

**PROCEDURE for SULFURIC ACID BOIL to REMOVE ORGANIC  
CONTAMINANTS from FUSED QUARTZ**

**Equipment:** Exhausted Wet Bench  
Chemical safety goggles or face shield  
Chemical Apron  
Chemical Gloves  
Arm Guards  
Hotplate  
Dump Rinser  
Beaker, 600 ml, Pyrex  
Reflux Condenser made from Pyrex round bottom boiling flask, 500 ml.  
Teflon housing fixture, DKG1002, DKG1004, DKG1005  
Teflon basket  
Lab Stand

**Materials:** Sulfuric acid, concentrated 18.0M

**Safety precautions:**

**Note that sulfuric acid is very hazardous, always wear chemical goggles or face shield, chemical apron, arm guards, and chemical gloves over clean room gloves. Hot sulfuric acid is very reactive, keep away from flammable materials, metals, and water. All containers should be clearly labeled before placing sulfuric acid solutions in them. Any spills or droplets should be immediately cleaned up.**

**Preparation:** Attach reflux condenser to water lines in general purpose acid wet bench. Mount condenser to stand over hotplate. Start a low flow (approx. 100 ml/min) of water through condenser. Verify flow exists and be sure condenser does not leak.

Place quartz part to be cleaned in teflon holder or basket which ever is appropriate and will permit covering the part with the minimum amount of acid.

Place holder or basket in 600 ml beaker. **Don full protective gear.** Pour sufficient sulfuric acid into beaker to cover part. Return sulfuric acid bottle to storage.

Place beaker with part on hotplate and lower condenser against top of beaker.

**Etching:** Turn on hotplate to about 3-4. Allow acid to heat until white fumes are observed. Takes about 25-30 minutes. Once fumes are observed, allow 15 minutes at this temperature.

After part has soaked at high temperature, turn off hotplate and allow sulfuric acid to cool. Allow a minimum of 1 hour for acid to cool.

Fill second beaker with DI water to a level high enough to cover the part and basket or holder.

Once acid has cooled to less than 30 C the part can be removed from the acid. **Be sure to wear full safety gear whenever approaching or handling acid.** Remove beaker with acid and part from hotplate and place on wet bench surface. Slowly lift basket from acid, allowing acid to drain from part back into beaker. Place basket in second beaker and place this beaker in the sink.

Verify that acid is below 30 C. If acid is cool pour into used sulfuric acid container. Allow as much acid to drain from the beaker as is possible. Return used sulfuric acid container to storage. Be sure container is properly labeled.

Remove part in holder or basket from beaker with DI water and place in dump rinser. Pour DI water into beaker from which acid was drained and place the empty beaker into the dump rinser. Run dump rinser.

When dump rinser has finished its cycle, remove part. Dry part or proceed to aqueous clean as appropriate.

**Shutdown:** Pour contaminated rinse water from beaker into waste container labeled DILUTE SULFURIC ACID WASTE. Place this beaker into the dump rinser and run dump rinser. Return waste container to storage.

Shut off cooling water to condenser, remove condenser and rinse. Return condenser to storage.

Verify hotplate is off. Wipe down hotplate surface, hotplate well and lab stand with lint free paper wetted with DI water.