How to test your slip

There are two properties of slip that we want to test frequently. They are specific gravity and viscosity. Specific gravity means how much more than water does the slip weigh. For instance: A gallon of water at 70 degrees weighs 8.3 lb. Lets say we weight out a gallon of slip and it weighs 14.4 lb. Simply divide 14.4/8.3= 1.73.This is a ratio, it is generally accepted that 1.75 is good for slip casting. So our slip is a little light at 14.4 lb. per gallon, water weighs less than clay so we have too much water in our slip, we can't take it out so we have to add more dry materials. (if the slip was too heavy we could have added water.) Okay, now we weigh the slip again and it is 14.5 pounds plus a little. Do the math and you can tell that you are right at 1.75.

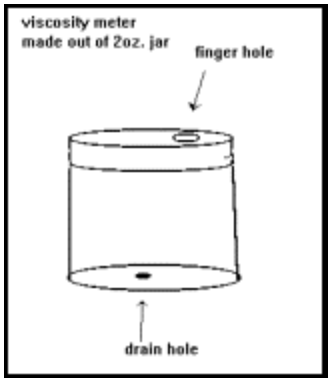
Unfortunately 1/10 of a pound is not as accurate as we would like so we use grams (1/10 lb. = 45.4 grams)

The **Viscosity** refers to how thick a liquid is. With slip we like to change how thick it is by adding more deflocculant (Sodium Silicate) NOT by adding water.

SLIP	
WEIGHT PER GALLON	*SPECIFIC GRAVITY*
14.4	1.73
14.5	1.75
14.6	1.76
14.7	1.77
14.8	1.78
14.9	1.80

How thin do you want the slip to be? It depends on what you are making. Hollow beads or tiny miniatures require thin slip, large items require thicker slip.

Measure viscosity by how long it takes (in seconds) to drain out of a container with a small exit hole. The best thing to do is find some slip you like, and then time it using a homemade viscosity meter like the one below.



Fill the jar up full to the top, while holding your finger over the hole in the bottom, place the cap on the jar and hold your finger on the finger hole, let go of the bottom and the slip will not come out until you let air in the top. Time how long it takes until the flow changes from constant to drips.

Each time you do this test try to do it exactly the same way.

If the slip is too thick and the specific gravity is right, then you can add some deflocculant, or some special slip thinner. These are very powerful in their action add only 2-3 drops per gallon.

Other Qualities.

⇒ Absorption: How porous the bisque is determines how easy the glaze is to apply, it changes by what cone the slip is fired to, and the composition of the slip.

⇒ Thermal Expansion: Determines glaze fit, a too tight fit and the glaze falls off (shivering), too loose and the glaze crackles (crazing). Glaze fit is determined by the amount of talc in the slip and the bisque temp.

⇒ Shrinkage: Is complicated to control, but it is useful to know so that you know how to size the molds, more water in the slip gives increased shrinkage and increases cracking in the mold.

⇒ Over Deflocculating: Slip casts slow, inside of cast appears sharp and greenware is brittle, hard. Noses and other high points may turn brown when dry.

⇒ Under Deflocculating: Slip casts fast, seems soft and flabby, molds get wet sooner. Inside of casts look smooth.

Slip Recipe (cone 04)

INSTRUCTIONS FOR MAKING YOUR OWN SLIP

The first time you make slip it all seems mysterious; it is **very important that you measure** carefully and keep a written record of what you have done. There are seasonal variations in the talc, and possibly in the other ingredients; so it is important to know what you have done in the past and be consistent. First figure out how many gallons your slip mixer will hold. It is easiest to make 25 or 50 gallons as you will not have to weigh the slip components. Test slip with a hydrometer, or scale, it should read 1.75, and weigh 14.5 lb. per gallon.

50 GALLON RECIPE

1. WATER ----- 27 GALLONS the warmer the better.
2. SODA ASH -----4 OZ. DRY
3. BARIUM CARBONATE 3 oz. DRY
   Dissolve Soda and Barium in hot water and add to water and allow to stir with mixer running add your Two Clays..
4. KT OM4 ----- 100 LBS. 2 BAGS
5. KT #1 SGP ----- 100 LBS. 2 BAGS
   When the mix seems too thick start adding the Sodium Silicate a little at a time
6. SODIUM SILICATE --12 to 18 OZ. LIQUID
7. TALC 2882 ----- 300 LBS. 6 BAGS add the talc with the mixer running. If it clogs up at the top, Turn the mixer off and use a stick to help mix it in.
8. Let the mixture mix for as long as possible and then rest overnight.

WHAT THE COMPONENTS DO: Soda Ash and Sodium Silicate are DEFLOCCULATES. `They make the particles of clay all repulse each other (like two north poles on a magnet). Proper deflocculating allows the use of less water to make the slip a liquid; this keeps the molds from getting too wet. BALL CLAY: The OM4 and SGP are called ball clays; they are the actual clay in the formula. TALC is the main ingredient, it is magnesium silicate and its function is to prevent the glazes from crazing and to make the bisque white.