Richard Notkin

APPENDIX A: COMPARATIVE ANALYSIS OF PLASTERS

Note: The following guidelines are partially drawn from my own personal experiences with these plasters, and partially summarized from product information bulletins published by United States Gypsum Company. I have noted some discrepancies between the two sources—please experiment!

White Art Plaster
No. 1 Casting Plaster – [redacted]
Molding Plaster

Although I have used all three of these plasters to make slip casting molds in the past, I would not recommend them for this purpose. They tend to produce softer molds with less strength than U.S.G. No. 1 Pottery Plaster, and these molds tend to develop surface pinholing and lose detail clarity after relatively fewer castings. However, as the cost of these plasters is about half of the cost of No. 1 Pottery Plaster, they are usually more available to students in a school-run studio, and are thus likely to be used for mold work. I found that Molding Plaster was the more preferable of the three for slip casting. Generally speaking, a standard slip casting consistency of 73 works well. Please experiment when using these.
↳ 73# water to 100# Plaster

U.S.G. Pottery Plaster

A good mold making plaster. I find it a little softer and more absorbent than U.S.G. No. 1 Pottery Plaster, as its consistency (or water portion of the mix) is higher. Although the consistency recommended by its manufacturer is 70 to 72, I have found it to be somewhat higher, as it sets up much too quickly at 70 to 72. Try about 76 to as high as 80; this will allow a sufficient working time. Dry compressive strength: 1800-1600 psi (pounds per square inch).

U.S.G. No. 1 Pottery Plaster

The best slip casting mold plaster I know of. Also considered by the manufacturer as "the standard of the industry, best material available...highly uniform... outstanding performance and long life." If you are investing much time and energy in your prototype, or intend to make many castings, it would be wise to use this plaster. Industrial product information rates the consistency at 68-70. However, I find 73 is perfect. Most professional mold shops agree, using a consistency of 73, including the Kohler Company's mold shop. Dry compressive strength: 1800-1750 psi.

Puritan Pottery Plaster

I do not recommend this plaster for artists slip casting molds, as it is too dense and less absorptive than U.S.G. No. 1 Pottery Plaster. Puritan Pottery Plaster was developed for use with mechanical casting equipment, as it contains a thermal shock additive. (Mechnical casting often involves forced heat drying of molds.) Also works well with jiggering molds and press molds, as it is the hardest plaster made for clay mold use, and thus the most wear resistant. Recommended consistency (by manufacturer): 64-68. Dry compressive strength: 2100-1750 psi.

Ultracal 30 Cement

A very hard, dense plaster of low absorption, this cannot be used for slip casting molds, but is intended instead for case molds. It has a very low setting expansion. Recommended consistency (by manufacturer): 43-46. Dry compressive strength: 5000-4300 psi.

Hydro-stone Cement

The hardest and strongest plaster, this is also used for case molds (not used for slip molds) and is an improved version of Hydrocal Gypsum Cement. Provides maximum durability, but has a high setting expansion. Recommended consistency (by manufacturer): 32-35. Dry compressive strength: 10,000-8,000 psi.

UNDERSTANDING PLASTER

Unknown Source

Plaster is calcined calcium. Calcined means that the molecular water has been driven off by heating or firing the powdered calcium to a low temperature (probably about 1000°F). Plaster is porous and ideal for making molds for clay. There are different kinds of plaster which have different uses. Pottery plaster is good for casting or other applications that require absorbancy. Ceramical and Hydrostone are harder, denser and less porous. These materials are good for drape molds or for making objects to paint. Ceramical is also used for ram press molds.

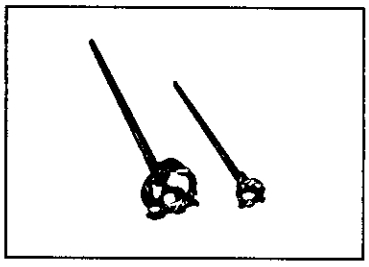
PLASTER ACTIVITY DURING MIXING AND SETTING

step 1 Adding plaster to water	step 2 Allow plaster to rest	step 3 Stirring or mixing		stage 1 Additive Stage: Plaster is pourable and trowelable as it begins to thicken and harden.	stage 2 Subtractive Stage: After plaster hardens, it may be sanded or carved.
1 - 2 minutes	2 - 4 minutes	2 - 4 minutes	**Plaster has now been activated.**		
Water/Plaster ratio: 7:10 Water/Ceramical ratio: 3:10	During this critical stage, plaster should be undisturbed so that water can be absorbed into the plaster. Plaster is not active during this stage, that is, it has not been activated and unless you stir or begin to mix the plaster, it will not begin to harden.	A power mixer is recommended. After mixing, if water still floats on top then the plaster hasn't been mixed enough. After the plaster has been stirred, it is now active and will begin to set up.	Air bubbles in the mixture will rise to the top. Encourage bubbles to rise by gently tapping bottom of bucket on the floor.	During the additive stage, the wet plaster may be poured for making molds. Then, as it begins to thicken, it can be troweled or sculpted. At the end of this stage, the plaster goes through exothermic conversion where heat is produced by the chemical reactions that are taking place. After exothermic activity the plaster expands .2-1.0 %.	During the subtractive stage, the hardening plaster may be scratched or carved. You can continue to carve or scratch into plaster after it has set up. Drying plaster can take up to a week or more, depending on the mass. You should wait until the plaster has dried or cured before using.
Using cool or room temperature water is best. Cold water slows down the process too much. Hot water will speed the process up and likely cause a lot of air bubbles to be trapped in the mixture.					

CONVERTING GRAMS TO POUNDS:

453 grams = one pound.
To convert grams to pounds divide grams by 453.

OESTRIECH SLIP	GRAMS		GMS. LBS.	BUY
Tile 6	2000		453 = 4.4	5 lbs.
OM4	1500	•	453 = 3.3	5 lbs.
Silica	750	———	453 = 1.7	2 lbs.
Custer	750	•	453 = 1.7	2 lbs.
	5000			



Hanson Mixers, see page 64

When considering the amount of materials needed, keep in mind that if you have the additional space, price breaks are given when buying in bulk. At Highwater Clays bag weights combine with clay so you can get a quantity discount.