

Lead Came Class

Welcome! Please read these first few pages before attending class.

In order for class day to be more rewarding and less taxing, we ask that you do the following:

1. Please choose your pattern and glass before class day(if possible). You have your choice of four designs incorporating the optional use of bevel clusters and bevel borders. These are available at the Vinery.
2. When you choose your pattern, you will be given a card stock copy along with the paper pattern. Please bring both copies to class intact. Part of the class will include instruction on pattern cutting.
3. PLEASE DON'T CUT ANY GLASS OR YOUR PATTERN BEFORE CLASS!!

Thank you for choosing the Vinery's Lead Came class. If you have any questions concerning this class or future projects, please call. We are happy to help!

Introduction – Lead Came Class

This is a six-hour, one day class. You will construct a small panel using the lead came method. The prerequisite for this class is that you have glass-cutting skills. We prefer that you have completed a beginning copper foil class. We ask that you have your pattern chosen before class, but please do not cut out your pattern pieces or glass until class time. We want to make sure that you have left the proper spacing between the glass to accommodate the lead came. We will talk about the use of bevels, and what to be careful about when you're drawing up your own patterns. (Namely, that bevels can and do vary slightly from shipment to shipment!)

Tools

Please bring the following tools to class:

1. Glass cutter
2. Grozing Pliers
3. Soldering Iron
4. Soldering Iron Holder
5. Solder (60/40)
6. Flux & Brush
7. Lead Cutters
8. Push Pins (Note: push pins for stained glass have a longer shank than the ones you usually find. This holds you work in place better as you are fitting the lead around it. It is highly recommended that you use the pins with the longer shanks.)
9. Marking Pens
10. Rheostat (if your iron is not temperature controlled)

* If you do not have one or two of the tools above, you are welcome to borrow ours. We prefer that you bring as many of your own tools as possible.

Step-By-Step-Checklist

A. Pattern Work

1. Allow for leading between glass pieces.
 - a. Use lead pattern shears
 1. Short, choppy cuts
 2. Put paper far back in the scissors
 - b. Space between bevels is approx. 1/16"
 - c. Trace pattern on glass. Cut down center of line
2. Allow for outside channel

B. Pattern Setup

1. Put wood strips along two sides
2. Fit outside channel on two sides

C. Glass Cutting

1. Cut and fit one piece at a time.

D. Leading

1. Stretch lead
2. Keep it straight
3. Cut lead with lead cutter or lead knife
4. Joints should fit tightly

E. Soldering

1. Iron temperature is important; use rheostat or temperature– controlled iron
2. Solder should flow about 1/2" in all directions from intersection channels.
3. Avoid getting solder on the glass
4. Solder all joints!

F. Cementing/Puttying/Glazing

1. Brush putty on one side of panel
2. Ensure that putty is brushed under all channels
3. Apply whiting to panel
4. Scrub excess putty off with brush
5. Pick corners with awl
6. Repeat this process on other side
7. Add extra whiting for final cleaning. Brush well to remove excess film from glass
8. Final clean within 2 days
9. Do not use water or glass cleaner until putty has set up. (Usually within about two weeks.)

Additional Information – Notes for future projects!

Pattern Work

Before making copies of your design, make sure that you have made allowances for the outside channel you are going to be using, especially if your panel has to fit inside of a fixed opening. If you are using a bevel cluster, make sure you lay it out on the pattern and allow the proper space that the lead will take between the bevels. This distance is approximately 1/16”.

Make a carbon copy of the design on pattern paper.

You may have two lines on the outside edge of your pattern. The outermost line would be the finished size of the panel including the outside channel, while the inside line (the one you would cut down) is referred to as the glass line.

Cut the “glass line” of the pattern with a regular scissors, since the outer edge doesn’t need a lead allowance.

The interior lines of your pattern should be cut with a pair of lead pattern shears. Pattern shears are a three-bladed scissors that cut a thin strip of pattern paper from the center of the line that you are cutting. They are a little more difficult to use than a regular pair of scissors; therefore we suggest that you practice first. Cut with the part of the blades that is closest to the handles, not with the tip of the scissors. This prevents the pattern paper from tearing.

Cut down the center of the lines on the pattern unless bevels or jewels are used. (Cut to the outside edge of these fixed shapes!) The allowance for the lead must not come from a fixed shape. It should come from any other piece of glass that you are cutting. Remember to cut carefully because each step builds on the next.

Lead Work and Glass Cutting

Once the pattern work is completed, it is time to get your working pattern ready. Place wood strips on two sides of your project if it is square or rectangular. Nail the strips directly onto the pattern along the edges. Pins or nails will have to be used for circles or ovals.

For your first project we recommend that you cut one piece of glass, place it on your pattern and then lead it in. Cut the second and all remaining pieces in the same way. When you work in this fashion, you will discover that “fine tune fit” that is necessary to build a strong panel. It will also save you time and glass!

The center of the lead (known as the heart) varies in thickness from one manufacturer to another. This directly affects the spacing between the glass that we must allow. Lead pattern shears make a generic space allotment for the channel heart thickness. Where we cut our glass in relationship to the line we have traced on our glass is critical. Your project has the potential to grow or shrink. Cutting and fitting one piece at a time allows you to fine tune the fit of each piece of glass.

If your project begins to vary from the pattern, you must deal with fitting it immediately as it will only get worse if you leave it until none of the pieces fit! Grind that piece that is a little too large or re-cut that piece that is a little too small now, and save yourself some misery!

Before working with lead came, it should be stretched. There are two reasons for this; one is to straighten the lead so visually it looks good, and the other is to stiffen the lead slightly to make your panel stronger and less likely to sag. This is necessary because lead is a soft metal.

For most projects, you can cut the lead with a pair of lead cutters (also known as a lead dyke). This cutter looks similar to wire cutters, but they are different! The jaws of a lead cutter meet flush, as opposed to the slightly beveled jaws of the wire cutters. If you use a wire cutter to cut lead, you will get a “peak” caused by the bevel

of the wire cutters that will not allow the lead to fit together tightly. This creates a weak panel that is hard to solder together. Using the lead cutters makes a seam that fits together and is easy to solder.

Another tool that we can use to cut lead is a lead knife. This tool is very sharp and must be used with caution. It allows us to cut sharp angles that the lead cutter isn't very capable of doing.

When you are cutting the lead channel it can sometimes get confusing as to what angle to cut the lead. If you remember to cut the lead parallel to the line you are joining, you will get the correct angle. It is important to cut the lead so there are no gaps between the pieces that you are fitting together. On the other hand, don't cut the lead so long that it doesn't let the glass fit properly. If your project doesn't seem to be fitting together properly, this could be the reason. If you don't notice this until after you have placed several pieces, you will probably have to go back and cut the glass and/or lead.

Soldering

After all of the pieces of glass have been leaded, the next step is to solder the panel together. All the intersections of lead must be soldered together, including the outside channel. The temperature of your soldering iron is very important. Your iron must be hot enough to melt the solder without melting the lead. Unless your iron has a built-in temperature control, you will need to use a rheostat to control the temperature of your iron. Test the temperature of the iron tip on a scrap piece of lead before you touch it to your project. The iron tip temperature does vary from project to project depending on size of the project and your speed of soldering. Also, remember to flux!

Puttying

Once you are done soldering, wash the flux residue from the lead channel. Your next step is puttying, sometimes referred to as cementing. The purpose of the puttying process is to strengthen the panel, to keep the panel from rattling, and (sometimes) to weatherproof the panel.

Putty comes in two forms – thick and thin. In either form it is used to fill in the space between the glass and the channel. Most lead channel is designed to accommodate a variety of glass thicknesses. This often leaves spaces that the putty can fill. Thinner putty is brushed under each channel with a small scrub brush. With a thicker putty, this is accomplished with your fingers or with a putty knife. Once putty is applied to one side, whiting (calcium carbonate) or sawdust is sprinkled over the surface of the glass. A sharpened dowel rod or an awl is then used to pick the areas where the bristles can't reach. This process is repeated on the other side of the piece and repeated on both sides until the panel is sparkling, and the oil film from the putty is gone. Repeat the cleaning in several days if necessary. This will catch any extra seepage from the putty. Remember not to use water of window cleaner on your piece for at least two weeks or you will cause putty to seep out.

Congratulations! Your project is ready to hang!

A Reminder about Lead Safety

We want to remind you about safety around lead. The two main ways to get lead in your body are through ingestion and through contact with open cuts or contact with your eyes, nose or mouth. Remember to keep those cuts covered! Do not rub your face with your hands while you are working with lead. Always remember to wash your hands (preferably with a metal-removing soap) before you eat anything and make it a habit to wash your hands at the end of class. We want you to stay healthy!

Thanks again for taking this class at the Vinery. Remember to sign up on our mailing list if you wish to stay current on upcoming classes and sales. We hope you have enjoyed our class and if you have any questions, please contact us... We are happy to help!