



**Karl Markl produces fine classical guitars and ukuleles in his custom luthiery shop.**

## French Polish Fundamentals

by Karl Markl

The French polish technique, while time consuming and labor intensive, can be used to attain a thin, durable, protective coating on a string instrument and will not inhibit its sound. In addition, if the surface of a French polished instrument is damaged, it can be restored in a satisfactory manner. In using this finishing technique, it is important to follow instructions carefully and develop your own methodology, respecting the component materials and the instrument itself and maintaining a healthy

work environment.

### Supply List

Here's a list of resources for supplies needed for applying French polish to an instrument:

Shellac flakes and other materials for making and applying French polish can be purchased from wood working and luthiery supply stores including: Luthiers Mercantile International, Stewart-MacDonald, and Woodcraft Supply.

Everclear grain alcohol (190 Proof) can be purchased in most liquor stores.

Pre-boiled linseed oil can be found in hardware and paint stores while olive and/or walnut oil can be found in grocery stores.

A buffing wheel and Menzerna fine high gloss polishing compound can be purchased from Grizzly Industrial.

A graduated cylinder for measuring by volume can be purchased from Indigo Instruments. All of these suppliers and manufacturers can be found on the Internet by conducting a simple Google search.

### Preparing the Instrument

Sand all surfaces of the guitar with a sanding block and 400 grit sandpaper. Next, determine exactly where the bridge will be located on the guitar top. Drill two holes, the size of round toothpicks, through both the saddle groove of the bridge and the top of the guitar. Apply masking tape to the area of the top where the bridge will be located. Keeping this area free of finishing materials will permit better adhesion of the bridge to the surface of the guitar when it comes to gluing and clamping. At the same time, taking this simple step will enable you to apply the shellac much easier and more evenly than if the bridge were already glued to the top.



**Shellac flakes are available in four colors: white, blond, orange (not shown) and garnet.**

### **Mixing the Shellac**

The basic ingredients of French polish are shellac flakes (processed from the secretion of the lac beetle) and alcohol. Very fine pumice powder and specific oils may also be used in the French polishing process. The shellac flakes are dissolved in Everclear 190 proof grain alcohol.

As a career chemist, I prefer to work with unadulterated alcohol as adulterated alcohol has some kind of toxic chemical added to it. The adulterant is usually a specific type of alcohol (methanol) or a ketone. Methanol can be absorbed directly through the skin. It has a cumulative poisoning effect and can cause blindness or death. Since I need to feel the pressure and pull on the pad as I apply the shellac, I don't use gloves; I do not want to expose my skin to toxic chemicals, nor do I want to inhale them. Neither shellac nor Everclear grain alcohol is toxic. In fact, shellac is used as a coating on candies, pills, and tablets. Everclear is sold in liquor stores for consumption, but can be lethal if the 190-proof variety is used in shots.



**The basic ingredients and tools of the French polish process: shellac flakes, fine pumice powder, and unadulterated grain alcohol, with a fresh rubbing pad.**

Using a graduated cylinder, the shellac solution is prepared in two concentrations-10% and 25% by volume. To prepare a 10% shellac solution, pour 25ml of shellac flakes into a 250ml graduated cylinder, then fill the cylinder to 250ml with Everclear grain alcohol. To prepare a 25% shellac solution, pour 80ml of flakes into a graduated cylinder, then fill to

240ml with Everclear alcohol. Let the shellac flakes dissolve overnight. The solution will require shaking to dissolve all of the flakes.

### **Making a Rubbing Pad**

Fold a 6 X 6-inch piece of French polishing cloth (or a piece of clean, white, cotton undershirt) several times until you have a pad approximately 1 1/2 inches square. A second 6 X 6-inch piece of the same cloth is used to cover the pad. Once the pad is covered, twist the outer cover to make the pad very firm. The working surface of the pad will now be the size of a nickel. Create a dimple in the center of the pad by pressing your thumb into the pad. The initial applications to the raw surfaces are applied in overlapping strokes with the wood grain. Subsequent applications are made with an overlapping circular motion with slight pressure on the pad.



**A dimple is formed in the middle of the tightly formed rubbing pad.**

### **Applying the Shellac**

Before trying the French polish technique on an instrument, experiment on scraps of the very wood used to build that instrument. Once you feel confident with the technique, you can then begin to French polish the actual instrument. Keep your practice pieces for reference.



**Using a manageable container like a small glass bottle or squeeze bottle, a small amount of shellac solution is applied to the dimpled center of the rubbing pad.**

To begin, carefully moisten the dimpled part of the pad with the 10% shellac solution. When the entire pad is moistened, wipe off the excess shellac on the practice pieces of wood until the pad is only slightly moistened. The finish is made up of numerous very thin coats of shellac and it's only by wiping off the excess on scrap pieces that you can be sure of applying a thin coat on the instrument itself.



**Excess shellac solution is constantly wiped off on a piece of scrap wood.**



**A thin coat of shellac is applied to the instrument, here represented by a piece of veneer.**

Some furniture and gunstock makers use a similar French polishing technique, except they add a small amount of oil to the shellac as a lubricant. Olive oil, pre-boiled linseed oil, or walnut oil is generally used for this process. I have found that the addition of oil to the pad significantly increases the drying time needed between applications. While the addition of a drop of oil to the shellac on the rubbing pad is a personal preference, oil should not be applied to the raw spruce surface.

If you are only going to apply 5 - 10 coats total, it's fine to use oil in the shellac. I prefer to apply numerous thin coats without the oil to achieve the desired finish, but if the pad seems to drag, that is- if the pad seems to pull as if it needs more shellac, but you're sure it has sufficient shellac to make the pad moist- you might want to consider adding a drop of oil to the pad. Make sure, however, that you allow for extra drying time between applications.



**After only a few coats of shellac, the wood begins to take on a lustrous glow.**

Do not add oil to the shellac you apply to the raw spruce top as it will darken the wood. Oil can be added to the rubbing pad and applied to the top after you have switched to the 25% solution of shellac, however. You may need to remove excess oil from the coated surface.

The excess oil is "spirited-off" by adding 10 drops of Everclear to the rubbing pad, removing the excess alcohol and lightly wiping the surface using overlapping strokes. This is a very tricky procedure as you are trying to dissolve the excess oil with the very solvent you have used to dissolve the shellac. This procedure can dissolve the finish if not properly done.

Using the 10% shellac mixture, coat the binding and purfling first. It is important to inspect the pad frequently to make sure no pigments or oils are accumulating on the pad. The binding and purfling are usually dark hardwoods and you do not want to contaminate the light top wood with color from adjacent binding or purfling. If you notice that the pad is picking up color, replace it with a new one. Coat the binding and purfling with 2 - 3 coats before proceeding further.

**Allow 15 minutes between applications of the shellac.** Store the pad in a small closed container to prevent the shellac from drying on the pad. A baby food jar works fine for this purpose.

**Make a new pad for use on the guitar top only.** The top or soundboard of a fine instrument is usually a light-color spruce and must remain free of any pigment contamination from the darker woods used in the back, sides, neck or headstock. Moisten the pad with the 10% shellac, wipe off the excess, and using a light touch, apply the shellac mixture to the guitar top with the pad. Apply the shellac with the grain. Add 6-8 drops of shellac and wipe off the excess as needed. Apply three coats to the guitar top allowing for drying time in between. Keep this pad in a separate container and use it only for the guitar top.

Now take out the pad used for the binding and purfling. Add a very small amount (about 6 - 8 drops) of the 10% shellac mixture to the pad. Always remove excess shellac from the pad on scrap pieces of wood before coating the surface of the guitar. Apply three coats of shellac to the sides and back of the guitar, adding shellac to the pad as needed. Again, apply the shellac in the direction of the grain. Make three applications to the guitar top, allowing for drying time between coats.

**Make a new pad** and apply three coats of 10% shellac to the neck.

**Now switch to the 25% solution of shellac.**

Apply three coats of the 25% solution of shellac to the entire guitar, this time using a circular motion. The circles will be about 1-1/2 inches in diameter. As you move the pad, each circle will form a spiral as the circles overlap one another. Hang the guitar up to dry by placing a hanger through the tuning machine holes and securing it to a hook in the ceiling.

### **Filling the Wood Pores**

The binding, peghead, neck, sides, and back of the guitar are made of hardwood, and most hardwoods have pores that must be filled. There are several brands of wood pore filler on the market. If, however, you want to use strictly traditional materials, you should use very fine pumice which can be obtained in most woodworking stores.

**Make a new pad just for pumice applications.** Moisten the pad with 10% shellac and, as always, wipe off the excess. Now add just a very small amount of FFFF powdered pumice to the new pad. Press the pumice into surface of the moist pad. Now wipe off the excess shellac and pumice on a separate piece of wood used only to wipe the pumice pad. The only

remaining pumice particles will now reside between the cloth weave. The pumice will be expelled from the weave and fill the wood pores as you rub the pad over the surface.

**Do not apply pumice or wood filler to the top surface of the guitar.** The top, being less porous does not need the pumice treatment. Using a circular motion as above, apply the pumice coating to the peghead, neck, sides, and back. Re-moisten the pad and add a small amount of pumice to the pad as needed, and always wipe off the excess on a spare piece of wood. Repeat this as often as needed for the application to the peghead, neck, sides, and back of the guitar. Place the pumice pad in a separate container between applications. Note: pumice is abrasive and will wear a hole through the pad. Replace the outer covering of the pad as needed.

**Allow thirty minutes for a pumice application to dry.** A surface treated with pumice will have a gritty feel after it dries. The grit is the pumice. Use 600-grit sandpaper to lightly sand the surface. When sanding, remember that you are removing excess pumice, and filling wood pores, not removing the previous applications. Inspect the sandpaper. If pumice or shellac particles are adhering to the sandpaper, the shellac is not yet dry. Wipe off the sandings with a clean, soft cloth.

Once you have sanded off the excess pumice, you can continue building up the shellac on all surfaces with the 25% shellac solution. Apply five more coats of the 25% shellac solution using the appropriate pads and drying times. After these five applications of 25% shellac, again apply pumice to fill the pores. Let this pumice coat dry for thirty minutes. Sand lightly, wipe off the sandings, and continue with five more applications of the 25% shellac. Keep alternating the five coats of shellac with one coat of shellac with pumice until you think the wood pores are filled. Let the guitar hang overnight to dry after you have lightly sanded the surface. The next morning, you will notice that you need to apply more wood filler due to the surface having dried thoroughly overnight. Repeat the alternate applications of pumice with 25% shellac until the surface is very smooth after the 600 grit sanding.

Now that the surface is filled, build up the finish with thin coats of the 25% shellac mixture. Make sure that the bindings and purflings have a good buildup of shellac on them. It will be necessary to level the surface by lightly block-sanding it after every five applications with 600-grit paper. Keep repeating applications and sandings until a total of 40-60 thin coats have been applied to all surfaces. At this point, because there are numerous layers built up on the surface, the same pad can be used to apply shellac to the whole guitar. You cannot however, use the pumice pad. Now hang the guitar in a safe dry area to cure for a week.

The entire surface of the guitar is now wet-sanded with 600 or 800-grit, wet sandpaper. Not all sandpapers can be used for wet sanding. The sandpaper must be labeled as "wet paper." Wipe off the surface with a damp, clean, soft cloth. Let the surface dry. The total shellac finish consisting 40-60 coats is now equivalent to two sheets of paper in thickness.

## **Polishing**

Polish the surface of the instrument with a 14-inch soft, cotton buffing wheel. I use a slow rpm motor. I also use Menzerna cream polish for "loading" the buffing wheel. Be extremely careful when buffing. Do not rush. Use a very light touch with the buffing wheel and do not apply it to any one area for a prolonged period or you will buff through the shellac surface.



**"Loading" the buffing wheel with Menzerna polishing compound.**

Use a sure grip and a light touch so that the buffing wheel does not "grab" the guitar and throw it on the floor. I have seen this happen! You have almost completed the guitar by now, having invested several weeks in the building and finishing process; yet the entire instrument can be ruined in an instant if the buffing wheel grabs it. Be particularly careful around edges and the soundhole. These are areas that can easily be grabbed by the buffing wheel.

Now that you have finished polishing the guitar, carefully cut the finish around the masking tape with a very sharp knife before removing it in preparation for gluing the bridge.

### **Summary**

The finest luthiers have consistently used the French polishing method to finish their instruments as it produces a very deep, lustrous and pleasing appearance. Once cured, it is also one of the most inert finishes and it can easily be repaired with applications over a particular area. By contrast, applications of nitrocellulose lacquer, polyurethanes, or photochemical-cured resins are toxic. These finishes are usually thick and tend to damp the sound of the instrument.

Try the French polishing method on your next instrument!

Best wishes,  
Karl Markl



**Markle with a vintage Martin uke he restored from pieces, retaining all of the original woods.**



**Light shows through a properly thinned and braced soundboard. Markle uses this damaged component in his lectures and demonstrations of luthiery technique.**

#### **About the Author**

Karl Markl has been a luthier for nineteen years and is best known for his restoration work and custom-built classical guitars and ukuleles. He studied classical guitar construction with Sasha Radicic of the European Lutherie School in St. Louis, Missouri. Karl began playing music professionally at the age of fifteen. He also teaches music to inner-city grade school children as well as to adults at St. Louis Community College. Karl is the owner of South County Vintage Instruments. His email address is [scvi1@aol.com](mailto:scvi1@aol.com).