

NW ETCH

PRECISION PHOTO CHEMICAL MACHINING



CAPABILITIES STATEMENT



NW Etch
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Preview Our Photo Chemical
Machining Process Here:
<https://www.nwetch.com>

- **ISO 9001:2008 Certified**
- **ITAR Registered**
- **WA State UBI: 600 263 288**
- **DUNS: 03-852-6026**
- **NAICS: 332 812**
- **CAGE Code: 1LXB3**
- Since 1978, family owned & operated small business.
- 35 full time employees, offering over 178 years of experience.
- 22,400 sq. ft. facility
- Able to process 5' wide materials, .0005" to .060" thick
- Working in stainless steel, spring steel, electrical steel, aluminum, brass, bronze, beryllium copper, copper alloys, inconel 600 & 750, nickel, nickel-silver, nickel alloys and phosphor bronze

Summary of Services: NW Etch is the alternative machining method for flat, thin metal parts of complex design when other machining methods won't suffice. For burr-free & oil free parts without discoloration, warping or structural changes to the metal, our photo chemical machining results will impress with clarity and precision not found elsewhere, at a competitive price.

Core Competencies Include:

- **Ideal for R&D:** Minimized time loss and expense for design revisions
- **Low cost tooling:** Typically \$200 for tooling that will not wear out vs capital expenditure of \$5K-\$10K+ for "hard" tooling costs with a limited lifetime
- **No Incremental Costs:** Complexity of design does not incrementally increase tooling costs or production time for part
- **Up to 60" wide** metal sheet etching capabilities.
- **Prototype-to-production** variations eliminated
- **Efficient:** Single Pass Production of 1 to one million components.
- **Parts with Intricate Geometries:** Ideal for photo chemical etching process

Areas of Expertise:

- Able to incorporate bend lines/bend reliefs/and score reliefs within design features to enhance productivity and maximize storage space
- Engineering support ensures fit of form & function
- CAD/in-house plotting and tooling
- Metal preparation, including lamination, exposure, developing, etching, stripping and inspection, including digital OGP
- Forming, plating, powder coating, and heat treating services available
- NW Etch built the industry's first waste water recycling system, utilizing the latest ion exchange technology in our closed loop system. Our filtered water is better quality than what we receive from the city.

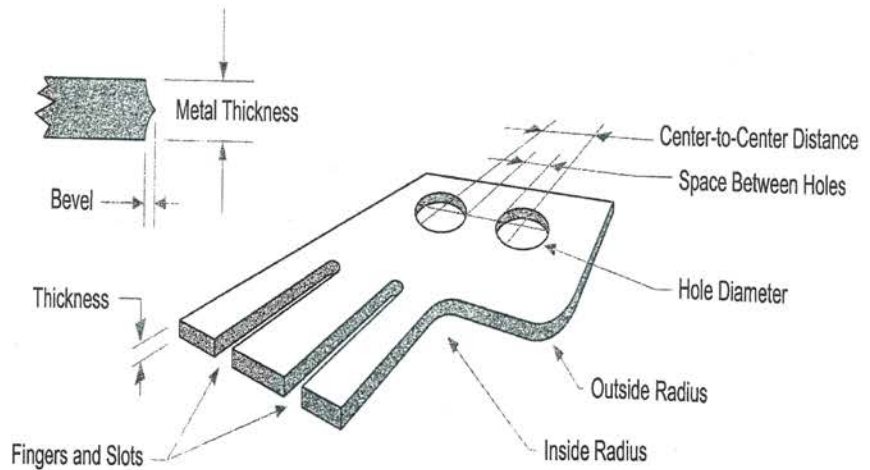
Did you know photo chemical machining methods require less electricity than other machining methods?

Current & Past Department of Defense Performance Includes:

Battelle	Boeing	General Dynamics
Jet Propulsion Lab	Los Alamos National Lab	NASA
Northrop Grumman	Parker Hannifin Corp	PPG Industries Inc
Raisbeck Engineering	Raytheon	Rockwell Collins
Sierracin Corp	Sikorsky	

Awards:

- **Northrop Grumman:**
Award for Exceeding Client Expectations throughout ten year B-2 project
- **Rockwell International - Space Transportation Division:**
Exceptional Company Performance Award
- **Pacific Northwest Defense Coalition's** "Ally of the Year" 2016



TYPICAL CHEMICALLY ETCHED PART DESIGN CONSIDERATIONS

In Photo Chemical Machining (PCM), a designer should consider three attributes regarding repeatable etching process tolerances and dimensions: metal thickness, metal type and part size. Following are basic PCM guidelines that may vary depending upon the sheet material used.

In general: Features are designed to 1.5 times material thickness. For example, 0.010" material can incorporate through-etched features of 0.015". The smallest feature should be 1.5 times material thickness. One must also consider the following:

Correlation of hole-size to metal thickness: Hole diameters cannot be less than the metal thickness, though this can vary with the metal material. For example, at $\geq .005"$, the smallest diameter obtainable is $\geq 110\%$ of the metal thickness. This is the tightest ratio obtainable under ideal conditions, but at very high cost. Most product design features will not require this ratio, and can be produced more cost effectively with wider ranges.

Line width, metal thickness, and remaining surface area: Large field of slots or holes has limitations of metal widths between holes, and depends on material thickness. Hole spacing must be at least the metal thickness when the metal $< 0.005"$ and can be at least 125% of metal thickness when the metal is $> 0.005"$.

Relationship of inside corners to metal thickness: Directly proportional to metal thickness. The smallest corner radius would be 0.002" for metal 0.002" thick.

Proportion of outside corners to metal thickness: Should be \geq two-thirds metal thickness. Outside corners etch more sharply than inside ones. Therefore, radii of less than metal thickness are possible.

Dependence of bevel to metal thickness: When etching one metal side, the etchant attacks the material laterally and vertically. The resulting bevel is barely perceivable to 0.015" depth etching. When material is etched equally from both sides, the bevel is appreciably reduced, resulting in a chevron.

Tolerances of PCM products: Depends on material type, panel size, equipment and required yield. Typically, a tolerance of $\pm 10\%$ of metal thickness is achieved with PCM, to a limit of $\pm 0.001"$.

The above guidelines are very general. For more specific dimension and tolerance information, along with design advice, call NW Etch at 800-343-2401. Design, alloys and component requirements will guide us to best specifications. We may even be able to exceed expectations.

NW Etch has its own in-house CAD staff that can generate both tooling and blueprints from DXF data files. Tooling is very reasonably priced, with design revisions incurring minimal time loss and expense.