



Pumping Solutions for Carbon Capture + Storage

INNOVATION, DESIGN, MANUFACTURE + AFTERMARKET SERVICES: PUMPING SOLUTIONS FOR A BETTER WORLD

>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



UNION Pump Union Pump - David Brown Pumps DB Guinard Pumps - American Pump - Pumpline





Pumping solutions for Carbon Capture + Storage

Pumps are critical to all CCS processes - ClydeUnion Pumps has a global reputation for supplying reliable and robust engineered pumping solutions for the most hostile and remote environments. Our experience spans several complex industries including pipelines, oil and gas production, refineries, reverse osmosis, nuclear and conventional power plants. We can provide solutions for all CCS pumping applications.







Driven by customer satisfaction

ClydeUnion Pumps, an SPX Brand, understands the needs of the Carbon Capture and Storage (CCS) market. After its formation in 2008, ClydeUnion Pumps brought together engineering expertise and experience from throughout its global organisation to create a specialist team focused solely on serving the CCS industry and meeting its specific requirements. ClydeUnion Pumps delivers best efficiency, performance and quality at market leading pricing.

The company is strategically aligned with customers' requirements and is fully committed to their working practices, and the demands of scheduling, efficiency and reliability, demanded by the CCS industry. This allows ClydeUnion Pumps to build considerable advantages into the services offered.

Within the Carbon Capture and Storage market, ClydeUnion Pumps offers a comprehensive range of products covering all applications.







COAL FIRED POWER PLANT

CO₂ Capture Processes + Pumps

CARBON CAPTURE INVOLVES SEPARATING CARBON DIOXIDE FROM FLUE GASES

ClydeUnion Pumps boasts over 50 years of operational experience with CO_2 capture processes. Our high performance range of API 610 centrifugal and API 674 reciprocating pumps provide reliable solutions for solvent, water and auxiliary pump applications in CO_2 capture processes. These comprehensive ranges include overhung, between bearings and vertically suspended centrifugal options and a range of reciprocating models, offering first class flexibility and integrity.

Where API compliance is not required, our high quality industrial standard ANSI or ISO pump ranges further provide reliable, economic solutions for CO_2 capture processes.

Both ranges offer some of the most comprehensive application coverage available through an extensive array of configurations and hydraulics.

KEY PROCESSES:

- Post-combustion capture: Pumps must handle lean and rich solvents as well as water, across a range of temperatures. A variety of solvents may be used, such as amines, ammonia, ethers or potassium carbonate
- Pre-combustion capture: For post-combustion processes, pumps handle similar fluids across a range of temperatures and pressures
- Oxyfuel combustion capture: This process avoids the need for solvents





Solutions for CO_2 Compression, Transportation + Injection

KEY CHARACTERISTICS + BENEFITS

Our high performance range of API 610 centrifugal pumps are at the forefront of $\rm CO_2$ pumping technologies. These pumps provide reliable solutions for compression, transportation and injection. The most common selections for CO_2 service for CCS would be multi-stage between bearings pumps.

With CO₂ pumping experience stretching back to the 1960s and injection experience to the early 1980s ClydeUnion Pumps is at the forefront of high pressure pipeline and injection service.

- Special wear parts for dry running in upset conditions
- Special elastomers and elastomer free designs
- Seal arrangements suitable for CO₂ service
- Bespoke hydraulic solutions for large flow variations



CCS selection matrix						TURE	PRESC	alogs A	CTIOM.
	CUP DESIGNATION	FLOW M³/HR	S UP TO USGPM	HEADS M	UP TO FT	Cak	COM	IR.	INJE
API 610 STANDARD CENTRIFUGAL						SUITABLE FOR			
Single stage API end suction pump	CUP-OH2	1,700	7,500	350	1,148				
Single stage API vertical in-line pump	CUP-OH3	1,365	6,000	305	1,000				
Single stage API vertical in-line pump	CUP-OH4	1,365	6,000	335	1,100				
Multi-stage API vertical diffuser / turbine single case pump	CUP-VS1	7,000	31,000	600	1,900				
Single stage sump pump	CUP-VS4	450	2,000	160	520				
Multi-stage API vertical diffuser / turbine double case pump	CUP-VS6	7,000	31,000	600	1,900				
Single / two stage API axially split between bearings pump	CUP-BB1	15,000	66,000	1,000	3,300				
Single / two stage API radially split between bearings pump	CUP-BB2	4,090	18,000	500	1,650				
Multi-stage API axially split	CUP-BB3	2,750	12,000	3,350	11,000				
Multi-stage API barrel radially split pump	CUP-BB5V	2,800	12,350	4,100	13,600				
INDUSTRIAL STANDARD CENTRIFUGAL									
Single stage end suction pump	ISOGLIDE	1,000	4,400	200	670				
Single stage large end suction pump	AQUAGLIDE	10,000	44,000	100	330				
Single stage axially split between bearings pump	UNIGLIDE	2,500	11,000	320	1,050				
Single stage axially split between bearings pump	UNIGLIDE-E	4,000	17,600	200	670				
Two stage axially split between bearings pump	DUOGLIDE	2,500	11,000	320	1,050				
Two stage axially split between bearings pump	DUOGLIDE-E	1,350	5,950	275	910				
Single stage vertical in-line pump	VCM	410	1,800	150	500				
API 674 OR INDUSTRIAL STANDARD RECIPROCATING PUM	PS								
Power driven small (single acting plunger) - simplex/duplex/triplex	Small Power	17	75	6,900	23,000				
Power driven medium (single acting plunger) - triplex/quintex	Medium Power	87	385	6,900	23,000				
Power driven large (single acting) - triplex/quintex	Large Power	146	645	6,900	23,000				
Steam driven simplex (direct acting)	Simplex Direct Acting	160	705	6,900	23,000				
Steam driven duplex (direct acting)	Duplex Direct Acting	173	760	6,900	23,000				

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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 supplies 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, America, 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





SPX.

PUMPING SOLUTIONS FOR CARBON CAPTURE + STORAGE

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