



SPX POWER+ENERGY

INNOVATION, DESIGN,
MANUFACTURE &
AFTERMARKET SERVICES



Pumping Solutions for the Global Power Industry



> ClydeUnion Pumps



SPX - An introduction

SPX is a Fortune 500 multi-industry manufacturing leader, headquartered in Charlotte, North Carolina. SPX manufactures and markets products, components, services and technologies that are integral to meeting today's challenges and tomorrow's needs. We are a place where innovation is fostered, and the real needs of business are understood. We transform ideas into powerful solutions to help our customers meet their goals, overcome business challenges and thrive in a complex, always changing marketplace.

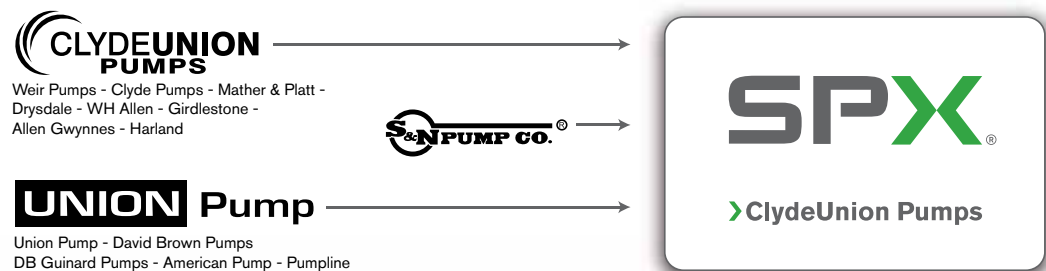
SPX's Flow Technology segment designs, manufactures and markets engineering solutions and products used to process, blend, meter and transport fluids. We also offer equipment for air and gas filtration and dehydration. Our leading brands have global operations which service the food + beverage, power + energy, and industrial processes.

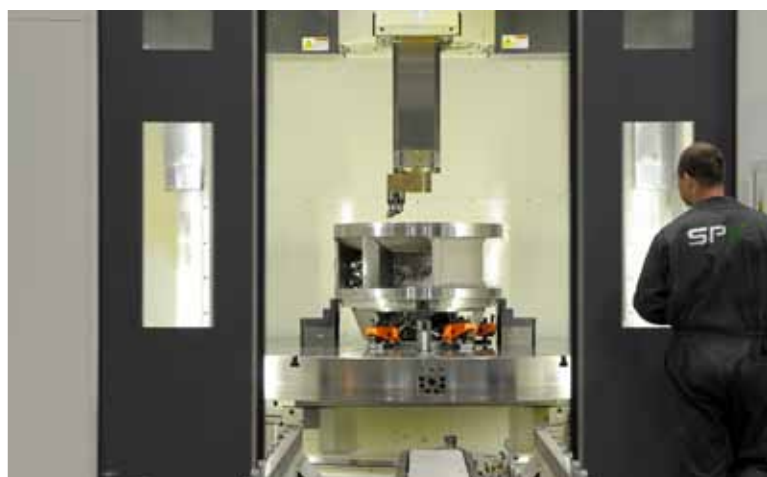


CLYDEUNION PUMPS, AN SPX BRAND - GENERATIONS OF EXPERIENCE

Whilst the name is relatively new, the ClydeUnion Pumps brand is known worldwide for supplying reliable and robust engineered pumping solutions stemming from over 140 years of industry expertise. Our experience spans across several complex industries including oil and gas, nuclear and conventional power generation, desalination and other key markets relevant to our product portfolio.

> ClydeUnion Pumps







POWER – DRIVEN BY ENGINEERING EXCELLENCE

At ClydeUnion Pumps, an SPX Brand, we understand the needs of the power industry. We bring together extensive engineering expertise and experience from our global organisation to offer engineer-to-order pumping solutions to our power customers.

We understand the importance of reliability, quality and safety to the success of a project. Key to this is engineering excellence and a culture of innovation and continuous improvement which places the company at the leading edge of pump design.

Our approach to quality is rigorous across all of our facilities. It is at the heart of our offering from the initial design stages through to supply chain, manufacture, testing, installation, and commissioning. The experience gained from hundreds of installations worldwide enables ClydeUnion Pumps to provide our customers with proven, reliable pumping solutions. In addition, our after sales spares and support service and our ability to have trained personnel sent to site on demand are key benefits for our customers.

These attributes ensure we deliver high quality, safe and reliable products, which combine with our extensive experience and global presence to make ClydeUnion Pumps the supplier of choice.

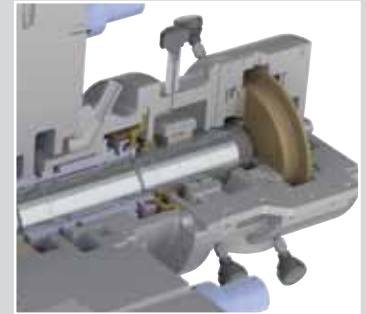
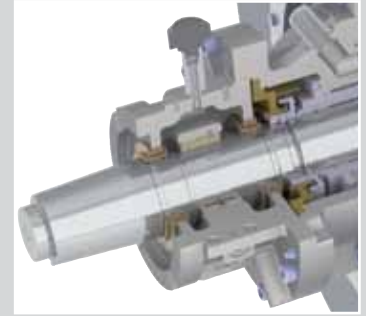




Traditional + Biomass Fuel Power Plants

With decades of experience in the power sector, ClydeUnion Pumps recognises the inherent need to offer varied engineer-to-order solutions for today's fossil fuel and biomass power plants. Whether supplying to supercritical coal plants, combined cycle power plants (CCPPs) or biomass plants, we work with our clients to ensure that our pumps serve their needs. Our key focus is on engineering our solutions to ensure maximum through-life reliability, minimum through-life costs and smooth start-up and commissioning.

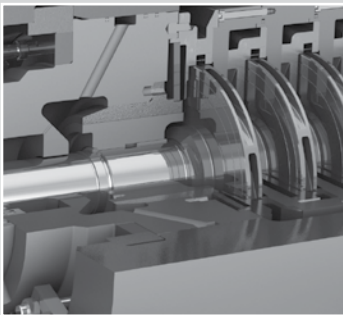
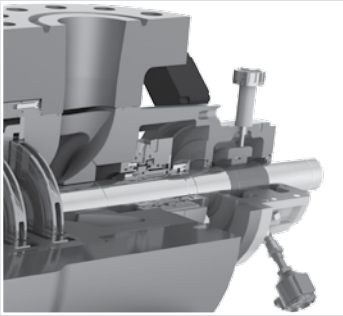
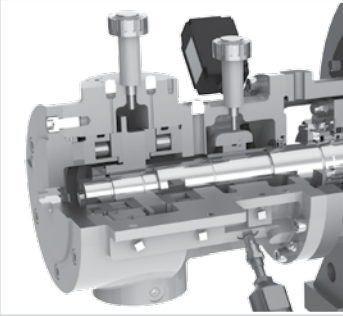
ClydeUnion Pumps offers tailored and standard designs for all types of thermal plants ensuring that our pumps are ideally suited across a range of technologies. Our comprehensive range of ancillary equipment is engineered for reliability under demanding operational conditions. This range includes condensate extraction pumps (CEPs) and vertical circulating water pumps (CWs). We strive to engineer our service pumps to give the lower costs associated with trouble-free operation.



FEATURED PRODUCT: CUP-FT / FK



Our CUP-FT/FK range of pumps is the perfect match for coal and combined cycle boiler feed applications. The CUP-FT/FK range of diffuser type pumps features options for throughbolt (CUP-FT) or barrel (CUP-FK) construction. Options suitable for low, intermediate or high pressure combine with the range's capacity, reliability and through-life efficiency to provide optimum operating performance for the life of the plant.



Carbon Capture + Storage (CCS)

ClydeUnion Pumps provides a comprehensive range of pumps for carbon capture and storage, from capture through compression to injection. ClydeUnion Pumps has over 50 years of operational experience in the process of pumping carbon dioxide. Our CCS offering combines expertise from a wide range of markets with our API and industrial standard pumps, to offer dependable solutions tailored to your carbon capture needs.

We combine our extensive experience and product range with a dedication to safety, quality and reliability to provide our customers with robust and reliable pumping solutions for this challenging industry.

FEATURED PRODUCT: CUP-BB5

The CUP-BB5 is ideally suited for compression, transport and injection of carbon dioxide for large scale CCS projects. Designed to API 610 standards, the CUP-BB5 is inherently capable of handling the high suction pressures required in these applications. Special wear parts mean that it is also suited for dry running conditions. With hundreds of installations in critical applications worldwide, this pump is proven in situations where high availability and reliability are a minimum requirement.







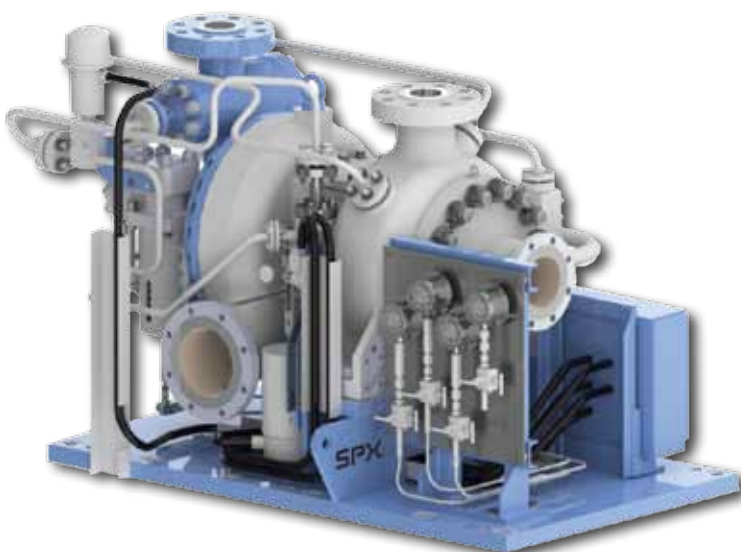
Nuclear Power

Our involvement in the nuclear power market began with the first ever industrial scale nuclear power plant and continues with ClydeUnion Pumps having nuclear pump installations in over 65% of operational nuclear power plants worldwide.

ClydeUnion Pumps offers a comprehensive Class 1, Class 2 and Class 3 product range and can also provide a full conventional island product offering designed for the high reliability and availability requirements of a nuclear facility. Key to our success in both civil and naval nuclear power is our ability to acquire and maintain the high standards required to design and build nuclear coded pumps. Our three coded facilities - Glasgow-UK, Annecy-France and Battle Creek-USA, are all qualified to ASME "N Stamp" and/or RCC-M and boast a long history of excellence.

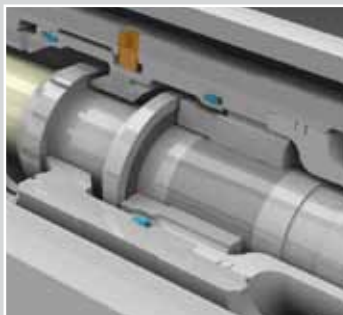
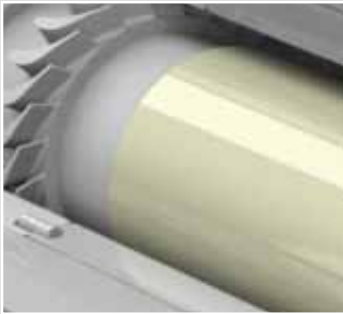
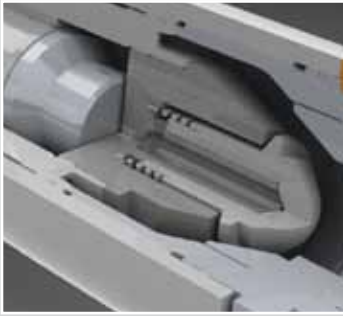


FEATURED PRODUCT: CUP-TWL



The CUP-TWL is a unique solution for turbine driven safety related duties in nuclear power plants. Capable of being engineered to match a broad range of system requirements, it consumes less physical space than separate turbine/pump configurations. Functioning as a turbine driven auxiliary feed water pump in a pressurized water reactor system and as part of the reactor core isolation cooling system in a boiling water reactor, the CUP-TWL provides a reliable decay heat removal capability.

It can operate without external services, so it has the ability to run for extended periods under a loss of external and/or back-up power to a reactor site. The CUP-TWL is one of the few proven technologies that can currently meet the demanding requirements of a station black out scenario, offering both existing and new sites a solution to improve the safety and integrity of their plant.



Geothermal

ClydeUnion Pumps has been involved in geothermal power projects since the 1980s. We manufacture a range of pumps matched precisely to the conditions in geothermal plants, including hot well pumps for transferring fluid out of the ground, condensing pumps, vacuum pumps for non-condensable geothermal fluids, circulation pumps for moving the condensate through the system, and injection pumps for transferring the fluid back into the geothermal chamber.

One of the key challenges faced by the geothermal power industry is downhole pumping. Challenges such as pumping corrosive fluids at extreme depths and temperatures create difficulties in maximising reliable energy output. ClydeUnion Pumps has developed unique solutions to address these issues and to aid in maximising the efficiency of geothermal plants.

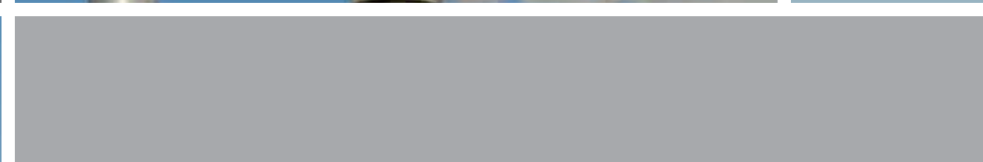
FEATURED PRODUCT: HSP

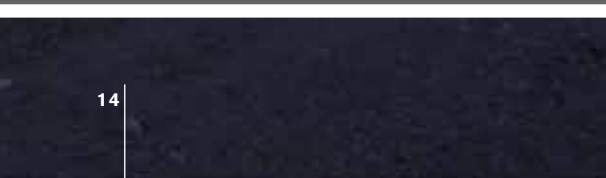
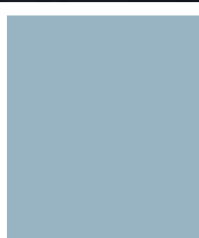
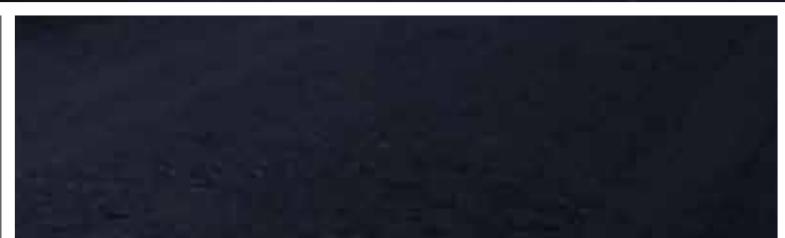
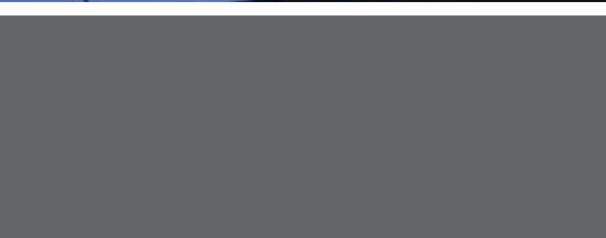
Our specialised Hydraulic Submersible Pump (HSP) has a range of advantages for geothermal well brine lift:

- Fluid turbine driven, requiring no electrical systems, enabling reliable installation at great depths.
- Capable of operating reliably at fluid temperatures in excess of 220°C
- Engineered to be resistant to aggressive well fluids

The HSP can offer unrivalled flexibility, availability and reliability for well pumping and meets the demanding mean time to failure requirements in geothermal applications. All of these features combine in the HSP to enable major improvements to the economic viability and return from a geothermal project.



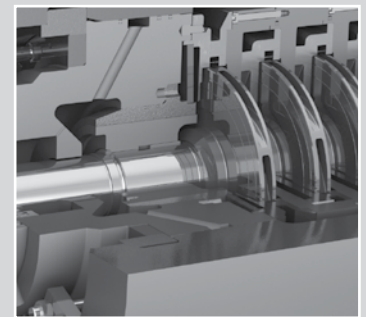
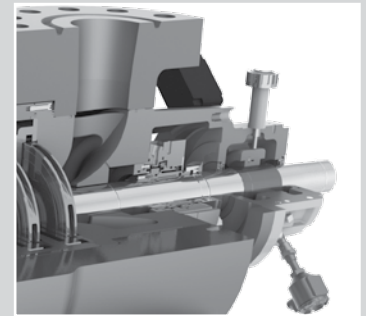
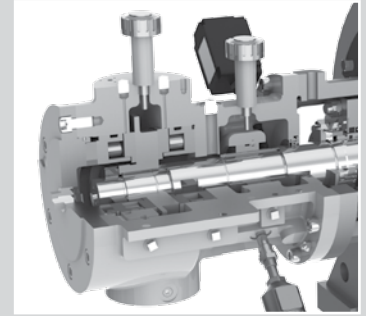




Concentrated Solar

ClydeUnion Pumps has the ability to leverage its involvement within different industries to serve the unique needs of concentrated solar plants. Our extensive experience in conventional power plants enables us to effectively service the boiler feed, cooling water and auxiliary applications on the thermal island. To complement our expertise in the thermal side, our comprehensive range of oil industry API pumps are ideally suited to applications such as pumping synthetic oils for heat circulation.

The start-stop cycle requirements inherent in concentrated solar plants are among the most demanding in power generation. Our experience with traditional plants enables us to offer reliable solutions using proven technology. Key priorities of high quality and reliability enable smooth operation and maximum availability, while minimising through-life costs.



FEATURED PRODUCT: CUP-FT



We tailor our CUP-FT boiler feed pump to suit the needs of different industries. In concentrated solar power, a number of design features, such as a higher head per stage capability than standard reduces the number of stages required, which enables a smaller footprint and higher reliability. These features mean that the CUP-FT is ideally suited for this application and will maximise availability and dependability in your power projects.



Product Ranges

	CUP DESIGNATION	FLOWS UP TO m ³ /hr	USgpm	HEADS UP TO m	ft		
SINGLE + TWO STAGE, PUMPS							
Single stage, end suction pump	Isoglide, Aquaglide, CUP-OH2, CUP-VS4	10,000	44,000	350	1,150		
Single stage, vertical in-line pump	CUP-OH3, CUP-OH4, CUP-OH5, CUP-VCM	2,000	8,800	335	1,100		
Single / two stage, axially split, between bearings pump	Uniglide, Duoglide, CUP-BB1	20,000	88,000	1,000	3,300		
Single stage, radially split, between bearings pump	CUP-BB2	4,090	18,000	500	1,650		
Single / two stage, vertical bowl / turbine pump	CUP-CW	40,000	176,000	100	330		
MULTI-STAGE PUMPS							
Multi-stage, axially split pump	CUP-BB3	2,750	12,000	3,350	11,000		
Multi-stage, radially split pump	CUP-FT, CUP-FK/RK, CUP-BB5	2,500	11,000	4,000	13,300		
Multi-stage, vertical diffuser / turbine, single case pump	CUP-VS1, CUP- VS6	7,000	31,000	3,000	9,842		
Multi-stage, vertical, double entry, canister pump	CUP-CEP	3,000	13,200	450	1,480		
Multi-stage, vertical bowl / turbine pump	SBWM	5,000	22,000	300	990		
RECIPROCATING PUMPS / API 674							
Power driven	S/M/L, Geared, High HP Power	155	680	6,900	23,000		
Steam driven (direct acting)	Simplex / Duplex Direct Acting	173	760	6,900	23,000		
SPECIALIST PUMPS							
Concrete volute pump	CUP-CVP	120,000	530,000	70	230		
Single stage, dry running, feedwater pump	CUP-FWP	6,000	26,400	1,200	3,990		
Integral steam turbine, water lubricated pump	CUP-TWL	350	1,550	1,200	3,990		
Single stage, radially split, horizontal/vertical, pull-out pump	CUP-RCP	1,635	7,200	400	1,330		
Hydraulic Submersible Pump	CUP-HSP	590	2,600	1,500	4,900		

LOW / MED HEAD SAFETY INJECTION



NUCLEAR POWER

CONVENTIONAL POWER

- CONFINEMENT SPRAY
- RESIDUAL HEAT REMOVAL
- REACTOR: AUXILIARY
- REACTOR CORE ISOLATION COOLING
- CHARGE PUMP
- ESSENTIAL SERVICE WATER
- CLOSED CIRCUIT COOLING WATER
- AUXILIARY SERVICES
- MAIN FEEDWATER PUMP
- BOILER FEED BOOSTER
- START UP FEED WATER PUMP
- CIRCULATING/ COOLING WATER
- CONDENSATE EXTRACTION/ TRANSFER
- AUXILIARY SERVICES
- GEOHERMAL WELL BRINE LIFT
- CARBON DIOXIDE CAPTURE & HANDLING

PUMP SOLUTIONS

	CONFINEMENT SPRAY	RESIDUAL HEAT REMOVAL	REACTOR: AUXILIARY	REACTOR CORE ISOLATION COOLING	CHARGE PUMP	ESSENTIAL SERVICE WATER	CLOSED CIRCUIT COOLING WATER	AUXILIARY SERVICES	MAIN FEEDWATER PUMP	BOILER FEED BOOSTER	START UP FEED WATER PUMP	CIRCULATING/ COOLING WATER	CONDENSATE EXTRACTION/ TRANSFER	AUXILIARY SERVICES	GEOHERMAL WELL BRINE LIFT	CARBON DIOXIDE CAPTURE & HANDLING
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INSTALLATION + COMMISSIONING: TROUBLE FREE COMMISSIONING ANYWHERE IN THE WORLD



PARTS: ANY BRAND, ANY MATERIAL, ANYTIME

Lifetime Worldwide Support

Every product ClydeUnion Pumps supply is supported by a full lifetime commitment. ClydeUnion Pumps provides a full aftermarket service, drawing on either its own engineers or fully trained and highly experienced service partners, depending on the location of the installation. ClydeUnion Pumps has service facilities in over 40 countries spread throughout Europe, Americas, Asia, the Middle East and Africa.

ClydeUnion Pumps after sales support extends across all of its legacy brands as well as new equipment, and provides full backup for obsolete products and for third party equipment. The parts ClydeUnion Pumps supply meet the original specification, or are upgraded where appropriate, and many components can be covered by a Rapid Response option which can have parts on site within 24 hours.

ClydeUnion Pumps after sales support is subject to the same supply chain management as the pump manufacturing. This provides customers with the lowest lead times and costs whilst meeting the highest standards of quality assurance.

In addition to spare parts, routine servicing, overhauls and inventory control, the aftermarket support covers upgrades and comprehensive technical advice about the potential refitting of existing installations for greater efficiency and reliability. ClydeUnion Pumps can work with your own engineers to carry out meticulous inspections and advise on maintenance schedules, carry out full vibration analysis, pressure and pulsation testing, and train your service personnel.

ClydeUnion Pumps history and breadth of experience, as well as its geographical coverage and expertise, make it the natural first choice for any pump related problem or enquiry, no matter what the location, the scale of the task or the original

manufacturer. We guarantee supply of parts for all heritage brands and/or obsolete products, including:

- Weir Pumps
- Clyde Pumps
- Union Pump
- Girdlestone
- Mather & Platt
- Harland
- Drysdale
- WH Allen
- Allen Gwynnes
- David Brown Pumps
- DB Guinard Pumps
- American Pump
- Pumpline
- S&N Pumps





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Design features, materials of construction and dimensional data, as described in this bulletin, are provided for your information only and should not be relied upon unless confirmed in writing. Please contact your local sales representative for product availability in your region. For more information visit www.spx.com.

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