CALDER

Energy Transition

Pumps for Low Carbon and Renewable Applications



P2X

CO_2

Hydrogen

Geothermal

Marine Propulsion

STANDARD UNITS | BESPOKE DESIGN | HAZARDOUS AREAS | HIGH PRESSURES | HIGH FLOWS | SPECIFICATION COMPLIANT

Energy Transition

Our knowledge and experience has transferred well into the emerging low carbon and renewable industries. We have specialised in high pressure, hazardous area bespoke pump system design and manufacture for four decades. This places us in a great position to support the energy transition and the drive towards net zero.

The very latest pumping technology for the very latest applications.



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Marine propulsion

An immediately available technology in our quest for net zero is the replacement of fossil fuels with CO_2-neutral green fuels such as methanol. One area that is already benefitting from green fuel is the marine sector. New combustion engines are being equipped with this technology, existing ones are being converted. Our pumps inject methanol (MeOH, CH_3OH, CH_4O), ethanol (C_2H_6O), and ammonia (NH_3).

CO_2

Typical CO_2 injection pump pressures required to maintain its supercritical state are very similar to the requirements of both produced water injection and drill cuttings re-injection. The flow rates for carbon dioxide injection can be considerably higher and our range includes numerous pumps capable of continuous duty at high flows.

Special metals are used in the construction of pumps when they are exposed to harsh process liquids. Material selection suitable for the corrosive effects of CO_2 ensures the pump's reliable operation and longevity. Integrated heaters help maintain the necessary temperature of the liquefied carbon, preventing it from transitioning back to a gaseous state.

Geothermal

Our experience lends itself well to pumping in deep geothermal applications. Indeed, this was borne out with our first geothermal energy recovery project, a Thermal Testing and Pumping System for Geothermal Energy Recovery. This was a closed loop, downhole heat exchanger system that is now in operation in the UK.

Many will say the most important part of designing and packaging a pump system is the pump selection. It is certainly up there with the major decisions we have to make with every new design. For geothermal projects, a high flow and low running costs are required. Our geothermal pump series is perfect for the application. The pumps deliver both high flow rates and high pressures coupled with reliability and long service intervals.

Hydrogen

We can support our customers by designing skid-based pre-feed or post-PEM hydrogen delivery systems. We can design bespoke hydrogen pressure systems compliant with PED requirements for 350 bar or 700 bar to suit your applications.

P2X

Our proven track record in designing and manufacturing specialized pump units for hazardous environments aligns perfectly with the diverse range of applications for high pressure pumping within the Power-to-X sector. We supply safe, well designed, high quality, and compliant pump and compressor packages. Our knowledge and experience will provide you with bespoke pump units that optimize safety, efficiency, and performance for the Power-to-X industry.

Applications include:

- Electrolysis
- Hydrogen Compression and Storage
- Methanation (Power-to-Gas)
- Synthetic Fuel Production (Power-to-Liquid)
- Carbon Capture and Utilization (CCU)
- Transport and Distribution
- Reaction Kinetics and Efficiency
- Safety and Containment

ATEX
NORSOK
IECEX
CSA

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Energy Transition

Working with You

As innovative green technology pushes the boundaries, we are here to help with the complex task of pump selection, unit design, and configuration to suit high pressure applications.

Whether it is the hazardous nature of hydrogen, the particularly high flow requirements of CO_2 injection, or the challenges posed by P2X high-pressure pumping applications, we are here for you.

Hazardous Area

With an emphasis on hazardous area design, the standard to which our company works is high.

We have developed our product technologies over many years to comply with various explosive atmosphere standards along with customers' own specifications. Designing and manufacturing pump units which are safe and compliant is what we do well.

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The HAMMELMANN® Pump

Controls

Comprehensive measuring, monitoring, alarm and shutdown functions ensure complete control over all processes, parameters and critical equipment. Operating parameters can be managed and restricted through a tiered approach to control panel settings access.

Alternatively, we will supply a simple pump/skid/instrumentation package for incorporation into your existing system.

Pump Design

The materials used and the system design are optimized for continuous operation. The upright design minimizes the mechanical stress on the components in combination with the pump head made of stainless steel with no alternating pressure loads to ensure low wear and extremely smooth running. The plungers move the conveyed medium with almost no pulsation and an efficiency of up to 95%.



Mounting

- Skid - The lightest and most economical solution.
- Skid with separate environmental/noise enclosure - The added protection of an enclosure.
- Road-going trailer - Built onto robust running gear and ideal for multi-site operations.
- Site trailer - A cost-effective option designed for onsite mobility.
- Crash frame - Lightweight with protection during transportation and onsite movements.
- Container - Maximum protection and a range of noise attenuation options.

Technical Features

The valve block is not subjected to alternating stress and therefore not sensitive to cracking by low cycle fatigue. A minimum clearance volume (dead area) results in low pulsation and high volumetric efficiency.

- In-valve Housing
- PTFE Bellows
- Zero Emission® Design
- High-Pressure Labyrinth Seal
- High-Pressure Parts Encapsulated within the Suction Chamber

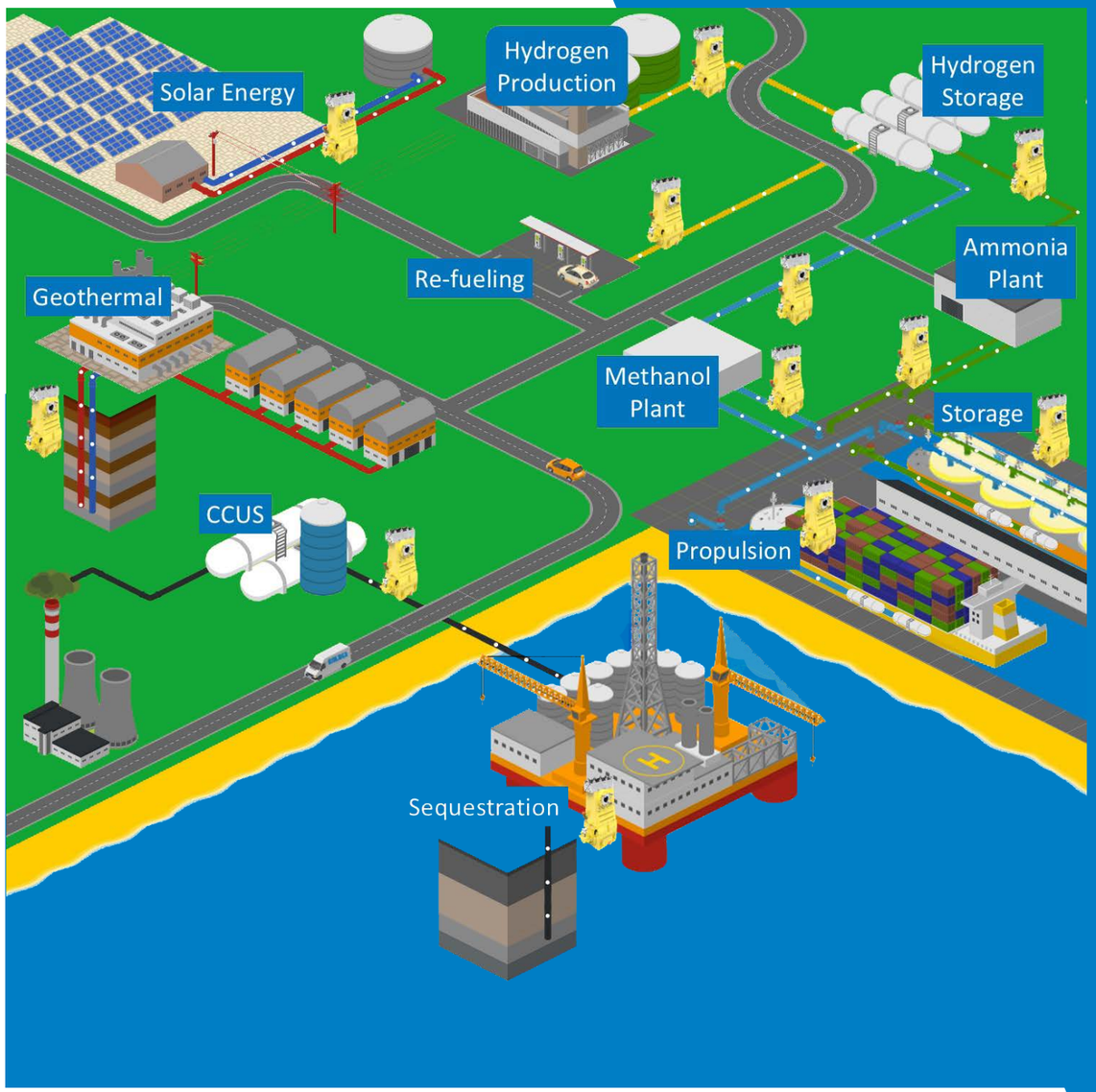


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How we Support the Energy Transition



Compliance

We back up our expertise in design, manufacturing and documentation with a rigid adherence to the ISO9001, ISO14001, and ISO45001 regulations.

Standards

ATEX
Our experience of supplying ATEX pump packages for both Zone 1 and Zone 2 is extensive. With our design and manufacturing facilities based in Worcester, UK, it is only natural that these European standards feature heavily in our supply history.

NORSOK
The standards of the Norwegian petroleum industry are, as far as possible, intended to replace oil company specifications. However, for many of our projects our equipment has to comply not only with NORSOK regulations, but also the very demanding requirements of customers operating in hostile and potentially dangerous environments.

CSA
We have designed many pump systems for operation in offshore Canadian waters. These units comply with the regulations of the CSA Group (formerly the Canadian Standards Association).

IECEx
We manufacture units to International Electrotechnical Commission System standards for operation around the globe. Australia was an early adopter of these standards and we have supplied many units to the Australasian markets ove rthe years.

Documentation

For Calder, documentation plays a vital role in providing supporting evidence that our systems comply with contract requirements. Without doubt, as important as the engineering design and the build.

Offshore and hazardous area projects are subject to the most stringent requirements for safety and quality. We must demonstrate our adherence to the plethora of rules and regulations from both industry and customer specifications.

Calder - Your passport to a compliant package

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We are **Calder**

A team of skilled, dedicated people striving to build the best at our base in Worcester, UK. From design to build, from installation to commissioning, we are there with you from start to finish.



We **Design**

In addition to our standard units, we have in-house design teams producing bespoke fluid-handling products from scratch.



We **Build**

Our pump units are built by our own engineers at our factory in Worcester, UK - and they have been for over 40 years.



We **Test**

We have two substantial, fully equipped test bays which allows us to ensure all units receive comprehensive testing before despatch. Customer witness testing of unit performance, vibration and noise is available due to our state-of-the-art facilities.

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