Metal Cold Casting Technique

There are different techniques used to achieve a metallic finish with a urethane resin.

"Cold-Casting" is a term used to describe the process of mixing urethane resin with a metal powder and casting the mixture into a mold to obtain a casting that gives the appearance of solid metal. Different metal powders such as bronze, brass, aluminum and copper can be used depending on the effect desired. Cold casting gives the benefit of being fast and much less expensive when compared with foundry casting of molten metal (lost wax process).

**Overview** - To make a "cold casting", metal powder is mixed into the resin, until the mixture is thick and creamy. The mixture is then "slush-cast" (poured in to a mold and rolled around to keep the mold face coated, until the mixture sets). The remaining cavity is then filled with the plain resin, foamed resin or a resin mixed with a different filler to give the casting body and dimensional stability.

**Specifics - Cold Cast Bronze** - Our example will detail making a "cold casting" using bronze powder (also referred to as "bonded bronze").

**Materials needed include:**

A. Bronze, Brass, Copper powder (All Available from Duroplastic),

B. Casting Resin - Different Smooth-On general purpose urethane resins can be used to blend with metal powder. Duroplastic Casting resin P223 or P230 (Both are very Cheap) or Duroplastic Easycast 80 / Smooth Cast 300 (works well because it is inexpensive, has extremely low viscosity (pours like water), and sets up quickly and

C. Liquid Pigment - adding a dark pigment (black or dark brown) to the resin/bronze powder mixture will give the final casting added definition and dimension. Also required: rubber mold, mold release agent (if casting into a urethane mold), measuring and mixing containers, mixing paddles and an accurate gram scale for weighing components.

Amounts of resin, bronze powder and pigment required will vary depending on the desired effect. Most customers will experiment by varying the amounts of resin, metal powder and pigment used in combination to attain a desired effect. For this example, we will use the following:

- **Part B of Resin:** 100 Parts
- **Powder:** 900 - 1200 Parts
- **Part A of Resin:** 100 Parts
- **Liquid Pigment:** 10 Parts

**Note:** Mix in catalyst of Polyester before mixing in powder
1. **Apply Release Agent To Rubber Mold** - To prevent resin mixture from sticking to rubber mold, thoroughly spray mold release agent over entire mold surface. Brush into all surface detail and follow with second light mist coating of release agent. Let dry.

2. **Mix Metal Powder And Pigment With Resin** - Add 100 grams Resin with either catalyst for the polyester resin, then add metal powder. OR Add powder to A component of Smooth Cast and then mix thoroughly then add B component.

3. **Pour Mixture into the mold cavity.** Gently roll mixture (slush cast) around mold cavity, being careful not to let a substantial amount settle to the bottom of cavity - the objective is to coat mold surface uniformly with mixture until it sets up or gels. This may take practice.

4. **You now have a hollow** casting that can be back-filled with resin, foamed resin or resin mixed with a different filler (such as Capolite). The addition of steel or lead beads to the back fill resin gives the finished piece the weight necessary to simulate the feel of real bronze.

5. **Entire casting should be thoroughly cured** before demolding. Remember, the resin/bronze mixture or filled resin will take longer to harden than unfilled resin. Cure time depends on size of casting, mold configuration, amount of fillers used, etc.. Generally, 30 to 40 minutes is sufficient at about 60 Deg C after it has cured is a good post cure.

   Applying mild heat will accelerate cure time. Let cool to room temperature.

6. **Demold - remove casting from mold.** Lightly abrade casting with medium/fine steel wool until the desired metal shine and luster is attained. Patina effect can be achieved with patina paint.

7. **To prevent oxidation** of the metal, spray finished casting with two coats of clear gloss acrylic spray (acrylic works well) available at most hardware/DIY stores.

**Other techniques used to achieve metallic finish include:**

- **Metal Powder/Shellac "Paint-On"** - A casting is made with unfilled resin. After removing casting from mold, release agent (if any) is removed with solvent. Next, metal powder is mixed with shellac to a brushable consistency and brushed onto resin casting.

- **Metallic Spray Paint** - After removing unfilled resin casting from mold, release agent (if any) is removed. Auto body primer is then applied (optional), followed by application of two coats of metallic spray paint.

*Recommended metal powder mesh size for mixing with resin is: -325 to -225.

**Use only a release agent specifically made for mold making and casting such as Easy Release 20