



## Working with Glass safety – cutting - grinding –soldering – finishing

### General safety tips

- Hot glass looks the same as cold glass
- Hot soldering can look exactly the same as fresh cold soldering
- Never eat or drink at your crafting station. It's a guaranteed method of ingesting lead and possible glass shards. Instead, stand up, stretch, and take a break away from your soldering station.

### Protective equipment

#### Always wear Safety Glasses when.....

- **Cutting & Grinding - I can't stress this enough!** Glass is very brittle and microscopic shards are always released when cutting, breaking and grinding glass
- **Fluxing and soldering** - Flux and solder can and does bubble at times and will splatter onto your hands and face

#### Ventilation Ventilation Ventilation

- **Fumes** - What's the sense of creating beautiful stained glass pieces if you aren't around to enjoy their beauty due to lead fume poisoning? Invest in a portable fume catcher or build yourself a fume hood using an over head kitchen range hood with charcoal filters
- **Respirators**
  - **I never solder without one.** Fume hoods draw most of the fumes but often stray fumes will curl up towards your face.
  - Dry grinding will produce a fine cloud of dust particles which can lead to silicosis

#### Wearing gloves

- Gloves provide protection for the hands from the flux, hot glass and hot solder and small glass cuts. The gloves will dissipate a certain amount of heat before starting to burn, usually enough time for you to react and prevent a burn. Also solder drips run right off the gloves and doesn't burn the hand.
- Gloves also snag on microscopic points letting you know where they are, allowing you to smooth them out.
- Wet glass is slippery and the gloves give a bit more gripping

## Supporting your work - “Alternate methods of immobilizing your work”

### Clamps (those CDN Tire specials)

- Try using a small clamp to hold your work while you are laying an edge bead. Holding the clamp keeps the hot glass and solder away from your hand and helps prevent burns
- A small clamp works great for holding beads to solder and allows you to roll the solder around the bead. Do be careful though, the beads can get slippery with the flux and can shoot out of the clamp clear across the room! It can be quite startling actually and sounds like a mouse trap snapping!
- Using 2 larger clamps you can clamp your work and mount it sideways to work on the edges. The clamps act like sawhorse legs so to speak.

### Green painters tape

- It's just tacky enough to hold pieces together when cutting and also when soldering.
- It's great to hold small pieces together where the traditional tacking method would be too large to allow soldering
- It's a simple solution of preventing solder creep or solder drip, especially when soldering hinges. All it takes is a drop of solder to fall onto an unprotected spot and the hinge is soldered together! Use the painters tape to cover and protect areas that don't require soldering
- **Frames** Soldering clean straight joints on a 45 degree corner can be difficult. Assemble your frame then tape off the corner leaving the exact width of the joint that you want to solder. Simple solution.

### Soldering work area

- Cut out a small piece of G1S ½” plywood approx 20”x24”. Carefully nail some narrow molding on two sides forming a corner. Make sure you have a true 90 degree angle. This will form a lip for you to brace your work against. If your piece is square, 2 sides can be braced against the lips. You can then use the traditional push pins or square nails, or you can cut a number of varied lengths of the same molding to gently nail against the remaining two sides to “box” your piece. This can be used for any piece with 1 straight side. To keep things clean and neat line the plywood with paper first.

### Foil - applying - repair – shaping

- ALWAYS ALWAYS wash your cut pieces of glass in hot soapy water, rinse and pat dry **BEFORE** foiling. This will ensure a good adhesive bond between foil and glass.

- **Foiling Beads** Smoothing out the wrinkles of copper foil on a bead is a difficult task and leaving it wrinkled can detract the finished look. A neat way to smooth out those wrinkles is to use a small slab of metal with a ¼ to 3/8 inch curved groove on the surface. By grasping the bead and gently rotating the bead along the groove the wrinkles are smoothed out. I do this for the top of the bead and the bottom. It's a little extra work but it does smooth out all the wrinkles and looks great when soldered.
- **Ripped or torn foil on a curve**
  - Cut a small piece of foil and tape it over the rip, flatten and burnish the new foil, then use an exacto knife to cut the excess foil to reshape the curved outline
- **Small glass pieces**
  - Sometimes it's easier to foil a very small piece of glass with wide foil and then trim the excess foil to the width you want instead of trying to foil the small piece with a narrow width of foil
- **Foil appliqués**
  - Select your foil width, install it, burnish it then cut away the foil that doesn't belong. I use this technique to create the root joints of a branch on a birch tree.
- **OVER HEATING** your foil. The foil adhesive is generally good for 2 applications of heat before it separates from your glass. "Rule of thumb" ...solder as carefully and quickly as you can the first time.

## Marking glass

- Red marker on opaque black glass shows up very well in reflected light.
- White marker (the kind that looks like white out) works well on dark opaque glass.
- White marker is great for marking grind points as it won't wash away in the grinding solution.
- Marking wax prevents the lines from washing away when using a water lubricated/cooled band saw. Draw your lines on your piece and then smear a thin coating of wax onto the lines then start cutting. The wax prevents the lines from blurring or dissolving away.
- Stadler non permanent markers are perfect. The ink wipes away easily.
- **Thick lines vs thin lines**
  - Thick lines, cutting on outside of the thick line is a quick way to increase the size of your pattern.
  - Conversely cutting on the inside of the thick line shrinks the pattern.
  - Thin lines provides more accuracy

## Lighting

- One can never have enough light when crafting stained glass. My studio is equipped with over head florescent lights, a light table for cutting and I've

a window to provide natural light. My band saw has a small directional light source to shine down onto the saw blade. I've found it useful to install a small clamp on led light to shine upwards under the glass to illuminate the cutting line. I've found this very helpful for some colours of glass.

- For those of us where reading glasses are starting to be an issue, I've found that a small lighted magnifying lens lamp is ideal for small intricate soldering.

## **Transferring Patterns or drawings**

There are a number of ways to transfer a pattern onto glass.

- Try tracing a pattern onto a clear plastic sheet such as you'd use for an overhead projector. Then using a light table you can easily slide and reposition your pattern under your glass to best capture the glass characteristics, then just trace the pattern onto your glass.
- Carbon paper works best for opaque glass once the image has been traced onto the glass, you can touch up the image with a marker as the carbon ink will be very faint.
- Some crafters trace and cut out their patterns on heavy cardstock or thin plastic much like a homemade jigsaw puzzle. These can be used over and over again.

## **Miscellaneous**

- A small wooden stick for holding, moving hot work
- When cutting straight edges, I use a cork backed stainless ruler. The cork sticks well to the glass and doesn't slip
- Take lots of pictures of the "work in progress". This provides a quick reference point when coming back to a piece after a "holiday"
- After soldering, I carefully rub my soldering with some fine steel wool. This polishes the solder and also grinds down those invisible snag points that are always left behind

## **Caring for your Stained Glass Treasures**

Periodic cleaning will help keep your treasure looking its finest

Recommended cleaning instructions:

- Avoid holding your piece one handedly horizontally like a dinner plate. This places great stress on solder joints. Use two hands instead and spread your fingers beneath the piece to support the weight, or try to carry or hold the piece vertically, with your hands at the noon and six o'clock position
- When polishing or cleaning your treasure always wipe from the outside into the center of the piece. The outside foil is fragile and can easily be detached from the edge of the piece

- Dirt and grease buildup can be removed by carefully washing in warm soapy water. An old soft discarded toothbrush works great. The bristles are soft and should not snag or tear any weakened solder joints. Again **support, support, support** your piece.
- Lightly scrub the solder as you may inadvertently scratch any colored finish. Wash carefully from outside into the centre of the piece to prevent snagging and possibly peeling off the outside solder.
- Carefully and gently pat dry, WATCHING for snags.
- Commercial cleaners like Windex can also be used to clean the glass.
- Steel wool works great to “sand” and polish your solder lines.
- When applying a patina to colour your solder, Do not let the patina dry onto the glass. It leaves a sheen on the glass which can be scrubbed away with steel wool but you will scratch the patina away from your solder, forcing you to touch up your patina.

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