

No, a cab isn't a mode of transportation. It's short for "cabochon".

I've been asked this question several times recently by several members in the club. This is my attempt to answer that question for our newer members.

A cabochon is a gemstone that has been shaped and polished as opposed to faceted (cutting with geometrically related flat cuts that maximize the light reflection/refraction of transparent stones). The term cabochon comes from the French word, caboche, meaning head. The resulting form is usually a convex (rounded) opaque gem with a flat reverse. Gemstones with a hardness lower than 7 on Mohs scale are easily scratched and would quickly make translucent gems unattractive; instead they are polished as cabochons which make scratches less evident.

The usual shape for cutting cabochons is an oval. This is because: (1) the eye is less sensitive to small asymmetries in an oval, as opposed to a uniformly round shape, such as a circle, and (2) the oval shape, combined with the dome, is attractive. If you are just learning to make a cab, use an oval shape (30 X 40 width to length is a good size), it's easier and more forgiving. Making cabs is a three-step process, i.e., preforming, shaping/smoothing, and sanding/polishing. The figure to the right shows the process from rough stone to final product.

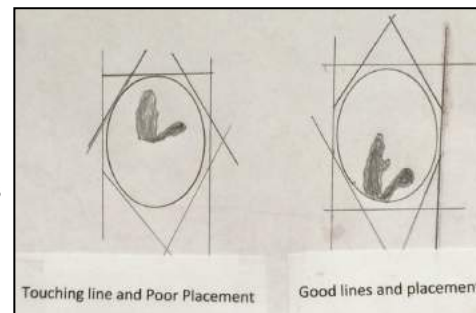


Preforming: Select the stone to use in making the cab (look for color, scene, or anything you like). The slab thickness should be 1/4" (or a little more) and free of pits, cracks, and faults. If you cut a slab from rough stone and are concerned about cracks and fractures, drop it from about 6 – 8" above a hard table top. If the slab doesn't break, it's a good stone. If it breaks, look at the larger pieces, they may be useable. You don't want to do all the work only to have the cab break into pieces. **If you are buying a slab from someone, don't drop it unless you're prepared to buy it if it breaks.**



Use a template, (figure to the left) to select the part of the stone you want. The part that you want should be centered in a template hole or in the lower 2/3 of the hole. Try different size template holes and choose the one you think is most pleasing to the eye. Trace the cab outline from the template to the stone using a fine tip sharpie. Draw straight guidelines on the slab within 1/16" of the cab outline as in the figure to the right. They form a polygon that becomes a guide for you to cut along as

you trim out the cab to minimize grinding. Using a trim saw, slowly push the slab into the saw blade using the thumb and forefinger of each hand (be careful that your fingers are away from the blade). Cut straight lines using firm and steady pressure. **Do not trim to your template outline.**



We are making a cab that will be wire wrapped. Therefore, it must have flat sides. If it has a sloped side, the wire will slide off the stone. Remember your geometry class with circles and tangent lines that touch the circle at one point only (that you said you'd never use), this concept applies to grinding the cab. If you hold the preform horizontally against the wheel, you will cut a curved/sloped edge, because the wheel's surface is grinding more than one point at a time. If you hold the preform vertically against the wheel, (Cont'd on the next page.)

(Cont'd from prior page.) as shown in the figure to the right, you will get a flat edge because only one point is touching the wheel at any one time.

Start with the 80-grit wheel, hold the preform just below the center of the wheel, and slowly start grinding to within 1/16" of the template line. Begin with the areas furthest from your template outline and work around until you are uniformly close to the template line. Slow, even, smooth strokes are needed with light pressure. Check the size of your stone against the size of the template you used. It's very easy with softer stone to over grind. You want the edge to be within 1/16" of the template line. Remember: **"Grind a little, look a lot."**

Now transfer to the 220-grit wheel, and use the same procedures to grind the edge slowly until you are touching the outside of your template line.

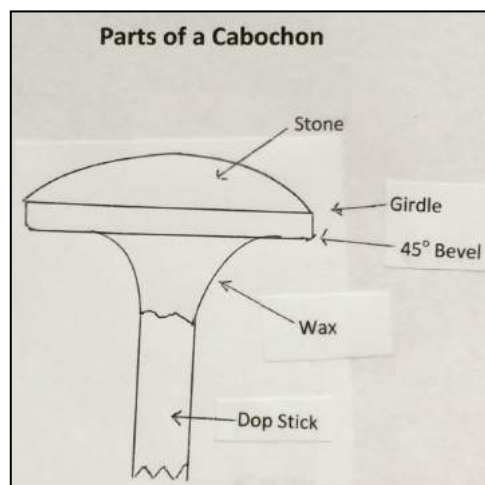
Look at both sides of your stone, choose the one you want to see, and mark it with "F" for front and the other side with a "B" for back. Move to the "B" side, and while holding the stone, vertically tilt the stone at a 45° angle to the wheel to make a bevel around the backside of the stone and take off the back's edge. No more than a 1/32" cut. **Grind a little, look a lot.**

You are ready to mark the girdle line. Make a mark on the stone's edge about 1/3 of the way up from the "B" side. Place the stone with the "F" side down on a flat surface. Use some slabs as a shim and a fine tipped sharpie pen. Hold the pen on top of the shim's edge at a downward angle and adjust the height of your pen point by moving the pen further away from the edge of your shims (raises pen point) or closer to the edge of your shims (lowers pen point). Once positioned on the stone's mark, twist the stone past the pen's tip to make a line around the stone. (figure to the right)

It's now time to dop the stone. Clean the stone with alcohol. Choose a dop stick about 2/3 to 3/4 the width of the narrowest part of your stone. (Note: Dop sticks longer than 4" can get in the way during grinding.)

Place the stone on the side of the dop pot "F" side down. Place a few small chips of wax on the "B" side of the stone. When the chips are melted the stone is ready. While waiting, dip the dop stick into the wax about 1/4". Pull the stick out, dip your fingers into water, and shape the wax on the end of the dop stick making it look like a pencil eraser. If the stone isn't ready yet, no big deal, just wait.

When the wax chips have melted, remove the stone from the dop pot's edge ("B" side up), center the dop stick over the stone, and press down gently (the wax on the dop stick will melt), use wet fingers (stone is very hot) to smooth the wax pushed from under the (Cont'd on the next page.)



(Cont'd from prior page.) dop stick, and ensure the stick is perpendicular to the stone. Hold stick until the wax had cooled.

Your stone should now look like the picture at the bottom of the prior page, but with flat front and back sides. It's ready for the next step in the process. Some people, who have a problem controlling the stone during preforming, may choose to dop the stone prior to starting this process. Others may choose to smooth the B side of their stone before dopping. I wait until the dop is removed near the end.

Shaping/Grinding: We are ready to form the domed top.

Hold the stone vertically with the dop stick at about a 45° angle to the wheel and proceed to grind slowly on the 80-grit wheel evenly all around (like peeling an apple) so that you have a smooth bevel all around the stone, down to but **not touching** the girdle line. (**Caution, the narrower ends of the stone will grind away faster.**)

Continue grinding on the edge, formed at a 45° angle to the wheel, towards the center in even steps, until there is no flat spot left in the center and no ridges. During this process, you should be able to see the overall shape of the get gradually smaller on the top as you keep grinding evenly around the stone towards the center. You should have removed about 95% of the unneeded material and have a definite dome formed. Dry the stone (wet stones will hide the grooves you have just made). Look closely at your stone and take note of the size and depth of the grooves that you made on the 80-grit wheel (use your magnifiers). You should remove these grooves with the next higher grit wheel.

Reminders:

- Softer stones will grind away much quicker than harder ones.
- Let the wheel do the work – use a light touch.
- Using more force or pressure produces deeper grooves that will be harder to remove later.
- Move the stone side-to-side across all the wheel's surface.
- Don't touch the girdle line.
- Grind a little, look a lot.
- All the wheels after the 80-grit wheel will not remove more material than the thickness of a sheet of paper.
- Change the water and clean the tray before using 220-grit wheel.

Now move to the 220-grit wheel and repeat the process. One difference here is that now you can use the "apple method" to grind crossway and lengthwise from girdle line to girdle line over 360°. This helps to form a pleasing curve. Look closely at your stone, take note of the size and depth of the grooves you made with the 220-grit wheel, and ensure that all the 80-grit wheel marks have been removed (use your magnifiers). The more time you spend checking for marks on the stone, the easier the remaining steps will be and the nicer the finished stone.

When you are happy with the dome, move to the girdle and work it with the 220-grit wheel to remove all 80 grit marks.

When you think you have done each step properly, go back and do it once more. Then move to the next step.

The 80 and 220-grit wheels are the only place where you can form the shape of the cab. The other four wheels are for sanding (removing wheel marks) and polishing (smoothing the surface). (Cont'd on the next page.)

(Cont'd from prior page.) Move to the 280-grit wheel and start the sanding process. Use the same methods used with the 220-grit wheel. Take your time, and ensure you sand away the 220-grit marks. If you have some marks that you can't remove, they are probably 80-grit marks that you missed. Remember to dry the stone prior to checking for scratches. To remove them, go back to the 220-grit wheel and work them until they are gone. Then rework the whole stone on the 280-grit wheel. Let the wheel do the work, and use light pressure. Your stone should begin having a soft sheen. **Watch your girdle line; don't forget to do the girdle area with the current wheel.**

The most important step to getting a good polish is to get a perfect pre-polish. This means that every step from grinding through sanding must remove the scratches from the previous step. Inspection is very important, observe your progress often. Do not go to the next step until all previous wheel marks on the cab have been removed and the surface has a similar texture overall.

After this step and each of the succeeding steps, it is very important to periodically dry the stone with a clean soft cloth or paper towel to check your progress and look for scratches. The wet surface of the stone can often hide scratches or imperfections that only become apparent after the cabochon dries.

Move to the 600-grit wheel, which is a pre-polish wheel. This wheel can only remove marks made by the 220-grit wheel. Work the whole surface, and then check for marks and symmetry by holding the cab directly below the Genie's light and moving the stone side-to-side. Watch the reflections from the stone's wet surface. Then dry the stone and check for scratches. Move to the girdle area, and repeat the process.

Move to the 1200-grit wheel, and repeat the 600-grit wheel procedures. When done, make a final check of the dome's symmetry. Find a double tube fluorescent light, stand directly below it, wet the stone, hold the long axis pointing away from you, and move stone from side-to-side. The light bulbs reflection should remain straight and parallel. Do the same with the short axis. If they don't, go back to the 220-grit wheel and work the area of the stone where the distortion occurred. Repeat all the procedures again through the 600-grit wheel.

When the distortion is gone and the 600-grit wheel is completed, move to the 1200, 3000, or 14,000-grit wheel (depending on your highest grit wheel) for final polishing. Harder stones should not require more polishing while softer stones might. Our club has wheels with diamond grits through 100,000 grit that can be used by members at our Treasures of the Earth (TOTE) show's GMSVP booth and our Spring and Fall picnics.

Now you have a finished stone with a stick held by wax. Remove the dop stick by putting the stone in a freezer or on ice cubes in a bowl. When chilled well (about 10 – 15 minutes), apply pressure sideways to the stick and it should break free. Use a razor blade to remove any remaining dop wax (save the chips for the next time you need to dop).

Now it's time to polish the back of the cab using the 220-grit wheel, usually this is enough to make it presentable. You can use higher grit wheels, if you want more polish and fewer scratches. Note: See the article on "Polishing: Adding that Extra Touch" for detailed guidance on cabachon polishing.

I strongly recommend keeping your first cab as a reminder of what to do in the future. Over time it will become easier and you will start doing other shapes and free forming. Good luck.

If you properly clean the rock grinding and polishing machine, it will increase the machine's life and reduce possible contamination between smaller grit wheels. Note: See the article on cleaning a Genie.

Word to the wise: "He who asks a question is a fool for five minutes; he who doesn't is a fool for life."