Faceting Instrument Maintenance, Tips & Tricks

I can't emphasize enough the importance of keeping the faceting instrument clean - which is a bit odd, given that faceting generates splashing water and swarf (ground-up gemstone), and uses various abrasive powders.

All of the grinding compounds, polish, and by-products of our work are highly abrasive - therefore highly destructive to the instrument we are using. Every bit of water from the lap, no matter how clear it looks, will contain very aggressive abrasive materials that will slowly destroy your faceting instrument. The cleaner you keep it the slower that process will be.

Here are my top tricks for preserving your equipment investment by slowing the inevitable erosion of your instrument through abrasive wear - and a few extra tips to save time and aggravation:

1. Level working surface.
2. NEVER move an instrument with the mast and head mounted.
3. Wax your deck.
4. Use "mast condoms" or wraps to protect your mast (& lead screw).
5. Use O-rings to protect your quill.
6. Use hand towels / shop cloths for your base.
7. Paper towels / Tissues for cleaning between steps & stones.
8. Good habits of instrument handling: two hands & a light touch.
9. Rubber band auto head-locker (for Facetron)
10. DIY splash pan claw (for Facetron).
11. Spill-proof Swarf-catcher to protect your carpet and lungs.
12. Spray control sponge.

Car wax for your Deck: Put good quality car wax on your instrument Deck - especially under your mast area, under your splash bowl, etc. This helps protect the Deck plate from harsh chemistry in some swarf solutions as well as creating a slight shield against abrasive particles. Of those that don't wash off, many will be trapped in the wax itself - which you should clean and replace between messy grinding steps. I use a little Windex or similar cleaner for cleaning, and keep a think layer of wax on my instrument Deck.

"Mast condoms" or Wraps: You may notice that your dentist uses polyethylene sleeves and baggies to protect various parts of his equipment from the inevitable splatter and mist created during his work. Faceting also causes mist and splatter - especially during more aggressive pre-forming and cutting steps. So, I use a similar strategy to protect my instruments from swarf splatter and polish contamination.

I buy 3-inch by 4-mil thick polyethylene sleeve and cut into 10-inch lengths - which I put over the mast both beneath and above the faceting head. This "mast condom" tends to accordion as the faceting head is raised and lowered, protecting especially the lowest portion of the aluminum mast core where there is a bearing surface with the outer mast. This area of the Facetron is especially vulnerable to wear from contamination. The "condom" also protects the head itself from swarf particles that can accumulate on the mast and get carried into the head galley (the hole the mast goes through). I use a second "condom" to protect the mast above the head whenever cutting higher angles (when more mast is exposed there).

You can buy the poly sleeve in 1,000 foot rolls, or you can use lightweight poly bags that you can buy in bulk and knock the bottoms out of them. For instruments with wider masts and lead screws, like the Ultra Tec or Polymetric, I use cheap You can open these at the zipper and rejoin after wrapping around the mast.

I've also used "snack-sized" ziploc baggies with the ends cut out - or tissues or paper towels held together with clamp-style paperclips. These all have the advantage also of working with other faceting instruments like the Ultra Tec or Polymetric - that have wider masts and exposed lead screws that are difficult to clean.

O-rings for your dops: During the faceting process, you're going to repeatedly raise the stone to look at it. When you do, water (containing swarf) can run from your hand and stone down the dop - and into the quill. This introduces abrasive material into a precision system. And, that abrasive material, when it dries, will form a hard concretion, inhibiting function, disturbing precision, and grinding away at surfaces every time you move things. The solution to this issue is a handful of hardware store O-rings. Find some that fit very snugly on your dops and install them snug against the front of the quill when you insert the dop, to end most quill problems.

Hand towels / shop cloths for your base: Remember that the Deck where the Base of your mast mates to it is a precision bearing surface. Dropping dops, stones, tools, etc on that surface can dent it, ruining instrument alignment in a way that can only be solved by replacing the Deck. So, I always keep shop rags or hand towels on this area, except when carefully moving the mast.

Also, during faceting - especially preforming and girdle work - you'll generate spray and splatter that will settle and drip onto the base of your instrument. The lightweight towels or shop rags protecting my Deck from dropped tools also capture much of the abrasive-carrying liquid, preventing it seeping into places it could cause wear. This also minimizes coarse chips of stone getting under the foot of the mast and causing damage.

Paper towels / Tissues for cleaning between steps & stones: Remember that any water you see on the instrument is absolutely carrying abrasive particles, and consistently wipe the instrument dry to reduce the amount of that abrasive material in your fittings, bearings, controls, and on working surfaces. I like to use a paper towel or a few tissues between steps or any time I see the need, as rags will tend to retain fine abrasive particles even after washing. A clean instrument maintains tolerances and lasts much longer!

Good habits of instrument handling: Careful instrument-handling practices can make your work faster, easier, and more enjoyable. It can also save you some serious aggravation and expenses. Here are some of the most important instrument-handling tips and practices.

Keep rags or hand towels on your Deck. And, use two hands whenever handling instrument or parts or tools - especially anything above the instrument, where dropping could dent the Deck, the Platen, or the lap. For efficiency the Facetron head is designed to move rapidly (no lead screw).

Always use two hands whenever adjusting your head, and minding the position of the quill relative to the Deck, Platen, or Lap. Dropping a heavy or hard object on your base plate can dent it, ruining precision.

Use a light touch whenever making adjustments. Faceting instruments are delicate precision instruments, not heavy machinery. Most of the knobs, screws, and bolts are meant to be set finger-snug and not tightened harshly. In many cases, heavy-handed treatment will damage the instrument, requiring a trip back to the factory.

Check before you connect. Locking-down metal surfaces with a tiny fragment of coarsely-ground stone between them can be disastrous. The two main risk areas for this are where the Mast meets the Deck plate and where the bottoms of laps meet the platen. **You can feel smaller particles than you can see.** So, whenever mating these items, ALWAYS brush the contact areas of BOTH surfaces carefully with your fingertips before putting the parts together. Before moving your mast across the base plate, ALWAYS brush the contact area on the base plate with your fingertips FIRST. Failing to do this check ONCE can cost you $800 and more in repairs.

Take good care of your transfer stand. Do not drop or handle it harshly. Store it carefully - not thrown into a box with dops, roughs, or other hard objects. Do not allow it to accumulate dop wax or glue from transfer work. The precision of every transfer you do will rely on the condition of your transfer stand.

Take good care of your 45 adapter. This item is not just for cutting tables, it is also a tool for calibrating your protractor, and zeroing your cheater. Use the same care for this tool as you do for your transfer stand. Dents, nicks, or dirt on this tool can cause a cascade of problems through all your faceting efforts.

Take good care of your dops. Store and transport carefully - in a dop block. Protect them from banging into hard objects - including each other. Do not over-tighten any retaining device such as quills or 45 adapters that could dent, warp or gouge them as the smallest injury to a dop will affect how it mates to the quill and/or the transfer stand, causing alignment issues. Keep your dops clean and free from swarf, polish, lubricants, wax and glue. The precision of every part of your work depends on clean, undamaged dops.

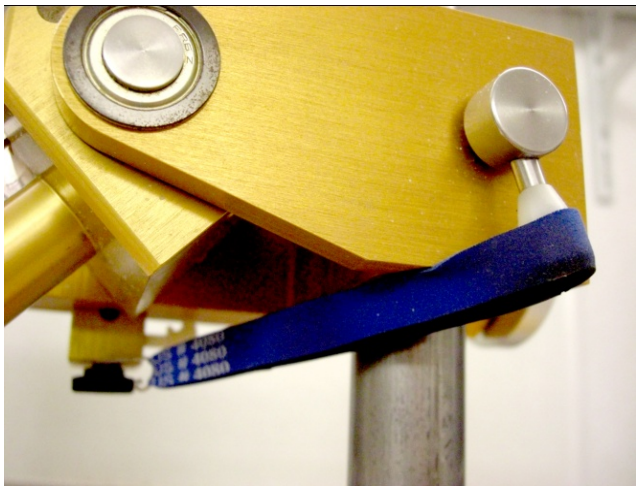
Always clean up all the liquid you can after working, before it evaporates. Lift the splash pan off the base plate; wipe under it; and leave it tipped-up so air can circulate beneath it to dry the area. Water left trapped between splash pan and base can have a corrosive effect on the aluminum or may leave abrasive residue after evaporating.

Never store or ship anything on top of your instrument Deck. Always be attentive to the critical mating surfaces such as the Deck, the Platen, and the Foot of the Mast. No matter how well you think you have padded something, NEVER ship anything but padding on top of the instrument Deck. When not using the instrument, it's a good practice to keep the critical surfaces covered with cloths, and to use a dust cover (or inverted kitchen garbage bag).

Rubber band auto head-locker (for Facetron): Many mast-style instruments such as the Ultra Tec use a lead screw for coarse raising and lowering the head. These exposed screws can collect swarf and dust and require cleaning, and aren't as fast as the Facetron for making coarse adjustments. The down-side of the free head is that a slight bump of the locking lever will release the head, allowing it to fall – potentially causing broken stones, ruined laps, a gouged base plate – or even a bent quill.

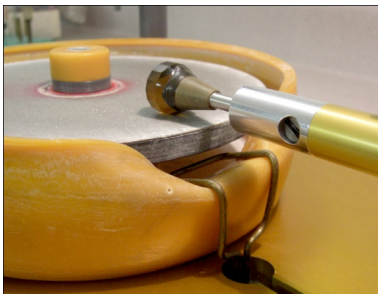
In addition to the "always use two hands" rule when moving the head, I like to spring-load the locking lever with a rubber band. If the locking lever of your instrument points up when locked, you can pass a rubber band around the back of the protractor area, and catch the lever with it. If the locking lever faces down when locked, fashion a small wire hook from a paperclip and anchor it to the hard-stop knob on the bottom left of the head.

Then, pass a thick rubber band through the hook and around the locking lever. I find the rubber bands used to bundle Asparagus to be just right in length and strength. With the rubber band in place, a slight bump of the lever won't set the head free. Also, when moving the head the cutter must maintain constant pressure against the rubber band to keep the head from locking in place. When the desired height is located, releasing tension on the rubber band locks the head almost automatically. I have used this add-on for many years, and it - along with two-handed head-handling technique - has saved me many times.

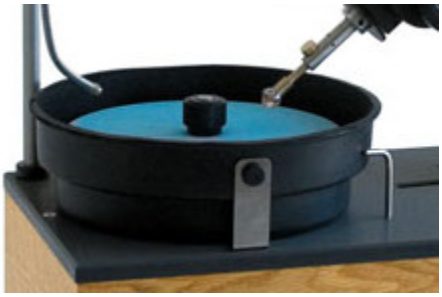


DIY splash pan claw: When doing girdle work on a large or troublesome stone - or using the dial indicator for precision dopping work ("lamp at the lap" technique), it's nice to work without holding the splash pan lip out of the way the whole time.

I recommend against cutting the pan as some people do. Whenever you need both hands for your work – or when longer periods of time will be spent on a girdle facet, you can make a splash-pan claw out of coat-hanger or similar wire. This is my original copy - made from a coat-hanger and still working after 10+ years:



The bottom hook of the wire inserts through the keyhole in the Facetron base, anchoring the claw against the upward flex of the splash pan. The Ultra Tec instrument has this sort of convenience built-in (silver hook on the right of this image):



The spill-proof swarf-catcher: Swarf is slurry of ground gem material and water. Some of this stuff can stain some flooring, and all of it will leave behind a concrete-like reside if spilled. And, this isn't only an aesthetic issue, as gem swarf is micro-sized silica dust that can be very hazardous to your health, especially after it dries-up and becomes airborne. To protect your floor (and lungs), you can use a gallon (or larger) receptacle with a special cap.

Make two holes in the cap: one a tight-fitting hole for the swarf hose, the other a very small air-escape hole. If you kick this over, only a very small amount of water / swarf will manage to escape before you can turn it back upright:

Spray control sponge: Some of the water dripping on your lap will spatter and spray, especially when you are cutting at higher speeds and when you are working on girdles. This spatter will contain abrasive swarf. Worse than being distracting, it can be nasty stuff to get into your eyes, and the spray droplets will contaminate your faceting instrument and surrounding area with abrasive, too. Control the spray by placing a household sponge between the lap and the splash pan. Trim the ends of the sponge at an angle to deflect spray that hits it downward.