CLYDEUNION PUMPS

Innovation, Design, Manufacture & Aftermarket Services:
Pumping solutions for a better world

nuclear power

clydeunion.com/nuclear-power

Generations of experience

While the name is comparatively recent CLYDEUNION Pumps is one of the most experienced specialised engineering companies in the world. Formed through the acquisition and integration of a series of highly respected pump manufacturers and designers on both sides of the Atlantic, CLYDEUNION Pumps incorporates an accumulation of over 300 years of engineering expertise.

George Weir: The eldest of the brothers, George trained as a ships engineer.

James Weir: The second eldest, James began work at 15 in a consulting engineers in Glasgow. He was the inventor of the celebrated direct-acting feed pump.

Reviewing the assembly of a TWL pump at Cathcart, Glasgow.

The history of CLYDEUNION Pumps begins with the formation, in 1871, of the engineering firm of G&J Weir. Founded by brothers George and James Weir in Glasgow, the company quickly prospered as a result of the improvements they introduced to pump machinery and valve technologies . Their work found applications across the world, from marine engines and power stations to desalination plants.

By the end of the twentieth century G&J Weir had aquired Drysdale Pumps, Harland, Mather and Platt, and WH Allen. They had also, under the name Weir Pumps, grown into one of the most respected and iconic engineering enterprises in Scotland.

Meanwhile just 14 years after the establishment of G&J Weir, the Union Manufacturing Pump Company was incorporated in 1885 in Michigan USA. Specialising in the design and manufacturing of steam pumps they grew prosperous, adopted the name Union Pump and established a Canadian sister company.

In 2006, two other highly respected specialist companies, David Brown Pumps of England and DB Guinard Pumps of France, were brought under the Union Pump umbrella.

A new chapter in the development of both companies began in 2007, when Weir Pumps was bought by Clyde Blowers, a company owned and run by Jim McColl (who had started his working life as an apprentice with Weir Pumps). At this time the name changed to Clyde Pumps. In 2008, Clyde Blowers bought Union Pump and amalgamated the two specialist engineering companies into CLYDEUNION Pumps.

CLYDE PUMPS Incorporating WEIR PUMPS Glasgow

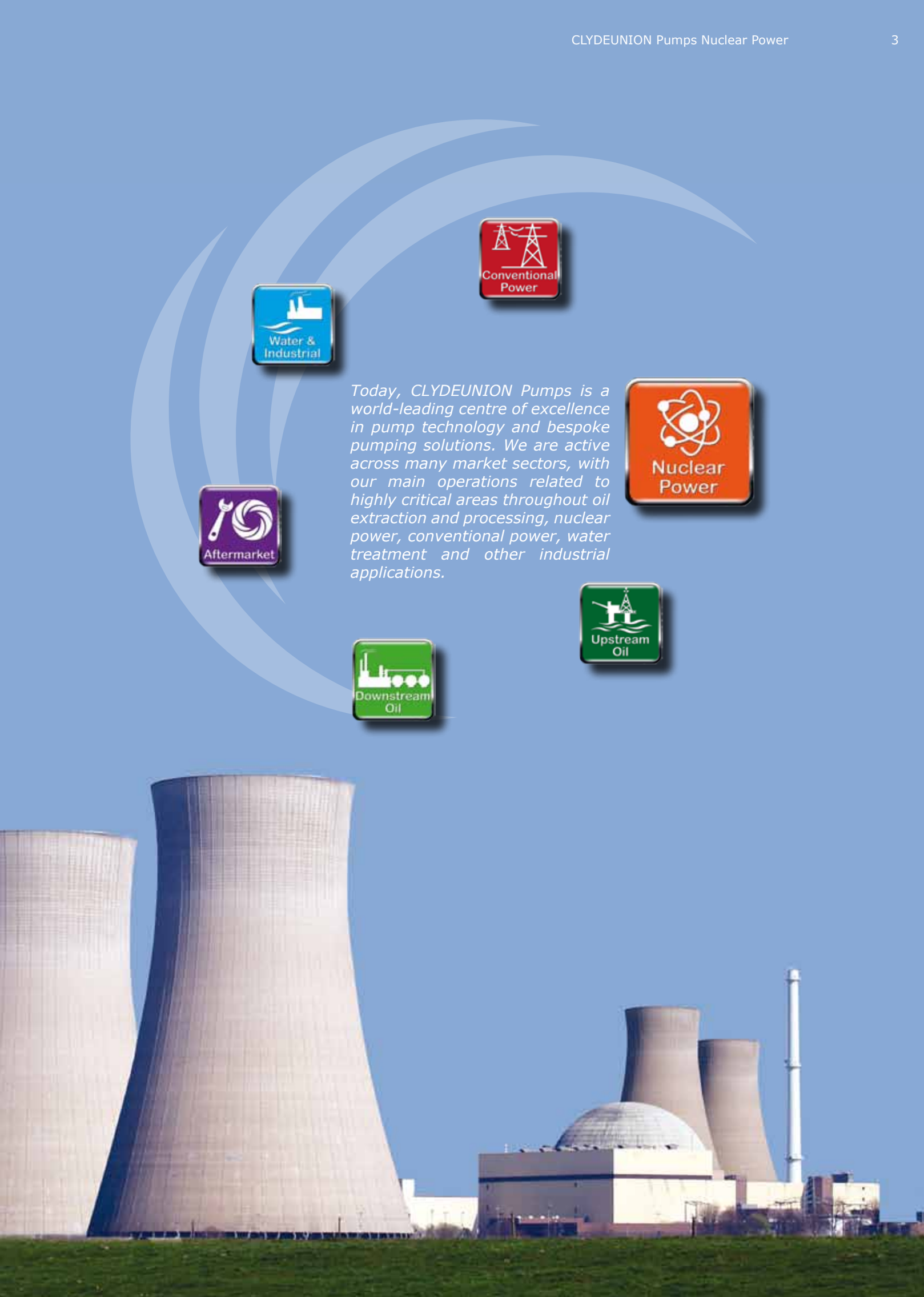
* Weir Pumps, Mather & Platt, Drysdale, WH Allen, Girdlestone, Allen Gwynnes, and Harland

UNION Pump

Union Pump, David Brown Pumps, DB Guinard Pumps, American Pump and Pumpline

CLYDEUNION PUMPS

This is a heritage product acquired when the Weir Pumps business transferred to Clyde Pumps in May 2007.



Today, CLYDEUNION Pumps is a world-leading centre of excellence in pump technology and bespoke pumping solutions. We are active across many market sectors, with our main operations related to highly critical areas throughout oil extraction and processing, nuclear power, conventional power, water treatment and other industrial applications.

Nuclear Power – certified for your requirements

At CLYDEUNION Pumps we understand the specialised needs of the nuclear power sector. With five global facilities, three of them fully nuclear qualified, as well as experienced local partners in China, India and Brazil we are the main supplier of nuclear pumps globally. We draw on over 50 years of nuclear pump experience to provide coded, safety related and balance of plant pumps for all reactor types.

CLYDEUNION Pumps has two of the most respected legacy brands in nuclear pumping - Weir Pumps* of Glasgow, Scotland and DB Guinard Pumps of Annecy, France. These leading providers of centrifugal pumps, now integral to CLYDEUNION Pumps nuclear capability, are further enhanced by our ability to offer reciprocating pumps for chemical injection and other critical nuclear duties through the ex-Union Pump facility located in Battle Creek, Michigan.

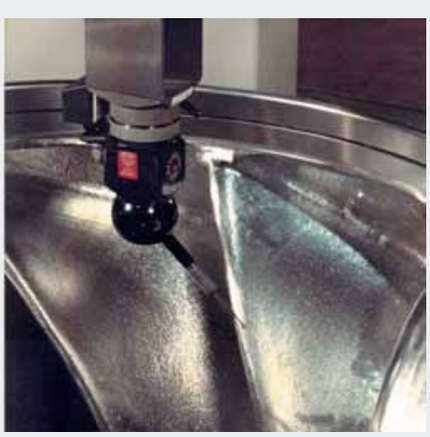
Our involvement in the nuclear power market began with the first ever industrial scale nuclear power plant. Since then we have been central to all major nuclear power programmes globally - notably in France, North America, the UK, South Korea, Spain, China and most recently Finland.

Our ability to design a reliable solution for specific needs of the overall nuclear plant, allied to our comprehensive service provision means

CLYDEUNION Pumps has nuclear pump installations in over 65% of operational nuclear power plants worldwide including PWR, BWR, ABWR and CANDU technologies.

Our product range includes some of the most reliable and proven designs in the industry as well as many unique offerings such as our class leading integral turbine driven pump, the CLYDEUNION Pumps TWL, and a range of high capacity concrete volute pumps that offer world beating availability and efficiencies.

In addition to our involvement in the commercial nuclear power market we continue to provide pumping solutions to the world's naval nuclear fleets, research reactors and other nuclear facilities. Our market focussed research and development programmes ensure that our solutions match the demanding requirements of current and future technologies, such as generation IV and fusion reactors.



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leading technologies

nuclear island pumps

Coded Pumps to Suit Your Requirements

CLYDEUNION Pumps experience as a supplier of specialist safety related pumping equipment for major types of nuclear reactors in commercial operation has enabled us to acquire a thorough understanding of the steady state, transient system modes and environmental conditions under which safety equipment is required to perform. This understanding is critical, enabling our team of engineers when preparing the necessary seismic, environmental and operational qualification reports to prove and ensure reliability, availability and maintainability of our equipment throughout its working life.

Amongst our portfolio of coded pumps for safety critical nuclear applications is the unique CLYDEUNION Pumps TWL. This is a single wheel steam turbine, two-stage pump, where both the turbine and impellers are mounted on a rigid shaft, supported by a central bearing assembly integral within a monobloc turbine/pump casing. This compact proven design will withstand water slugs in the steam line. It requires no external services or electrical supplies to operate and is one third the size of a conventional pump and turbine unit. Units are designed to ASME III Class 2 or 3 requirements.

In addition we offer a comprehensive range of ASME III Class 2 & 3 safety pumps, applications including - safety injection & containment spray, residual heat removal, charging & CVCS, auxiliary feed, essential service water, component cooling water, lube oil priming, reactor core isolation cooling, high pressure core flooder, moderator, emergency core cooling and auxiliary building water.

Emergency Feed Water Pumps

The unique CLYDEUNION Pumps TWL pump is a single wheel steam turbine, two-stage pump, where both the turbine and impellers are mounted on a rigid shaft. One third of the size of a conventional pump and turbine unit the TWL also requires no external services or electricity supply.

Key Applications:	Auxiliary Reactor Feed, Reactor Core Isolation Cooling
Capacity:	up to 350 m³/hr / 1,550 gpm
Delivery head:	up to 1,200 m / 3,990 ft
Temperature:	up to 120 °C / 250 °F
Speeds:	up to 8,000 rpm

Reciprocating Pumps

Reciprocating power pumps are designed with exceptional versatility to efficiently meet the requirements of a wide variety of pumping applications.

High Horse

Key Applications:	Charging, CVCS
Capacity:	up to 155 m³/hr / 680 gpm
Delivery head:	up to 6,900 m / 23,000 ft
Temperature:	up to 177 °C / 350 °F
Speeds:	up to 240 rpm

Residual Heat Removal

Heavy duty, single stage, radially split, horizontal and vertical pumps with comprehensive hydraulic coverage. Reliable operation at elevated temperature, ensured due to a number of cooling methodologies that result in cool running bearing modules.

Key Applications:	Residual Heat Removal
Capacity:	up to 1,635 m³/hr / 7,200 gpm
Delivery head:	up to 400 m / 1,330 ft
Temperature:	up to 425 °C / 800 °F
Speeds:	up to 3,600 rpm

Safety Injection Pumps

Vertical and horizontal multistage engineered pumps with low NPSH capabilities (use of inducer technology) with comprehensive range of hydraulic options to meet various duties available.

Key Applications:	Safety Injection, Containment Spray, High Pressure Core Flooder, Residual Heat Removal
Capacity:	up to 7,000 m³/hr / 31,000 gpm
Delivery head:	up to 920 m / 3020 ft
Temperature:	up to 205 °C / 402 °F
Speeds:	up to 4,500 rpm

Feedwater Pumps

Single stage pumps, with full cartridge and stiff shaft design, are constructed to withstand specific site environmental conditions & operating criteria.

Key Applications:	Charging & CVCS Main Auxilliary feed, High Pressure Core Flooder
Capacity:	up to 7,000 m³/hr / 31,000 gpm
Delivery head:	up to 600 m / 1,900 ft
Temperature:	up to 205 °C / 402 °F
Speeds:	up to 3,600 rpm

Auxiliaries (Class 3 Safety Pumps)

Horizontal or vertical, single or two stage pumps with a versatile hydraulic range to cover a range of applications.

Key Applications:	Essential Service, Component Cooling, Auxiliary Building Water
Capacity:	up to 10,000 m³/hr / 44,000 gpm
Delivery head:	up to 350 m / 1150 ft
Temperature:	up to 200 °C / 390 °F
Speeds:	up to 3,600 rpm

turbine island pumps

Leading Conventional Pumps for Nuclear Power Stations

The same design know-how and operational understanding that goes into our coded pump offering is put into our conventional pumps for the turbine island portion of a nuclear power plant. In fact over 125 years of conventional power pump experience allows CLYDEUNION Pumps to provide some of the most efficient, reliable and robust units ever offered.

CLYDEUNION Pumps portfolio truly is a comprehensive offering of pumps ranging from main reactor feed, reactor feed booster, condensate extraction through to main cooling water and auxiliary units. Of particular note is our range of large capacity concrete volute pumps. These offer almost 100% availability and are designed for high cooling water flow applications typically seen in nuclear power plants. Our unique design features boast a minimum of 10 years between internal inspections eliminating the need for stand-by units and providing other specific advantages such as reduced civil costs.

Boiler Feed Pump

Our boiler feed pump range has features that include full cartridge withdrawal, optimum efficiency hydraulic design and the inherent ability to withstand thermal shock.

Capacity: up to 2,500 m^3/hr / 11,000 gpm
Delivery head: up to 4,000 m / 13,300 ft
Temperature: up to 250 °C / 480 °F
Speeds: 2 pole as standard & up to 7,000 rpm

High Capacity Cooling Water Pump

Concrete volute pumps are designed for high flow applications, resulting in fewer pumps. This need for fewer pumps reduces overall civil dimensions considerably.

Capacity: up to 120,000 m^3/hr / 530,000 gpm
Delivery head: up to 70 m / 230 feet
Temperature: 180 °C / 350 °F
Speeds: up to 350 rpm

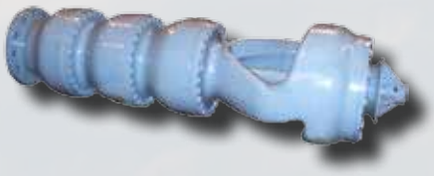
Cooling Water Pump

Our cooling water pump range are high efficiency single stage pumps that can be supplied in a variety of configurations and materials optimised to site conditions.

Capacity: up to 40,000 m^3/hr / 176,000 gpm
Delivery head: up to 100 m / 320 feet
Temperature: up to 80 °C / 180 °F
Speeds: up to 1,760 rpm

Condensate Extraction Pump

CEP pumps have been designed for low NPSH applications and can be supplied with a double entry first stage impeller.



Capacity: up to 2,500 m^3/hr / 11,000 gpm
Delivery head: up to 400 m / 1,330 ft
Temperature: up to 180 °C/ 350 °F
Speeds: up to 3,600 rpm

Auxiliary Pumps

A wide range of auxiliary pumps to suit all enviroments.

Condenser Vacuum Pump

leading nuclear capability

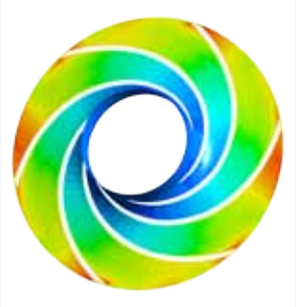
CLYDEUNION Pumps has successfully developed pumping solutions for various generations of nuclear reactor since the 1950s whilst continually refining proven product technology. It is this blend of studied innovation with proven reliability that ensures our global customers are always offered the best possible solution.

From the concept and planning stages through to service and upgrade our dedicated nuclear business unit team is here to help you.

CLYDEUNION Pumps aims to be in global partnership with its customers by delivering world leading engineering solutions through the full life cycle of their projects.

CLYDEUNION Pumps is able to offer:

- All nuclear & turbine island pumps
- Naval nuclear pumps
- High efficiency & proven reliable nuclear pump designs
- Dedicated nuclear design department
- In-house seismic, environmental and operability qualification
- Qualification tests under accidental conditions: thermal transients, debris and seismic tests
- Commitment to quality - ASME 'N', 'NPT' and 'NA' - RCC-M
- Compliance with international standards
- Large, innovative in-house research & development facilities
- Comprehensive in-house software & analytical capability
- Modern manufacturing & extensive test facilities
- Qualified welders & NDE operators in-house
- Prompt aftermarket service
- Installation & commissioning capability
- Upgrades and life extensions
- CDE, CE I, Gen IV & Fusion



Our nuclear business unit brings with it a dedicated team of nuclear design and project engineers who ensure our pump design is optimised to your duty.

Our capability includes the latest software to optimise rotor dynamics, hydraulics, conduct thermal and stress analysis as well as simulate seismic loading.

Our modern manufacturing facilities include dedicated nuclear production, assembly and test areas including nuclear clean rooms.

They ensure that each and every aspect of our nuclear business meets the exact standards that the project demands.

Class leading test facilities enable us to prove pump performance, whether it be a simple duty test or more complex testing as commonly required for nuclear projects.

Our capability includes all major test types including hydraulic performance, NPSH, thermal shock, cavitation and seismic testing.

Around 80% of pump failures on start up are attributable to inadequate installation and commissioning procedures.

Our installation & commissioning teams use their expertise to ensure best practice processes are utilised enabling trouble free operation and extended pump life.

coded facilities

Whilst many pump manufacturers have been unable to acquire or maintain the high standards required to design and build nuclear coded pumps, CLYDEUNION Pumps has three coded facilities with a long history of excellence. Glasgow, UK ; Annecy, France and Battle Creek, USA are qualified to ASME "N Stamp" and/or RCC-M qualifications. In addition we have a global aftermarket organisation that is able to offer full service and upgrade capabilities.

CLYDEUNION Pumps, Glasgow

Our largest manufacturing facility is located in Glasgow, Scotland. We have been manufacturing here for over 120 years and the site has continued to adapt to the needs of our global customer base. The site has held the ASME "N Stamp" continuously since 1977 and produces a wide range of coded, safety related and balance of plant pumps. Development, design, project management, manufacture, test and service capability are all under one roof.

CLYDEUNION Pumps, Battle Creek

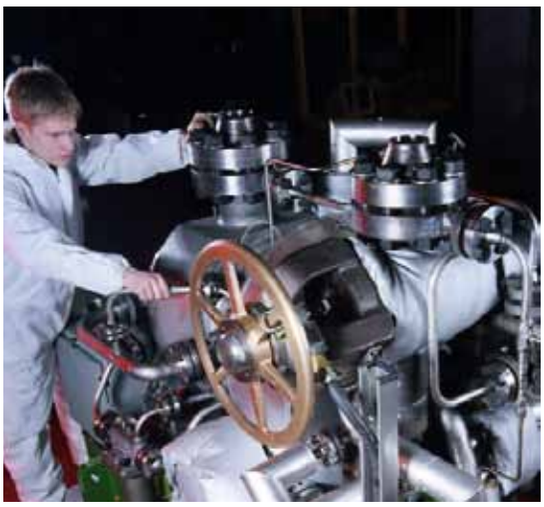
Located in Battle Creek, Michigan, our coded facility in the USA has a long tradition of manufacturing superior centrifugal as well as reciprocating pumps. Also qualified to ASME Section III for nuclear grade Class 1, 2 and 3 pumps and parts, Battle Creek specialises in both reciprocating power applications.

CLYDEUNION Pumps, Annecy

Our French facility, located in Annecy, has origins that date back to 1919 and the DB Guinard Pumps heritage brand. Today this facility specialises in the design and manufacture of a complete line of centrifugal pumps including many of our more specialised units for the nuclear market. As well as state of the art production facilities, Annecy has equally impressive test and R&D capability. It holds the ASME "N Stamp" and the RCC-M qualification.

Across all of our coded facilities our approach to quality is rigorous and is at the heart of our offering from the initial design stages through to sourcing, manufacture, testing, installation and commissioning. The experience we have gained from hundreds of installations allows you to benefit from the reliability we have proven globally in nuclear power stations of numerous reactor designs.

Lifetime worldwide support



Every product we supply is supported by a full lifetime commitment. We will provide a full aftermarket service, drawing on either our own engineers or our fully trained and highly experienced service partners, depending on the location of the installation. We have service facilities in over 40 countries spread throughout Europe, America, Asia, the Middle East and Africa.

Our after sales support extends across all of our legacy brands as well as new equipment, and we provide full backup for obsolete products and for third party equipment. The parts we supply meet the original specification, or are upgraded where appropriate, and many components can be covered by our Rapid Response option which can have parts on site within 24 hours. As an additional service we also can provide professional service people that can work in contaminated work shops.

CLYDEUNION Aftermarket is subject to the same supply chain management as our pump manufacturing, to provide customers with the lowest lead times and costs while meeting the highest standards of quality assurance.

In addition to spare parts, routine servicing, overhauls and inventory control our aftermarket support covers upgrades and comprehensive technical advice about the potential refitting of existing installations for greater efficiency and reliability. We 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.

Our history and breadth of experience, and our geographical coverage and expertise, make us 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.

nuclear
power

CLYDEUNION
PUMPS

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OUR EXTENSIVE BRAND HERITAGE :

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