

## INTRODUCTION TO SIMPLE GLAZE CHEMISTRY TERMINOLOGY

**GLAZE** = 50% Silica (usually) + Oxides + Flux

A glossy coating melted in place over a ceramic body.



easily cleaned, sanitary coating, usually non-porous for functional wares

vehicle for decoration and adds colour and texture

acid and chemical resistance

durability



**Silica** (glass) will only melt at 1650 °C, so a FLUX must be added to lower the temperature.  
FLINT is a primary source of silica in glazes.

**Fluxes:** lowers melting temperature of silica in glaze

Examples

Low Temperature: lead, boric oxide, soda, potassium

Higher temperatures: calcium, magnesium, barium, lithium, zinc

Feldspars: Nepheline Syenite, Cornwall Stone, Orthoclase, Albite, Anorthite, Spodumene, Custer, etc.

Feldspars are made up of sodium, potassium, or calcium, combined with alumina and silica. too much can cause crazing of glazes.

### 10%+- Clay

Furnishes alumina and silica to the glaze: these contribute to the total glaze chemistry and need to be taken into account

For bonding to clay body, often Koalin or china clay is used as it is free from colorants.

Slip Glazes are composed almost entirely of clay (i.e. Terra Sigilata)

**General Guideline for Glaze Consistency:** dip hand in mixture, lift hand out and it should "drool" and drop about 7 drops of liquid. Your hand is still visible through the glaze.

**Vitreous:** glass-like

**Vitrification:** glassification

**Devitrification:** development of crystals in the glaze as it cools from solid to liquid, usually an excess of silica

**Alumina:** increases viscosity of glass and acts as a binder

**Transparency/Opacity:** clearness, ability to see clay body below.

### FRITS

A glass which had been melted, quenched, and ground to powder, added to glazes.

Frits contain un-soluble alkalis such as sodium and potassium.

Fritting renders certain oxides, such as lead oxide less poisonous.

Frits can be caustic and should be used with caution.

## **GLAZING TECHNIQUES**

Always glaze the inside of your wares first for the bisque ware to be able to absorb maximum water, and to allow the outside to be still handled for decoration.

## **METHODS OF APPLYING GLAZE**

- ✓ Dipping
- ✓ Pouring
- ✓ Spraying
- ✓ Brushing

## **SCRAFFITO**

Scratching through slip/glaze to reveal clay body beneath, can be done on leather-hard clay or through glaze on bisque.

## **GLAZE FIRINGS**

- ✓ Glazed wares must NOT touch other pieces
- ✓ Leave space of 2" minimum at edges of kiln
- ✓ 1/4" from bottom of pieces should be glaze-free - Wax the bottom of the piece to ensure that this happens. Always ensure that the wax is wiped clean of any excess glaze that may have stuck to it, otherwise small droplets can stick to the kiln shelves. The wax itself will burn off in the firing.
- ✓ Always use kiln wash on shelves
  - ✓ **Kiln Wash:** 50% Kaolin, 50% Silica + water, paint on shelves to protect them
- ✓ Glaze firings can be started faster, then slowed down if necessary. In reduction firing the glaze is often allowed to "soak" for about 1 hour.
- ✓ Glaze firings can be as fast as 3 hours for luster or china paints, and Higher temperature firings can take 8 - 10 hours or longer depending upon methods of firing.

**MATT GLAZES** - harder to clean for functional use, mattness is also related to opacity

Matt glazes can be achieved through the following methods:

- ✓ Under firing
- ✓ Increase amount of Alumina
- ✓ Increase calcium oxide or magnesia
- ✓ Increase amount of silica to point of where devitrification will occur when cooling
- ✓ Including barium oxide (colemanite) in glaze (soft and frosty appearance)

## **OPACIFIERS - INCREASE OPACITY IN GLAZES**

- ✓ 5% Tin Oxide (i.e. in majolica glaze) or 7% Zirconium Oxide are most common opacifiers (i.e. Zircopax). Addition of Tin can produce slightly pinkish colourings in certain glazes, which may or may not be desirable.
- ✓ Titanium oxide
- ✓ Increase Barium Oxide .05 - 2% (colemanite)