

Know Your Plaster

by Jonathan Kaplan

We sometimes select what we think is the correct material for a specific application only to find out that the expected results fall short of our expectations. Plaster materials are often misunderstood and, as a result, what we hoped to achieve does not work: a simple case of not selecting the correct plaster.

PLASTER BASICS

Plaster is calcium sulphate that is ground and heated after mining. The heating is controlled very carefully so that a chemical reaction is started but not completed. Water is required to complete the reaction and after correct mixing and pouring in your studio, the plaster hardens and becomes warm as the reaction takes place. This is a simple explanation of how plaster works. What's extremely important to remember is that a specific amount of water is necessary for a given quantity of plaster to achieve optimum working conditions.

The type of plaster, as well as achieving the right ratio of plaster to the required water, determines the absorption and density of the finished casting or mold. The more water used to mix the plaster, the greater the absorption and, therefore, the weaker the final product. All plasters expand when mixed with water, but this is a controlled expansion and is how mold and model makers design their work so that mold parts release from each other when being made. All plaster materials have superior dimensional accuracy.

PLASTER TYPES

There are many different types of plaster. United States Gypsum (USG) Company is the largest sup-



Plaster is an essential part of any pottery studio, but care must be taken when using and storing it. Keep any plaster areas clean at all times so plaster cannot contaminate your clay, and store plaster for up to 90 days in airtight food service containers.

plier to the ceramics industry. Different types of plaster are used in different ways within ceramics.

The most widely used plaster in the pottery studio is **USG® No. 1 Pottery Plaster**. This plaster is ideal for making slip-casting molds and other plaster castings where a high degree of water absorption is required. Pottery #1 requires 70 pounds of water to set up 100 pounds of dry plaster. This is referred to as a consistency of 70. Pottery #1 can easily be cut, carved and manipulated in many ways in the studio.

Plaster of Paris (USG No. 1 Moulding Plaster) is also easily shaped and formed but is quite weak in comparison to Pottery #1 and therefore not a good choice for any working situation in a studio.

Puritan® Pottery Plaster has similar working properties to Pottery #1 but has an additive to promote a much more durable and harder surface. It's used primarily for molds that are used with jigger/jolly machines so that they do not wear out as quickly.

GYPSUM CEMENTS

Hydrostone, Hydrocal and **Ultracal 30** are also used in the pottery studio. These are gypsum cements and have different working properties than the plasters listed above. They are very dense, have a low absorption, and a much smaller controlled expansion. These three products are used to create a wide array of tooling such as case molds (master molds) for slip casting, template turning, permanent models and solid castings such as lamp bases or figurines. Gypsum cements set more slowly than conventional plasters.

Cerami-Cal is an industry standard for making air permeable dies for hydraulic pressing (RAM pressing). This formulation has a very low absorption, high strength, and is very resistant to abrasion.

RECOMMENDATIONS

- For most simple applications in the studio such as press molds, sprig molds, casting molds, carving stamps, making models, etc., Pottery #1 is the best choice.
- It is important to weigh both the water and the plaster in the correct proportion using clean buckets and mixing tools).

Each type of plaster has its own consistency and this is what needs to be observed. The recommendation to sift the plaster into the water until it mounds on top may produce workable results, but it does not take full advantage of the characteristics of plaster as the ratio of water to plaster is not likely to be exactly right. It is always better to weigh out the water and plaster, after calculating the volume you need to fill.

- When mixing, sift dry plaster into the water and let it slake or absorb the water for ninety seconds. I use a Jiffy-type mixer for small batches and mix for an additional ninety seconds and then pour.

Remember that plaster sticks to plaster and for that matter, to any porous material. Proper separating or "parting" of absorbent or porous surfaces is necessary. Do not use petroleum jelly for this. There are many suitable commercial compounds such as Polyurethane Parting Compound, Crystal Mold or Fels Naptha Soap that do not leave a residue. Murphy's Oil Soap also works well as a parting agent.

When pouring plaster, pour it over a sharp edge to break the air bubbles, and into a corner of the mold box or coddle. Do not pour directly over the model of whatever you're making a mold of. Following these directions will reduce the number of bubbles in the mix, as well as reduce the likelihood that air will be trapped between your piece and the plaster, creating a void in the mold. It also ensures that your model does not become dislodged by the force of the plaster hitting it, and, if using a leather hard clay form as a model, that the plaster does not deform the surface.

- You should NEVER EVER let any excess plaster or clean up water go down the drain. The plaster will harden in the drain or pipe, and plug it permanently. If this happens, the only solution is to replace the drain/pipe.
- Plaster absorbs moisture from the air so it must be stored in airtight plastic containers.
- Plaster should not be stored for more than 90 days. When purchasing, check the bag for a packing date.
- An excellent source of information on plasters, gypsum cements, procedures and techniques is USG Company, and their ceramics website at <http://gypsumsolutions.com/application.asp?app=Ceramics> ●

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