Cutting-edge pumping solutions for the power generation
The Sulzer advantage

Solutions for tomorrow’s needs

The ever growing demand of energy in the world constitutes a challenge for power suppliers. In their search for reliable and always more competitive solutions, they have successfully turned to Sulzer. More than pumps, Sulzer provides complete and sustainable systems and services for a greener future.

Energy efficiency

- The increase of energy efficiency policies pressures utilities to constantly strive to improve their processes.
- Sulzer benefits from extensive experience in improving energy and works towards energy savings to make utilities the most competitive in their field.

Reliability

- Because downtimes are expensive, Sulzer offers proven solutions.
- Through its wide testing capabilities, Sulzer is able to test pumping solutions prior to shipment for even more reliability.

Environmental responsibility

- Sulzer provides pumping solutions dedicated to lowering energy costs and increasing reliability of your system while preserving the environment.
- Limiting the environmental footprint is a value which Sulzer implements within and outside its walls.
All Sulzer manufacturing plants have advanced testing facilities, capable of demonstrating pump performance and proving the ancillary equipment to ensure smooth commissioning and start-up.
Quality and sustainability

We are committed to providing our customers with the best products and services at the highest quality standards in the industry. At all our locations worldwide, we implement certified management systems, according to ISO 9001, ISO 14001 and OHSAS 18001 as an effective way to sustain the continuous improvement of our processes and products. Some of our locations have specific certificates such as ATEX IECEx03.
Whatever the process, we have the pumping solutions

You set out the challenge, we present the solutions.
• **Coal- and oil-fired power plants:** pumps for boiler feedwater, condensate extraction, cooling water and associated auxiliary applications

• **Gas-fired power plants:** pumps for feedwater, condensate extraction, cooling water, fuel injection, NOx abatement and associated auxiliary applications

• **Nuclear power plants:** pumps for feedwater, condensate extraction, cooling water, nuclear safety services and associated auxiliary applications

• **Biomass-fired power plants:** pumps for boiler feedwater, condensate extraction, cooling water and associated auxiliary applications

• **Solar thermal power plants:** pumps for feedwater, condensate extraction, cooling water, Heat Transfer Fluid (HTF) oil circulation, molten salt and associated auxiliary applications

• **Geothermal power plants:** pumps for hot water production, hydrocarbon feed, condensate extraction, cooling water, brine reinjection and associated auxiliary applications

• **Pumped-storage hydro power plants:** storage pumps and power recovery turbines
Your ideal service partner

Our global aftermarket presence, expertise and commitment always deliver reliability, responsiveness, rapid turn-around and innovative solutions.
## Our comprehensive product portfolio

<table>
<thead>
<tr>
<th>Power plant type</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Feedwater Pumps (FWP)</td>
</tr>
<tr>
<td></td>
<td>HPT HPTd CD GSG CP ME MD MC MBN MSD/MSD2 HZB ZE BBS</td>
</tr>
</tbody>
</table>

| Coal- and oil-fired power plants | ✓ | ✓ | ✓ | ✓ |
| Gas-fired combined cycle power plant | ✓ | ✓ | ✓ | ✓ |
| Nuclear power plant | ✓ | ✓ | ✓ | ✓ |
| Biomass-fired power plant | ✓ | ✓ | ✓ | ✓ |
| Solar thermal power plant | ✓ | ✓ | ✓ | ✓ |
| Geothermal power plant | ✓ | ✓ | ✓ | ✓ |
| Pumped-storage hydro power plant | ✓ | ✓ | ✓ | ✓ |
| Industrial power plant | ✓ | ✓ | ✓ | ✓ |
| District heating plant | ✓ | ✓ | ✓ | ✓ |
Product overview

Leading products for the power industry

List of Acronyms
CCPP = Combined-Cycle Power Plant
CSP = Concentrated Solar Power
NPP = Nuclear Power Plant
OCPP = Open Cycle Power Plant
TPP = Thermal Power Plant

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 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

KEY CHARACTERISTICS
- Capacities: up to 4’000 m³/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

APPLICATIONS
- Feedwater for TPP

GSG DIFFUSER STYLE BARREL PUMP

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

KEY CHARACTERISTICS
- Capacities: up to 900 m³/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

APPLICATIONS
- Feedwater in fossil and industrial power plants
- Safety related services for NPP
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

**KEY CHARACTERISTICS**

| Capacities  | up to 1'750 m³/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 |

**APPLICATIONS**

- Feedwater for TPP
### 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

### Key Characteristics
- **Capacities**: up to 1,700 m³/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

### Applications
- Feedwater for industrial, biomass, CSP, TPP and CCPP
- Fuel injection and NOx abatement in OCPP and CCPP
- Condensate extraction

### MD 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

### Key Characteristics
- **Capacities**: up to 1,700 m³/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

### 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 pump
- Wide range of materials including duplex stainless steel grades

### Key Characteristics
- **Capacities**: up to 700 m³/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
- Feedwater for industrial and biomass power plants
- Auxiliary services
- District heating
Axially split pumps

MSD AND MSD2 AXIALLY SPLIT MULTISTAGE PUMPS

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)

KEY CHARACTERISTICS

<table>
<thead>
<tr>
<th>Capacities</th>
<th>up to 3’200 m³/h / 14’000 USgpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heads</td>
<td>up to 2’900 m / 9’500 ft</td>
</tr>
<tr>
<td>Pressures</td>
<td>up to 300 bar / 4’400 psi</td>
</tr>
<tr>
<td>Temperatures</td>
<td>up to 200°C / 400°F</td>
</tr>
</tbody>
</table>

APPLICATIONS

• Feedwater for industrial, biomass, CSP, TPP and CCPP
• Safety related services for NPP

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 outlet performance
• Robust design with generous safety margins for long life of reliable service with minimum maintenance

KEY CHARACTERISTICS

<table>
<thead>
<tr>
<th>Capacities</th>
<th>up to 20’000 m³/h / 88’000 USgpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heads</td>
<td>up to 700 m / 2’300 ft</td>
</tr>
<tr>
<td>Pressures</td>
<td>up to 175 bar / 2’500 psi</td>
</tr>
<tr>
<td>Temperatures</td>
<td>up to 70°C / 160°F</td>
</tr>
</tbody>
</table>

APPLICATIONS

• Pump and hydro turbine for pumped storage power plants

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

<table>
<thead>
<tr>
<th>Capacities</th>
<th>up to 25’000 m³/h / 110’000 USgpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heads</td>
<td>up to 260 m / 850 ft</td>
</tr>
<tr>
<td>Pressures</td>
<td>up to 34 bar / 490 psi</td>
</tr>
<tr>
<td>Temperatures</td>
<td>up to 140°C / 280°F</td>
</tr>
</tbody>
</table>

APPLICATIONS

• Cooling water pumps for industrial, biomass and CSP
• Auxiliary services
• District heating
SMN AXIALLY SPLIT CASING DOUBLE SUCTION PUMP

FEATURES AND BENEFITS
• Broad hydraulic coverage through over 50 different sizes
• High efficiency
• Robust design for long service life
• Easy maintenance
• Flexible layout enabled by clockwise and counterclockwise rotation as well as vertical and horizontal arrangements

KEY CHARACTERISTICS
| Capacities    | up to 10'000 m³/h / 44'000 USgpm |
| Heads         | up to 200 m / 650 ft              |
| Pressures     | up to 30 bar / 435 psi            |
| Temperatures  | up to 150°C / 302°F               |

APPLICATIONS
• Cooling water pumps for industrial, biomass and CSP
• Auxiliary services
• District heating

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 25'000 m³/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               |

APPLICATIONS
• Cooling water pumps for industrial, biomass and CSP
• Auxiliary services
• District heating

HSA/HSB HORIZONTAL AXIALLY SPLIT SINGLE STAGE BETWEEN BEARING PUMP

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

KEY CHARACTERISTICS
| Capacities    | up to 10'000 m³/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
• Safety related services for NPP
Single stage pumps

HPTd SINGLE STAGE DOUBLE SUCTION PUMP

FEATURES AND BENEFITS
- Robust design to accept high piping loads
- Single cover design to reduce overhaul times
- Split bearing housings allow for bearing inspection without pump disassembly
- Single mechanical seal provides higher efficiency

KEY CHARACTERISTICS
- Capacities: up to 5'000 m³/h / 22'000 USgpm
- Heads: up to 800 m / 2'625 ft
- Pressures: up to 150 bar / 2'175 psi
- Temperatures: up to 220°C / 428°F

APPLICATIONS
- Feedwater for NPP

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

KEY CHARACTERISTICS
- Capacities: up to 5'500 m³/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

APPLICATIONS
- Feedwater booster for TPP and NPP
- Safety related services for NPP
- District heating

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

KEY CHARACTERISTICS
- Capacities: up to 5'000 m³/h / 22'000 USgpm
- Heads: up to 450 m / 1'500 ft
- Pressures: up to 50 bar / 740 psi
- Temperatures: up to 425°C / 800°F

APPLICATIONS
- HTF oil for CSP
- Feedwater booster for TPP
CD 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

KEY CHARACTERISTICS
- Capacities: up to 7'000 m³/h / 17'500 USgpm
- Heads: up to 800 m / 2'660 ft
- Pressures: up to 100 bar / 1'450 psi
- Temperatures: up to 425°C / 800°F

APPLICATIONS
- Feedwater for NPP
- Feedwater booster

HZB-HTF 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
- Carbon steel or chrome steel casing with excellent mechanical properties
- Double mechanical seal provides safer operation

KEY CHARACTERISTICS
- Capacities: 4'000 m³/h / 17'500 USgpm
- Heads: up to 340 m / 1'115 ft
- Pressures: up to 48 bar / 700 psi
- Temperatures: up to 425°C / 800°F

APPLICATIONS
- HTF oil for CSP

ZE AND ZF END SUCTION PUMPS

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

KEY CHARACTERISTICS
- Capacities: up to 2'600 m³/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
- Boiler feedwater booster
- Condensate extraction
- HTF oil for CSP
- Auxiliary services
- District heating
OHG OVERHUNG SINGLE STAGE PUMP

FEATURES AND BENEFITS

- Finned bearing housing and fan cooling for long bearing life
- Broadest range map in the industry for ISO 13709 (API 610) type OH2 pumps
- Heavy duty baseplates with 2x ISO 13709 (API 610) nozzle load option
- ISO 21049 (API 682) cartridge type mechanical seals for reduced emissions
- Electric motor, Variable Frequency Drive (VFD), engine and steam turbine drivers

KEY CHARACTERISTICS

| Capacities | up to 2'250 m³/h / 10'000 USgpm |
| Heads      | up to 360 m / 1'200 ft          |
| Pressures  | up to 75 bar / 1'110 psi        |
| Temperatures | up to 425°C / 800°F             |

APPLICATIONS

- HTF oil for CSP
- Auxiliary services

AHLSTAR END SUCTION SINGLE STAGE LONG COUPLED 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

KEY CHARACTERISTICS

| Capacities | up to 11'000 m³/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            |

APPLICATIONS

- Cooling water pumps for industrial and biomass power plants
- Auxiliary services
- District heating

CPT END SUCTION SINGLE STAGE CENTRIFUGAL PUMP

FEATURES AND BENEFITS

- 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

KEY CHARACTERISTICS

| Capacities | up to 1'600 m³/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

- Auxiliary services
- District heating

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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

KEY CHARACTERISTICS

<table>
<thead>
<tr>
<th>Capabilities</th>
<th>up to 1'400 m³/h / 6'000 USgpm</th>
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</thead>
<tbody>
<tr>
<td>Heads</td>
<td>up to 160 m / 525 ft</td>
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<tr>
<td>Pressures</td>
<td>up to 16 bar / 230 psi</td>
</tr>
<tr>
<td>Temperatures</td>
<td>up to 120°C / 250°F</td>
</tr>
</tbody>
</table>

APPLICATIONS

- Auxiliary services

ZFn HORIZONTAL VOLUTE TYPE PROCESS PUMP

FEATURES AND BENEFITS

- Basic design according API 610 latest edition
- Casing designed for higher nozzle loads
- Proven hydraulic design from our API 610 pump range ZE/ZF
- Larger shaft diameter compared to API 610
- Reduced rotor bending
- Higher dry running critical speed
- Some sizes according to RCC-M codes

KEY CHARACTERISTICS

<table>
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<tr>
<th>Capabilities</th>
<th>up to 2’600 m³/h / 11’440 USgpm</th>
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<tbody>
<tr>
<td>Heads</td>
<td>up to 300 m / 1’000 ft</td>
</tr>
<tr>
<td>Pressures</td>
<td>up to 100 bar / 1’450 psi</td>
</tr>
<tr>
<td>Temperatures</td>
<td>up to 425°C / 800°F</td>
</tr>
</tbody>
</table>

APPLICATIONS

- Safety related services for NPP
REL HORIZONTAL DIFFUSER STYLE SINGLE STAGE PUMP

FEATURES AND BENEFITS

• Casing designed for higher nozzle loads
• Proven hydraulic design from our API 610 pump range ZE/ZF
• Larger shaft diameter compared to API 610
• Reduced rotor bending
• Higher dry running critical speed
• Some sizes according to RCC-M codes

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</tr>
<tr>
<td>Temperatures</td>
<td>up to 425°C / 800°F</td>
</tr>
</tbody>
</table>

APPLICATIONS

• Safety related services for NPP

VMOA TRANSFORMER OIL CIRCULATION PUMP

FEATURES AND BENEFITS

• Excellent performance
• Suitable for transformer oil cooling systems
• Unique design features minimize life-cycle costs
• Quick and easy installation, safe operation, maintenance free

KEY CHARACTERISTICS

<table>
<thead>
<tr>
<th>Capacities</th>
<th>up to 115 m³/h / 500 USgpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heads</td>
<td>up to 13 m / 40 ft</td>
</tr>
<tr>
<td>Pressures</td>
<td>10 bar / 145 psi</td>
</tr>
<tr>
<td>Temperatures</td>
<td>up to 100°C / 210°F</td>
</tr>
</tbody>
</table>

APPLICATIONS

• Clean transformer oil
Vertical pumps

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

KEY CHARACTERISTICS
<table>
<thead>
<tr>
<th>Capacities</th>
<th>up to 90,000 m³/h / 396,000 USgpm</th>
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</thead>
<tbody>
<tr>
<td>Heads</td>
<td>up to 60 m / 200 ft</td>
</tr>
<tr>
<td>Pressures</td>
<td>up to 12.6 bar / 183 psi</td>
</tr>
<tr>
<td>Temperatures</td>
<td>up to 50°C / 122°F</td>
</tr>
</tbody>
</table>

APPLICATIONS
• Cooling water pumps for CCPP, TPP and NPP

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

KEY CHARACTERISTICS
<table>
<thead>
<tr>
<th>Capacities</th>
<th>up to 4,900 m³/h / 21,560 USgpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heads</td>
<td>up to 400 m / 1,300 ft</td>
</tr>
<tr>
<td>Pressures</td>
<td>up to 94 bar / 1,360 psi</td>
</tr>
<tr>
<td>Temperatures</td>
<td>up to 100°C / 212°F</td>
</tr>
</tbody>
</table>

APPLICATIONS
• Condensate extraction for CSP, CCPP, TPP and NPP
• Heater drain for TPP and NPP

SJD (API) VERTICALLY SUSPENDED PROCESS PUMP

FEATURES AND BENEFITS
• Reduced number of stages results in shorter and more reliable pumps
• Double suction first stage impeller on larger sizes can reduce pump length
• High efficiency with reduced power consumption
• Modular construction to fit project nozzle location requirements
• High head per stage means process conditions can be reached with slower speeds

KEY CHARACTERISTICS
<table>
<thead>
<tr>
<th>Capacities</th>
<th>up to 3,800 m³/h / 20,000 USgpm</th>
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</thead>
<tbody>
<tr>
<td>Heads</td>
<td>up to 700 m / 3,000 ft</td>
</tr>
<tr>
<td>Pressures</td>
<td>up to 75 bar / 1,100 psi</td>
</tr>
<tr>
<td>Temperatures</td>
<td>up to 205°C / 400°F</td>
</tr>
</tbody>
</table>

APPLICATIONS
• Organic fluid feed for geothermal power plants

Key Characteristics
<table>
<thead>
<tr>
<th>Capacities</th>
<th>up to 700 m³/h / 3,000 USgpm</th>
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<tbody>
<tr>
<td>Heads</td>
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<td>up to 205°C / 400°F</td>
</tr>
<tr>
<td>Temperatures</td>
<td>up to 700 m³/h / 3,000 USgpm</td>
</tr>
</tbody>
</table>

APPLICATIONS
• Condensate extraction for CSP, CCPP, TPP and NPP
• Heater drain for TPP and NPP

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

KEY CHARACTERISTICS
<table>
<thead>
<tr>
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<td>up to 12.6 bar / 183 psi</td>
</tr>
<tr>
<td>Temperatures</td>
<td>up to 50°C / 122°F</td>
</tr>
</tbody>
</table>

APPLICATIONS
• Cooling water pumps for CCPP, TPP and NPP
**SJT VERTICAL TURBINE PUMP**

**FEATURES AND BENEFITS**
- Optimized hydraulics for high efficiency
- Packed stuffing box for reliable sealing and simple maintenance; mechanical seal available as an option
- Rubber-lined product-lubricated bearing in bowls and columns for long maintenance-free periods; other bearing materials are also available
- Optional spacer coupling allows servicing of seal and thrust bearing as required

**KEY CHARACTERISTICS**
- Capacities: up to 62'000 m³/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 pumps
- Safety related services
- Auxiliary services

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**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
- Optional spacer coupling allows servicing the seal area and thrust bearing as needed

**KEY CHARACTERISTICS**
- Capacities: up to 58'000 m³/h / 250'000 USgpm
- Heads: up to 30 m per stage / 100 ft
- Pressures: up to 18 bar / 260 psi
- Temperatures: up to 50°C / 122°F

**APPLICATIONS**
- Cooling water pumps for industrial, biomass, CSP, CCPP, TPP and NPP

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**VEY AND VNY VERTICAL TURBINE PUMPS**

**FEATURES AND BENEFITS**
- Engineered suction design for optimized submergence
- Engineered bearing bushings for better shaft alignment and adaptation to the thermal expansion
- Main shaft sealing by throttle bushing for permanent leak-off recirculation to the molten salt tank
- Auxiliary shaft sealing deflector preventing leakage of molten salt to the atmosphere
- Efficient thermal barrier between hot/cold sections
- Muff coupling to ease dismantling
- Special design to allow thermal expansions: extended wear ring zone and clearances calculated considering all the relative expansions

**KEY CHARACTERISTICS**
- Capacities: up to 4'000 m³/h / 17'600 USgpm
- Heads: up to 380 m / 1'260 ft
- Pressures: up to 100 bar / 1'450 psi
- Temperatures: up to 600°C / 1'100°F

**APPLICATIONS**
- Molten salt for CSP
Hydraulic power recovery turbine

Hydraulic turbines come in various shapes and sizes. For higher flows, centrifugal pumps in reverse rotation are efficiently used as HPRTs. For high flows and lower pressure differential, mixed flow, or axial flow (propeller) type vertical pumps may be used as HPRTs. The standard MSD, HSB, GSG, HPDM, MC, MD, and many other pumps can all be modified to capture energy as an HPRT.

FEATURES AND BENEFITS

- Convert the excess pressure into mechanical shaft energy and increase the overall process efficiency
- Low investment costs compared to conventional turbines
- Economical solution for pressure reduction in industrial processes
- Can provide substantial savings with a short payback period

SJT (Geo) PRODUCTION HOT WATER PUMP

FEATURES AND BENEFITS

- Increased flow for higher geothermal hot water production capacity of 13 3/8” wells
- Increased power transmission capability
- Increased temperature for high enthalpy geothermal resources
- Water lubricated bearings or oil recovery system to protect the environment
- Up to 5.5” end-play axial float for shaft adaptation to shallow geothermal wells

KEY CHARACTERISTICS

| Capacity (m³/h) | 680 |
| Head (m)       | 700 |
| Pressure (bar) | 100 |
| Temperature (°C) | 220 |

APPLICATIONS

- Production hot water for geothermal power plants