

A photograph of a SpaceX Dragon capsule in orbit, viewed from a high angle. The capsule is white with "SPACEX" written on its side and is attached to a solar panel array. The background shows a brown, desert-like landscape with intricate patterns of erosion, and a blue ocean is visible at the bottom.

aerospace & defence

When safety and
performance are
at stake...

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innovators in chemical etching since 1970

tecan^o

aerospace & defence

Major technological advances in land, sea and air have increased demand for aerospace-grade metal components with dimensions and tolerances on the micro-scale.

This is one of the most demanding industries in terms of precision, accuracy, and safety. It requires the production of complex and intricate components that must be able to withstand extreme conditions such as high altitudes, extreme temperatures and pressures.

When safety and performance are at stake, nowhere are the following more critical:

- **high-level precision**
- **tight tolerances**
- **great strength**
- **light weight**
- **precision and accuracy**

The aerospace industry requires parts that are highly precise and accurate, with tight tolerances and complex geometries. Etching is a highly precise manufacturing process that can produce parts with extremely fine features and tight tolerances. The process can produce parts with an accuracy of up to +/- 10µm, making it an ideal choice for manufacturing aerospace components such as fuel nozzles, turbine blades, and engine components.

cost-effectiveness

The aerospace industry is also highly cost-sensitive, with manufacturers looking for ways to reduce costs without compromising quality. Etching is a cost-effective manufacturing process that can reduce production costs by up to 50% compared to traditional machining methods. This is because etching can produce highly complex parts in a single step, eliminating the need for multiple machining steps, reducing the number of tool changes, and minimising waste.

fast turnaround time

The aerospace industry is highly competitive, and manufacturers need to produce parts quickly to stay ahead of the competition. Etching is a fast-manufacturing process that can produce parts in a matter of hours, compared to days or weeks required for traditional machining methods. This is because etching does not require any special tooling or fixturing, and parts can be quickly produced using digital designs.

versatility

The aerospace industry requires a wide range of components, each with unique geometries, materials, and tolerances. Etching is a highly versatile manufacturing process that can produce parts from a wide range of materials, including stainless steel, copper, and nickel alloys. The process can also produce parts with a wide range of geometries, including complex shapes, deep cavities, and thin walls, making it an ideal choice for producing a variety of aerospace components.

improved material properties

Chemical etching can also improve the material properties of aerospace components, making them more durable and resistant to extreme conditions. The process can remove surface imperfections, such as cracks, porosity, and impurities, improving the mechanical properties of the metal. Etching can also improve the surface finish of the metal, reducing the risk of corrosion and improving the aerodynamic performance of the components. The process enables the production of lightweight components, reducing the overall weight of systems without compromising their strength or durability.

related products

heat exchangers

Heat exchangers transfer heat from one liquid or gas to another without them mixing. They typically consist of a number of thin metal plates with complex channels that the liquid or gas flows between. Plate heat exchangers are often etched as it is an efficient way to produce large volumes of channels and can be diffusion bonded to create a block.

By using photo chemical etching, we can produce complex designs, with a precision of $\pm 25\mu\text{m}$ and with a low tooling cost. The process significantly reduces limitations on channels, ridgetops, headers, collectors and port features. Etching removes mechanical or thermal stress and leaves no compound planarity. Almost any metal can be used, even highly corrosion-resistant ones.

contact springs

Tension springs join two components and bring them together when they try to detach. High-tension springs absorb and store energy, and when tension is applied, create a resistance to counter the pulling force.

Chemical etching has the perfect manufacturing capabilities for producing springs, flexures or diaphragms as it produces flat and stress-free components.

lead frames

Semiconductors are attached to these thin layers of metal frame as part of the package assembly process. Quality is essential: any tiny defect seriously affects the performance and reliability of the resulting insulated circuit device.

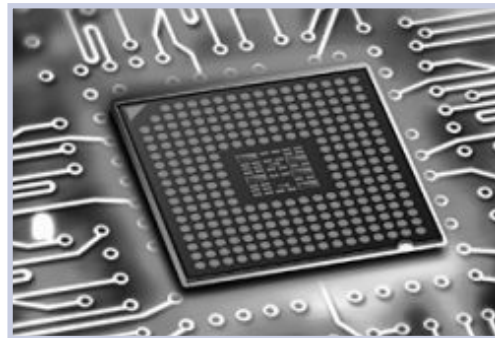
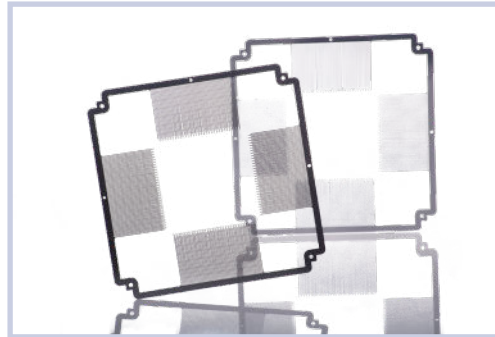
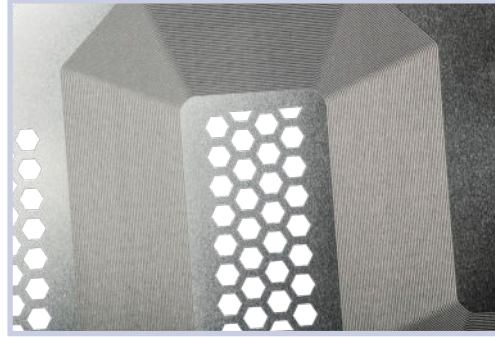
As semiconductor processes and design technologies become increasingly sophisticated, there is an ongoing demand for more complex, smaller and thinner assembly solutions. For precision-engineered components, we advocate the chemical etching process in order to achieve a high level of accuracy, ultra-fine tolerances and a reduction in production lead time.

electrical connectors and contacts

Custom electrical connectors and contacts manufactured by Tecan include microwave antennae and spring finger contacts used on circuit boards.

Chemical etching allows for:

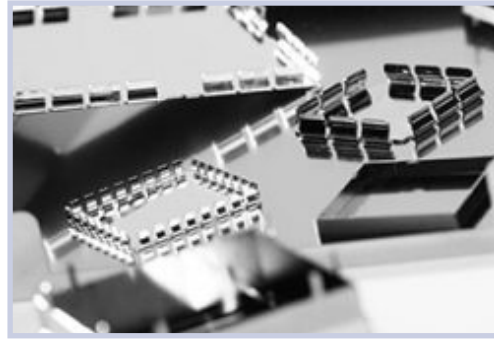
- **burr-free, stress-free, ultra-smooth surface**
- **quick and simple prototyping**
- **wide range of materials**
- **fast manufacture**
- **precision to $\pm 25\mu\text{m}$**



RFI/EMC shielding

EMC / RFI shielding is necessary to avoid any interference from electromagnetic signals. Used across electronics, telecommunications, automotive control, avionics and more, shielding gaskets are vitally important in many critical applications.

We provide standard and bespoke RFI and EMC shields and shielding solutions to meet the very latest Electromagnetic Compatibility (EMC) directives. A full range of products is available from off-the-shelf standard cans through to complex multi-cavity labyrinths.



washers, shims, spacers

Tecan provides customised precision washers, shims and spacers according to every specific application requirement. With precision chemical etching, ultra-precision products are achievable with burr free, stress free finishing.

They are indispensable parts of many industrial applications and assemblies. Common forms include thrust washers, fasteners, precision compression, piston and cylinder rings, etc. Accuracy of geometries and lifetime duration are major quality features of the product.



about Tecan

Established to serve the growing demand for fine-featured, flat profile precision metal parts, Tecan works with cutting edge organisations to co-develop innovative products and bring them quickly to market. Operating from a purpose-built facility, Tecan's capability also includes precision component forming and high-quality metal finishing.

Tecan pioneered the use of photo chemical machining (etching) – an innovative, photolithography-based process that was developed as an off-shoot from the manufacture of printed circuit boards. We also use this expertise in conjunction with other precision manufacturing processes to develop and produce bespoke solutions across a variety of metals which not only deliver critical features that a single process cannot achieve in isolation, but also maximise cost effectiveness and technical capabilities.

Part of the global Muon organisation, which sits within the Health & Science Technologies division of IDEX Corporation, Tecan has seen significant investment in plant and technology over the past few years – strengthening its position as one of the World's leading precision etching experts.