SMD HSA | |
| Coal- and oil-fired power plant | ✓ | ✓ | ✓ | ✓ | ✓ |
| Gas-fired combined cycle power plant | ✓ | | ✓ | ✓ | ✓ |



Product overview

Barrel casing pumps

HPT high pressure barrel casing pump

Features and benefits

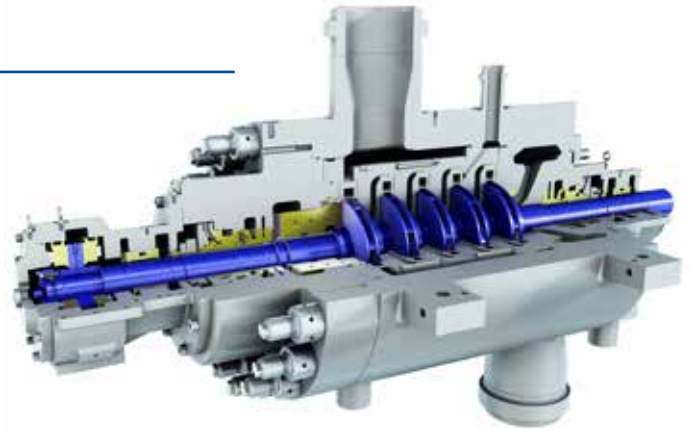
- Maximum safety due to double casing design
- Pipework connections remain undisturbed during disassembly
- High strength barrel material to accept occasional thermal shock
- Full cartridge pull-out for rapid changeover
- Design features to eliminate the need for pre-warming in most installations except on larger sizes
- Long operating life regardless of the operating mode

Applications

- Feedwater for TPP

Key characteristics

| | |
|--------------|--|
| Capacities | up to 4'000 m ³ /h / 17'600 USgpm |
| Heads | up to 4'200 m / 13'800 ft. |
| Pressures | up to 545 bar / 7'905 psi |
| Temperatures | up to 220°C / 430°F |



GSG diffuser style barrel pump for feedwater applications

Features and benefits

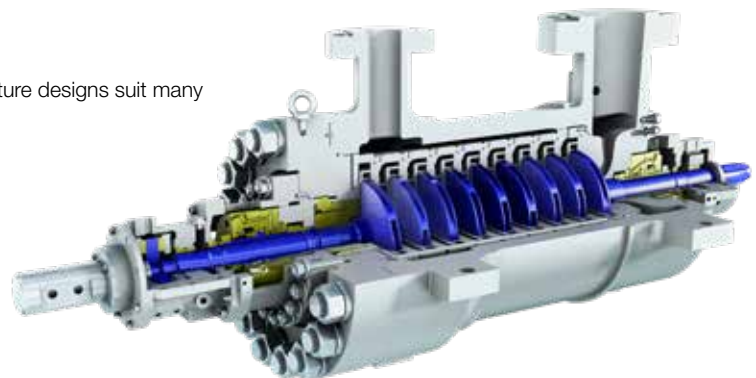
- Direct drive options to 6 MW
- Back-to-back rotor stack allows up to 16 stages
- Multiple sizes cover a broad hydraulic range
- Low pressure, high pressure, twistlock, and high temperature designs suit many applications

Applications

- Feedwater for TPP and CCP

Key characteristics

| | |
|--------------|---|
| Capacities | up to 900 m ³ /h / 4'600 USgpm |
| Heads | up to 2'600 m / 10'000 ft. |
| Pressures | up to 300 bar / 4'500 psi |
| Temperatures | up to 425°C / 800°F |



CP volute style barrel pump

Features and benefits

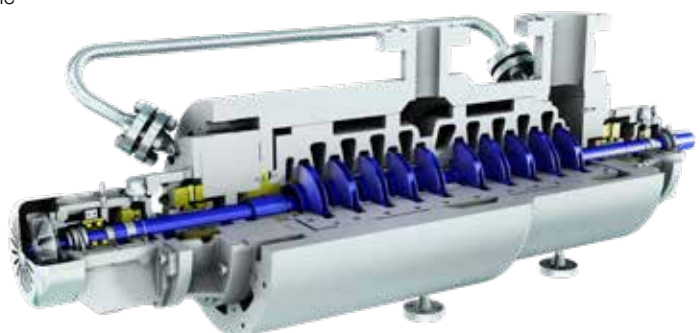
- Opposed impellers balance axial thrust, without need of lube system on smaller pumps
- Axially split inner case means rotor balance is not disturbed when installed in the pump
- Dual volute inner case balances radial loads for longer service life
- Twistlock barrel closure reduces maintenance time on lower temperature services
- Cartridge design on larger pumps can speed up pump repair time
- Volute inner case with lower erosion wear on abrasive services

Applications

- Feedwater for TPP and CCP

Key characteristics

| | |
|--------------|---|
| Capacities | up to 1'000 m ³ /h / 4'400 USgpm |
| Heads | up to 4'000 m / 13'120 ft. |
| Pressures | up to 425 bar / 6'250 psi |
| Temperatures | up to 425°C / 800°F |



Ring section pumps

ME high pressure stage casing pump

Features and benefits

- Optimized labyrinth design for high efficiency and good rotordynamic behavior
- Shaft forged with low lift-to-drag (L/D) ratio for stable operation without critical speed problems and reduced vibration levels
- Radial grooves providing increased radial stiffness, reduced effect on rotor tilting and good rotordynamic behavior
- Swirl break at balancing piston to maintain rotor stability even when internal clearances are worn
- Optimized shaft sealing design with jacket cooling and mechanical seal; pre-warming not required

Applications

- Feedwater for TPP

Key characteristics

| | |
|--------------|---|
| Capacities | up to 1'750 m ³ /h / 7'700 USgpm |
| Heads | up to 4'000 m / 13'120 ft. |
| Pressures | up to 430 bar / 6'240 psi |
| Temperatures | up to 220°C / 430°F |



MD high pressure stage casing pump

Features and benefits

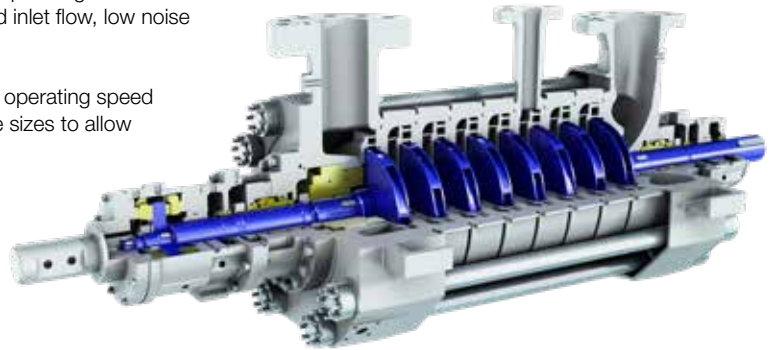
- Modular hydraulics for high efficiency in a wide range of operating conditions
- Centerline mounted with large branch sizes for optimized inlet flow, low noise level and higher allowable forces and moments
- Unaffected by rapid temperature variations
- Stiff shaft design for critical speeds above the maximum operating speed
- Multiple screws mechanical tensioners are used on large sizes to allow simpler tightening and loosening

Applications

- Feedwater for TPP and CCGP

Key characteristics

| | |
|--------------|--|
| Capacities | up to 1'200 m ³ /h / 5'300 USgpm |
| Heads | up to 2'800 m / 9'200 ft. |
| Pressures | up to 350 bar / 5'080 psi |
| Temperatures | up to 210°C / 410°F, higher temperature upon request |



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
- Low pressure version with dedicated large sizes for condensate extraction service

Applications

- Feedwater for CCGP
- Fuel injection and NOx abatement in OCPP and CCGP
- Condensate extraction

Key characteristics

| | |
|--------------|---|
| Capacities | up to 1'700 m ³ /h / 8'500 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 |



Axially split pumps

MSD axially split multistage pump

Features and benefits

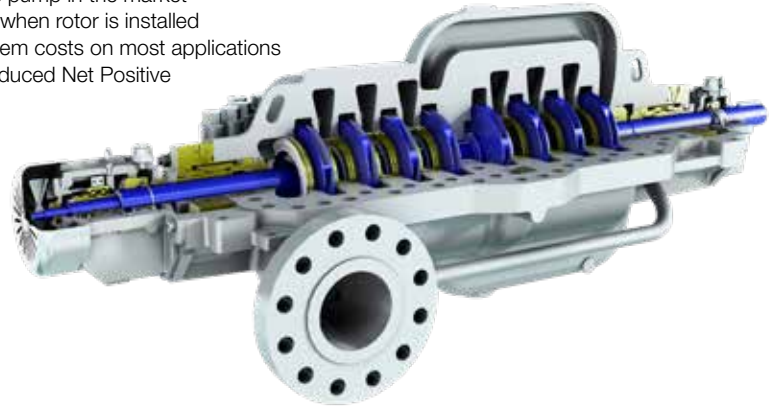
- Broadest hydraulic coverage of any BB3 type multistage pump in the market
- Axially split casing means rotor balance is not disturbed when rotor is installed
- Opposed impellers balance axial thrust, saving lube system costs on most applications
- Double suction, first-stage available on most sizes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

Applications

- Feedwater for TPP and CCPP

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 200°C / 400°F |



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

Applications

- Cooling water pumps
- Auxiliary services

Key characteristics

| | |
|--------------|--|
| Capacities | up to 25'000 m ³ /h / 110'000 USgpm |
| Heads | up to 260 m / 850 ft. |
| Pressures | up to 34 bar / 490 psi |
| Temperatures | up to 140°C / 280°F |



HSA axially split single stage double suction pump

Features and benefits

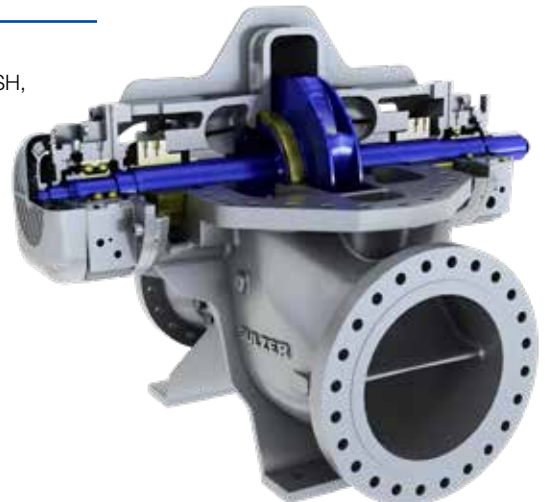
- Double suction impeller with optimum geometry provides high efficiency, low NPSH, and quiet running over a wide operating range
- Large shaft diameter with minimum bearing span for more power capacity and longer mechanical seal life
- High capacity bearing assembly
- Horizontal and vertical construction

Applications

- Cooling water pumps
- Auxiliary services

Key characteristics

| | |
|--------------|---|
| Capacity | up to 18'000 m ³ /h / 80'000 USgpm |
| Head | up to 280 m / 900 ft. |
| Pressure | up to 40 bar / to 580 psi |
| Temperatures | up to 150°C / 300°F |



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

Applications

- Cooling water pumps
- Auxiliary services

Key characteristics

| | |
|--------------|--|
| Capacities | up to 25'000 m ³ /h / 110'000 USgpm |
| Heads | up to 160 m / 525 ft. |
| Pressures | up to 20 bar / 290 psi |
| Temperatures | up to 120°C / 250°F |



Single stage pumps

HZB double suction volute pump

Features and benefits

- Centerline mounting to allow free thermal expansion and high nozzle loads
- Minimum bearing span to minimize shaft deflection
- Single cover casing design to reduce overhaul times
- Chrome steel casing with good corrosion resistance and excellent mechanical properties is standard; other materials available
- Single mechanical seal provides higher efficiency

Applications

- Feedwater booster for TPP

Key characteristics

| | |
|--------------|--|
| Capacities | up to 5'500 m ³ /h / 29'000 USgpm |
| Heads | up to 340 m / 1'115 ft. |
| Pressures | up to 48 bar / 700 psi |
| Temperatures | up to 220°C / 428°F |



BBS between bearings single stage pump

Features and benefits

- Centerline support for reduced thermally induced misalignment
- Double suction impeller for low Net Positive Suction Head Required (NPSHR)
- First critical speed is well above operating speed range for smooth operation
- Casing designed for 2 times API 610 nozzle loads for freedom from piping distortions
- Grouted or ungrouted, 1x or 2x nozzle load baseplates for reduced installation cost

Applications

- Feedwater booster for TPP

Key characteristics

| | |
|--------------|--|
| Capacities | up to 7'000 m ³ /h / 30'000 USgpm |
| Heads | up to 800 m / 2'600 ft. |
| Pressures | up to 100 bar / 1'450 psi |
| Temperatures | up to 425°C / 800°F |



ZE and ZF end suction pumps

Features and benefits

- Designed for hot or cold water medium design pressure applications
- Modular construction to provide maximum interchangeability of spares

Applications

- Feedwater booster for TPP
- Condensate extraction
- Auxiliary services

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 |



PRE/PRER/PRETR end suction pumps

Features and benefits

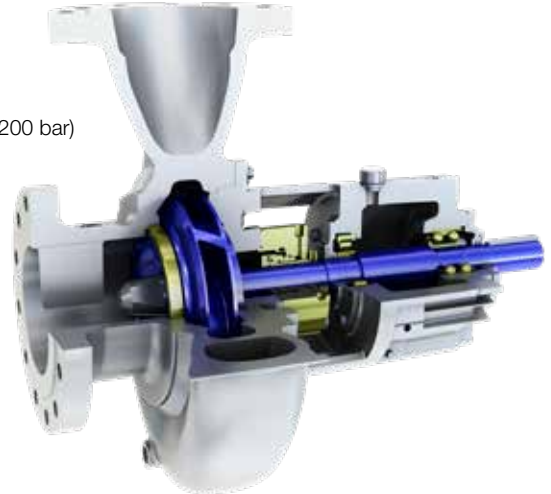
- Centerline mounted to allow thermal expansion without jeopardizing the shaft alignment
- Wear rings and balance holes optimized to maximize seal and bearing life
- Extra heavy-duty shaft for low shaft deflection and long life of seal and bearings
- PRER/PRETR reinforced designs available for very high pressure services (up to 200 bar)

Applications

- Feedwater booster for TPP
- Condensate extraction
- Boiler circulation
- Auxiliary services

Key characteristics

| | |
|--------------|--|
| Capacities | up to 4'500 m ³ /h / 19'800 USgpm |
| Heads | up to 320 m / 1'050 ft. |
| Pressures | up to 60 bar / 870 psi |
| Temperatures | up to 400°C / 752°F |



AHLSTAR end suction single stage centrifugal pump

Features and benefits

- Exceeds standard requirements of international ISO 5199 and ISO 2858 standards
- Suitable for the most demanding industrial applications
- Unique, patented and superior design features minimize life cycle costs
- Quick and easy installation, reliable operation, easy maintenance and service

Applications

- Auxiliary services

Key characteristics

| | |
|--------------|---|
| Capacities | up to 11'000 m ³ /h / 48'400 USgpm |
| Heads | up to 160 m / 525 ft. |
| Pressures | up to 25 bar / 360 psi |
| Temperatures | up to 180°C / 355°F |



SNS end suction single stage centrifugal pump

Features and benefits

- Designed to meet the design requirement of EN ISO 5199 international standard
- Exceeding EU's (European Union) requirements for energy-related products (ErP)
- Highest efficiency across the whole pump range, exceeding the benchmark efficiency index MEI 0.7 (Minimum Efficiency Index)
- New, state-of-the-art hydraulics ensure optimum capacity with low net positive suction head required (NPSHr)
- Low energy consumption, high standardization, easy installation and unique construction also equate to lower maintenance and operating costs

Applications

- Auxiliary services

Key characteristics

| | |
|--------------|---|
| Capacities | up to 1'400 m ³ /h / 6'000 USgpm |
| Heads | up to 160 m / 525 ft. |
| Pressures | up to 16 bar / 230 psi |
| Temperatures | up to 120°C / 250°F |



CPE end suction single stage centrifugal pumps

Features and benefits

- Designed to exceed the strictest energy regulations for all the industries as well as the requirements of ASME B73.1
- Revolutionary hydraulics and high efficiency to offer the lowest life cycle costs
- Improved reliability
- Minimized total cost of ownership

Applications

- Auxiliary services

Key characteristics

| | |
|--------------|---|
| Capacities | up to 1'650 m ³ /h / 7'000 USgpm |
| Heads | up to 275 m / 900 ft. |
| Pressures | up to 27.5 bar / 400 psi |
| Temperatures | up to 260°C / 500°F |



Vertical pumps

SJD (CEP) vertical can mounted turbine type pump

Features and benefits

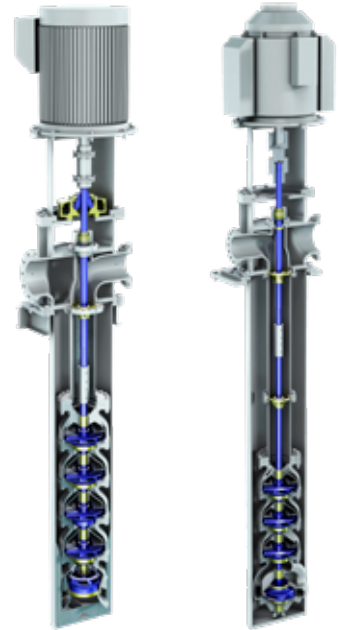
- Carbon graphite product lubricated bearing in bowls and columns for long maintenance free periods
- Removable seal housing allows servicing throttle bushing without removing the head
- Separate fabricated driver stand allows using one suction and discharge head per pump size
- Spacer coupling allows servicing the mechanical seal and thrust bearing as needed
- Can is provided with lateral and anti-rotational ribs uniform inlet velocity along the can length
- Various options available for the first stage impeller hydraulics, including double suction impeller allowing optimum sizing of pump

Applications

- High pressure condensate extraction

Key characteristics

| | |
|--------------|--|
| Capacities | up to 4'900 m ³ /h / 21'560 USgpm |
| Heads | up to 470 m / 1'540 ft. |
| Pressures | up to 47 bar / 680 psi |
| Temperatures | up to 100°C / 212°F |



SJT/SJM CWP vertical pump

Features and benefits

- Modern fabricated suction bell and bowl casing incorporating swirl break for stable pump performance curve
- Semi-open or closed cast impeller design for best fitting and optimum efficiency
- Segmented elbow to reduce the internal losses
- Optional full pull-out construction to reduce lifting crane capacity and ease maintenance

Applications

- Cooling water pumps for TPP and CCPP

Key characteristics

| | |
|--------------|--|
| Capacities | up to 90'000 m ³ /h / 396'000 USgpm |
| Heads | up to 60 m / 200 ft. |
| Pressures | up to 8.6 bar / 125 psi |
| Temperatures | up to 50°C / 122°F |



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 also available
- Optional spacer coupling allows servicing of the seal and thrust bearing as required

Applications

- Cooling water pumps for TPP and CCPP
- Auxiliary services

Key characteristics

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



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 also available
- Optional spacer coupling allows servicing of the seal and thrust bearing as required

Applications

- Cooling water pumps for TPP and CCPP
- Auxiliary services

Key characteristics

| | |
|--------------|--|
| Capacities | up to 58'000 m ³ /h / 250'000 USgpm |
| Heads | up to 30 m / 100 ft. per stage |
| Pressures | up to 18 bar / 260 psi |
| Temperatures | up to 50°C / 122°F |



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