

Douglas and Sturges, Inc.

SCULPTURE TOOLS, MATERIALS AND SUPPLIES

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Cold Casting With Atomized Metal Powders

If you've ever had the experience of approaching a foundry to have a piece of sculpture cast in bronze or some other metal, and realized that this method of casting can be rather expensive, then I'm sure that you'll appreciate the technique called cold casting. (This is sometimes referred to as bonded metal or faux metal) By using atomized metal powders bound by a resin base or modified gypsum base, one can simulate and even patina a casting to appear like a foundry cast metal piece.

We offer atomized bronze, copper, brass, zinc, steel, aluminum, and nickel-silver, and generally recommend that polyester resin be used as a binder when using the cold casting technique. These are not to be confused with bronzing powders which are tiny flakes of metal. Generally bronzing powders do not work for cold casting because the particles of metal are flat as opposed to chunk-like or round as with the atomized powders. It's true that epoxy and in some cases even polyurethane resins will work for cold casting, but number one, polyester is cheaper, and number two polyester is very predictable. The only case where polyester is not recommended is when using the copper powder; this material has a tendency to accelerate the cure of polyester to the point where it is unworkable. If you need to use copper powder, we recommend using either epoxy resin or modified gypsum cement (FGR-95 with forton MG).

Cold casting can be done utilizing latex, polyurethane, silicone, fiberglass or plaster molds. When choosing the casting medium of course it will be necessary to use the proper mold release with the casting material you have chosen. (See our catalog number 6, pages 22 and 23 for a guide to release agents for this purpose.) Once the mold material and casting material have been chosen, the piece may be created. This is generally done by brushing the resin/metal slurry into the mold and backing up with a less expensive material.

The most important thing to consider when using atomized metal powders to simulate cast metal is that if you don't get enough metal into the binder, the metallic effect will be diminished. Conversely, if too much metal powder is used, money will be wasted because the effect will not necessarily be enhanced. So, we are including a table to give optimum loadings to give the best effect at the least expense.

Metal Powder	Recommended Loading (Figures are parts metal powder to parts binder by weight)
Aluminum	1:1
Brass	2:1
Bronze	2:1
Copper	2:1
Nickel-Silver	2:1
Stainless Steel	2:1
Steel	1.5:1
Zinc	2:1

Once the metal and medium have been chosen, and the mold has been prepared to accept that medium, the cold casting may be created. In order to do this, it is best if a thin layer of metal/binder is put into the mold first. By mixing a small amount of thickener (Thixo or Thixo HP work well for this.) with your resin/metal mixture it will be possible to brush a thin coat of this mixture into the mold. You want the consistency of the mixture to be about like thin yogurt. It is important to do this in order that the metal not separate or settle out from the resin when applying it to the mold. If there are thin spots, a second layer of this metal mixture may be added to the first to insure that the surface of the sculpture has enough metal to appear metallic. If by chance there are surface areas that appear to be translucent upon removing the casting from the mold, it is possible to patch these areas with the resin/metal powder mixture, but it is best if all of the surface of the sculpture is covered when the casting is created. Once the mold surface is completely coated, the casting is ready to be backed or reinforced. For small pieces, it is easiest to simply fill the mold with an inexpensive filler such as a mixture of resin and sand or resin and whiting. For large pieces it is usually best to reinforce the back of the piece with fiberglass and resin. (For very small pieces it is sometimes easiest to simply fill the mold completely with your resin/metal slurry and cast these solid.) An important thing to consider when cold casting is that the only thing you see when looking at a sculpture is the outside surface and as such the actual volume of material that contains metal should be kept to a minimum.

After the casting is reinforced appropriately and cured adequately, it may be demolded. If upon demolding you find that there are imperfections, these may be filled with a heavier clay like mixture of resin/metal powder/thickener. Sand these areas to match the surrounding surface. If the model is such that it must be made in pieces, it will be possible to adhere these pieces together as you would any fiberglass piece, the only difference is that the seams will need to be patched with the resin/metal powder mixture.

Once the casting has been patched or finished to your satisfaction, it is now possible to patina the surface as you would any metal casting. In order to do this though, it is first necessary to remove the microscopic film of resin from the metallic particles on the surface in order that the chemicals being applied for the patina may react with that metal. To do this abrade the casting with either steel wool or a Scotch Brite* pad, or lightly sand blast the surface. Generally the steel wool or Scotch Brite works better because there is less chance of removing more material than you need to, but sometimes sandblasting will give better access to all of the nooks and crannies of the sculpture.

After the casting has been abraded properly, it may be patinaed with hot and cold patinas. If using a hot patina, one must use a heat source other than a torch to avoid the hazard of fire. A heat gun or blow drier work well for this, and sometimes even heating the casting in the sun is enough to warm the surface so that it will react with your chemicals. For further information on the subject of patination, we suggest you refer to the book Contemporary Patination#, by Ronald Young.

This bulletin is offered as a guide and as with any sculptural process there are many variations on a theme that will achieve essentially the same end result. As such, experiment to see what works best for you and I'm sure that you can make this technique a viable part of your repertoire.

"The information and data contained herein are based on information we believe reliable. each user of the material should test any application and independently conclude satisfactory performance before commercializing"

***Trade Mark, 3M Corp.**

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