Terra Sigillata

Adapted from a lecture by Anton Reijnders 10/21/2015

The Term Terra Sigillata is Italian name describing a fine glossy slip that was developed by the Greeks, and utilized by the Romans. We do not *know* how they made it. In the early 1900's scientists were able to analyze it and determine it *not* to be a glaze. It is a slip that mainly contains clay minerals. South Americans used burnishing slips – *terra sigillata does not require burnishing to impart a sheen*. SeeSamian ware or Roman red-gloss pottery.

"How to make Terra Sigilatta" Folklore:

~~Recipe~~ ~~Soda Ash or Calgon~~ ~~3 layers~~ ~~Only fine particles work~~

~~Ball Milling is necessary~~ ~~Cannot be fired to high temperatures~~

Problems with Classical Approach: Too much water, long procedure, delicate siphoning, evaporation, leads to excessive separation and results are more akin to a Burnishing Slip.

A Theory of Making Good Terra Sigillata

We want to promote delamination so that the 'flocs' of kaolin break loose and liberate from one another as platelets. We also want to promote sedimentation so that large particles of non-plastic materials fall out of the sig and collect at the bottom of the container.

What determines a good terra sigillata?

- The right clay
- The right type of defloculant
- The right balance between clay, water, and defloculant
- Sedimentation time
- Maturing time
    - Ideal clay 3 hrs, Non-ideal clay could take years

The Right Clay:

Not all clays will work (well). Kaolinite is most important of the clay minerals. Montmorilonite and Illite can be problematic because their surface charges do not respond readily to the defloculant (1:1 silicate vs 2:1 silicate). The Chemical analysis might be useful in identifying clays that will work best. Anton said, "I'm afraid life is complex, and ceramics is even more complex".

> Na_20 > 0.3 and Ca0 > 0.4 may indicate high levels of of Montmorilonite. K_20 >2.2 and Mgo >0.5 may indicate high levels of Illite. Both of these phyllosilicate minerals will be problematic in dispersed systems like terra sigillata or casting slips.

The Right Defloculants:

> Sodium Polymetha-Acrylate (e.g. Darvan 7 and Darvan 811)
>
> - Darvan 811 is twice as strong and Darvan 7
>
> Sodium Silicate also works well.

The Right Amount of Water:

- Too little = no separation
- Right amount = Quick sedimentation and good separation
- Too much = Quick sedimentation, insufficient separation, water layer on top

Sedimentation:

With optimal water/clay/defloculant ratios everything should be settled within 24 hours.

- Longer Sedimentation may yield a higher gloss sig with a reduced yield.
- Shorter sedimentation time may increase the chance of 'flaking'.

Maturation:

Overtime, clay will delaminate in the sig and split into smaller platelets resulting in higher gloss (a few days or months). Increase in gloss will stop over time. Coarse kaolinite minerals take a long time to fully split up (several months or years).

Terra Sigillata Ratios:

Clay	Water	Darvan 811
Kaolin	140-150%	0.5%
Porcelain	130-150%	0.5%
Ball Clays	180-190%	1-1.5%
High White Body	160-170%	1-1.5%
Stoneware Clay	210-240%	2-4%
Stoneware Body	200-220%	2-4%
Plastic Terra Cotta	200-220%	2-4%

Identify the type of clay that you would like to work with and use this chart to reference the necessary water and defloculant percentages. Start at the low end of the recommended range. Mix components together in a clear jar amd leave it undisturbed. Within just a few minutes you should see vertical lines appear in the mixture as sedimentation begins to occur. If there is no sign of sedimentation in the first 10 minutes, consider increasing first the darvan and then the water but stay within the recommended ranges.

After 24 hours your Terra Sigillata should have settled sufficiently into just 2 layers. If so, decant the top layer and the sig should be ready to use. Sheen will improve with further maturation (aging).

Apply to bone dry wares; it can be applied to bisque, but will be more prone to flaking. Normal firing temperatures would be between ▲04 –▲1 but some formula/body combinations will be successful as high as ▲7.