

Sharing your passion for making jewelry. Products. Service. Know-how.

Welcome to BRONZclay[™] & COPPRclay[™]

BRONZclay™ bracelet created by Celie Fago

An introduction to the tools & techniques for working with BRONZclay™ and COPPRclay™

DD

200g #132-008

🦻 🕒 🚹 🔚 THE Studio

200g #101-008

OPPR

BRONZ

o Disotte

100g #101-007

BRONZ



100g #132-007

800.545.6566

Welcome to BRONZclay[™] & COPPRclay[™]

The Next Step in the Evolution of Metal Clay

Welcome to the next step in the evolution of metal clay: BRONZclay[™], FASTfire BRONZclay[™], and COPPRclay[™]! Both provide an incredible artistic range. And, because they're so affordable, they can be used to sculpt large pieces and create specialized tools—they can even be thrown on a potter's wheel to create hollowware. Available in generous 100- and



200-gram blocks, BRONZclay[™] (original and FASTfire) and COPPRclay[™] allow the artist to experiment with how far (and big!) designs can go.

These clays can be pinched, rolled, sculpted and manipulated. In their dried state, they're still highly flexible and easy to carve—ideal canvases for applying details and finishing touches prior to firing.

When fired in a kiln (as outlined in this booklet), the binder vaporizes, leaving a solid, pure bronze or copper object that can be sawn, shaped, drilled, sanded, patinaed or soldered using traditional jewelry tools and techniques. And because COPPRclay is pure copper, it's great for jewelers and sculptors who enjoy applying enamels (follow the special firing schedule on page 9). These exciting products offer a new world of possibilities for jewelry-makers, artists and sculptors.

The Art of Metallurgy

Bronze and copper, used as far back as 3500 BC and 6000 BC respectively, delivered more strength and durability than iron and commanded a higher price. Every day, bronze and copper artifacts are unearthed, still in excellent condition, still rich in color, full of history and representing an incredible combination of skill and art.

Growing up, Bill Struve, the inventor of BRONZclay[™] and COPPRclay[™], thought about being a physicist or maybe a psychiatrist, but he wasn't interested in math or medical school. Instead, he earned a doctorate in classical chemistry and a master's in electrical engineering, working 20 years in each field before embarking on a third career: art, in the form of metallurgy.

His desire to produce a new medium for his wife to use in creating strong, durable and wearable jewelry led Bill to experiment for countless hours to achieve success with BRONZclay[™] and COPPRclay[™]. As Bill developed these clays, one of his goals was to keep their ingredients safe to use. Another was to keep the tools needed for working with the clays simple: nothing fancy, just the basics, a kiln and the artist's imagination. BRONZclay[™] and COPPRclay[™] would be gifts to the artist, new additions to the tool box.

Although Bill has earned many letters to follow his name, he considers those he ascribed to himself to be the most accurate: "P.M.H." (Philosopher, Maker, Helper). Striving for perfection, he achieved excellence in the form of a piece of clay—open to artistic opportunity, bursting with creative potential. Welcome to BRONZclay[™], FASTfire BRONZclay[™] and COPPRclay[™]—it's time to play!

The

Apart conta consi of pu durin with piece the co

> Co BR BR de bra

Tips

BRON Here

- WI pa pa
- Ru
 wc
 BR
- cla the
- us
- of
- pli
- Ke
- Av

800.545.6566

www.riogrande.com



800



xible

pper nd lying

ed. of

or e in rking

·у

he

0

Commercial Bronze and Copper vs. **BRONZclay™ and COPPRclay™**

comes from recycled materials!

The Right Formula

BRONZclay[™] is true bronze (although a bit less dense) and is composed of tin and copper, not the brass form that you see in most commercial bronze. COPPRclay[™] contains pure copper metal.

page 2

Apart from the water and non-toxic binding materials contained by each of these metal clays, original BRONZclay™ consists of 11% tin and 89% copper; FASTfire BRONZclay™ consists of 10% tin and 90% copper; COPPRclay[™] consists of pure copper. The binding materials vaporize completely during the kiln-firing process, leaving a solid bronze piece

with a density 90% that of cast bronze, or a solid copper piece with a density over 95% that of cast copper. And, all of the copper used to make BRONZclay™ and COPPRclay™



COPPRclay[™] earrings created by Patrik Kusek

Rio carries bronze and copper wire that is ideal for incorporating into BRONZclay[™] and COPPRclay[™] jewelry and hollowware designs.

Tips for Working with BRONZclay[™] and COPPRclay[™]

BRONZclay™, FASTfire BRONZclay™, and COPPRclay™ each have their own special characteristics as well. Here are some tips for working with BRONZclay[™] and COPPRclay[™]:

- When you're not using the clay, keep it in a water-tight plastic container along with a wet sponge or wet paper towel (a take-out soup container works great!). Make sure the clay is not touching the sponge or paper towel.
- · Rub a dab of olive oil on your hands and tools before you begin working with the clay.
- BRONZclay[™] and COPPRclay[™] tend to dry quickly. You'll notice the clay stiffening and cracking when it begins to dry. While working the clay, refresh it periodically with a small amount of water using a spray bottle or brush. You can also knead a small amount of olive oil into the clay to minimize stickiness and to improve pliability.
- · Keep pieces wrapped in plastic and placed to the side when they are not actively being worked.
- Avoid using tools that absorb water.



COPPRclay[™] and enamel pendant created by Pam East

AND

800.545.6566



800.545.6566

Welcome-to-BronzClay-CopprClay-IS.indd 3

Forming BRONZclay ${}^{\scriptscriptstyle \mathsf{TM}}$ and COPPRclay ${}^{\scriptscriptstyle \mathsf{TM}}$

Using simple tools and your own talented fingers, roll, press, form and sculpt BRONZclay[™], FASTfire BRONZclay[™] or COPPRclay[™] into any desired shape. Clay elements can be added, removed and refined as you go, making this a spontaneous and highly creative process. Keep the tips on page 3 in mind as you form your piece.

page 3

Suggested Hand Tools

One of the best things about BRONZclay[™], FASTfire BRONZclay[™] and COPPRclay is that you can find tools to work these clays just about anywhere—around the house, in the studio, the kitchen, the office, the toy box and the great outdoors. In fact, you'll find yourself always on the look-out for everyday objects that can become the next great tool for enhancing your designs.

Basic Tools

to your tool box!

Sheets of plastic or glass make terrific and portable work surfaces. Use Mylar® sheets, page dividers or plastic signs. Most artists start with the tools below; many are available from Rio Grande:

water dish with sponge

Rio tool kit #111-411

Just the Beginning ...

The list below is just a small

sample of the tools you can use

See your Rio Grande catalog or

visit riogrande.com for a wide

selection of hand tools to add

on BRONZclay[™] and COPPRclay[™].

- paintbrush
- plastic rolling tube
- drinking straws
- rubber-tipped shaping tool
- playing cards (spacers)
- needle
 knife
- ruler
 toothpicks
- nail brush

Specialty Tools

As your interest grows, you'll start adding tools to your collection. In addition to your own discoveries, you might find these useful; many are available from Rio Grande.

small chisels

tweezers

tissue blade

• emery boards

• potter's wheel

files

- magnifiers
- stiff flat brush
- rubber stamps
- texture plates
- plastic design templates
- patina solution

www.riogrande.com

Keep Your Tools in Shape!

If you're also a PMC[®] artist, never use nonwashable tools (files, abrasive papers, etc.) on both PMC and BRONZclay[™]/COPPRclay[™] projects. Keep a separate set of these tools reserved exclusively for BRONZclay and COPPRclay.



- Ru FA
- To pla (th
- A k
- To
 slip
 the
 sev
- To the ca
 - po Or
 - it i wi
- To for for
- pre

Note

water to allo aside small it plia



800

RIO GRANDE

page 4

Basic Forming Techniques

orm

into

ive

ce.

y™

ıst

۱,

d

are

7

.)

ls

AND

- Rub a few drops of olive oil on your palms and tools before •
 FASTfire BRONZclay[™] starting to keep them from sticking to the clay and to keep the clay moist.
- To make sheets, use a roller and stir sticks or two equal stacks of playing cards on each side of the lump to make a uniform thickness (thicknesses of 3–6 cards are typical for jewelry items).
- A knife, X-Acto[®] blade or playing card edge can be used to lift the pieces off the sheet.
- To join parts, set them close together and apply a drop of water and slip with a pointed brush. Let the water penetrate for a few seconds, then firmly press the parts together and hold them in place for several seconds.
- To achieve textures, press the clay against a rough surface or roll the surface over a sheet of clay. Even simple objects such as bottle caps create interesting trails, and leaves, bark and wood offer many possibilities.
- One way to make a pendant bail is to roll out a slender rod and form it into a loop. Cut off the ends to make a solid attachment, moisten with water and press it into position.
- To make rings, wrap enough wide tape around a dowel to create a form of the correct size (remember to allow for shrinkage). Cover the form with plastic wrap and create your ring. When it is finished (and preferably before the clay dries), slide the ring off.

Note: If the clay becomes dry as you work, spray or brush on a little water (not too much!) and cover it with plastic wrap for a few minutes to allow it to rehydrate. If you add too much water, just set the clay aside, loosely wrapped, and allow it to dry out. You can also knead a small amount of olive oil into the clay to prevent stickiness and to keep it pliable.



Use stirring sticks as a thickness gauge.



Use a sharp edge to cut the clay.



Use just about anything to add texture.



Roll out a slim rod to form a bail.





800.545.6566



Making and Using Slip

Use slip to fill small cracks that can appear as the piece dries.



Use slip to fill between elements.

Slip will quickly become one of your favorite tools for working with BRONZclay[™], FASTfire BRONZclay[™] and COPPRclay[™], and it's easy to make. Simply mix tiny pieces of clay (filings, small fresh or dried pieces, etc.) with water (we recommend distilled water) until you reach a toothpaste consistency. Keep your slip stored in a sealed container; stir

Making Repairs

Because of their strength, BRONZclay[™], FASTfire BRONZclay[™] and COPPRclay[™] slips are suitable for attaching parts, repairing breaks and reinforcing delicate areas such as the point where a loop attaches to a pendant.

Transitioning

Use slip to fill between elements when creating an organic effect.

Adding Stones

Add CZs or certain lab-created stones to BRONZclay[™] and COPPRclay[™] to add design versatility. Because these particular gems are composed of laboratory-grown corundum, spinel or CZ, and are created at very high temperatures, they will not be damaged during firing. We do not recommend firing precious natural stones, most glass objects or any organic material such as pearl, opal, bone, shell and wood. Important: Never fire a doublet or other assembled stone.

To Set a Small Faceted Stone

- 1. Prepare a seat or rim that will provide enough metal to surround the stone. This can be added to a completed form or built into the original design.
- Make a conical hole with a pencil point or similar tool. 2.
- Use a straw or similar tool to remove clay from beneath the stone. 3
- 4 Set the stone in place and press it down until the table is below the surface of the work. Remember that the clay around and under the stone will contract, squeezing the stone upward.
- 5. Fire as usual; cool in the oven to prevent thermal shock.

Important: Pieces embedded in activated carbon will remain hot for several hours; do not remove them until you can comfortably hold your hand just above the firing pan.



Create a seat to hold a faceted stone.



After firing

Set the stone deeply into the clay to compensate for shrinkage.



BRON by Yvo

800

800.545.6566

www.riogrande.com







Ma

BRON

make

multi

Soa

A sim

it awa

dozei

Rub

Hobb



Coml putty

Dry

RIO GRANDE

page 5

Making Molds and More

BRONZclay[™], FASTfire BRONZclay[™] and COPPRclay[™] lend themselves easily to working with molds you make yourself or with commercially made molds. Molds allow for repeated elements and the production of multiples. Hollow forms allow your work to be light. Here are some ideas for molds:

^{ces,} Soap

stir

nd

) a

A simple way to get started is to carve a pattern into a bar of soap. Press the clay into the depression, peel it away, and you have a molded form. If you don't like the result, re-work the carving and try again. Need a dozen? It's a simple matter of repetition.

Rubber Molds

Hobby shops sell a variety of molds intended for candy, candles and plaster. Specialty kitchen shops may be a good source for interesting cookie, butter or gelatin molds. All will work for BRONZclay™ and COPPRclay™.

To make your own molds, buy a two-part silicone mold compound (such as Rio Cold-Mold[™], shown below). Most molds do not need lubrication, but if the clay sticks, spray the mold lightly with an aerosol cooking oil.







You will need to dry your BRONZclay[™], FASTfire BRONZclay[™] and COPPRclay[™] pieces thoroughly before firing to prevent moisture in the clay from expanding and creating defects during firing.

To dry the piece, gently place it on a warming surface such as a coffee

When dry, the clay will be leather-hard, making it flexible and amenable to finishing touches such as filing, drilling, sanding and carving. After firing, this work is more time-consuming, so take advantage of this prefired stage to do as much of your detailed finishing work as possible.

Combine equal parts of Cold-Mold $^{\rm m}$ silicone compound into a flexible putty that you can use to create your mold.

Drying BRONZclay[™] and COPPRclay[™]



Rio Cold-Mold[™] compound, 1 lb.

ed





e clay .



800.545.6566

BRONZclay[™] earrings created by Yvonne M. Padilla

www.riogrande.com

mug warmer or a vegetable dehydrator.





Rio 120-volt kiln



Stainless steel fork



To remove a hot firing pan from the kiln, gently slide the fork tines around the bottom half of the firing pan and lift the fork until the tines engage the lip at the top of the pan. Carefully lift the pan from the kiln and set it on a heat-resistant surface to cool. **Note:** The fork will only fit around the narrow side of the firing pan.

Firing BRONZclay[™] and COPPRclay[™]

Firing BRONZclay[™], FASTfire BRONZclay[™] and COPPRclay[™] is a process that uses low heat to prepare the kiln's atmosphere and vaporize the binder and high heat to sinter the alloy. BRONZclay and COPPRclay[™] must be fired in a kiln. During firing, the non-toxic binder vaporizes, leaving a solid, pure bronze or copper object. **Note:** Make sure your piece is completely dry before firing; it's not a problem for the piece to dry for weeks before firing, but firing a piece while it's still damp can cause the moisture to expand, creating blisters.

page 7

To reduce oxidation, the clay piece(s) must be surrounded by activated carbon during firing. On BRONZclay[™], the coconut shell–based carbon tends to produce a natural terra cotta color; the coal-based, acid-washed carbon can produce a colorful, more intense range of patinas, but may not sinter as well and lead to a weaker piece. **Important**: COPPRclay[™] and FASTfire BRONZclay[™] can be fired *only* in the coconut shell–based carbon; do not fire it in the coal-based carbon as the piece will not sinter properly and may break easily.

To Fire BRONZclay[™] or COPPRclay[™]:

- Spread 1" of activated carbon granules on the bottom of a stainless steel firing pan. Remember, COPPRclay[™] and FASTfire BRONZclay[™] can be fired only in the coconut shell–based carbon.
- 2. Place the piece on top of the layer; if firing two or more pieces, leave at least 1/2" between pieces; leave more if the pieces are larger.

Note: Most front-loading kilns are cooler in the front near the door, so the front of your firing pan will be cooler than the back and sides. To compensate for this, place pieces closer to the sides and back of the firing container. If you're using a top-loading kiln, there's no need to adjust. Avoid the front of the pan when using a front-loading kiln.

- 3. Pour more activated carbon granules on top of the piece until the container is full, making sure there is at least a 1" layer of granules on top of the piece. If you are firing several pieces in layers, make sure there is at least 1" of space between the vertical layers as well.
- 4. Cover the firing pan with its lid and place it in the kiln on stilts to allow good heat circulation. Fire clay according the firing schedules show on the facing page.

800.545.6566

www.riogrande.com



BR

For hol For 155

thic

FA

Reg to 1 If yo 50ten

CO

Reg 170 4 h pro dec

CC

lf y usii **Ph**

For Rar

For

Rar Ph

Reg Rar

▲ **W** weldi remo

5. The ne

6. On

pa Yo

ap Note

BRONZclay[™] Firing Schedule:

For pieces 1.7–1.75mm (6 cards) thick or less: Ramp at 500°F/hour (278°C/hour) to 1550°F (843°C) and hold for 2 hours (total firing time, including ramp-time, will be between 4 and 5 hours).

For pieces thicker than 1.7–1.75mm (6 cards) and less than 10mm: Ramp at 250°F/hour (139°C/hour) to 1550°F (843°C) and hold for 3 hours (total firing time, including ramp-time, will be about 9 hours).

Note: The firing schedule for thicker pieces will work fine for thin pieces should you have both thicknesses in your firing pan.

FASTfire BRONZclay[™] Firing Schedule:

Regardless of thickness (embedded in coconut shell–based activated carbon): Ramp at full speed to 1525°F (829°C) and hold for 1 hour (total firing time, including ramp-time, will be about 2 hours). If you discover that your pieces are not sintering properly, try raising the firing temperature by 50–100°F. **IMPORTANT:** Test fire a piece of FASTfire BRONZclay[™] to ensure you have the optimal firing temperature before firing your designs. **Please Note:** Use a slotted lid on the firing pan.

COPPRclay[™] Firing Schedule (for pieces that will not be enameled):

Regardless of thickness (embedded in coconut shell–based activated carbon): Ramp at full speed to 1700°F–1800°F (927°C–982°C) and hold for 3 hours (total firing time, including ramp-time, will be about 4 hours). Most firings perform well at 1700°F. However, if you discover that your pieces are not sintering properly, try firing them at 1800°F. **Please Note:** Blistering may occur at 1800°F; if this occurs, slightly decrease the firing temperature.

COPPRclay[™] Firing Schedule (for pieces that will be enameled):

If you plan on enameling your fired COPPRclay[™] piece, follow the two-phase firing schedule below using only the coconut shell–based activated carbon:

Phase 1 (open-shelf fire)

For pieces 3mm thick or less: Place the piece directly on the firing shelf. Ramp at 500°F/hour (278°C/hour) then hold at 560°F (293°C) for 15 minutes.

For pieces thicker than 3mm: Place the piece directly on the firing shelf. Ramp at 200°F/hour (93°C/hour) then hold at 560°F (293°C) for 15 minutes.

Phase 2 (sintering)

Regardless of thickness: Embed the piece in coconut shell–based activated carbon inside a firing pan. Ramp at full speed to 1750°F (954°C) and hold for 3½ hours. Allow the pan to cool naturally in the kiln.

Warning! The firing pan will be extremely hot; do not touch! Wear heat-resistant gloves, such as Rio 12" welding gloves, while removing any hot firing pan from the kiln. Allow the pan to cool completely before removing the lid.

- 5. The firing pan should be allowed to cool completely before removing it from the kiln; however, if you need to use your kiln again right away, wear protective gloves and move the pan to a heat-resistant surface (e.g.: a soldering pad or ceramic tile) and allow it to cool there.
- Once the firing pan and carbon have cooled (you can comfortably hold your hand just above the firing pan), remove the pieces from the carbon and place them on a heat-resistant surface to finish cooling.
 You can re-use the activated carbon until you notice it starting to break down (broken grains and a sooty appearance).

Note: If there are no stones embedded in the piece, it can be quenched in water at this time.

800.545.6566

www.riogrande.com



ANDE.

l / oxic

ot

; a ™ it in may

e

es,

oor,

d ere's

til

ı tical

S



BRONZclay[™] bowls created by Jeanette Landenwitch





Tri-M-Ite[™] polishing papers





Dura-BULL® rotary tumbler; 1 qt.

800.545.6566

Finishing BRONZclay[™] and COPPRclay[™]

page 9

Once fired, BRONZclay[™], FASTfire BRONZclay[™] and COPPRclay[™] pieces are solid metal and, like any other metal, they can be sawn, drilled, sanded, patinaed or soldered using traditional jewelry tools and materials. Fired COPPRclay[™] can also be enameled; follow the required firing schedule on page 9.

Hand-Burnishing

Perhaps the most basic (and rewarding) way to polish BRONZclay[™] or COPPRclay[™] pieces is to rub them with any hard, smooth object. Commercial burnishers offer a time-tested tool shape held in a comfortable handle, but you can use knitting needles, teaspoons or polished wood nails. Rub the piece in all directions to bring out a shine. Follow this with a polishing cloth to smooth away burnishing marks.

Tri-M-Ite[™] Polishing Papers

With 3M micron-graded abrasives, you remove a controlled amount of material, leaving a more consistent finish after each grade of abrasive. This soft, cloth-like WetorDry[™] Tri-M-lte[™] material is ideal for interior shapes and for polishing just about any contoured surface—it is especially effective on BRONZclay[™] and COPPRclay[™]. Sheets measure 8½" x 11".

Scratch-Brushing

Brushes made from very thin stainless steel wires can be used to burnish BRONZclay[™] and COPPRclay[™]. Lubricate the brush with any sort of soap and work under a slow drizzle of water. Scrub in all directions. Scratch-brushing can be used in conjunction with any other technique.

Mass Finishing

A rotary tumbler is a mechanical device in which hundreds of steel balls and rods cascade against jewelry objects as they rotate in a drum like a miniature clothes dryer. Using this method, many pieces can be finished at once with minimal individual handling. A magnetic finisher with steel pins is also a very effective choice.

Hea Safe

BRC

Issue COPF sinte kilns. surfa of op the k may

The k firing COPF brusł

As alv and c but if *Tools*

Pleas

Sto BRON

inside work the s moist of wa they COPF wate a hur clay w meta waxe



800



page 10

/TM

ard, ol J all loth

ch ut

ay™

d to ⁄ith b in ⁄ith

у

o a

Health & Safety

Safely Working With BRONZclay™ and COPPRclay™

Issues of safety do not arise from BRONZclay[™] and COPPRclay[™] themselves, but rather in the firing/ sintering process due to the use of high-temperature kilns. Kilns should be positioned on a sturdy, stable surface, away from combustible materials, with a foot of open space on all sides. Take special precautions if the kiln is in an area where animals or young children may come in contact with it.



BRONZclay[™] pendants and components created by Yvonne M. Padilla

The binder in BRONZclay[™] and COPPRclay[™] is non-toxic, and no toxic fumes will be present during firing. Though rare, it is possible for some individuals to experience some sensitivity to BRONZclay[™] and COPPRclay[™]. We recommend wearing a dust mask while working with the activated carbon. Use a nail brush to clean hands and nails after working with the clay.

As always, when working around high heat, wear appropriate clothing and avoid loose or dangling clothes and clothes made with synthetic fabrics. There is little reason to look into a hot kiln for any length of time, but if you do, wear appropriate eye protection; we recommend kiln safety glasses (see your *Rio Grande Tools & Equipment* catalog or visit riogrande.com).

Please access and read the online MSDS for BRONZclay™ at riogrande.com.

Storage & Shelf Life

BRONZclay[™] and COPPRclay[™] are sealed in air-tight foil packages to preserve their freshness. Keep the clay inside the package, and keep the package in a water-tight plastic container (a take-out soup container works great!). Add a wet sponge or wet paper towel to the container, making sure the clay doesn't touch the sponge or the paper towel. Use the original package or a good-quality plastic wrap to keep your clay moist. It is good practice to take out only what you will use within a few minutes and to add a few drops of water to the lump at the end of each work session. BRONZclay[™] and COPPRclay[™] can be rehydrated if they dry out, though it can be difficult to achieve the homogenous consistency of fresh BRONZclay[™] and COPPRclay[™]. To restore dry material, pierce the lump with several holes or dice it into small pieces. Add water and knead, then seal the clay and water in a water-tight container in a hydrated atmosphere such as a humidor. Set the container aside to allow the water to penetrate; allow at least one full day, more if the clay was very dry. With the clay still wrapped in plastic, knead repeatedly to force the water into the dense metal structure. If you find you have added too much water, spread the clay on a piece of plastic, glass or waxed paper and allow it to dry to a useable consistency.

Many illustrations are copyrighted by Jeff McCreight and reprinted here courtesy of Brynmorgen Press. See your Rio Grande *Gems & Findings* and *Tools & Equipment* catalogs for BRONZclay[™] and COPPRclay[™] products, tools and supplies. Call toll-free 800.545.6566 or visit riogrande.com to order.

ANDE

800.545.6566





Rio Grande®

7500 Bluewater Road NW Albuquerque, NM 87121

To order BRONZclay[™] and COPPRclay[™] products, tools and supplies or for expert technical support: 800.545.6566 (toll-free) 800.965.2329 (fax) 505.839.3300 (local)

riogrande.com

Education In MotionSM

7500 Bluewater Road NW Albuquerque, NM 87121

Rio's jewelry experts are the best in their fields and eager to share their knowledge and experience with you through jewelry-making classes.

For class offerings: 866.346.2698 (toll-free) 505.839.3216 (local)

e-mail: education@riogrande.com

educationinmotion.com

Metal Adventures Presents

education

in motion[™]



BRONZclay™

e-mail: info@bronzclay.com

bronzclay.com

Metal Adventures Presents



COPPRclay™

e-mail: info@copprclay.com

copprclay.com



©2013 Rio Grande, Inc. All rights reserved.

800.545.6566

www.riogrande.com

RIO GRANDE