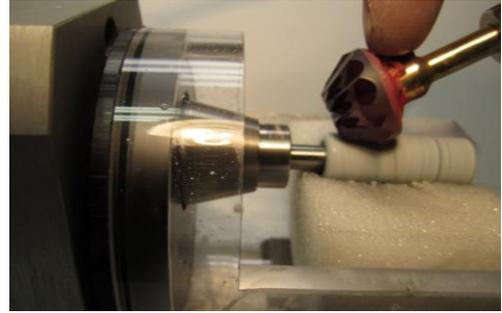


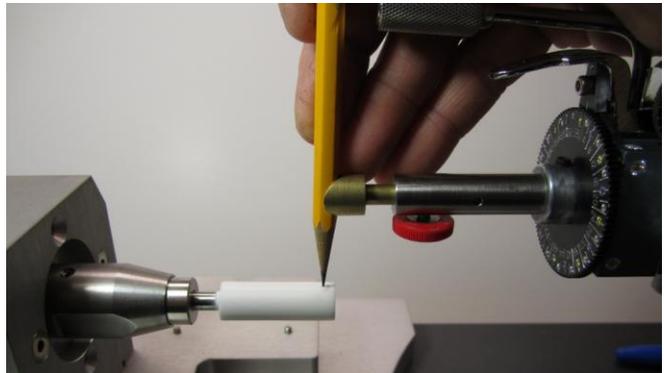
Concave Facet Polishing

Polishing concave facets, in theory, isn't any different than polishing flat facets. The goal is to polish the surface without striated lines or blemishes. The important thing to remember in polishing flat facets is to sweep the stone back and forth across the lap which changes the direction the polish moves across each facet. That keeps grooves from forming like they would if the stone were held in one place. The difference in concave faceting is the polishing mandrel oscillates back and forth and the stone is held in one place in most production model concave faceting machines.



The key to obtaining a good polish is in getting a good pre-polish. Therefore, let's break it down to the mechanics of two very important functions necessary to accomplish that goal. First is the RPM of the cutting mandrel and second is the oscillating motion. Cutting concave facets is usually done with a 600 or 1200 grit diamond plated mandrel. At these stages the ratio of RPM per oscillation is not as critical as it is in the pre-polish stage. Initial cutting can be done at relatively high RPM but at the pre-polish stage it's important for the equipment to facilitate the same thing sweeping does in flat faceting.

To demonstrate this in an easy to understand manner we'll look at a simple experiment anyone can do. First place a v-dop in the quill then set the angle at 90°. Next place a white or light color polishing mandrel in the drive motor. To conduct the experiment hold a sharp pencil securely in the v-dop with the point riding against the mandrel and turn the machine on.

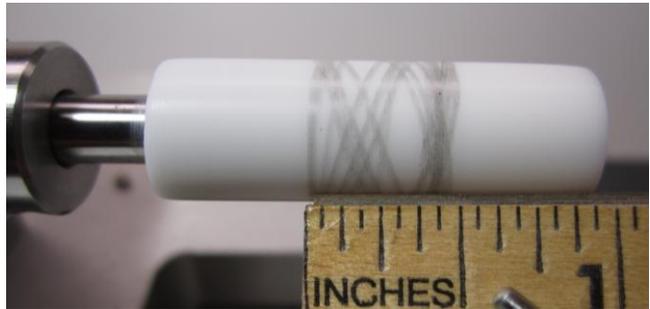


Let the pencil mark the mandrel for several oscillating motions of the machine. The result will show you what your machine is doing to the concave facet. One of the most important features of the Fantasy or Concave Machine by Ultra Tec is the ability to adjust the ratio of RPM per oscillation. Beginning at the pre-polish stage the lines should cross at a sharp angle as the machine travels in and out. This is what eliminates the striated lines and gives a true



concave facet. Since both the Fantasy and the Concave Machine by Ultra Tec have independent controls for each motor the ratio can be adjusted. For the most effective pattern the oscillating motor control is turned up and the drive motor is turned down. An additional feature of both of these mentioned machines is the ability to adjust the amplitude(distance the mandrel travels).

Even in adjusting the amplitude down, which might be done for smaller mandrels, or for cutting large concave facets, the desired cross cutting action can be achieved. The following image shows the grease pattern that trails in cutting a piece of ametrine. This stage is using a Batt mandrel charged with 3000 grit diamond, which is an excellent pre-polish for quartz, and the lubricant is WD40. It is at this stage where you want to make sure there are no striated lines left over from cutting.



Following this stage the final polish is done with cerium oxide. To obtain an even coating of cerium oxide I use a dedicated piece of poly foam cut to just touch against the mandrel. After applying a slurry solution of cerium to the mandrel the poly foam helps keep an even distribution and consistent wetness in order to achieve optimal polishing.



The above information is excerpts from the book Concave Facet by Dalan Hargrave.

