

## RECOMMENDED ETCHING PROCEDURES/SOLUTIONS

These recommended procedures and solutions were compiled from a variety of industry sources and are offered as suggested ways to etch beryllium, but no guarantee or warranty is implied. Etching is performed on machined beryllium surfaces in order to remove the machine damaged layer of material, twinned grain structures, which typically is .002" to .005" deep. Etching is performed typically prior to the final machining of critical dimensions. A typical process flow on producing machined beryllium components is as follows; rough machine to within .025/.035 per surface of final dimensions, stress relieve by heating to 1450 F in a vacuum or inert atmosphere, semi-finish machine to within .003" to .008", etch and finish machine.

<u>Material</u>	<u>Volume (Percent)</u>
Nitric Acid (39 Baume)	25 ± 2
Hydrofluoric Acid (60%)	0.25 to 1.0
De-ionized or Distilled Water	Balance
Nitric Acid	48.0
Hydrofluoric Acid	2.0
De-ionized or Distilled Water	Balance
Hydrofluoric Acid (48% Reagent Grade)	2.0
Nitric Acid (70-71% Reagent Grade)	2.0
Sulfuric Acid (96% Reagent Grade)	2.0
Tap Water	Balance
Chromic Acid (Dry Technical Grade)	17 ± 0.5 oz/gal.
Phosphoric Acid (75% Technical Grade)	75 ± 3 volume percent
Sulfuric Acid (95 to 96.7% Reagent Grade)	15 ± 1 volume percent
Deionized or Distilled Water	10 ± 1 volume percent

### General Process

1. Heat solution to 75±F up to 100±F.
2. Clean parts before etching.
3. During etching agitate parts to allow free circulation of the etching and to minimize gas entrapment.
4. Rinse parts in de-ionized or distilled water.
5. Blow dry with clean warm air or dry nitrogen.
6. Handle etched parts with clean, lint-free gloves to avoid fingerprint and other stains.