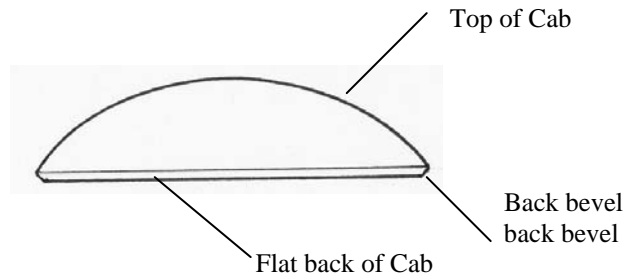


# CUTTING A STANDARD CABOCHON

A **Standard Cabochon** or 'CAB' is an oval or round stone with one flat side and the other side having an even curved dome shape.

It will have a narrow bevel (*about* 1mm wide ) at 45 degrees to the back of the Cab.

When finished, **all** surfaces of the Cab will be polished.



The following steps are one method to cut a Cab. Other instructors may do things differently and you might use different machinery, but the final results should be the same.

**It is very important**, that you are constantly aware that you are using machines rotating at high speeds. Take care, but realize that they are only machines. The machine will not make the mistake, **you will**. You must be careful and thinking all the time. You will also be using very hot waxes and flammable liquids.

**\*\*\* Safety goggles are available and should be worn when necessary \*\*\***

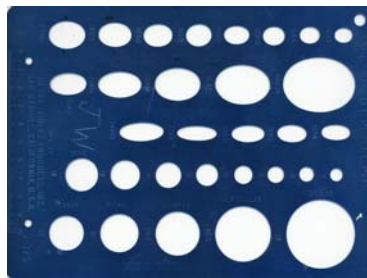
It is essential that, at the end of every step during the process of cutting your Cab, you thoroughly wash the stone and your hands. You will be working progressively from very coarse grit to very fine polish powders. If a particle of coarser material is carried on to a finer step then deep scratches are possible on the polished surface of the stone.

**1 SELECT** suitable material. It takes time to cut a cab. Don't waste it on rubbish.

Avoid slabs with cracks, soft spots, big pits or crystal lines. Look for a slab with interesting patterns and colour.

Use a template to mark out an oval shape on the back of the slab.

template



slab

**2 SAWING**

Use the trim saw to cut away excess material from the outline shape. **You MUST wear safety goggles**

Make sure that there is plenty of cooling fluid flowing on to the saw blade. If not, then add more liquid. The saw can only cut in a straight line. If you try to cut a curve, then **YOU** will wreck an expensive saw blade.

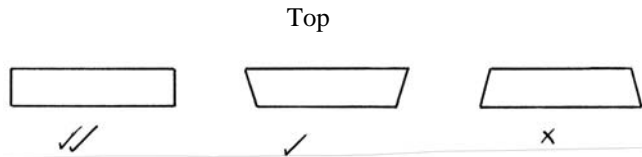
Hold the stone firmly with the fingers of both hands. Feed the stone into the saw with a steady, even pressure.

### 3 GRINDING THE OUTLINE SHAPE

Turn on the coarse (100 grit) grinding wheel, then turn on the water.  
The water supply may need adjustment as you are working, be aware.

Hold the stone in your fingers and grind the edge of the stone towards the outline shape.  
Keep the stone in a horizontal plane, almost at the centre of the shape of the wheel.  
Use the full face of the wheel, don't just use the middle of the wheel.

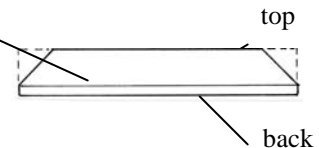
Try to keep the edges at right angles to the back (outline side) of the slab **or** you can have a small slope from the back towards the top of the stone.



Continue grinding until the shape of the stone is about 1 to 2 mm from the marked oval shape.

Now use a fine marker to draw a line around the edge of the stone about 2mm up from the back.

Go back to the same grinder and grind a big bevel all around the stone at approximately 45 degrees from the top down to the line you drew around the edge.



This big bevel will be the start of the dome shape but at this stage it will make it much easier to trim the stone down to the correct outline shape.

### 4 DOP THE STONE on the top or domed side using a round wooden dowel and wax.

You will be shown how to do this at first but some key factors are;

Use the flame and a metal plate to mould and shape the wax into a cone shape on the dop stick.

When you put the waxed dop stick and stone together, the stone must be warm, the wax must be hot and almost runny (like an ice cream on a hot summer day). **Hot wax can burn you badly.**

Wet your fingers so the wax does not stick to them and then mould the wax to a smooth shape on the stone.  
The dop stick must be central on the stone and perpendicular to it.

The only way to learn how to dop is to practice, practice, practice. Use scrap bits of stone.

### 5 TRUING THE OUTLINE SHAPE or cutting the stone down to a perfect oval shape.

Use a medium (180 or 220 grit) grinding wheel cut the stone to the marked outline.

Try to hold the dop stick vertically so you look down on the back of the stone and see the outline as you cut.  
Be aware that the narrow ends will cut much faster than the sides.

Check the shape by holding the dop stick out at arms length and look at the outline of the stone. Is it oval ???  
Try and look at one end only, then rotate the dop stick in your fingers and compare with the other end.

The shape can also be checked by using a sharp pencil to draw around the stone on a sheet of paper.  
Then turn the stone end for end and compare the outlines.

Finish the outline shape on a fine grinder (360 grit) or on a 400 sander.

**6 BACK BEVEL** This is a bevel that is cut at 45 degrees around the back edge of the stone. It will reduce the possibility of the stone chipping around the edge and also it is necessary if the Cab is eventually fitted into a jewellery mount.

Back bevels must be cut on a hard flat surface. If you use one of the 'soft' rubber backed cutters then the bevel will be rounded and not flat.

Our options are to use the 1000 grit diamond disc, or, start on the 400 grit hard sander and then a 600 sander  
Hold the dop stick horizontal, in the 3 or 9 o'clock position on the disc and at 45 degrees to the disc.  
Use the 45 degree guide lines on the bottom of the drip tray and keep the back of the stone in line with these lines.  
Use your left hand as a support and close to the disc.  
Now turn the dop stick and stone with your right hand.  
Take care as the stone will cut quicker on the narrow ends than on the sides.



Finish on the 1200 grit NOVA sanding wheel but only apply light pressure.

A typical back bevel should be *about* 1mm wide but not wider than 20% of the Cab height.

A 'perfect' back bevel will have an even width, correct angle, not have any flats, undercuts or pits, grinding or sanding marks, not be rounded or too wide and will be polished (we will do this later). Sounds hard but it is possible.

## 7 WORKING THE BACK OF THE STONE

To remove any saw marks, scratches, chips or pits and to get the back of stone perfectly flat.

Use a clean piece of flat glass with loose silicon carbide grit and water to remove any saw marks or pits from the back of the stone.

If the stone has deep marks start with 400 grit, then move to 600. In most cases you can start with 600. Continue until all marks have gone and you have an even matt finish all over. **Use your loupe**  
Hold the dop stick and 'roll' the stone under a light, look for ripples or uneven surface reflections.  
Finish off with 1200 grit on a clean piece of glass.

## 8 POLISHING THE BACK OF THE STONE AND THE BACK BEVEL

There are lots of options and opinions about polishing. It can depend on the type of stone, equipment available, the instructor and your own ideas. You will however, use some type of 'Buff' which may be covered with either leather, hard felt, canvas, vinyl, wood, plastic or some other material.

On the Buff you will use a polish powder water mix of cerium oxide, tin oxide, aluminium oxide, chrome oxide, Linde A or ?? The most common and effective of all these is cerium oxide ).  
You might use diamond powder on polypads, crystal pads or ??.

However, here are some suggestions for polishing;

Use a 'Hard' polishing buff as you are polishing a flat surface.  
Polish the back bevel before you polish the back of stone. It is easier to see your progress.  
As you polish, look at the stone every few minutes and you should see the polish improving.  
Use the stone as a mirror and look at the filament and the writing on the light globe you are working under.  
What works for one type of stone may not work for a different stone.  
**Experiment**, polish the stone on one type of buff for a while, then try a different buff. Which one was best??  
Depending on the type of stone, the time spent on the glass, and ???, polishing may take minutes OR hours.

Note that you can not polish out deep pits or marks. If you see them, then it's back to the glass and 600 and 1200

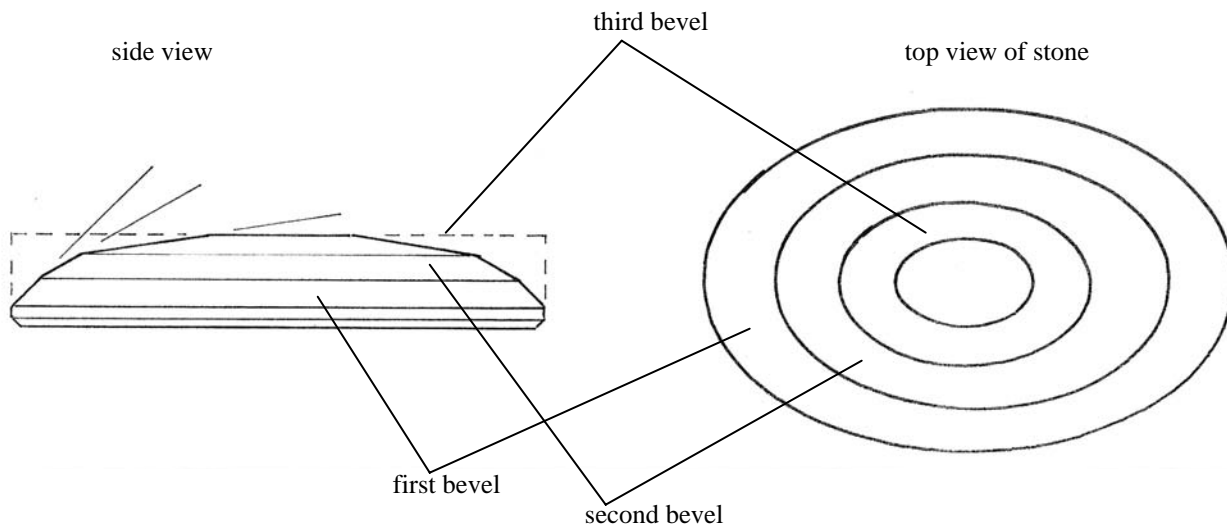
**9 REMOVING THE STONE FROM THE DOP STICK** after you have that perfect polish. The best way is to put the stone in the freezer for 5 to 10 minutes and it should just fall off the dop stick. Take care if you do this in a room with a concrete or tiled floor. If you drop the stone then \*\*\*\*\*+. Another method is to melt the wax with a hot knife (carefully).

## 10 DOPING THE STONE ON THE TOP

The same comments in Step 4 still apply here. However you are now dopping on to a highly polished and slippery surface. Apply a thin coating of shellac and methylated spirit mix to the back of stone before heating it. It is very sticky stuff and also very flammable.

## 11 CURVING THE TOP

As you did in Step 3, use a fine marker to draw a line around the edge *about* 2mm up from the back bevel. Go back to the coarse grinder and regrind a bevel all around the stone at approximately 45 degrees from the top down to the line you drew around the edge. Grind a second bevel at about 35 degrees halfway down the first bevel and more towards the centre of the stone. A third bevel is now ground at about 25 degrees which should result in three bevels of about the same width and a small flat area in the middle.



Change to a medium grinding wheel then gently grind and roll the cab across the face of the wheel until the three bevels combine into a smooth and even curve. Don't grind below that line 2mm up from the back bevel. Use your fingers to feel for any bumps or flat spots. Hold the dop stick at arms length and visually check the shape.

When the shape is correct change over to a fine grinding wheel to remove coarse scratches and flats. Use light pressure, grind and roll the cab over the wheel, use your fingers to feel for any high spots.

*Now grind down the side past the line you drew to about 1mm above the back bevel.*

## 12 SANDING

Use the 280, 600, and 1200 Nova diamond sanding wheels progressively to sand the Cab. into an even smooth curved dome. Always use plenty of water on the wheel. Nova wheels must be kept wet.

As you go through the sequence, gradually decrease the angle between dop stick and disc so that you sand away that small narrow flat just above the back bevel. After using the 600 wheel, that flat area on the side should be removed and the curve of the dome should meet the back bevel.

Use the dop stick as a handle and move the stone continually over the rotating sanding disc.

Try and combine an up and down movement while also rotating the dop stick.

Keep looking closely right on top of the stone and also down near back bevel. **Use your loupe constantly.**

When the 280 wheel has removed all the grinding marks move on to 600.

When all the 600 sanding marks are gone go to 1200.

When the 1200 marks are gone it's time for polishing.

### 13 FINAL POLISH

All the comments in step 8 still apply here.

However you will most likely use a 'Soft' Buff with a rubber backing behind the polishing material as it will 'wrap around' the domed stone.

Polish for a few minutes and then have a good look with your loupe.

Are there-- any deep sanding marks ?? If so go back to the 1200 sander (or even the 600)  
any small flats down near the back bevel ?? Go back to the 1200


As suggested when you were polishing the back, **experiment**, polish one end of the cab with one buff, then do the other half with a different buff, compare them, what is the best buff polish combination for your stone. If you have spent enough time on the sanding process the polish should start to appear quickly.

Keep polishing and keep looking. You will see the polish building up.  
Continue until there is no improvement in the polish.

### 14 FINISHED STONE

Take it off the dop. Use metho to remove any wax or shellac.  
Wash in warm water with detergent, rinse and dry carefully.

## SOME COMMENTS and EXPLANATIONS

**GRIT** We have referred to grits, grinding wheels and sanders by numbers. eg. 100, 220, 400, 600 etc.. The lower the number then the coarser the grit, and higher the number then the finer the grit or polish will be. As an example, on this square,  we could possibly fit 100 grains of ground black pepper, 220 of sugar, 400 of salt and 1200 of flour.

**HARD** sanders and polishing buffs have the disc glued directly to a hard back plate of wood, plastic or metal.

**SOFT** sanders and buffs have a soft rubber padding between the disc and the back plate.

*As a general rule* we use **HARD** machines when working on flat surfaces like back bevels and backs of the stone and. **SOFT** machines are used when working on the curved dome as the disc will 'wrap around' the curve. However, all rules are made to be broken and with polish buffs they often are.

**NOVA** sanding wheels have diamond grit bonded to a belt and have a soft backing behind the belt. A reasonable amount of pressure is needed so the belt wraps around the Cab. This means that it is not suitable for flat surfaces as it would "round" the edges. Take care to ensure sharp edges on the Cab do not DIG IN to the belt and dislodge the diamond.

Although there is an automatic water feed on our Nova machines you must at all times watch and make sure water is flowing. If it runs dry then the wheel can be damaged or destroyed. **They cost over \$300 each !!**

**LOUPE** or magnifier. **To cut a good stone you must use magnification.**

Most lapidaries will use a 10x loupe. A few may use 7x or 5x.

It takes time to learn how to use a 10x especially when looking at a polished surface. Some suggestions are;

Hold the stone in your left hand, the loupe in the right and then have the two hands touching to give stability. The distance between stone and loupe for a 10x should be about 25mm (1inch). Hold the loupe close to your eye. Don't work under a bright light, a 25 watt clear globe is ideal.. Position the stone under the light so it DOES NOT act like a mirror under the light and shine back at you. Roll the stone under the light until you can see the surface clearly.

Practice, practice practice. Look at the hairs on the back of your hand, the fibres in a bit of material or ?