

**PHOTO CHEMICAL
MILLING**

ON CUSTOMER DEMAND

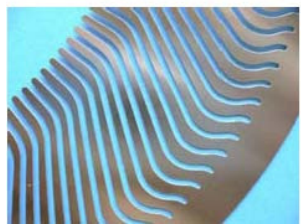
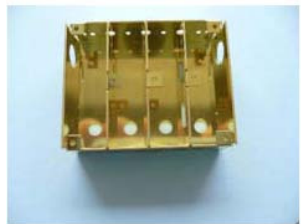
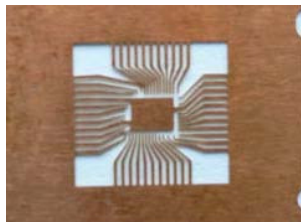


Photo chemical machining vs traditional technologies: major benefits:

- very low tooling costs
- highest flexibility: cost is not dependent on complexity
- very high precision, tolerances as low as +/-0,015mm
- wide range of thicknesses, from 0,02mm to 2mm
- no effect on the molecular structure of the metal: components are burr free while temper and magnetic properties remain unchanged; no strains or stresses are generated by this process.
- Very short delivery time in the order of days
- Competitive costs both for prototyping and for medium/high productions

Techniques such as half-etched bend lines facilitate complex hand forming of parts, saving the cost of hard tooling. Integrated marking reduces handling and cost.. This feature is particularly useful to build EMI/RFI shielding

On Customer request Chemical Machining S.p.A. is able to supply a complete service which includes galvanic surface treatment, painting, Teflon coating, PVD etc. It is also possible to offer bending, forming and assembly of complete subsystems.

**LEADER IN PHOTO CHEMICAL MILLING AND LASER CUTTING SERVICES, WE BUILD
PRECISION METAL PARTS FROM CUSTOMER'S DESIGN SUITED FOR VIRTUALLY
EVERY MARKET SEGMENT**

GROUP
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PHOTO CHEMICAL MILLING

The process



The production of Chemical Machining follows an optimized process well proven over 35 years of leadership in the Italian market.

The Customer submits a design (in any form or shape, but a dwg or dxf file is preferred) together with all relevant information including which is the target market of the finished product. The Technical Office evaluates the feasibility i.e. the applicability of photochemical milling to the particular project and supplies all the cost information to the Sales Office which will prepare the offer to the Customer.

When the Customer releases the order a photo tool will be generated by proper CAD software, and the negative of the shape of the part is impressed by light exposure on a thin photosensitive film which is attached to both sides of a metal sheet.

The metal sheet which now contains the negative image of the part on both sides is then developed in a special machine, by which the film polymerizes in the zones that have not been exposed to light.

Then the sheet is ready to enter into the etching machine where a special acid will etch the zones that are polymerized; a sheet may contain several replicated parts which remain attached to the sheet by means of small tie-ins or tabs.

After that the remaining film is stripped away and the parts are ready to be delivered to the Customer.

Chemical Machining can provide on demand a complete service by which includes all finishing processes like galvanic treatments, painting, tefloning, sieving, bending, forming etc

Lot of application areas

Photo Chemical milling is basically a 2D technology: all pieces are developed on a plane. This may become a limitation in the mind of a designer who does not see immediately how to develop a 3D object on a plane. This is the reason why a very close communication is necessary between the designer and our technical staff in order to exploit all the potential of this technology. To that end Chemical Machining regularly organizes technical workshops at its premises in order to allow its Customers to take full advantage of this technology.

In fact, although the production is mainly on 2D objects, three-dimensional parts can be achieved as well and is possible on almost every material with the exception of noble metals like gold, titanium, molybdenum and a few others who have an extremely high resistance to the etching process.

Photo chemical milling is well suited to several applications, that range from models to gobos, to precision mechanics, to stencils, to fashion accessories: the complete list would be too long and is limited only by the fantasy of the designer. Generally speaking this technology is particularly convenient on thicknesses are between 0,02 and 2 mm. when geometries are very complex, tolerances are very tight, and time to prototyping and production is short. It is also possible to achieve full and half etching on the same part, creating many different effects and functionalities.

Last but not least it has to be remembered that the cost of tooling is order of magnitudes lower than competing technology and is largely independent on product complexity

Market segments

We briefly recall some of the market segments where photo chemical milling is employed more successfully:

Precision Mechanics - Electronics - Telecom - Automotive - Space and Military - Medical Equipment -Textile - Glasses - Lighting - Springs - Electric Engines - Instrumentation - Ornamental - Fashion accessories - Research Labs