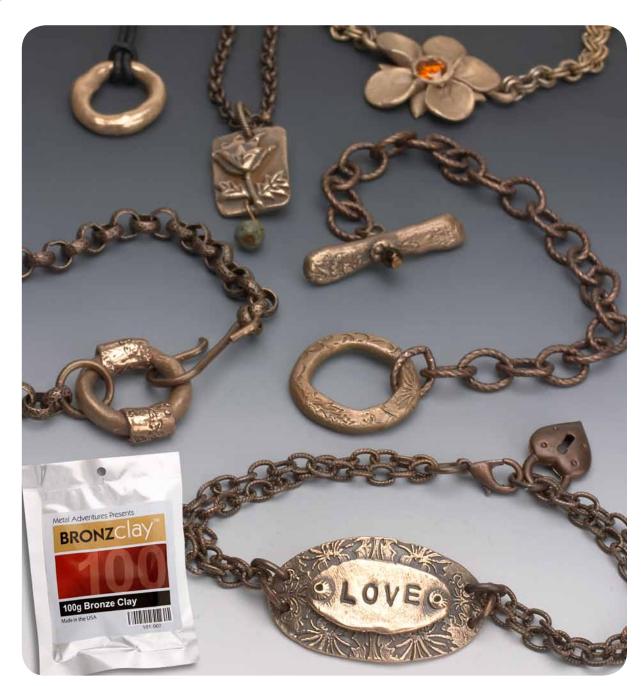


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Table of Contents

Introduction to Bronze Clay	2
Tools	2-4
Techniques	4-15
Basics	4-6
- How to handle the clay	
- Storing bronze clay	
- Making slip	
- Homemade oil paste	
- Keeping your clay hydrated	
Working Methods	7.0
- Sculpting and texturing	
- Attachments	
- Filling seams and gaps	
_ Making holes	
Beads	
- Core beads	
- Tube beads	. 10
Embedding Stones	. 10
Embedding Wire	
Carved Pieces	
Repairs	
- Unfired clay	
- Fired clay	
Drying and refining the clay	
- Sanding	
- Refining holes	
Drying	
Firing	
Finishing Techniques	4-15
- Burnishing	. 14
- Patinas	. 15
Barrer Brothad	
Bonus Project	0.00
Sculpted Flower Charm	o-20
Bronze Clay Gallery	2 - 23





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Introduction to Bronze Clay

Bronze clay consists of copper and tin particles suspended in an organic binder. It consists of 89% copper and 11% tin, which creates a solid bronze object after the binder burns away and the particles sinter during firing. The clay is smooth and pliable and can be sculpted, textured and carved to make a variety of projects.

The clay shrinks about 25%, so allow for this when sizing pieces. It must be fired in a stainless steel container layered in carbon to keep it from oxidizing. Bronze clay is sensitive to oxidation and will crumble if not fired properly. You only need a few simple tools and firing accessories to successfully fire bronze clay.

Bronze has a rich warm color, with a variety of options for finishes and color. It is very strong and dense, which is perfect for jewelry pieces. The best part is that it is inexpensive, making it a good choice for larger pieces, and offering the freedom to experiment without worry.

Tools

The following are the essential tools and supplies you will need as a minimum when working with bronze clay. If you already use silver metal clay, many of the tools will be familiar to you. A few of the tools are especially good for texturing bronze clay, which is quite different than that of silver clay.

It's a good idea to keep your silver metal clay tools separate from your bronze clay tools unless they are tools you can clean between uses. Silver will attempt to alloy with bronze if bits are embedded in the unfired pieces. Supplies such as sanding papers and files are inexpensive and disposable, making it easy to use them specifically for the clay being used.

Tools and Supplies

<u>Work surface</u> - A Teflon sheet is a good choice for a work surface because you can remove the clay easily from the non-stick surface of the Teflon.

<u>HattieS® NoStick™, olive oil or Badger Balm</u> - Use one of these on your hands and tools to keep the clay from sticking





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<u>Playing cards or spacers</u> - Roll various thicknesses of clay by using spacers or cards on each side of the clay as you roll. The spacers act as a guide for the roller which will keep the thickness of the clay consistent.

<u>Roller</u> - A lightweight plastic roller allows you to roll flat sheets of clay. This type of roller is less likely to stick than rollers made of other materials. A light coating of HattieS® No StickTM will further minimize sticking.

<u>Sherri's Favorite Clay Shaper Tool</u> - Dual-tipped multipurpose tool. One tip is a tapered round shape which is perfect for blending, sculpting and making attachments. The other end is a wedge shape to use for smoothing edges and pushing flat surfaces on the clay. The firmness of the tool is just right for moving the clay. It's also excellent for polymer and other metal clays as well.

<u>Round Tapered Paint Brush</u> - Stiff bristles are perfect for the texture of bronze clay. The bristles help with sculpting and smoothing the clay. Softer brushes do not work as well, since bronze clay is heavy and dense.

Soft Grip Knife with #11 blade - Cut out shapes and trim clay with this pointed knife.

Pro Needle Tool - Used for piercing holes in the clay, scoring and making textures.

<u>Wet Wipes (baby wipes)</u> are good to use to clean your hands if the clay starts to build up on your fingers. Use them to cover your clay as you work to keep pieces moist.

<u>Emery Boards</u> - disposable type with two grits (one on either side). Sand the edges of your dried clay with a small emery board.

Long Brass Scratch Brush - For burnishing the fired bronze clay.

<u>3M polishing papers (3 grits Green, Gray, Blue - 400, 600 and 1200 grit)</u> - Polishing papers have a fine grit on a soft cloth like paper and are used on both fired and unfired clay. Use the papers to sand unfired clay prior to firing, starting with the coarse grit moving progressively finer. After firing the bronze, use the papers to bring the surface up to a high shine if desired.

<u>Curved Burnisher</u> - Use this tool to burnish the raised areas or textures of the fired clay to add sparkle and shine.





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<u>Sherri's PasteMaker™ or lavender oil</u> - Add a small amount to clay to create a paste for making attachments with dry clay and repairs. Sherri's PasteMaker™ comes ready to use. Lavender oil should be mixed two drops with 1 teaspoon of water. PasteMaker™ creates a smoother paste than lavender oil.

<u>Ultra Polishing Pads</u> - Polish the metal to remove patina or oxidation for a bright finish

<u>Metal Clay Dryer</u> - Bronze must be thoroughly dried before firing to prevent oxidation and for proper sintering. Warming devices will speed the process.

<u>ClaySafe™ and ClayVault™</u> - Field tested and proven effective, the ClaySafe™ is ideal for storing clay during a work session. One handed operation makes it easy to keep your clay soft and moist without having to rewrap it every time you need some. The ClayVault™ is ideal for overnight and longer term high capacity storage. The unique included water crystal guarantees an ideal storage condition! It is recommended for maximum protection that clay be wrapped up in plastic then placed in the ClayVault™.

Firing Accessories

<u>Coal Based or Coconut Shell Carbon</u> - Coal based carbon produces a range of colorful patinas on the fired bronze. Coconut shell carbon gives the fired bronze a uniform brown/gold patina. Both can be left as is or burnished away during the finishing process.

<u>Stainless Steel Firing Container and Lid</u> - fill the container with layers, first of carbon, then alternating layers of bronze pieces and carbon finishing off with a layer of carbon on top. Pieces must be surrounded with the carbon. The lid helps to keep an oxygen free environment during firing.

Techniques

Basics

How to handle the clay

If you are familiar with silver metal clay you will note that bronze clay has a much stickier texture than silver metal clay. The clay will stick to your fingers and tools. To help keep this to a minimum,





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oil your hands and fingers with a little HattieS® No StickTM, olive oil or badger balm prior to working with the clay. Oil your tools and cutters as well; this will minimize the amount of clay that sticks to them. If your clay is sticky right out of the package, take a lump of clay out and let it sit to dry out for a minute or so. This usually helps reduce the moisture and then you can pick it up and roll it into a ball.

It also helps to keep the clay cool as you work. Bronze clay is very similar to chilled cookie dough. Cookies that require the dough to be chilled are firm and easy to handle while cool but become progressively stickier as the dough warms up. This is the case with bronze clay; as it becomes soft and sticky try putting it in the refrigerator for awhile in an airtight zip top bag. The good news is that bronze clay is not as expensive as silver, so don't worry if you get a little muddy. Just wipe the clay away with a baby wipe and start with fresh clean fingers when necessary.

Storing Bronze Clay

While working on a project, it is best to keep unused clay wrapped up tightly. Alternatively, you can use a ClaySafeTM or a ClayVaultTM to quickly move pieces back and forth as you work to keep the clay moist. For overnight and longer term storage keep the clay refrigerated. Press the air out of the bag as best you can then seal the clay tightly in its original zip top bag. Alternatively, you can wrap the clay in cling wrap and place in the larger ClayVaultTM to keep it from drying out. If any oxidation does appear on the surface (it will be a dark brown or black color), scrape off the outer layer of oxidation and use the fresh clay underneath.

Making slip

Slip is indispensable when it comes to working with bronze clay. It is very easy to make and is good to have on hand when working on a project. To make slip, use Sherri's Favorite Clay Shaper tool to incorporate water with the clay to make a creamy paste. Start by making a thick slip, adding a few drops of water to a small lump of clay on your work surface. Blend well before adding more water until desired consistency is







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obtained. Use the tool to "mash" the water into the clay until thoroughly blended. Continue adding water until it is the consistency of soft frosting. The slip can vary from thick to very thin (like cream) depending on what is needed for your project. Thick slip can be used to fill gaps or to make attachments. Thin slip made with more water is good for smoothing small cracks or refining rough areas. The slip can be saved in a small closed container for about a week, and needs to be refrigerated in the same manner as the opened package of bronze clay. (see "Storing Bronze Clay")

Homemade oil paste

In addition to making slip with water, you can make an oil based slip that is stickier to help when making repairs. This is especially helpful for repairing previously fired pieces. Mix 6-10 drops of Sherri's ready to use PasteMakerTM into a small pea sized lump of clay for a creamy consistency. Alternatively, you can use lavender oil by mixing 2 drops of it with 1 teaspoon of water then add 6-10 drops of this mixture to a small pea sized lump of clay until desired consistency is obtained. If time permits, it is helpful to let the clay mixture sit in a closed vial or plastic container for a few hours or overnight which allows the liquid to soak into the clay without having to spend as much effort incorporating the water into the clay. Add a bit more water as needed until the desired consistency is obtained. The paste should last for some time if kept in a closed container. Do not use if the clay starts darken in color which indicates that the clay is oxidizing.

Keeping your clay hydrated

As you work, keep the clay a soft pliable consistency. This is done by incorporating water with the clay as it begins to dry out. You will know its time to add water when the clay feels like chalk on the surface and cracks around the edges when rolled or pressed flat. To hydrate the clay, press the ball of clay into a flat pad. Add a few drops of water into the center and fold the clay in on itself. This will work the water into the clay from the inside out, preventing it from sticking to your hands. Roll it in the palm area of your hands. Repeat a few times as necessary until the clay is a soft workable consistency.







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Working Methods

As with any other type of water based clay, there are various stages of working as the clay dries. Sometimes fresh moist soft clay is preferred for a technique and other times it helps to let the clay dry a bit so it will firm up and hold its shape better, for example when attaching formed elements. Once you become accustomed to the clay and how quickly it dries you will become skilled at knowing when to add moisture as you work and knowing when the clay is dry enough to move on to the next step. This depends on how warm and humid your environment is. To keep your clay moist, only use what you need at a time and keep the rest of the clay wrapped up or stored in the ClaySafeTM or ClayvaultTM to keep if from drying out too quickly.

Sculpting and Texturing

Bronze clay is smooth and pliable and it can be sculpted, textured and stamped. Use the techniques described in the following sections to help you with sculpted projects. Form shapes by hand or use small clay or cookie cutters. Form curved shapes while the clay is still moist. Blend simple shapes or formed clay components together to make more complex designs. Leather stamping tools, texture plates and found objects can be used to texture the clay. Use HattieS® No Stick™, olive oil or Badger Balm as a release agent for tools or texturing surfaces that stick to the clay.



Attachments

Bronze clay does not stick easily to itself. Make clay attachments with bronze clay by physically blending pieces of clay to one another using soft clay and paste or slip. Though slip could be used, oil paste seems to work better. To join seams, blend the clay firmly using Sherri's Favorite Clay Shaper to make a good mechanical connection utilizing thick slip or paste between contact areas. The following methods explain how to make clay attachments for the various stages the clay goes through as it dries.





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Making attachments with moist clay

When clay is fresh, make attachments by using the clay shaper tool to blend clay pieces together by pushing and working the soft clay to blend. A small drop of water can be used if the clay is a little dry. Use water sparingly. Too much water causes the clay to be slippery and to not adhere. In this way bronze clay is very different than silver metal clay. Silver metal clay responds to water differently. A layer of water on the surface actually helps the pieces to adhere. It is more important to have thick slip or oil paste handy instead of water for bronze clay.



Attaching fresh clay to firm clay

If you are adding clay to a piece that is dry enough to hold its shape, use slip to make the attachment. Mix a medium consistency of slip and apply it to join the pieces. Press the pieces together using firm pressure to attach the clay.





Attachments with dry clay (leather hard or bone dry)

Score the pieces that are dry, either a base piece that fresh clay will be added to or two dry pieces that will be joined together with the tip of your Soft Grip Knife with #11 blade or needle tool. Use oil paste or a thick slip to attach the pieces. After the oil paste or slip dries, use soft clay and blend over the seam to make sure the attachment is strong. Use the clay shaper tool to blend the clay over the seam followed by a round brush and water to refine after the seam dries.







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Filling seams and gaps

Wait until the clay is leather hard to fill gaps. Blend soft clay into the seam or gap with the clay shaper tool. Make sure the clay is densely packed into the gap; use a brush and water to refine prior to firing. Simply using slip to fill gaps will not be sufficient to substitute for dense clay.

Making Holes

Use a needle tool to pierce holes in the clay for attaching jump rings, wire or stringing materials after firing. To avoid distorting the clay, make a small pilot hole with a needle tool that will be refined later when the clay is dry. A drinking straw or cocktail stick can be used to make larger holes in the clay. Read the section on refining dry clay for how to enlarge and refine the holes before firing.

Beads

Building beads over cores

To make beads with bronze clay, you will need a bead core to cover with clay. Materials such as cork or wood do not work with bronze clay since they burn away allowing oxygen to flow through the bead during firing. Use a ceramic bisque bead or a bead made with Paperclay® (air dry clay made with volcanic ash). Wrap the clay loosely around the core, as the clay will shrink during the firing process. A sheet of clay about 3 cards thick works well for bronze beads. Blend the seam with the clay shaper tool add clay; add clay as needed to cover the core. Create holes for stringing on each end of the bead if you are using paper clay. Use a needle tool to pierce through the clay to expose the existing holes if using a bisque bead. Decorate the bead with textured pieces of clay attached with thick slip. As the clay dries, repair cracks or splits with fresh clay.







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Tube beads

Another type of bead you can make is a tube bead. Wrap a strip of clay loosely around a drinking straw. Blend the seam with the clay shaper tool, add oil paste or thick slip and continue to blend the seam well.

After the seam dries, remove the bead from the straw. Add more clay to the inside seam of the bead and more to the outside to keep the bead from splitting. If the tube bead splits after firing, you can repair it by adding more clay to fill the seam and re-fire the piece.





Embedding Stones

Certain stones will withstand firing at high temperatures. For more information, Metal Clay Supply offers stones that are known to fire successfully with metal clay. Cubic Zirconia stones are a lab created type and most colors fire very well with any type of metal clay including bronze clay. To set a stone in the clay, make an indentation in the clay with a pointed tool.



Setting the stone on top of the indention, push the stone into the clay deeply so that the girdle of the stone is embedded below the surface of the clay. The clay will shrink in around the girdle as it fires, creating a secure setting that will hold the stone in place in the finished piece.







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Embedding Wire

Brass, copper or bronze wire are good choices for embedding into bronze clay. These metals will withstand firing temperatures without reacting with the bronze. Brass or bronze coordinates with the color of the bronze clay in a pleasing way. To make a loop to embed in the clay, form a loop over a form such as a pair of round nose pliers. Use chain nose pliers to hold the ends of the wire and twist the ends of the wire to embed in the clay. The twist will mechanically hold the wire in place so it won't pull out after firing. Clip off the excess wire if the twisted portion is too long for the piece. Embed the loop, burying the twisted portion into the clay.

Use the clay shaper tool to push fresh clay around the base of the loop for extra security.





Carved pieces

Clay that is dried to a leather hard state can be carved using carving tools. A V-Gouge or Micro-Carvers™ are nice tools to use for carving designs on the dried clay surface. Smooth the carved detail with a paint brush and water to soften the edges if desired.

Repairs

Unfired clay

If your clay breaks prior to firing it, you can repair the piece. This often happens if you are sanding the unfired piece too aggressively or if you have a weak or thin spot. Sometimes you simply drop a piece and it breaks. To make a repair, tack the piece together with thick slip and soft clay. Let the piece dry, then add another layer of slip and fresh clay. Oil paste will help if you are having trouble attaching the pieces, as it has a stickier consistency than water based slip. Add an extra layer of





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clay to the back side of the piece if applicable for extra strength. This "patch" will help support the repair. Smooth the clay with a paintbrush and water prior to firing.

Fired clay

Fired clay can be repaired using oil paste. Add fresh clay to the un-burnished piece for best results. It's hard to get clay and slip to stick to a shiny burnished piece of bronze. Fire the piece after making the repairs.

Drying and Refining the Clay

Dry the bronze clay to firm it up prior to refining it. Simply let it air dry or speed the process by using a warming device. When the clay is leather hard you can smooth it with a brush and water or use sanding tools.

Sanding

To sand, use a small emery board to refine the edges of the clay, using a coarse grit to remove rough areas. Use the finer grit to refine the edges and soften corners.

Sanding papers or 3M polishing papers also work well to sand tight areas or around curves.





Refining holes

Use the Soft Grip Knife with #11 blade to drill or shave holes in the dry clay. Place the tip of the blade into the hole and twirl the blade around until the hole is the desired size. Don't put pressure on the blade; let it shave the clay evenly with a soft touch.







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As a final step, smooth edges and surfaces with a brush and water. Water will do quite a bit of refining, so use it sparingly being careful not to wipe out details or textures by mistake.

Drying

After your clay is refined, let it dry thoroughly before firing the clay. This may take several days, especially for larger pieces. If you fire the clay too soon with moisture trapped inside, it will not fire properly and will crumble apart after firing due to the oxygen that is released from the moisture during the firing process.

Firing

Fire the pieces in a stainless steel container in layers of activated coal carbon or coconut shell carbon. The coal based carbon produces colorful patinas including blue, green, purple and gold after firing, the coconut gives a golden brown patina to the pieces. Pour the carbon into the container to make a layer at least 3/4 inch to 1 inch deep for the base. Make sure each piece is placed about 1/2 inch or 1.5cm apart; and that same distance from the sides of the pan. Cover each layer with at least 1/2 inch or 1.5cm deep of carbon. Finish with a nice thick layer of carbon over the last layer of pieces, filling the container to the top. Place the lid on top of the container. This will keep the oxygen from affecting the carbon and keeps the inside of the kiln clean.



Place the container in the center of the kiln on the kiln floor or on a kiln shelf. Make sure the container is not in contact with the thermocouple. Firing bronze clay is very sensitive and you must have even consistent temperatures to fire it properly. Make sure the kiln you use has a good controller with accurate temperature controls. Some small kilns can spike in temperature as they heat up even if they are controlled, so make sure you test fire a few pieces if you are unsure of the kiln you are using. The Lilly KilnTM or Lilly Kiln TravelerTM 3-Key can be programmed to fire bronze clay with success.







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Set the kiln to fire at a 200F/93C per hour ramp speed up to 1550F/843C and hold for 3 hours. After the firing session, let the pieces remain in the stainless container to cool, leaving them in the carbon until cool enough to handle. If the pieces are removed from the carbon while hot they tend to oxidize quickly, turning almost instantly black. Cooling bronze in the carbon will reveal the beautiful patinas created by the carbon.

Remove the pieces from the carbon. The carbon can be saved and re-used for future firings. Check the pieces for any splits or cracks. These can be repaired by adding fresh clay, utilizing oil paste and re-firing if necessary. Beads and rings are particularly sensitive to splitting at the seams. Fill the seams with with oil paste or with fresh clay utilizing clay paste, thoroughly dry and re-fire them.





Finishing Techniques

Burnishing

Fired bronze clay can be finished in the same manner as silver metal clay. A piece can be left as is, or burnished to bring out the bright gold color of the bronze. Start with a brass scratch brush and brush the surface for a matte brushed finish. Use 3M polishing papers to further burnish and refine the pieces. If a shiny gold finish is preferred, using a burnishing tool by hand or a tumbler filled with mixed stainless steel shot, distilled water and burnishing compound will give the metal a bright finish. Other mechanical means for finishing metal are also applicable to bronze clay. Radial disks, polishing wheels and flex shaft tools may also be used.







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Patinas

Patina can be added chemically to bronze after firing and burnishing. One easy method is to use Liver of Sulfur. Warm the piece by running it under hot water and then dip it into a prepared solution of Liver of Sulfur. Dip the piece in clean cold water to stop the reaction. Dry the piece well and use an Ultra Polishing Pad to wipe the patina from the raised areas, leaving the patina in the recessed areas as desired. Do not pour Liver of Sulfur down the drain. Leave it outside for light to neutralize it and then it can be disposed. It should be used in a ventilated area with great care not to have contact with skin or eyes. Follow all safety guidelines from the manufacturer before using a hazardous product such as Liver of Sulfur. It should never be used around children or pets, and must be disposed as dictated by local authorities.

Finish your pieces by adding brass, copper or silver findings. The bronze looks great mixed with other metals and various jewelry components.

For more information about the products featured, please visit www.MetalClaySupply.com

Sherri's BRONZclay™ Flower Pendant Project is found on the next 3 pages...



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Bonus Project

Sculpted Flower Charm

Step by step images can be found on the last page.

STEP 1

If you would like to make loops to attach to each side of the flower, make these in advance so they can dry. Roll a thin rope of clay and cut it into segments to make the loops. Alternatively you can pierce holes in the flower instead of adding loops. Skip steps 1 and 2 if you prefer to form holes rather than loops.

STEP 2

Quickly wrap the rope segment around a tool to form the loop. Blend the seam with your finger or another tool. Make 2 loops and set them aside to dry while you make the flower portion.

STEP 3

Roll 5 balls of clay for the petals.





STEP 4

Flatten each and shape into an oval. Form the oval over your finger to shape the petal (thinning it a bit, cupping it over your finger).

STEP 5

Pinch the base of the oval to form the petal. Repeat this for each of the petals.

STEP 6

Score the petal with the clay shaper tool to make "veins" in the petals.

STEP 7

Assemble the flower, using the clay shaper tool to blend the petals together in the center.

STEP 8

Roll a small ball of clay for the center of the flower. Add thick slip to the center of the flower to attach the ball of clay .

STEP 9

Push the ball of clay into the center of the flower.

STEP 10

Use a leather tool to make a texture to the ball of clay if desired.

STEP 11

To embed a stone in the center of the flower, make an indentation with a tool. Place the stone on the indention and push it deeply into the clay.

STEP 12

Blend the dried loops to the sides of the flower with thick slip; add fresh clay after the seam dries for extra security.





STEP 13

Let the flower dry until leather hard. Turn the flower over and build up the center back with soft clay and smooth with water. This will give more strength to the center where the petals connect.

STEP 14

Dry the flower again. Sand the edges with a file and polishing papers. Use water and a paint brush to smooth the surface before firing. Check seams and joints and add more slip, paste or clay if needed.

STEP 15

Fire the piece as directed for bronze clay.

STEP 16

Burnish the piece with a brass brush for a matte finish or use additional burnishing methods if you want a brighter finish.

STEP 17

Attach brass chain with wire or jump rings to make a bracelet or pendant.

PROJECT IMAGES

Step by step images are on the following page...

For more information about the products used in this project visit www.MetalClaySupply.com

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