CUP-FT/FK
MULTI-STAGE, THROUGHBOLT + BARREL CASE, RADIA LLY SPLIT PUMP

ClydeUnion Pumps
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.

SPX - An introduction

CLYDE UNION 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.
High technology pumps for the most demanding services

ClydeUnion Pumps, an SPX Brand, is committed to delivering market leading products and services which meet the technical and commercial challenges of our customers operating across the full spectrum of power industry activities.

ClydeUnion Pumps experience in manufacturing boiler feed pumps dates back to 1893. Our boiler feed pump design philosophy is underpinned by decades of experience of providing highly reliable boiler feed pumps that offer assured generating capacity. This design required a very reliable, incredibly robust, boiler feed pump that assured generating capacity.

CONVENTIONAL POWER PLANTS

The ClydeUnion Pumps CUP-FT/FK (2 Pole) is a world class product designed for boiler feed applications, meeting the demands of modern thermal, combined cycle and solar power plants.

World energy demand is increasing daily and modern power plants require to meet higher loads and efficiencies. ClydeUnion Pumps understands the demands of the latest generating facilities and our CUP-FT/FK (2 Pole) pump range is designed to exceed these requirements. The design principles of the CUP-FT/FK (2 Pole) product are equally applied to diverse applications such as:

- Desalination
- Descaling
- High pressure injection

We are committed to quality throughout the company. Our Quality Management System is fully approved to ISO 9001:2008 and independently verified to comply with the latest quality standards. ClydeUnion Pumps is an environmentally responsible firm. In recognition of efforts considering the environment and surroundings, ClydeUnion Pumps Glasgow facility has been awarded the ISO 14000:2004 series of international standards.

RESEARCH + DEVELOPMENT

ClydeUnion Pumps recognises the importance of cleaner energy and the significant impact a boiler feed pump can have on the overall plant output. This is demonstrated by supplying CUP-FT/FK (2 Pole) boiler feed pumps to one of the worlds cleanest and most efficient integrated gasification combined-cycle (IGCC) facilities.

Our efforts are focused on continuously improving and developing our technology to ensure we deliver the most reliable, efficient, and low life-cycle cost products.

CUP-FT/FK (2 Pole) - Multi-stage, throughbolt + barrel case, radially split pump

Our extensive engineering, manufacturing and operational experience has been incorporated in the design of the 2 pole diffuser pump CUP-FT/FK (2 Pole). A radially split case, diffuser type pump with options for throughbolt (FT) or barrel case (FK), designed for low, intermediate and high pressure and high temperature applications. A world leading product, with features such as optimum hydraulic design, sustainable efficiency, and the inherent ability to withstand thermal shock, the CUP-FT/FK (2 Pole) pump offers reliable operation and low through life cost of ownership.

ClydeUnion Pumps CUP-FT/FK (2 Pole) pumps are at the heart of global power plants with operating parameters in the range of:

- Capacities - up to 1,100m³/hr / 4,840 USgpm
- Head - up to 2,500 m / 8,200 ft
- Speeds - up to 3,600 rpm
- Temperatures - up to 180°C / 350°F

PROVEN PRODUCT INTEGRITY

The CUP-FT/FK (2 Pole) encompasses optimal hydraulic designs from our heritage product ranges. The design integrity of our products is demonstrated with operational boiler feed pumps in power plants in every continent.

MECHANICALLY STIFF ROTOR DESIGN - THE HEART OF THE MACHINE

ClydeUnion Pumps mechanically-stiff, large-shaft rotor design differentiates our boiler feed pump. Our rotor design is based on achieving maximum sustainable efficiency, extended mean time between overhauls and reliability in operation. Designed to low-K factors, the resulting high critical speed margins and low static deflections reduce internal wear and increase reliability. The ability to accommodate thermal transients without the need for warm-up and superior start-stop capability ensure a breadth of operational requirements can be serviced.

INTERSTAGE TAKE-OFF

To suit low/intermediate pressure for heat recovery steam generators. Available at various stages to service project requirements.

NO WARM-UP REQUIRED

Without the need for expensive warming through, the CUP-FT/FK (2 Pole) pumps can accept full thermal shock without damage hence the pump is always available for start-up.
HYDRODYNAMIC BEARINGS
- Capable of higher load, higher speed operation
- White metal lined hydrodynamic journal bearing
- Force-fed or self-contained options available
- Unlimited life dependant on oil cleanliness

ROLLING ELEMENT BEARINGS
- Available depending on hydraulic balance arrangement and absorbed power
- Self contained lubrication saves need for force feed system

MECHANICALLY STIFF SHAFT
- Large shaft to impeller diameter proportions
- High critical speeds and low static deflection

OPTIMUM NPSH PERFORMANCE
- Single and double entry options available

SEALING OPTIONS
Mechanical Seal
- Cartridge style, no seal setting
- Reduced capital cost
- Plan 23 or cooled seat options available

360° BEARING SUPPORT
- Optimum rotor alignment and support
- Reduced vibration levels
- Hydraulic Thrust Balance
- Balance Drum
- Extended pump performance with ability to handle transients and flow changes
- Balance Disc
- Reduced leakage for increased efficiency
- Elimination of thrust bearing and force feed lubrication system

LIFT-OFF DEVICE
- Used in conjunction with a balance disc subject to start-stops
- Eliminates axial contact on starting and stopping

CONNECTION OPTIONS
- Flanged branch
- Welded branch (FK only)
- Interstage tapping
- Shaft driven lubrication oil pump when required

RING SECTIONS (FT)
- ‘O’ ring sealed joints to prevent leakage between stages
- Reduces the effect of thermal growth at elevated process temperatures

FORGED BARREL (FK)
- Removable cartridge design
- The barrel casing forms the pressure boundary
- 2⅓% chrome material, as standard, providing strength and corrosion resistance
Packaging + optional features

**IMPELLER OPTIONS**
- Low NPSHr single entry first stage as standard offering
- Double entry first stage available
- Reliable performance and long impeller life
- Proven and optimised inlet design criteria assures cavitation free operation
- Designs are optimised by computational fluid dynamics
- Commonly tested in cavitation visualization rigs
- Routinely NPSH tested

**HYDRODYNAMIC BEARINGS**
- Used in conjunction with balance drum
- Hydrodynamic double-acting thrust white metal lined hydrodynamic journal bearing
- Capable of higher load, higher speed operation
- Force-fed or self-contained options available
- Infinite life dependant on oil cleanliness
- Optimum rotor stability
- Proven reliability in the most demanding service conditions

**ROLLING ELEMENT BEARINGS**
- Available depending on hydraulic balance arrangement and absorbed power
- Ring oil lubricated
- Self contained lubrication saves need for forced feed system
- Lower cost than hydrodynamic bearing, plus support system
- Radial and axial compensation
- Rated for full radial and residual thrust load

**BALANCE DRUM**
- Balance drum arrangement absorbs up to 95% of hydraulic thrust loads, the remainder being compensated by generously rated thrust bearings
- Robust and rugged
- No axial clearance therefore no risk of axial contact
- Pump withstands transients and flow changes without wear
- Long operating life

**BALANCE DISC**
- At full speed, balance disc carries 100% of axial imbalance created by impellers
- Self regulating axial thrust compensation achieved through leakage control across small axial clearance between the rotating balance disc and stationary seat
- Variable axial clearance during flow changes or suction transients
- Reduced leakage for increased efficiency
- Eliminates requirements for large bearings and support systems
- Lift-off device included to minimise axial contact

**LIFT-OFF DEVICE**
- Lift-off device holds axial clearance between rotating disc and stationary seat open when operating speed falls below a certain speed and pumping action does not generate sufficient pressure to keep the faces open
- ‘Floating’ housing allows visual check on rotor position
- Easy maintenance - grease lubricated, standard components and cartridge design
- Reverse thrust capability to protect pump internals

**MECHANICAL SEAL**
- Cartridge design for easy installation, no seal setting leak-free design option
- Gain in overall feed pumping thermal efficiency (especially where warming through is not required)
- Long seal lives achievable
- Lower capital cost compared to other options - does not require complex support systems
- Lower cooling water quality (station CW system)
- Fewer external components

**50HZ RANGE COVERAGE CHART**

**60HZ RANGE COVERAGE CHART**

These charts cover the CUP-FT/FK standard pump range. Other engineering designs exist for extreme applications.
Global aftermarket capability best in service + response

Our customer focused aftermarket organisation is positioned to provide comprehensive care for our varied and diverse product lines. Heritage and obsolete products benefit from the same level of attention and expertise ensuring that reliability and availability is maximized irrespective of a pump’s length of service.

GENUINE HIGH QUALITY

Original or upgraded specification spare parts, coupled with full engineering design capability, enables longevity of reliable operation. Highly skilled and experienced service engineers ensure accuracy in build and optimised performance. The worldwide presence of ClydeUnion Pumps offers local service facilities in over 40 countries.

SERVICE SOLUTIONS

ClydeUnion Pumps is committed to supporting our installed base wherever it may be. Depending on your location we will provide either direct service support or support via our local authorised service partners. Whichever option is provided, you can be assured of the best attention from fully qualified and experienced engineers.

• Upgrades + re-rates
• Service + overhaul
• Installation + commissioning
• Technical support
• Inventory management
• 3rd party equipment

Parts + maintenance:
Any brand, any material, anytime. Heritage products, upgrades + improvements
Global locations

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CUP-03-FTFK-UK
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