

# Quail Creek Pottery and Sculpture Club

## GLAZING CERTIFICATION

### Handout

#### WHAT IS A GLAZE

Glaze is a vitreous (melted glass) substance fused on to the surface of pottery to form a hard, impervious decorative coating.

The main components are ground minerals and materials placed in a liquid suspension that will melt when fired to a high enough temperature.

OXIDES are the colorants:

- IRON - reds, orange, yellow and brown
- COPPER - greens and reds
- COBALT - blue
- RUTILE - yellow, tan
- MANGANESE - brown, black, bronze, pink /purple
- UMBER - walnut brown

There is a lot of chemistry behind glaze development and outcomes. If you wish to pursue a better understanding check out: [Google - Chemical Composition of Glaze](#).

#### WHAT WE HAVE IN THE STUDIO

There is a very good selection of mid range Cone 5/6 Laguna brand glazes. This is the most cost effective choice and saves on storage of the many different components that go into making a glaze as well as for safety reasons as glaze components can be toxic in their dry form. (example of cost difference 25# of Laguna Light Blue at \$30 versus 25# Amaco Potter's Choice Indigo Float at \$175)

#### CONE 5/6 GLAZES

**HOW TO USE THE GLAZE WALL - The glaze tiles illustrate how the cone 5/6 glazes perform on two different types of clay (Speckled Buff and B-Mix) with one, two or three coats of brushed on glaze. Three coats of glaze are comparable to dipping a glaze. The tiles tell you that some glazes have full coverage with just two coats. They also tell you how the glazes perform when used either over or under a glaze. How much a glaze runs on its own and how much it runs when combined is very valuable information.**

The sample tiles also show the various glaze finishes such as:

- Gloss
- Matt
- Semi gloss
- Transparent (these are best used over textured surfaces)
- Translucent - barely see through
- Opaque
- Textural

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The glaze name at the top of the tile is the glaze that is underneath the other named glaze. Outcomes at one, two or three coat application of the two glazes combined is illustrated on the tiles.

These glazes can be layered but not mixed together.

### **STROKE AND COAT**

These are low fired glazes like those used in the Ceramics Club and offer a broader range of brighter colors. They can be fired to Cone 5/6 or fired in a Bisque firing at cone 05. Refer to the Mayco data sheets in the green binder on the glaze table to see how firing temperatures affect the colors. Stroke and coats can be blended together to create different colors and layered over one another. A GREEN WORKSHEET must accompany work if it is to be fired at cone 05 and placed on the BISQUE firing shelves.

The POTS club stocks a very limited selection of these glazes and members are encouraged to purchase their own.

### **UNDERGLAZES**

These are liquid clay (slip) with colorants (stains) added to it. They do not melt like glaze and remain in place when fired. Underglazes can be applied to unfired greenware or bisqueware. Underglazes can be blended together to create different colors. When appropriate numbers of coats are applied underglazes are opaque and can be used for detailed imagery. They can also be watered down and used with a water color technique. Because Underglazes don't run they are ideal for realistic detailing, sgraffito, mishima, printing techniques such as stamping and screen printing and surface treatments like staining. For food safety underglazes need a clear or transparent glaze applied over them. Check the Amaco Velvet Underglaze color sheets in the Green binder for color variances at cone 05 versus cone 5/6.

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## **SLIPS**

These are a mixture of simply clay and water or mixtures that have had stains added to them for color. They can be applied to wet or leather hard surfaces only. Surface moisture is important for adhesion. You can use slips made from the different clays in the studio for color contrast as our clays shrink at similar rates. Contrasting colors of clay or colored slips can be used to decorate surfaces with a thick or thin application. Slips can be thinned out for a smooth overall coverage or left thick for a dimensional application. After bisque firing glazes can be applied.

## **WASHES**

Iron, Rutile, Cobalt, Manganese and Copper are metallic oxides mixed with water that can be applied to greenware or bisqueware and can also be used over or under glazes. The washes are highly concentrated and need to be diluted with water to a 50% solution. Use a pipette for exact measurements when mixing. Washes can be applied by brushing, sponging or spattering with a toothbrush and they can be wiped off (on bisqueware only) to highlight low areas. Washes provide a matte finish and require a clear glaze for food safety unless applied over or under a glaze. The club does not stock washes - members can buy their own from Marjon.

## **WAX RESIST**

Wax resist can be used to as a design element to control the flow of glaze, protect the raw clay from glaze or protect decorated areas from application of additional glaze. Applying wax resist is not necessary if you are brushing on glazes and paying careful attention for protection from glazes running. However, until you develop a consistent method of application and confidence in glazing we suggest waxing the base of your piece and a minimum of 3/8" on the sides at the lower edge of your piece. If glaze goes right to the bottom edge then the use of cookies or stilts is mandatory. It is recommended that members have their own brushes marked for "Wax Only".

## **APPLYING GLAZES**

Glazes can be brushed, poured or dipped. Members are encouraged to have a good selection of their own brushes and applicator/decorator sets. Soft brushes of varying shapes and sizes including fan brushes work well.

When using glazes be very thoughtful about how much glaze you are applying particularly when layering glazes. The best rule of thumb would be to leave a minimum of 2" on vertical exterior surfaces. Interiors and flat pieces are safer areas to use glaze combinations.

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Glazes can be layered over one another but not mixed together. Without knowing the contents of each glaze the outcome of mixing glazes is totally unpredictable and rarely as expected.

Using a glossy glaze over a matte finish is almost guaranteed to run so be careful about placement.

For glaze application basics refer to the Glazing Instruction handout or the information sheets on the glazing table.

### **COOKIES, STILTS AND KILN PROTECTION**

Understanding a “clean bottom” and when to use cookies is extremely important as it provides protection for expensive kiln shelves. Essentially no glaze, underglaze or wash can come in direct contact with a kiln shelf. Always inspect and wipe the bottom of your piece before moving it to the Glaze Shelf. Use wax resist to apply cookies to elevate your piece and make sure the cookies don't come in contact with any glaze. Cookies or supports must be positioned inside the outer edge of your piece. If glaze runs on to a cookie it may be permanently attached to your piece.

When designing and creating a piece consider how you will glaze it and if it requires any special support to keep it well balanced and off the kiln floor. You will need to design and build a custom support and bisque it at the same time as your piece so you have it

ready when it comes to glaze firing. A well balanced piece is necessary as pieces may actually rock a bit under high temperatures. If you are using an already fired clay support for an opening you have to account for the fact that the support will not shrink but your piece will definitely shrink around it and can become permanently attached.

Very light weight pieces can be supported on wire stilts. Beads and smaller pieces with holes in them are fired on nichrome wire supports and bead trees. If your holes are filled with glaze they will become permanently attached to the wire supports or if your pieces are too heavy the wires will bend when heated and your pieces may shift into one another and fuse.

### **GLAZE INFO SHEETS**

These sheets are essential for the Kiln Committee as well as for yourself and provide a lot of information as to what finishes are on your work. Consider taking a picture of your glazed piece with the glaze sheet visible before firing. After firing take another picture with the end results. These visual references will show you how certain glazes reacted with one another - did your design stay in place or did it run? Did you stumble upon a brilliant combination that you want to repeat? Keep a “Glaze Diary” or a file with your glaze sheets.

Low Fired glazes will be identified with a GREEN colored Glaze Info Sheet if they are to be fired in with the Bisque loads.

## **FIRING METHODS**

Ceramic work is typically fired twice: **bisque** fired then **glaze** fired. Firings take place when the shelves are sufficiently full to justify a firing. The Kiln Master oversees a committee of trained volunteers to handle your pieces. Every effort is taken to assure that your work is handled with care but understand that the combination of clay and your construction and/or decorative techniques present many vulnerabilities at the various stages.

### **BISQUE FIRING**

The goal of **bisque firing** is to convert totally dried greenware to a durable, semi-vitrified porous stage where it can be safely handled during the glazing process.

**NOTE: Your piece will shrink at this stage but will shrink a greater percentage in the glaze firing. Our clays shrink about 12% from wet to glaze fired.**

### **GLAZE FIRING**

This is where glaze materials are heated sufficiently to melt forming a glassy surface coating and vitrifying the clay and making your piece waterproof.

## **TYPES OF KILNS**

Our studio uses programmable electric kilns and the firing technique is referred to as OXIDATION.

There are multiple other types of firing methods and kilns such as Gas Reduction, Soda and Wood Firing, Raku and Open Pit. Due to safety concerns and lack of available space the POTS studio doesn't have these firing options but members are encouraged to research outside community options and share their experiences and information with our club.

Complicated chemistry compounds and molecules are very active in the glaze firing process. Not only are the glaze components melting and fusing but the interaction between the clay and the glazes are also in play. Final results can be affected by not only what glaze you use but how you apply it, where a piece is placed in a kiln, how full the kiln load is and external temperatures.

We use witness cones to give us feedback about what is happening with regard to temperature at various locations within the kiln.

### **FOOD SAFETY**

Most glazes provided by the POTS Club are food safe . For a piece to be “food safe” all surfaces that come into contact with food or beverages must have smooth, unbroken glassy surfaces without cracks or rough areas that water, juices or oils can penetrate. These unglazed surfaces can be havens for bacterial growth. Clays that are fired at cone 5/6 or may be considered food safe without glaze when fired to their full maturity because the clay particles vitrify enough to form a waterproof surface. Matte glazes are not as food safe and Crackle glazes are definitely not food safe.

### **CLEAN UP**

Wiping jars and lids, taking care of brushes, pipettes, ladles and all tools and surfaces you touched during the glazing process is important. Make every effort not to contaminate glazes with debris from your pots or by mixing glazes together. Unused glaze that has been decanted and not brushed near or combined with any other glaze can be returned to the jar.

### **GENERAL**

There are many different ways to glaze and embellish your wares. Keep an ideas file and get inspired by websites like Pinterest, Etsy or Google Images. There are a lot of interesting YouTube and Ceramic Arts Daily tutorials to help illustrate the glazing and decorating process so take advantage of them.

Members are welcome to purchase their own glazes but must take special care to protect our kiln equipment as we don't know how these glazes will interact if layered with our studio glazes or with themselves. Cookies and a protective clay “drip” shelf are recommended when using the glaze for the first time and clear information on your Glaze Sheet is a must.