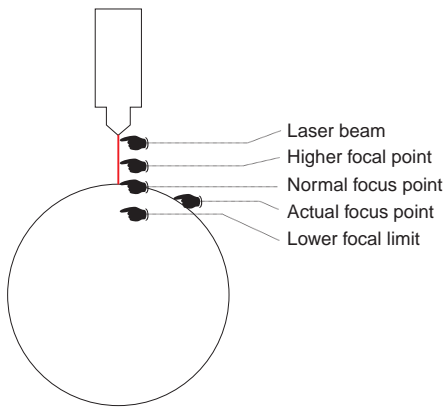




Wine glass engraved without a rotary attachment - and filled with green acrylic paint.



Focus was set just below the surface of the glass, allowing the engraving to curve!



Mirror reverse-engraved and filled from the back with acrylic paint - note the phone camera reflection.

## Laser Engraving Glass

Basically, glass is made by heating silicon, which melts and can then be poured into moulds or blown. To add strength or colour, other elements such as lead, zinc, cobalt or even gold are added. As the laser beam strikes the glass, it heats up the silicon and any metal content, which in turn cause the air and moisture trapped between the elements of silica and metal to heat up. Remember, water and air expand when heated.

Because the glass itself is relatively rigid, when molecules within the glass are heated until they expand, something has to give to allow for the expansion. This results in microscopic fractures in the glass surface. It is this chipping or fracturing that we see as engraving.

Marking glass with a laser is generally straightforward. Lasered glass output can include almost anything you can generate on your computer - images, text, etc. Lasers are great at producing detailed images, but there are some limitations - especially the type of glass.

Glass with metal in it is a no-no. Most coloured glass can be lasered, but if there is too much metal in it, no matter how many times you repeat the job, it just won't mark. Expensive Lead crystal is impossible to mark - don't waste your time. The best glass for laser engraving is the cheapest glass you can buy. This usually has little or no metal content and generally marks very well. Same goes for mirrors (generally reverse-engraved) because expensive mirror coating has silver in it. Cheap mirrors work best.

## How to do it

Best results are on flat glass, because the focal length of the beam stays constant. Engraving wine glasses, bottles and other cylindrical objects normally requires a rotary attachment - unless your output area is relatively small compared to the curvature of the object. Also, handles on beer or coffee mugs can cause interference.

For rounded objects, the depth of field of the lens will allow for slight curvature - the focus of the lens can be set slightly closer at the centre, allowing the outer parts to remain within the maximum focal length - normally around 5mm or so. The highest and lowest point will then only be slightly out of focus.

Generally, you want to use a high power and fast speed setting which will reduce the likelihood of fractures. A strip of transfer paper or a layer of wet newspaper on the glass will also produce a better result - especially with higher power lasers - which tend to "chip" the glass.

After engraving, use a small brush to remove loose glass bits, spray a bit of alcohol on the glass and wipe off with a paper towel.

If you want your design to "pop". rub in a bit of cheap acrylic paint - available in many colours from most craft suppliers. Apply and remove the excess before it dries. Once dry, it is relatively permanent.

To get your design lasered in the right place, tape a sheet of paper or cardboard on the laser bed and set the focus. Then (using low power), engrave the image. Now position the glass over the engraving, re-focus and engrave the job again. If you are doing more than one or two items, you could also use some scrap wood or metal to place around the glass to make a "jig" so placement for the next one is easier.

