

High accuracy, high intricacy component solutions

Photo-Chemical Machining – an alternative to conventional machining

Photo-chemical machining, using acid to remove metal is a technique believed to have been pioneered by the Egyptians 4000 years ago. Today, the combination of modern computer-aided design and a photo-sensitive mask enables Attewell to produce highly-accurate and intricate components used in a very wide range of systems applications. The technique is particularly attractive for use in electronics, filtration, aerospace and defence.

Minute holes and radii, at a pitch that would make conventional processes uneconomic, can be produced without inducing burrs or stresses in the material. In addition, to gain maximum yield from a standard sheet 450mm x 300mm (18" x 12") and depending on size, a large number of components can be produced simultaneously. The best use of the material can also be obtained by intelligent 'nesting' of similar parts.

Tooling costs are low, resulting in cost-effective solutions for prototype development of thin sheet details. A wide range of metals can be etched from stainless steel to brass 0.127mm (0.005") to 1.6mm (0.063") thick.

The Photo-Chemical Machining Process

After ensuring that the metal to be etched is clean, it is coated with a polymer resin-based photo-sensitive resist. The coated sheet is then exposed to ultra-violet light through the photomaster created by the CAD system from both sides, hardening the photo-resist where exposure takes place.

The unexposed areas are chemically developed away removing the resist, leaving the bare metal where etching will occur. Etching solution is sprayed at pressure to the top and bottom surfaces, removing the unwanted metal very accurately and producing the component. The remaining resist is then removed from the sheet of components.

Materials Processed

- Aluminium
- Beryllium Copper
- Brass
- Copper
- Mild Steel
- Super Alloys, including: Jetfire, Waspalloy, Haynes, Rene, and some Hastelloys such as Inconel and Incalloy
- Phosphor Bronze
- Nickel
- Spring Steel
- Stainless Steel

Forming

Attewell has a range of equipment to carry out forming of a number of etched products.

Surface treatments

Attewell has partnerships with a number of treatment houses catering for aerospace or commercial applications.



TECHNOLOGY-DRIVEN COMPONENT AND ASSEMBLY SOLUTIONS FOR AEROSPACE AND INDUSTRY

Typical products manufactured using Photo-Chemical Machining

- Shims
 - RFI Screening Products
 - Lead Frames
 - Contacts
 - Screens
 - Radial & Axial Springs
 - Valve Plates
 - Heat Sinks
 - Solder Paste Masks
 - Watch Parts
 - Encoder Discs
 - Filtration Products
 - Iris Leaves and Graticules
- ...any many more

Achievable Tolerances

Metal Thickness mm	0.025	0.125	0.250	0.500	1.000
Dimensional Accuracy +/-	0.010	0.015	0.025	0.050	0.100
Minimum Hole Size	0.040	0.175	0.375	0.750	1.500
Minimum Corner Radii	0.025	0.125	0.250	0.500	1.000

Positional

Pitch	25	125	250	500	1000
Accuracy +/-	0.012	0.025	0.050	0.075	0.10

Benefits of Photo-Chemical Machining

Low-cost tooling

Since the main 'tool' for PCM is a CAD drawing, the costs are relatively low and, furthermore, can be produced quickly. Drawings can be accepted electronically via e-mail in the following formats: IGES; DXF and DWG.

Low-cost modifications

Modifications to the requirement can be accommodated relatively easily and with little costs. Small batch sizes can be economically produced.

From prototype to production

Whether just one or a large number of parts, the same tooling can be used every time. This allows the engineer or designer to develop concepts from prototype and pilot to full production with relative ease.

Metal properties

PCM carries the unique advantages of leaving the hardness, grain structure and ductility of the metal unchanged.

Burr free

The PCM process produces burr-free components, thus removing the need for costly time-consuming de-burring.

Identification marks

Company logos, part numbers and other identifying marks can be etched into the surface during manufacture at no extra cost.

Precision and Intricacy

Very precise and intricate components can be produced that would confound other manufacturing processes.



Attewell Limited

4 Southbridge Way, Southall, Middlesex UB2 4BY, UK

Tele: +44 (0) 870 777 4210

Fax: +44 (0) 870 777 4211

Email: sales@hampsongroup.com

Web: www.attewell.co.uk



professionalism
commitment excellence



www.hampsongroup.com