

Safety

An independent occupational safety and health laboratory conducted a safety evaluation of **Multi-etch**. Their evaluation states that "the mixture, if handled properly, is not a highly dangerous solution." **Multi-Etch** contains no acid. However, it is poisonous and must be treated with appropriate safeguards (a fume hood or outdoor use, rubber gloves, safety glasses and your full attention). The safety evaluation suggests that you may flush the spent solution down the drain using copious amounts of water (Check local regulations.) **Not for disposal in septic systems!** It is your responsibility to follow all federal, state and local disposal procedures.

Avoid contact with clothing & aluminum, check glassware periodically for wear--excessive frosting indicates weakened glass.

This solution is a strong oxidizer(bleach) and should not be used around aluminum or metal shavings, turnings or powders. Protect clothing from contact. It is the responsibility of the user to read and understand all directions and safeguards. Failure to do so could result in injury. **Your full attention is required when using this product.** MSDS available by request.

Emergency and First Aid Procedures: 24hr Emergency Assistance- 800/451-8346

In case of eye contact: immediately flush eyes with lots of running water for 15 minutes, lifting the upper and lower eyelids occasionally. Get immediate medical aid.



In case of skin contact:- remove contaminated clothing and shoes and wash later before reuse. Immediately wash affected area with soap or mild detergent and lots of running water until no evidence of chemical remains (approximately 15-60 minutes). Get immediate medical aid.



In case of ingestion: if conscious, immediately induce vomiting by giving 2 glasses of water and sticking a finger down the throat. Get immediate medical aid. Do not give anything by mouth to an unconscious or convulsing person.

In case of inhalation, remove to fresh air. Give artificial respiration if not breathing. Get immediate medical aid.

Precautions for Safe Handling and Use

Spill Procedures -- Do not touch spilled material. Wear rubber gloves, rubber boots, rubber apron, chemical goggles and respiratory protection. Stop leak if you can do it without risk. Neutralize with agricultural lime, slaked lime, crushed limestone, or sodium bicarbonate. For small spills, take up with sand or other absorbent material and place into DOT-approved containers. For large spills, neutralize and shovel into DOT waste containers. Comply with all governmental regulations on spill reporting.

Waste Disposal Method -- Dispose of in a manner approved for this material. Consult appropriate Federal, State, and local regulatory agencies to ascertain proper disposal procedures.

Precautions to Be Taken in Handling and Storing -- Store in a cool, dry, well-ventilated place away from incompatible materials. Protect eyes, skin and clothing. Wash thoroughly after handling. Keep out of reach of children.

Other Precautions -- Contact lenses may contribute to the severity of an eye injury. Empty containers may still contain residues and are subject to proper waste disposal.

Equipment

1. A fume hood with an exhaust fan is required for etching indoors. A diagram of suitable set-up is pictured here. Make sure there is enough clearance between the heated solution and the fume hood to dip and remove your work.

2. A pickle pot (**NOT** a crock pot) **or all of the following:**

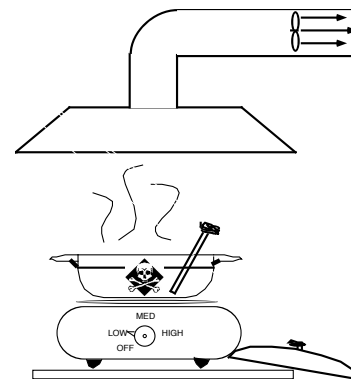
- Hot plate
- A metal grill as a heat diffuser between the hot plate and the container.
- A metal pan to float a plastic bowl containing Multi-Etch for double boiler system.

3. **Distilled water** is highly recommended for mixing the solution and for storing the etched and rinsed pieces.

4. Probe-type thermometer with a range up to 210° F.

5. A high density polyethylene container with lid to mix up and hold solution (provided with single order). The capacity should be 1 gallon or more. Metal containers should not be used to hold Multi-Etch. Glass containers should not be used to store Multi-Etch.

6. Plastic stirrer, plastic strainers or baskets for bulk etching.



If food storage containers and utensils are used they must be clearly marked as poison and stored away from food and out of children's reach.



Titanium

Multi-Etch was developed as a safer alternative to hydrofluoric acid for cleaning titanium prior to anodizing. To obtain the brightest colors, the solution must be heated to a range of 120 to 180°F. At 140 to 160°F, a three second dip is sufficient to produce brilliant colors on titanium. A pickle pot common to the jewelry trade will usually maintain the proper temperature, or you can use a hot plate, thermometer and Pyrex containers. **Multi-Etch** will work at room temperature if you are seeking pastel colors. **Etch times can vary greatly. Test the metals you are working with for proper temperature and etch time.** Recent investigations indicate that equal results can be obtained with cooler temperatures and longer times.

Other Metals

Multi-Etch will clean and etch copper, brass, pewter, zirconium, 01 tool steel, and some Mokume-Gane combinations. It will **not** etch gold, palladium, or platinum. **Multi-Etch** attacks sterling very slowly, but may remove shallow fire scale. It will strip oxides from most metals. It provides a very clean slow etch on copper at room temperatures. The temperature that you use will control how fast the solution works on any particular metal. There are too many variables for guidance in these uses. It is suggested that you test a small sample of any metal you wish to etch.

Never etch aluminum!

Resists

Multi-Etch will work with many resists. When etching designs into metals, the resist may need to withstand temperatures of 120-180°F. The temperature of the bath will control the rate of metal removal. Anodizer's tape, plater's tape, finger nail polish and many commercial resists can be used.

Other Features

A useful feature of **Multi-Etch** is its application as an "ERASER" for anodized titanium and niobium. Anodizing mistakes can be removed in as little as ten seconds. Residual oxides on niobium that cause uneven anodizing can also be removed. In most cases the surface texture on titanium or niobium can be maintained during cleaning. However, surface treatments will be removed with longer etching times and repeated processing. Minimize etch times to preserve polished surfaces.

Lifespan

The lifespan of **Multi-Etch** depends on what you are using it for and with which metals. One gallon of Multi-Etch will clean approximately 1,500 square inches of titanium (etching time approximately 3 seconds at 160°F). The powder has a long shelf life, but once it has been mixed with water, it will begin to slowly decompose. Life of the unheated liquid is at least 6 months. Dispense the solution in quantities as needed. Do not mix used solution with new uncontaminated **Multi-Etch**. Decomposition is hastened when the solution is heated. So, as a production tip, lay out as much metal as is feasible to etch in one session.

Procedures for etching titanium

Note: Clean and degrease metals before etching.

All etching times are approximate. The times can vary according to the grade (chemical composition) of the metal, temperature of the solution, age of the solution (including how long it has been heated), and the desired effect. **Multi-Etch** can maintain whatever texture you have applied to titanium during short, hot dips. Longer etching times and repeated etchings will remove the surface finish and texture. The deep bite possible with acid solutions is not possible.

1. Setup and mixing In a ventilated area put on all safety equipment ie. rubber gloves, safety glasses etc.

Fill the **Multi-Etch** container to about one half with distilled water. Close tightly and while holding the lid in place shake the bottle vigorously. Continue to fill the bottle to within a couple of inches of the top. All of the powder will not dissolve immediately. For best results the solution should sit over night.

If you can't stand to wait, shake the bottle again so all the powder is in suspension and pour off what you need. Close the container and store in a safe location.

NOTE: You must use the complete amount of powder in the bottle. Do not attempt to measure out smaller portions.

2. Heating Turn on the exhaust fan. If there is undissolved powder, shake or stir the holding bottle. When the powder is completely suspended, pour the necessary amount into a plastic container in which you will heat the solution. Heat only as much solution as you think you'll need for one session; more solution can be added as needed upon evaporation. Heat to 160-180°F and maintain that temperature until you have finished etching. Higher temperature will shorten the effective life of the solution. A standard jewelry pickle pot automatically maintains the correct temperature.

3. Etching Submerge the titanium into the heated solution and count three seconds (One thousand one— one thousand two— one thousand three.) while moving the metal. Remove the piece, rinse immediately in distilled water and store in distilled water until you are finished processing. Remove the bath from the heat, cool, cover tightly and store properly.

If the titanium is very dirty and you want it textured, e.g., sand blasted, scratched or scored, it is best to do two etching sessions. First clean and then etch for 10 seconds to remove surface oxides, texture the metal, and then etch a second time for 3 seconds. Always rinse immediately in distilled water and store as above. It is best not to mix metals in a bath of Multi-Etch. The effectiveness of the solution will be diminished.

5. Disposal It is your responsibility to follow all federal, state and local disposal procedures.

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