TEXTURING AND LAYERING WITH MIXED METALS

Take a Layered Approach

Layer different metals to give your jewelry texture and dimension.

by Barbara Nelson

Basic artistic concepts, such as creating a three-dimensional form, using contrast and texture, and manipulating positive and negative space, all come into play when you mix metals. Layering different metal elements will literally add depth to your jewelry and also add visual complexity.

How the layers of different metals relate to one another determines the order in which you’ll fabricate a jewelry piece. Pre-planning will help prevent you from overheating the joins or secondary metals so you don’t damage or destroy the piece. You’ll learn these techniques by making the pendant of the featured necklace. You can then apply what you’ve learned to make the links to finish the necklace.
Pre-plan with sketches. Sketch your design by breaking it down into layers [1]. Decide which parts must be soldered to which layer and how you will join the layers. When you're planning the piece, consider the texture, form, shape, and size of each decorative gold or copper element (see "Why Not Brass," below). Use tracing paper to create the individual layers, and then use a glue stick to transfer the drawings to cardstock. Cut out each layer to make your templates. Manila file folders work well for making templates because permanent marker will not bleed through them and soften the edges or blur the outline.

Select a gauge for the leaf layers. You will have better results with mixing metals if you use 20–22-gauge (0.8–0.6 mm) sheet metal for the leaf layers (see "Gauge Advice," below), because those are moderate gauges. The leaf pendant in the featured project is over 3 in. (76 mm) long and the leaf layers are 22-gauge (0.6 mm) silver sheet. If you make the leaf layers from a metal gauge that's too thin, the secondary metal elements may pool or sink (see "Pool or Sink," below).

Cut out the layers of the leaf pendant. Use a permanent marker to trace the template for the top and bottom layers of the leaf pendant onto 22-gauge (0.6 mm) sterling silver. Using a jeweler's saw with 2/0 blades, cut out the two leaf shapes. Flatten the metal with a rawhide mallet, and mark a front side on each leaf.

Build the top leaf layer. Cut a 3-in. (76 mm) piece of 16-gauge (1.3 mm) gold wire for the main vein. The wire should be long enough to slightly overhang the leaf at one end. To get a good solder seam, make sure to fit the vein to the front side of the top leaf layer [2] without any gaps. Flux each piece, placing the vein on the top layer, and then allow the pieces to air-dry. If they're still wet, the flux may bubble while you're soldering and cause the pieces to move. You can speed up the drying process by drying the pieces with a small hair dryer.

Heat the entire piece, keeping the torch mainly on the perimeter instead of directly on the vein [3]. This will prevent you from overheating the vein before the metal reaches soldering temperature. When the flux on the piece begins to go clear, indicating the metal has reached soldering temperature, bring a ball of hard silver solder on a soldering pick to the edge of the join where the vein overhangs the leaf. Keep the torch...
moving, but concentrate more heat on the join. Watch for the solder to flow. Then move the torch along the vein to keep the solder moving along the vein.

If the vein begins to warp, use the soldering pick to gently push it down while you continue to heat it. Remove the pick as quickly as possible because it acts as a heat sink and will stop the flow of the solder. If you can’t get the vein down, or if you see metal starting to pool around it, stop heating the piece. Pickle, clean, and re-flux it, and then try again. You can improve the fit of partially soldered pieces by using a rawhide mallet to tap them down before reheating. Correct any irregularities in the join of the main vein before you add the smaller metal elements. Clean and flux the top leaf layer and then set it aside to dry.

**Add the smaller metal elements.** Cut 18-gauge (1.0 mm) gold wire to make small veins that abut the large vein. Make three copper balls from 18-gauge (1.0 mm) copper wire. Flux the copper wire before you make the balls, and then pickle them afterward. To clean the smaller metal elements, adhere them to masking tape and sand them lightly on 400-grit sandpaper. Flux the smaller metal elements and allow the flux to dry. Use a syringe applicator to apply medium silver paste solder to each small vein and copper ball. Position the veins and balls on the leaf, using small soldering tweezers; the paste solder will hold them in place.

Heat the entire piece until the solder flows. Hold the torch briefly on stubborn areas, but be careful not to overheat the join of the main vein. Keep a soldering pick in hand to realign the metal elements if they move. When the solder flows, remove the heat and then quench and pickle the piece. Trim the excess from the ends of the small veins with flush cutters, and then sand the edges of the top layer smooth.

**Form the layers.** Place the top layer of the leaf pendant in a wooden dapping block. Place a wooden punch on the veins and then tap it with a hammer or rawhide mallet end-to-end a couple of times to make the leaf concave. Clean and flux both sides of the piece, and allow it to dry. Repeat to form the bottom layer of the leaf pendant; or, use a large steel forming set. Turn the piece over on a steel block, and hammer the leaf tips to create undulating curves.

**why not brass?**

It’s not advisable to use brass with sterling silver in mixed-metal designs, because brass is an alloy of copper and zinc. Silver solder is an alloy of fine silver, copper, and zinc. So, when you’re soldering brass to sterling silver, the zinc and copper present in the brass tend to alloy with the silver, turning all the metals into solder. The result is heavy pooling of silver solder around a sinking brass element. You can solder brass to copper without this problem occurring.

**gauge advice**

Selecting sheet in thinner gauges, like 26–28 gauge (0.4–0.32 mm), for the leaf layers will present more challenges during soldering. The thin metal may melt or cause the secondary metal elements to sink.

On the other hand, soldering small secondary metal elements is more difficult with 18-gauge (1.0 mm) or heavier leaf layers. Because 18-gauge (1.0 mm) metal requires more heat overall to bring the entire assembly up to the solder’s flow temperature, using a thick-gauge sheet makes it more likely that the smaller metal elements will pool.

Sheet in the 20–22 gauge (0.8–0.6 mm) range offers the best results for mixed-metal designs.
Build the bottom leaf layer. Make an oval spacer ring from 14-gauge (1.6 mm) square sterling silver wire. Determine the placement of the spacer ring and then use a scribe to mark its position on the top of the bottom leaf layer [11]. Clean and flux the spacer ring. Solder it into position, using hard silver solder [12].

Cut out a bail from 22-gauge (0.6 mm) sterling silver sheet, and fit the bail to the back of the bottom layer [13]. Clean and flux both the bail and the back of the bottom layer. Solder the bail in place with medium solder. Pickle and rinse the bottom leaf layer.

Form a ring of easy wire-solder that matches the size and shape of the spacer ring [14]. Tap the wire solder with a rawhide mallet to flatten it. Flux the bottom leaf layer and the wire solder. Place the wire solder on the spacer ring, and allow the flux to air-dry so it will hold the solder ring in place.

Solder the top and bottom layers. Place the top layer on the bottom layer to test the balance of the piece [15]. Good balance will minimize movement.
when the solder ring flows and allows the top layer to drop into position. Place the bottom layer securely into pumice gravel and then place the top layer in position on top of it.

Heat the pieces from the edges, keeping the torch low and angled so you apply heat to the bottom layer [16]. When the flux on the bottom layer begins to go clear, indicating that the metal has reached soldering temperature, start moving the torch over the top layer. When the solder flows, the top layer will drop into place. Keep the entire assembly at soldering temperature for a few seconds after the top layer drops, and use a soldering pick to gently adjust the position of the top layer. Keep the torch moving during these adjustments. If either layer looks like it is overheating during this final soldering, pull the flame back from the piece.

Finish the piece. Firescale is a discoloration on the sterling silver caused during soldering and is visible between the veins [17]. Light sanding or buffing with a Scotch-Brite buff on a buffing machine [18] may help, but be careful not to wear

pool or sink

**Pooling** usually occurs when you overheat the secondary metal before the backing metal reaches soldering temperature. The result is a loss of crisp edges and clean joins. **Sinking** occurs when the backing metal reaches a semimolten temperature, allowing the secondary metal element to sink into it. The result is that the secondary metal element looks as if it were almost an inlay. Both pooling and sinking are akin to fusing and indicate that the metal is being overheated.

It’s difficult and time consuming to clean up pooling or sinking scars around a secondary metal piece, but if you don’t correct the problem, it will get worse in subsequent soldering steps. If you have to clean up, do it after each soldering.

To clean up pooling and sinking scars, use sanding disks in a flex shaft. The disks come in coarse, medium, and fine grits. Use the edge of a new sanding disk to clean minor pools along the secondary metal’s join. Once the edge of the disk softens, it won’t get in crevices as well. Use the flat side of the sanding disk to smooth ridges along the silver’s surface, and then use consecutively finer grits to smooth the metal. You can also use burs to get into tight spaces, but take care not to create a bigger problem. Small files of assorted shapes are useful too; remember to use emery paper to smooth over the file marks when you’re done filing.

Sometimes the secondary metal has melted so much that cleanup won’t be effective. Removing the secondary metal completely usually produces a deep scar in the silver backing that’s difficult to repair, but as a last-ditch effort, it’s worth a try. If removing the secondary metal is no longer an option, try hammering the secondary metal element into the backing metal and then sanding the top so it looks like an inlay.
away the veins.

Use liver of sulfur according to the manufacturer’s instructions to oxidize the entire pendant. Buff off some of the oxidation to accentuate the contours, layers, and veins. If the first layer of oxidation is not a uniform color [19], use a toothbrush or a brass brush with soapy water to clean the piece [20], and then oxidize and buff it again [21].

Highly polished finishes are not optimal with mixed metals. The metals reflect off each other and hide the contrasting colors. To achieve a striking effect, buff only the secondary metal elements to a high polish. Start buffing lightly, using a muslin buff with tripoli polishing compound in a flex shaft. Watch closely to see how much metal is being removed. Don’t buff too heavily on the secondary metal, and be careful not to alter the shape of the veins. After buffing, you can apply paste wax as a sealant to protect the finish.