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METAL CLAY FUNDAMENTALS



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Design Idea 724U



Tammy is the founding editor of the magazines *Step by Step Beads* and *Step by Step Wire*.

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INTRODUCTION TO METAL CLAY

Silver metal clay is a compound of fine silver particles, organic binder and water. Metal clay is pliable with a consistency similar to modeling compound and it can be worked with your fingers and simple tools. It's true benefit lies in being able to create designs made of metal, without the tools and time consuming metalsmithing techniques otherwise required if working with metal sheet and solder. Metal clay is best suited for techniques that are not easily attainable in traditional fabrication so the true benefit and cost savings (your time!) are realized.

There are few brands of silver metal clay on the market. Differences between Art Clay® and Prometheus Silver Clay are listed on pages 5 and 6.

As metal clay is formed into a finished design, dried and fired at a high temperature, the binder and water burn off. The metal particles fuse to form solid metal that can then be worked with traditional metalsmithing skills.

Metal clay shrinks in the drying process and more significantly in the firing process. Each brand has a different percentage of shrinkage — the range is from 8% to 12% with the clays we will be using. Details will follow.

Once fired, silver metal clay can be hallmarked and will assay as .999 pure. The metal is lighter and less dense than metal sheet so the finished designs will be lighter and easier to wear.

The tools needed to work metal clay are included in our basic kit.

DIFFERENCES BETWEEN PROMETHEUS & ART CLAY®

Fine silver clays work similarly. Silver particles are mixed with an organic binder. They look and work just like ceramic clay. They are easily manipulated with simple tools and hands. They can even be thrown on a pottery wheel. You may add water to both to make them more workable, or to create paste (also known in the clay industry as “slip”). Both can be reconstituted from dry by adding water.

They can be kiln fired or torch fired. When fired, the organic binder burns away. The silver is sintered (united, but not melted) and you have a solid piece of .999 fine silver. Prometheus shrinks 12-13% and Art Clay shrinks 8-9%. The nice thing about shrinkage is that you work in a larger format and when the clay shrinks the details become more defined.

Art Clay is manufactured from reclaimed silver such as from film stock and negatives. Both brands are non-toxic according to their manufacturers. Prometheus Clay is a Turkish product. Art Clay is a Japanese product.

Raw and dried Prometheus 999 is a different color and texture than Art Clay, but after firing and finishing they are all .999 fine silver and have the same lustrous appearance after finishing.

Prometheus 999 can be fired at a lower temperature than Art Clay and therefore can be fired with more types of inclusions, such as glass, that cannot survive higher temperatures.

Prometheus 999 claims to be more malleable, meaning it is easier to bend without cracking.

DIFFERENCES BETWEEN PROMETHEUS & ART CLAY® CONTINUED

When dry, Prometheus 999 is very dense, although it is harder to break at this fragile stage. You may find it more difficult to sand, file and shape your piece.

Torch-firing Art Clay is only recommended for items no larger than a half dollar and less than ¼" thick for uniform firing.



DIFFERENCES IN SILVER METAL CLAY

	Gas Burner	Torch Fire	Kiln Fire	Shrinkage	Firing Temp	Firing Time
Prometheus Fine Silver	Not Advised	Not Advised	X	12%	1058	60 min
				13%	1292	60 min
Art Clay Silver	Up to 25 gm (Not with cork clay or artificial gemstones larger than 5mm)	Up to 25 gm	X	8-9%	1200	30 min
				8-9%	1290	15 min
				8-9%	1380	10 min
				8-9%	1472	5 min

Since the two brands have different firing times, shrinkage rates and temperatures, do not mix the two types of clay in one piece.

TIPS

- ☞ Applying a bit of olive oil to your hands, work surface and tools prior to working with the clay will help prevent the clay from sticking to those surfaces.
- ☞ Clay is packaged to prevent moisture loss. Shelf life is based on the possibility of moisture loss in the packaging causing a change in the pliability of the clay. Once the package is opened, covering clay with plastic cling wrap will help retain moisture and working condition. Metal clay can be rehydrated by following the next two notes.
- ☞ Before opening a package prepare a hydration station. Place a sponge or paper towel dampened with distilled water snugly in the bottom of a small container. Turn the jar upside down and place it over any clay you are not currently using to keep it hydrated.
- ☞ Spritz with a bit of water when surface appears to be drying/cracking. Allow the water to absorb before working with it and work the water in by “squishing” the clay with your fingers (make sure you have applied olive oil to prevent wet clay from sticking to your hands).
- ☞ Drying time will vary based on conditions in the room and your environment. Pieces will generally dry overnight, but drying times can be sped up by using a candle warmer or dehydrator. Clay must be dry before firing or the remaining moisture will escape and alter the surface of your design.
- ☞ You can store clay (even those packages still wrapped) in an air-tight container with a damp paper towel tucked inside. Use distilled water for wetting the towel to prevent too much mold from forming. Any mold formed on or around the clay has not been found to cause any problems with the clay.
- ☞ Use distilled water to wet the clay, as well as when forming “paste” from your leftover pieces from sanding and filing that you have collected. This will help prevent mold blooms in your container.

TIPS CONTINUED

- ☞ Acrylic slats are available to use as thickness guides. Simply roll your clay between the chosen slats to create a uniform thickness. Another option is to use ordinary playing cards to create your own thickness guides. Tape two or more together to create different thicknesses.
- ☞ Aluminum tools can be used when working with metal clay, but do not allow metal clay to dry on an aluminum form and do not incorporate any metal clay that may have dried on an aluminum tool into your slip/paste (there is an adverse chemical reaction between metal clay and aluminum which will not yield desired results).
- ☞ Remove all dust before firing or it will fire in place.
- ☞ White residue after firing is not residue but rather a bumpy surface that cannot reflect light. Knock down the bumps with a burnishing tool. The light will reflect and the metal will shine!



by
Barbara A.
Briggs

Design
Idea
K11N

BASICS

ROLLING CLAY INTO A SHEET

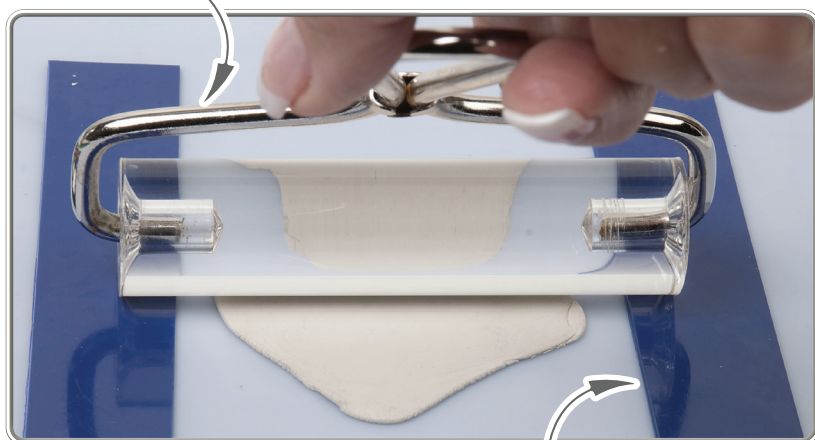
Have all supplies ready — the clay air-dries so it's best to be prepared before you open the package. Determine the thickness you need for the project you are working on, keeping the shrinkage percentage in mind.

STEP 1: Lightly oil your roller, the work surface (a silicone or teflon sheet is recommended*) and your hands. Unwrap your clay and condition it by pressing it between your fingers for a few seconds.

STEP 2: Place the clay onto your work surface, between the thickness guides. Roll across the clay using the roller. Flip the clay and roll again. Continue flipping and rolling until the clay is rolled to the height of the thickness guides.

Note: The flipping will help keep the clay from sticking to the work surface as well as the roller.

Acrylic roller



Acrylic thickness slats

**Teflon sheets sold on page 39.*

ROLLING CLAY INTO A SHEET & ADDING TEXTURE

Have all supplies ready – the clay air dries quickly, so it's best to be prepared before you open the package. Select thickness guides for the predetermined thickness of the clay before texturing, and a thinner set of thickness guides to use with the texturing plate.

STEP 1: Lightly oil your hands, roller, work surface and the texture plates (sold on page 40) you'll be working with. Unwrap your clay and condition it by pressing it between your fingers for a few seconds.

STEP 2: Place the clay onto your work surface, between the thickness guides. Roll across the clay using the acrylic roller. Flip the clay and roll again. Continue flipping and rolling until the clay is rolled to the height of the thickness guides.

STEP 3: Place the clay on a texture plate. Place the thinner thickness guides on each side of the clay, on top of the texture plate. Using the acrylic roller, firmly roll across the surface of the clay. Once you think you have achieved your desired impression, lift the clay slightly to see if the impression is as you intended.

Note: The flipping will help keep the clay from sticking to the work surface as well as the roller.

- ☞ If so, remove the clay and place onto the non-stick sheet
- ☞ If not, set the clay back down and roll across the surface one more time, then carefully remove the clay from the texture plate and flip upside down (revealing the texture) onto the non-stick sheet, texture side up

Tip: If you'd like, before rolling the clay out, you can place a different texture plate on top of the clay and roll across it to impress a texture on both sides of the clay.



CUTTING OUT CLAY TEXTURE & FORMING OPTIONS

Lightly oil your hands, roller, work surface and any textures and forms of your choice.

STEP 1: Open the package of clay and remove about 10 grams. Compress it between your fingers a few times then place it between thickness guides suited to your finished design. Using an acrylic roller or brayer, roll over the clay 1-2 times. Flip the clay over and roll again. Repeat until the clay is level with the guide and has a shape suited to your cutout shape.

OPTIONAL: Transfer the clay to the oiled texture plate. Place thickness guides, thinner than the original thickness, on either side of the clay, yet on top of the texture you are working with; roll out the clay.

STEP 2: Carefully transfer the clay, right-side up, onto a non-stick worksheet. Place the appropriate template or cutter onto the clay, positioned so you are capturing the area of the sheet you'd like. If using a template, place the tip of a beading awl or fine knitting



needle along the inside edge then cut out the shape. If using a cutter, press firmly through the clay.

To dry the clay flat, put the non-stick sheet aside so the clay shape can dry flat.

TO FORM OR DOME THE CLAY

Carefully transfer the shape to the mold or form, either face down or up depending on the design effect you are going for. Gently press into place.

Allow to dry completely.

JOINING WET CLAY TO WET CLAY

STEP 1: Create the base of your design. Determine the best method for joining the ends.

STEP 2: Using a paintbrush, apply a layer of water to the first or bottom layer.

STEP 3: Press the top or second layer of clay to the wet area of clay. Apply pressure either with the paintbrush or an oiled finger. Apply additional water, if necessary.

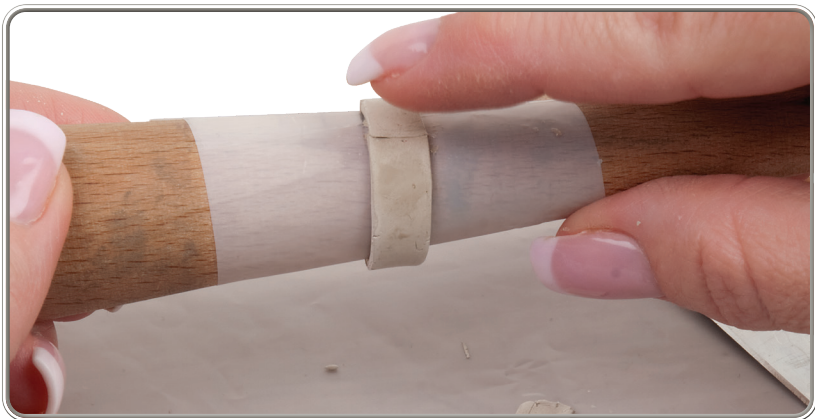
Two important factors for joining clay are water and pressure. The oil helps keep the clay from sticking to your finger as you apply pressure.

STEP 4: Using the paintbrush, clean up the join and ensure the seam is sealed.

STEP 5: Allow the clay to dry. Using slip or paste, fill in any areas that are not smooth and sealed. Allow to dry again.

Once dried completely, refine the area as needed.

Note: Do not mix Prometheus and Art Clay as they fire differently. This could result in your piece falling apart during firing.



JOINING DRY CLAY TO DRY CLAY

Complex designs can be created by joining dried, refined clay to other dried, refined clay. Create the components of your design, allow them to dry thoroughly then refine them.

Note: Dried, refined clay is clay that you have worked by filing, sanding and shaping.

STEP 1: On one layer of your design, apply a thick layer of slip or paste-type clay using a fine-tipped paintbrush.

STEP 2: Apply a thick layer of slip or paste-type clay to the second layer. Press the two layers together. Using the paintbrush, apply a bit of water, as well as neaten up the slip that has “oozed” out between the join.

Allow the clay to dry. Fill in any areas that are not smooth and sealed.

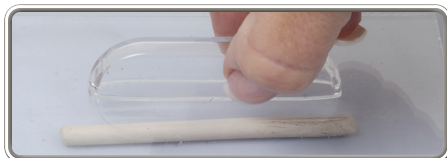
Allow to dry again. Once dried completely, refine the area as needed.

Note: You want the slip to be thick in this area as well as exceed the join. However, it does not need to be messy, just thick enough so when the clay dries, the join is still sealed well.



ROLLING A ROPE OF CLAY

Using a clean, dry cloth, clean your work surface and snake roller (sold on page 40). The snake roller is used to easily flatten and roll out tubes of polymer clay or metal clay by pressing gently onto the desired surface.



STEP 1: Pinch off about 10 grams of slow dry clay from the package and condition it by pressing it between your fingers a few times.

STEP 2: Roll the clay into a cylindrical shape with your hands and place onto your work surface. Place the snake roller on top of the cylinder of clay then move the roller forward and back, rolling the clay. Put downward pressure on the roller to stretch the clay into a thin rope.

Roll to the thickness needed for your project.

TO TAPER ONE END OF A ROPE

As the rope begins to get longer, put more pressure on one end of the rectangle, creating a thinner end on one side of the rope.

EXTRUDING A ROPE OF CLAY FROM AN EMPTY SYRINGE

STEP 1: Remove the plunger from the syringe. Pinch off about 10 grams of clay and condition between your fingers. Roll the piece of clay into a cylindrical shape that can fit into the tube of the empty syringe.

STEP 2: Place the clay into the empty syringe tube then reinsert the plunger. Depress the plunger until it meets the clay. Work the air out from around the clay, helping to eliminate air bubbles in the extruded clay later.

STEP 3: Begin extruding the clay from the syringe tube onto the work surface, working in nice even lines.

Tip: If the clay is difficult to extrude, place the end of the plunger on the work surface (with the tip of the syringe pointing up) and, by pulling down on the syringe, depress the plunger with the work surface's support.

TEXTURING DRIED CLAY

Dried clay can be textured or carved using sharp tools. The key to success with this application is ensuring you plan ahead and create the proper thickness for your finished design. You want to have at least a 2-card thickness below the lowest carved area so you retain integrity and structure in the fired piece.

It is often best to practice this on polymer clay prior to trying it on metal clay, so you get a feel for the tools and the motion as well as have a pattern in mind.

STEP 1: Wrap the forefinger of your non-dominant hand with finger-wrap or put on a leather thumb (typically used for hand-sewing leather). Hold the dried piece in your non-dominant hand. Hold it so the piece is comfortable and stable.

STEP 2: Carve across the surface, working from the front to the back toward your forefinger.

Continue until your pattern is complete.

Alternatively, you can “engrave” the clay using fine-tipped metal tools, like beading awls, needles, etc.



File sets sold on page 41

USING THE SYRINGE-TYPE CLAY TO DECORATE & EMBELLISH A DESIGN

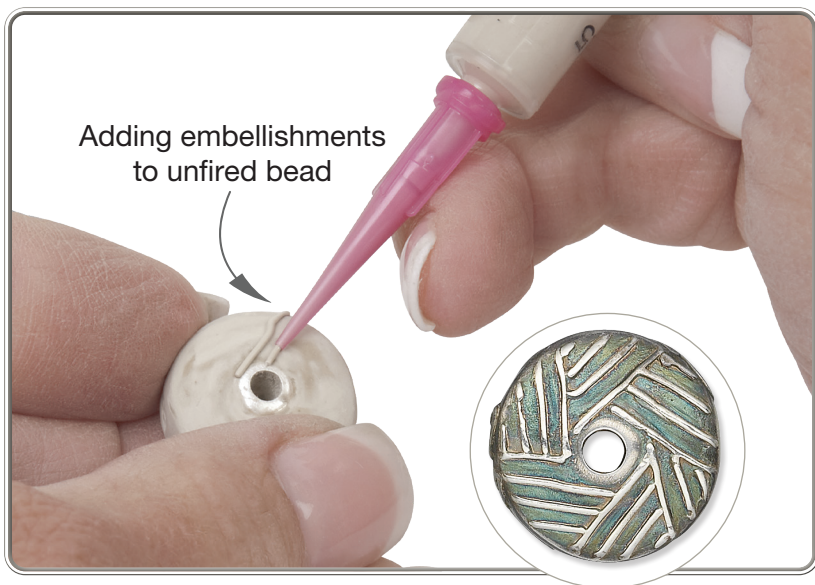
STEP 1: Create a piece and refine it by getting it to the right size, adding desired embellishments, etc. When it is perfect and ready for firing, use a paintbrush and water to wet the surface in preparation for decoration.

STEP 2: Place the appropriate tip on the end of the syringe. Depress the plunger slowly to release a little bit of clay, as well as any trapped air.

STEP 3: Extrude the clay into the design of your choice. Using the paintbrush, wet the surface again, working carefully so you don't compress the surface of the extruded clay.

Gently press on the extruded syringe-type clay to secure the two surfaces together. Let the clay dry.

Once dry, check to make sure the extruded clay has adhered to the surface of the design. If there are any gaps, fill in the spaces using the syringe- or paste-type clay. Let dry.



Adding embellishments
to unfired bead

Fired Bead

CREATING A TWO-PART SILICONE MOLD

STEP 1: Gather equal portions of each part of the two-part molding compound, so when combined it equals an amount larger than the object being molded.

STEP 2: Blend until the compound is one uniform color.

STEP 3: Work the compound into a ball shape. Place the ball onto the work surface and flatten slightly. Press the item to be molded into the molding compound so the entire shape is captured and the item is level.

Let the item and compound rest in place until the compound is cured, approximately five minutes.

Once cured, remove the item from the mold.

Tip: You'll know when the compound is cured when you can press your fingernail into the side of the compound and your nail doesn't leave a mark.



CREATING A COMPONENT FROM A MOLD

STEP 1: Pinch off enough clay to fill the mold. Condition it by compressing it between your fingers for a few seconds, then form into a small ball shape.

STEP 2: Press the ball of clay into the mold so it fills the space created by your object as well as sits level.

OPTIONAL: Press a texture onto the back side of the clay so both the front and the back will hold details.

Set aside until the clay is dry. Drying time will vary based on conditions in the room and your environment.

Tip: You can wait 30 minutes, carefully release the clay from the mold and set on a candle warmer or in a food dehydrator to expedite the drying.

STEP 3: Once fully dried, refine with sandpapers and polishing papers, working from the lowest to highest grit, on both the front and back.



CREATING A CLAY ELEMENT FROM AN ORGANIC FORM

(FIRED IN PLACE)

STEP 1: Stir the paste-type clay using the handle of a paintbrush, bamboo skewer or other similar item. You want to make sure you stir the paste, working all the way to the bottom of the jar, incorporating any silver particles which may have settled.

STEP 2: Using a paintbrush, apply a thin coat of paste-type clay to the entire surface of the dried pod or other item that can be fired in place. Make sure you get into all areas. Set the item onto a non-stick sheet to allow the clay to dry.

Drying time will vary based on conditions in the room and your environment.

STEP 3: Repeat Step 2 six more times.

STEP 4: Carefully refine the dried clay using needle files, salon nail board, sandpapers and polishing papers, working from the lowest to highest grit, until you are pleased with the finish.

STEP 5: Fire and finish accordingly.



*Design
Idea
822S*

CREATING A HOLLOW FORM

STEP 1: Create a form from a combustible (and safe) material like cork clay, or apply a layer of white glue (like Mod Podge®) to an organic form (like a seed pod).

STEP 2: Roll out a sheet of metal clay to be applied to the core. (The glue will help the clay stick.)

STEP 3: Embellish the form.

STEP 4: Dry, refine and fire accordingly. The core will “combust” in the firing cycle. If you have a hole in the design, you can rinse the inside of the form to remove the “burnt” remains.

ADDING FINE SILVER FINDINGS TO WET CLAY

Fine silver findings, wire and components can be fired in place. Sterling silver can be fired in place when using low fire metal clay.

STEP 1: Using tweezers or flat- or chain-nose pliers, grip the finding and place it into the wet clay.

Note: Consider the shrinkage factor when positioning the finding. You want to ensure your findings are not in a vulnerable spot or too close the edge.

Ensure the finding is placed level and square to your design. Allow it to dry.

STEP 2: Using a paintbrush, apply slip or paste-type clay to fill in any gaps that may have emerged during the drying phase.

Allow to dry, then refine and fire accordingly.



ADDING FINE SILVER FINDINGS TO DRY CLAY

There are times when you may want to add a finding or component to your design after it has dried.

Apply water to the area where you want to add the finding. Place a piece of wet clay to the wetted area.

Repeat Step 1 and 2 of Adding Fine Silver Findings to Wet Clay.



ATTACHING A FINE SILVER PIN BACK FINDING

Fine silver findings can be fired in place. Create a brooch with the pin back finding set.

STEP 1: Using tweezers, grip one half of the pin finding and place it into wet clay, approximately 1/3 of the way down from the top of the design and at least 1/4 inch from the edge. Place the second half of the pin back finding in the same position, opposite the first half. Check to make sure the pin back finding parts are positioned directly across from each other so the pin will line up straight once the brooch is fired.

Tip: It's good to have the pin back finding positioned above the center of the brooch so it doesn't flop forward when you wear it.

STEP 2: Using the paintbrush, apply slip or paste-type clay over the flat parts of the pin back finding, closest to the brooch's surface. Repeat to have two good layers securing the finding parts and let dry.

STEP 3: Refine the entire surface of the brooch using salon nail boards, sandpapers and polishing papers, working from the lowest to the highest grit.

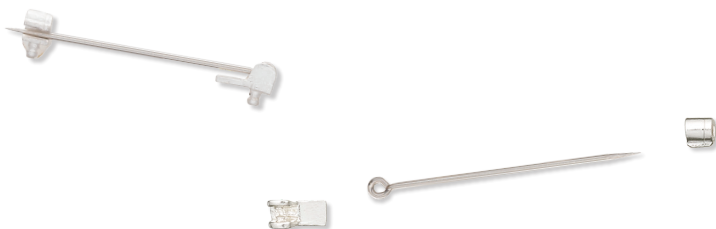
Remove any remaining particles from the surface of the brooch before firing it.

ATTACHING THE PIN TO THE PIN FINDING

STEP 1: Check the length of the pin against the space between the two halves of the pin back finding. If the pin extends past the end of the brooch, use the flush-cutters to trim to the appropriate length. The point of the pin should extend just past the catch of the pin back finding, yet not past the edge of the brooch.

STEP 2: Use jeweler's files and sandpapers, working from the lowest to the highest grit, to re-sharpen the end of the pin.

STEP 3: Position the circle end of the pin into the hinge half of the pin back finding so the knobs on the inside of the finding fit into the open circle. Using chain-nose pliers, close the pin back finding to secure the pin.



REFINING DRIED METAL CLAY

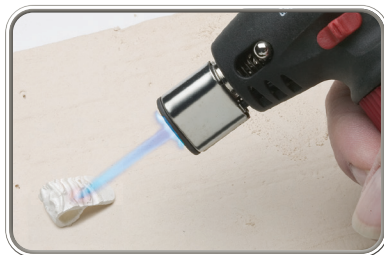
It is advisable to refine or finish the surface of dried metal clay prior to firing. This will ensure your piece comes out of the kiln with the best possible finish and require minimal work to polish it.

- ☞ Before you begin refining metal clay, clean your work surface so when you capture your “dust” it can be repurposed into paste or slip .
- ☞ The clay is at its most fragile and vulnerable state when dry, so support the piece as best as you can while applying pressure in finishing.
- ☞ Refining can be done with various tools and sanding materials. Always work from the lowest (coarsest) grit to the highest.
- ☞ Do not remove more material than is absolutely necessary — you do not want your metal clay design to become too thin.
- ☞ Always remove any remaining “clay dust” as it may fire in place otherwise.



FIRING WITH A BUTANE TORCH

Silver metal clay can be fired to the proper temperature and held for a suitable amount of time to reach sintering using a butane torch. The metal clay piece must be completely dry before firing and it should not be larger than a silver dollar for this to be done properly.



STEP 1: Be sure to work in a well-ventilated area and on a heat-proof surface. Place a fire block onto the heat-proof surface. Following the instructions for your butane torch, fill the chamber with butane fuel. Set your timer for 2-1/2 minutes.

For safety purposes, have a pair of long-handled tweezers and a bowl of cold water near where you are working. Put on your safety glasses.

Tip: Dim the lights in the work area, if possible, so you can see the color of the piece while firing.

STEP 2: Place the metal clay design onto the fire block. Press the safety on the torch, ignite the torch then press the switch to keep the flame lit (this will enable you to work without having to hold the trigger of the torch the whole time).

Begin to heat the design, working the flame around in a circular pattern. Soon you will see smoke, then a small flame. That is the indicator that the binder is burning off. If you look closely you will also notice the piece has shrunk. Continue to heat the piece until it reaches a peachy-salmon color.

STEP 3: Once the piece reaches the peachy-salmon color, hit the timer and begin the 2-1/2 minute countdown. Continue to heat the piece, maintaining the color, working the flame over the entire surface in a circular pattern. This will help ensure the piece is heated properly.

Tip: If the design begins to appear shiny it is getting too hot. Pull the torch away slightly so the flame isn't so close to the piece. Continue to heat the piece and maintain the peachy-salmon color.

Once you have fired the piece for 2-1/2 minutes, you can turn off the torch and set it aside. Let the piece cool to room temperature. Finish accordingly.

FIRING IN A KILN



FIRING A FLAT DESIGN

For designs that have a smooth back or flat surface, there is no need to add support. The design can be placed directly onto a kiln shelf — NOT the kiln floor.

FIRING A RING, DOMED OR SHAPED DESIGN IN A KILN

For designs which are domed, have dimension or depth, you want to support them in the firing process. The metal in the kiln reaches at least 1100° Fahrenheit, gravity will take over without the support and your piece can wind up flat. Here are some options for support.

FIBER BLANKET

- ☞ While working in a well-ventilated area, and while wearing a mask, tear off pieces of fiber blanket that are suitable in size for supporting the shape of your design
- ☞ Place the lumps of fiber blanket into a ring band or onto the kiln shelf for other types of components
- ☞ Place the ring onto the kiln shelf or a section of fiber blanket; place the domed or shaped components on top of the lumps of fiber blanket
- ☞ Fire the kiln following the manufacturer's recommended temperature and time. Let the components cool to room temperature, then finish accordingly.

VERMICULITE (a soil additive found at local nurseries)

- ☞ While wearing a mask, put vermiculite onto the kiln shelf or into a kiln-safe container
- ☞ Place ring or the domed or shaped components on top of the vermiculite and nestle the piece(s) into place
- ☞ Fire the kiln following the manufacturer's recommended temperature and time. Let the components cool to room temperature, then finish accordingly.

KILN FIRING A DESIGN WITH INCLUSIONS

It is advisable to fire designs with gemstones or glass in a kiln with an electronic controller as the speed for heating and cooling can be controlled, as well as regulate the temperature.

Note: If firing above 1300° Fahrenheit, be sure to leave an opening in the clay, positioned behind the glass, so there is room for the glass to escape as it reaches a soft state.

STEP 1: Place the design into the kiln, ensuring it is supported or positioned in a way that is best suited to the design. (See “Firing in a Kiln” for guidance on placement and positioning.)

STEP 2: Determine the temperature best suited to the material you are firing as well as the clay you have used. Set the kiln with the following parameters:

- ☞ Ramp speed – 100°/hour
- ☞ Kiln temp – best suited to the design components
- ☞ Time – hold for longest recommended time at the recommended temperature (different for each brand)
- ☞ Cool to room temperature without opening the kiln door

CAUTION: If you open the kiln door, room temperature air will rush into the kiln, cooling the silver fast and forcing the inclusion to cool fast. This may create thermal shock and cause the inclusion to crack.

Design Idea
9A47



USING GOLD PASTE TO ACCENT METAL CLAY

Add a bit of gold to a design. Not only does it make a beautiful accent, gold also increases the value of your design.

STEP 1: Prepare a design, fire and let it cool to room temperature. If needed, dilute the paste per manufacturer's instructions.

STEP 2: Using a paintbrush, apply a layer of gold to the design. This layer should not be more than 0.5mm thick.

STEP 3: Allow the gold to dry completely. Heat the kiln to 932° Fahrenheit. Carefully place the design onto a kiln shelf in the kiln. Heat the kiln to 1472° Fahrenheit. Hold the temperature for 10 minutes. Turn the kiln off and allow it to cool to room temperature.

STEP 4: Place the cooled component onto the rubber block. Brush the surface of the gold area using a burnisher, working in small circular strokes. Complete the polishing by applying a dab of metal polish with a soft, lint-free cloth and rubbing onto the surface of the components. Follow this with the Moonshine® polishing cloth (sold on page 39).



Design Idea
822Q

FINISHING FIRED METAL CLAY

The surface of fired metal clay will appear white once cooled. This is quickly remedied by changing the topography of the silver.

STEP 1: Stabilize the piece in your hand or place it onto the rubber block. Using the steel brush, brush across the surface until you achieve a silvery satin finish.

STEP 2: Further enhance the shine of the silver by going over the surface with a burnisher.

STEP 3: Complete the polishing by applying a dab of metal polish to a soft, lint-free cloth and rub onto the surface of the pendant. Follow this with the Moonshine® polishing cloth (sold on page 39).

If you'd like to add an antiqued effect to your pendant, follow manufacturer's instructions for using the liver of sulfur (instructions also found on page 29). After patinating, use the Moonshine polishing cloth to burnish the surface and return it to bright silver, leaving the patina in all the recesses you created with the texture.

You can also use a tumbler with mixed stainless steel shot for a high shine.



APPLYING A PATINA WITH LIVER OF SULFUR™

Give bare clean copper, bronze or silver a classic patina with Liver of Sulfur™ (LOS) oxidizing agent. Create a vintage style you won't have to wait years for.

STEP 1: Clean your piece thoroughly with a paste of baking soda and water. Dry.

STEP 2: Microwave or otherwise heat 1 cup of water until steaming, but not boiling. Fill a second cup with cold to room temperature water for rinsing.

STEP 3: Place a thumbnail-sized amount of LOS into the steaming water and stir until dissolved. Measure approximately 1 teaspoon of ammonia and add to LOS. Mix well.

STEP 4: Using tweezers, grasp the cleaned metal clay piece firmly with tweezers or make a hook at one end of a wire and string the piece on it.

STEP 5: Dip quickly into LOS and then into rinse water. Dry.

STEP 6: Repeat, dipping from LOS to clean water until the color is satisfactory.

When completed, dry piece thoroughly and, if desired, rub with silver polish on a soft cloth, brush with stainless steel brush or use a miniature power tool to remove patina from raised areas for maximum contrast.



APPLYING PATINA WITH PATINA GEL

Patinas add warmth to metal (bare clean copper, bronze or silver) as well as offer an antiqued effect, enhancing the recesses of a textured finish. Patina Gel is a stable patina that has a long shelf life.

STEP 1: Thoroughly clean the metal to be patinated, removing any oils or dirt on the surface of the metal. The patina will not work well if the surface is not clean.

STEP 2: Prepare three bowls: plain coldwater; cold water with baking soda for a neutralizing bath; warm water with a drop or two of patina gel. (The water should not be boiling as that would create harmful sulfur-dioxide fumes. Stir the water to mix in the gel.)

STEP 4: While wearing a glove, dip the polished and cleaned metal into the patina gel solution.

Note: The darker the color the less control you will have on the colors achieved in the patina process.

STEP 5: Remove the item and dip it into a bowl of plain cold water.

Repeat Steps 4 and 5 until you are happy with the result of the patina.

The dipping process will be like adding multiple layers of patina rather than just one, it will also allow you to control the colors on the metal better; you may like the gold or purple achieved midway to black.

STEP 6: Once you are happy with the color achieved, put the piece into the neutralizing bath to stop the patina process and hold the color.

Rinse the piece in clean water then dry it.

STEP 7: Wrap the Moonshine® polishing cloth (sold on page 39) around the handle of a tool then rub the cloth against the surface of the piece you patinated.

Polishing the piece this way will remove the patina from the high areas and leave the patina in any recesses. If you don't wrap the cloth around a stick, the cloth will conform to the surface of the item and remove the patina from all levels.



PATINA TIPS

Liver of Sulfur™ will go through the following color changes: gold, amber, magenta, blue and black. The intensity of the color changes depends on a number of factors:

- ☞ The degree to which the piece has been polished; the higher the initial polish, the brighter the colors
- ☞ Whether ammonia has been added; colors will be more intense and brighter with ammonia
- ☞ The temperature of the water; the cooler the water, the longer it will take to change color and the duller the colors will be

Rinsing your piece after each dip is important, as the LOS will continue to act even once the piece has been removed from the solution.

Drying your piece after rinsing is equally important. Re-dipping without drying will add cool water to the LOS solution and cause it to dilute and be less effective.

Do not immediately place finished LOS pieces into the tumbler, as certain tumbling solutions may cause the LOS patina to bleed, contaminating the water and any other pieces in the tumbler.

If you are not satisfied with the result, or have left your piece inadvertently in the LOS too long, it is possible to remove the patina entirely. Either place the piece in a kiln to a temperature of approximately 1,100° Fahrenheit, or fire your piece with a butane torch for a few seconds until the piece becomes white and the patina is gone.

CAUTION: Do not fire glass or ceramics with a torch.



POLISHING WITH A TUMBLER AND STAINLESS STEEL SHOT

STEP 1: Unscrew the nut on the top of the barrel. Remove the metal washer. Remove the outer metal lid. If the lid is difficult to remove, insert the washer into the area between the lip of the lid and the barrel and twist to lift the lid away from the barrel. Work all the way around the lid to loosen until the lid can be removed.

STEP 2: Pull the center bolt on the inside lid to expose the inside of the barrel.

STEP 3: Fill the barrel with the metal charms, wireworked elements, metal clay designs, etc. Add 2 pounds stainless steel shot. Add burnishing compound (dilute mixture of liquid dish soap and water) to the barrel until it's filled to just above the shot and jewelry components.

Replace the inner lid, the metal outer lid, the washer then the nut until the lid is secure. Only tighten the nut by hand, not with tools.

STEP 4: Plug the tumbler in, then place the barrel onto the rollers, lining up the groove in the nut with the guide on the base of the tumbler.

Let the tumbler run for 20 minutes then check progress. If needed, run the tumbler longer until the desired finish is achieved. Dump the stainless steel shot and jewelry components into a sieve over a bucket. Remove the jewelry components and rinse them with soap and water. Let dry. Return the shot to the tumbler barrel for storage or leave it in the sieve undisturbed until it is dry, then place in a top zip bag. Dispose of the water in the bucket as you would other wash water.



SETTING A STONE IN METAL CLAY

There are several ways to add a stone to your metal clay. Stones add great value to your metal clay creations.

FIREABLE STONES

Some stones can withstand the heat of a kiln (See the Gemstone Firing Chart on pages 37 and 38). The following chart provided by Art Clay World can help you determine if a stone is fireable. Stones are not uniform. They may have flaws or inclusions that alter their ability to be fired. It is highly recommended to pre-fire your stones before you fire them into clay. A stone may crack, explode, melt or change color and ruin all your hard work and materials.

METHOD ONE: CREATE A METAL CLAY BEZEL

STEP 1: Cut a small circle from your base piece. This should be slightly smaller than the stone you are setting and will accommodate the pointed pavilion of your stone.

STEP 2: Use syringe silver or a clay snake to create a bezel around the hole.

STEP 3: Press the stone into the bezel. It needs to be pushed in far enough that the bezel comes up just over the top of the girdle of the stone. As the metal fires and shrinks it will grasp the girdle and prevent your stone from coming loose.

STEP 4: Refine and dry. Use a water brush to smooth any imperfections and clean the surface of your stone. Any remaining clay residue or dust will fire in place and be harder to remove.

STEP 5: Fire and finish.

SETTING A STONE IN METAL CLAY

CONTINUED

METHOD TWO: CREATE A CARVED METAL CLAY BEZEL

STEP 1: Push your stone into a thick piece of clay until the clay just comes up over the top of your stone's girdle.

STEP 2: Use a sharp oiled blade to cut away any excess clay. You may make any shape bezel you choose.

STEP 3: Refine and dry

STEP 4: Use a bit of clay paste or syringe silver to attach the stone and bezel to an unfired piece of metal clay.

OPTIONAL STEP 5: Add more clay and use carving tools to add shoulder details to the stone setting.

METHOD THREE FOR CABOCHONS:

OPTIONAL STEP 1: Cut a hole smaller than the stone in the base piece (to allow light to shine through).

STEP 2: Build a bezel with syringe clay and include a nice decorative rope over the top of the stone for beauty and security.

STEP 3: Refine with a water brush, dry and fire.

ALL STONES INCLUDING NON-FIREABLE STONES

METHOD ONE

STEP 1: Cut a piece of fine silver bezel wire the exact length of the diameter of the stone.

STEP 2: Solder the bezel strip closed and test fit your stone into it.

STEP 3: Press the fine silver bezel deep into your raw metal clay. When it is fired the fine silver will fuse with the clay.

STEP 4: Test the fit of your stone. You may need to remove a bit of clay from under the setting to accommodate the pavilion of the stone. When the stone is in place the girdle of the stone should be just under the top edge of your bezel.

SETTING A STONE IN METAL CLAY CONTINUED

OPTIONAL STEP 5: You may reinforce and/or embellish the bezel with syringe or paste clay.

STEP 6: Dry and fire with the bezel but no stone in place.

STEP 7: After cooling, set stone in place. Push the edge of the bezel down to hold stone in place. When pushing bezels push from opposite sides to center the stone.

METHOD TWO:

STEP 1: When creating your base piece, incorporate metal tabs or prongs that can be fired into place (like petals of a flower).

STEP 2: After firing and cooling, fold the tabs over your stone to hold it in place. Work from opposite sides to center the stone in the middle of the setting.

METHOD THREE:

STEP 1: Purchase pre-made fine silver bezels.

STEP 2: Use a bit of oil paste to paint the bottom of the bezel and let dry.

STEP 3: Wet the spot where you want to attach your bezel cup and the bottom of the bezel cup with water.

STEP 4: Apply a bit of silver syringe to your base and attach the bezel cup.

STEP 5: Fire and finish.

STEP 6: Add the stone and push the bezel sides down to hold the stone in place.

Watch a video on creating a silver border mold ring online at:
firemountaingems.com/resources/videos/fb06
Or enter "FB06" in the search bar.

USING SYRINGE-TYPE CLAY TO SET A STONE

STONE MUST BE SUITABLE FOR FIRING IN PLACE

You can set a stone in clay and fire it in place if the stones can withstand the heat. You must let the kiln cool to room temperature before opening the door to eliminate thermal shock. Check the Mohs rating for the stone you want to use before starting your project; harder stones work better. Place the stone by itself in the kiln and run the planned firing schedule to see if the stone can withstand the heat.

Create a design and let it dry. Refine it until it is perfect and ready for firing. This step will minimize the work needed after the stone is in place and the clay bezel has dried.



*Design
Idea
822L*

STEP 1: Using the syringe-type clay, apply a large, controlled amount of clay on one side of the design.

STEP 2: Using the tweezers, pick up the stone and place it into the clay. The wet clay will move out and surround the stone, creating a rim or “bezel” around the perimeter.

STEP 3: Use a damp paintbrush to neaten up the bezel of clay so, when fired, the clay works to hold the gemstone in place. Let the clay dry.

STEP 4: Examine the bezels and fill in any gaps, or even up the edges of the bezel by applying more clay.

Refine the areas around the stones so the bezels are neat and clean. Clean off the surface of the stones using the paintbrush and, if needed, a small amount of water.

Note: You want the exposed surface of the stones to be free of any clay before they are put into the kiln or the metal will fire in place.

GEMSTONE FIRING CHART

Provided by Art Clay® World

This chart provides information on the gemstones and natural stones that can be safely fired with Art Clay and which stones should be avoided. Use the following key to determine what stones are safe to use with the Art Clay products available:

** Can be safely fired in place with Art Clay Silver standard and slow dry formula, in addition to all 650 series.

(650) Can only be fired with Art Clay Silver 650 low fire series.

GEMSTONE CHARACTERISTICS

Stone	Hardness (mohs)	Specific Gravity	Refractive Index	Dispersion	Durability
Alabaster	2-2.4	2.2-2.4	1.52	med-high	low
Alexandrite**	8	3.68-3.79	1.54-1.75	low	high
Amber	2.5	1.03-1.10	1.54	none	low
Apatite (650)	5	3.16-3.22	1.64-1.65	low	medium
Aquamarine	7.75	2.68-2.70	1.57-1.58	low	high
Azurite	3.5	3.8	1.48-1.65	none	low
Beryl (650)	7.75	2.68-2.70	1.57-1.58	low	high
Cat's Eye**	8	3.68-3.79	1.54-1.75	low	high
Chalcedony	7	2.65	1.55	low	high
Chrysoberyl**	8	3.66-3.79	1.54-1.75	low	high
Corundum**	9	3.95-4.10	1.762-1.770	low	high
Diamond	10	3.52	2.42	high	high
Emerald**	7.75	2.66-2.70	1.57-1.58	low	high
Epidote	6	3.25-3.49	1.73-1.76	med-high	high
Feldspar	6-6.5	2.54-2.58	1.522-1.530	low	medium
Garnet (650)	7.5	3.70-4.16	1.74-1.89	med-high	high
Gypsum	1-1.5	2.3	1.53	med-high	low
Hematite (650)	5.5-6.5	4.95-5.30	2.94-3.22	none	high
Jade/Jadeite	6.5-7	3.30-3.38	1.66-1.68	none	high
Jet	3.5	1.1-1.4	1.64-1.68	none	high
Kunzite	6.5-7	3.18	1.660-1.676	medium	low
Labradorite (650)	6	2.70-2.72	1.55-1.57	medium	medium
Lapis Lazuli	5	2.76-2.94	1.5	none	medium
Malachite	3.5-4	3.25-4.10	1.655-1.909	none	medium
Marble	3	2.71	1.48-1.65	none	low



Stone	Hardness (mohs)	Specific Gravity	Refractive Index	Dispersion	Durability
Moonstone (650)	6	2.58	1.518-1.526	low	high
Nephrite	6.5	2.96	1.62	none	high
Obsidian (650)	6	2.33-2.60	1.48-1.51	high	medium
Olivine	6.5-7	3.3-3.5	1.654-1.690	medium	high
Peridot (650)	6.5-7	3.3-3.5	1.654-1.690	low	medium
Quartz	7	2.65	1.55	low	high
Rhodonite	5	3.53	1.73-1.74	none	medium
Ruby**	9	3.95-4.10	1.762-1.770	low	high
Sapphire**	9	3.95-4.10	1.762-1.770	low	high
Serpentine	3.5	2.5-2.7	1.57	low	low
Sodalite	5	2.13-2.29	1.483	low	medium
Spectrolite (650)	6	2.70-2.72	1.55-1.57	low	medium
Sphene	5-5.5	3.52	1.95-2.05	high	medium
Spinel**	8	3.6	1.72	low	high
Spodumene	6.5-7	3.18	1.660-1.676	low	low
Steatite (soapstone)	1-1.5	2.7-2.8	1.540-1.590	none	low
Topaz (heat diff.)**	8	3.54	1.63	low	medium
Tourmaline	7	3.06	1.63	low	high
Turquoise	5	2.6-2.8	1.61-1.65	none	medium
Zircon	7	4.02	1.81	high	high

Warning: Do not subject stones with fractures or heavy inclusions to direct heat (such as torch or kiln). This could cause the stone to explode.

Fire Mountain Gems and Beads® cannot be responsible for stone breakage or accidents resulting from firing gemstones.

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