



# RENEWABLES

# WHAT IS ELECTRIFICATION AND WHY THE PUSH?

Electrification refers to the process of converting systems, technologies, or infrastructures to use electricity as a primary source of power. This can apply to various sectors, including transportation, heating, industrial processes, and more. In transportation, for example, electrification often involves replacing fossil fuel-powered vehicles with electric ones and moving from traditional fuels like coal or oil to electricity generated from renewable sources like solar, wind, or hydroelectric power.

Electrification is often pursued for its potential to reduce greenhouse gas emissions, increase energy efficiency, and promote sustainability. The global shift towards electrification is a response to the pressing need for a sustainable future and the reduction of greenhouse gas emissions. The objectives outlined in the Paris Agreement emphasize the urgency of moving away from fossil fuels and embracing cleaner, electric energy sources. Metal components play critical roles in various renewable energy systems and electrification technologies.

Typical materials selected for these components are steel and stainless steel (all grades and hardness), aluminium, nickel, and copper alloys.

**We currently supply into the renewable industry in the following ways:**



## WIND TURBINES

Wind energy is a rapidly growing sector, and wind turbines require a variety of metal components.



## SOLAR MOUNTING SYSTEMS

Solar photovoltaic (PV) systems require components must withstand various environmental conditions and ensure optimal panel orientation for maximum energy production.



## ELECTRIC VEHICLE COMPONENTS

The electrification of transportation offers significant opportunities including connectors, terminals and heat sinks which are essential for EV powertrains and charging systems.



## HYDROELECTRIC COMPONENTS

Hydroelectric power plants utilise various metal components, including turbine blades, penstocks, gates, and intake structures. We can produce precision parts designed to withstand high pressures and flow rates. Additionally, corrosion-resistant coatings may be applied to extend the service life of metal components in aquatic environments.



## SMART GRID TECHNOLOGIES

Metal enclosures and cabinets are essential for housing electrical equipment and control systems in smart grid applications. We can produce enclosures with custom configurations to accommodate sensors, meters, relays, and communication devices. These components enable real-time monitoring, automation, and optimisation of grid operations.



## FUEL CELL COMPONENTS

Our methods can be employed in the production of fuel cell components, such as proton exchange membranes (PEMs), gas diffusion layers (GDLs), and catalyst-coated membranes (CCMs). This includes precision patterning, etching, and deposition of materials to optimize fuel cell performance and durability.



## ENERGY STORAGE SYSTEMS

Metal enclosures and casings are integral components of energy storage systems, including batteries and capacitors. Components including busbars, terminals, and interconnects made from copper or aluminium are crucial for efficient energy transfer within storage systems. We can also offer customised battery prototyping and with rapid prototyping services which allows customers to quickly iterate and optimise their designs. This can be particularly valuable for emerging battery technologies such as solid-state batteries or flexible batteries.



## RESEARCH AND DEVELOPMENT

Collaborating with research institutions such as universities and start ups and technology developers, provides us with opportunities to innovate and develop new materials, processes, and designs tailored to renewable energy and electrification applications.

# WHO ARE WE?

We specialise in chemical etching and photochemical machining. Founded in 1968 and based in St. Neots, Cambridgeshire, UK, we have developed a strong reputation for our expertise in producing high-quality, intricate metal components. We hold several quality certifications, including ISO 9001, ISO 14001, and ISO 45001, highlighting our commitment to quality management and environmental standards.

We also have SC21 Bronze accreditation, reflecting our continuous improvement in supply chain processes. We pride ourselves on exceptional customer service, offering dedicated account managers to guide customers through the entire production process. This personalised approach ensures that customer requirements are thoroughly understood and met with the highest standards.

# WHAT DO WE DO?

## CHEMICAL ETCHING

We excel in chemical etching, which allows for the precise creation of complex metal parts with high accuracy and consistency. This process is ideal for manufacturing components like electrical contacts, encoder discs, filters, gaskets, and more. Our process offers burr-free and stress-free production, offering high temperature and corrosion resistance for the components.

## SHEET METAL FORMING & TOOLING MANUFACTURE

In addition to etching, we provide metal forming and tooling services. This includes prototyping, toolroom services, and finishing processes, enhancing their capability to deliver fully formed metal parts.

## RAPID PROTOTYPING AND HIGH-VOLUME PRODUCTION

We support both small-scale prototyping and high-volume production and our service is designed to be flexible, catering to different production needs while maintaining fast turnaround times.



# WHAT ARE THE KEY BENEFITS TO THE ETCHING PROCESS?

Chemical etching offers several key benefits:

## HIGH PRECISION

Chemical etching can achieve very high levels of precision, allowing us to produce intricate and complex metal parts with tight tolerances. This process does not compromise the structural integrity or composition of the metal parts because it operates at the surface level and does not involve heating or mechanical stress that could alter the material properties. Photochemical etching produces parts with uniform etch depth across the entire surface, ensuring consistent mechanical properties and surface finish. This uniformity is essential for applications where precise tolerances and mechanical performance are critical. This is crucial for components used in electrification systems, where precise dimensions and shapes are often required for optimal performance.

## BURR-FREE AND STRESS-FREE

Unlike traditional machining methods like milling or stamping, chemical etching produces parts without burrs or mechanical stresses. This results in clean, smooth edges and surfaces, which is essential for electrical contacts, connectors, and other sensitive components where burrs or stress can interfere with performance or reliability.

## MATERIAL FLEXIBILITY

Chemical etching can be used with a wide range of metals and alloys, including copper, aluminium, stainless steel, and exotic alloys. This versatility allows for the fabrication of parts tailored to the specific requirements of electrification applications, such as conductivity, corrosion resistance, or thermal properties.

## SCALABILITY AND COST-EFFECTIVENESS

Chemical etching is highly scalable, making it suitable for both prototyping and high-volume production. Additionally, the process is often more cost-effective than traditional machining methods for producing complex, low to medium volume parts, offering potential cost savings for manufacturers.

## DESIGN FLEXIBILITY

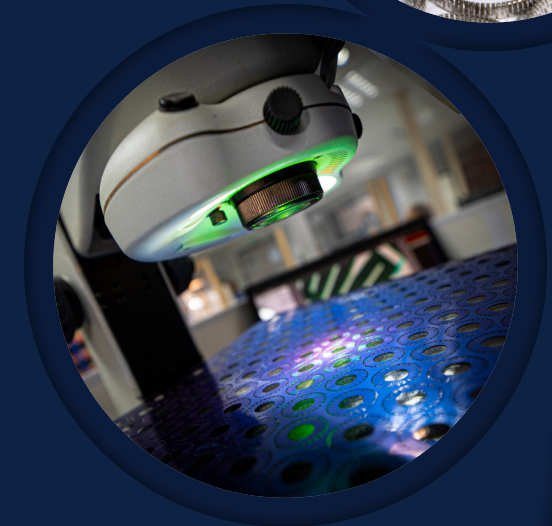
Chemical etching enables the fabrication of parts with intricate geometries, including features such as fine meshes, micro-holes, and channels. This design flexibility allows engineers to optimise component performance and functionality, leading to more efficient electrification systems. Rather than undergoing costly re-tooling for design alterations, changes can be seamlessly integrated with minimal lead time. This agility enables us to adapt swiftly to evolving requirements while maintaining peak efficiency and cost-effectiveness.

## ENVIRONMENTAL CONSIDERATION

Compared to some traditional machining processes, chemical etching is relatively environmentally friendly and produces minimal waste and does not require the use of large amounts of energy, aligning with sustainability goals in electrification and manufacturing. It combines precision, versatility and is relatively cost effective making it well-suited for fabricating the types of precision metal parts required.

## CAPABILITIES

We offer exceptional precision in component manufacturing, with tolerances reaching as tight as  $\pm 0.025\text{mm}$ . This level of accuracy ensures that components meet the most demanding specifications and requirements. We can work with material thicknesses ranging from 0.01mm to 1.5mm, providing flexibility in component design and application.



# WHAT PRODUCTS CAN WE SUPPLY INTO THIS SECTOR?



## WIND TURBINES

Gears, bearings, and shafts which are all essential for turbine performance.



## SOLAR MOUNTING SYSTEMS

Mounting brackets and other hardware using aluminium or steel.



## ELECTRIC VEHICLE COMPONENTS

Connectors, terminals and heat sinks which are essential for EV powertrains and charging systems.



## HYDROELECTRIC COMPONENTS

Turbine blades, penstocks, gates, and intake structures.



## SMART GRID TECHNOLOGIES

Metal enclosures with custom configurations to accommodate sensors, meters, relays, and communication devices.



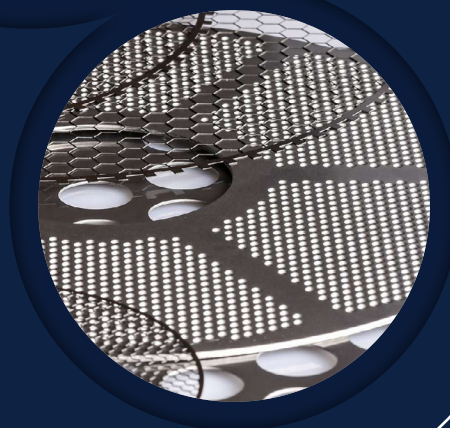
## FUEL CELL COMPONENTS

Proton exchange membranes (PEMs), gas diffusion layers (GDLs), and catalyst-coated membranes (CCMs).



## ENERGY STORAGE SYSTEMS

Metal enclosures and casings, busbars, terminals, and interconnects made from copper or aluminium are crucial for efficient energy transfer within storage systems.



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