

## **Zen And Now Studio Information**

**Studio safety.** Many materials used in the ceramic industry have certain risks involved with them. Zen And Now has made a conscious choice to reduce any risk to our students and staff. If you have any question about the following information, please ask Christine or Martie. All of the materials used in our studio are pre-manufactured, such as glazes, underglazes and clay bodies. Proper care of the studio such as cleaning and wet-mopping are performed to keep dust under control. We ask that you read the following information as it will assist us in keeping our clay house in order.

Almost all ceramic material contains silica. This is the most common hazard in the pottery world. The practical solution is to keep all work areas clean and free from any airborne ceramic dusts. Wet clays and glazes are not potentially harmful. Take care not to raise dust when you are sweeping up clay trimmings and always sponge-mop your wheel, table and or glazing areas.

A few potters have contact dermatitis from moist clay or liquid glazes. Small bumps or irritation on the hands and forearms are noted after working with these materials. Applying hand lotion to the arms before working with moist clay or glazes will often eliminate a sensitive skin reaction. Under the right condition mold can occur on moist clays (which increases the clays plasticity). Mold can also grow in stored wet glaze containers. This is not a hazardous type of mold.

### **The following are some safety rules you have to comply with:**

- Kiln area is off limits to students without permission.
- Wipe down worktables and wheel with a wet sponge after project completion.
- Do not put any form of clay in the sinks. Pre-wash hands, tools and buckets in large clean-up bucket in throwing room.
- Do not trim dry pots, wet them first. If they squeak and the trimmings don't come off in ribbons, they are too dry.
- Remove any materials from the floor that might cause an accident.
- Please notify teacher if something spills.

## **CLASSES**

Class duration is 8 weeks 2.5 hours each week and a maximum of 10 students per class. Open studio is available any time the studio is open. Open studio hours are posted online and in the main throwing room.

You can make-up one class per semester session. Make-up classes can't be carried over beyond the 8-week program involved and are not transferable to others.

In a class where new and repeat students attend, the new students will receive the most teacher attention in the first couple of sessions. However, all students will receive adequate “face” time with the class instructor.

If you intended to sign up for another 8-week program, please notify your instructor so that a seat can be reserved for you.

Due to the studio storage limitations, we ask that you keep up with taking your glaze and bisque ware off the pickup shelves. We do not keep finished or unfinished work longer than 4 weeks past each session. If you have special circumstances, please request an extension.

Studio towels are provided to dry wet hands and not heavily “clayed” hands. If your towel is covered in clay, rinse it in the clean-up bucket before putting it in the “dirty” bin.

## **BISQUE AND GLAZE FIRING**

We bisque at cone 04. At this stage the bisque is hard enough to be handled easily yet sufficiently porous to absorb glaze readily. We glaze fire at cone 6.

Wax must be applied to the bottoms of every pot that has glaze on it. Before glazing, the ware should be clean and free of dust. We recommend a quick rinse under the faucet before glazing. The glaze must be completely removed from the bottom of the pot and about 1/4 inch up the side as soon as it is dry enough to handle. Excess glaze runs, so it is not advisable to allow a heavy layer of glaze to remain near the foot rim. Poorly glazed work will not be fired.

All work to be fired must have a signature on the bottom and be accompanied by a glaze info sheet.

## **METHODS OF GLAZE APPLICATION**

**Brushing:** Best suited for pint containers. Make sure your brush is cleaned in between different colors if you want to layer. Rinse pot under faucet first to help smooth out brush strokes. Commercial brushing style glazes are thicker than dipping or pouring glazes. You will need the thickness of around a dime for good glaze results.

**Dipping:** One of the best methods for achieving an even glaze thickness. The bisque is plunged into a container of glaze, withdrawn almost immediately and shaken to remove any excess glaze. Finger marks may be touched up with a brush or finger touch of glaze.

**Pouring:** Most vessels are poured with glaze to coat the inside first. Immediately after pouring in, the glaze is poured out. Rotate the piece as you pour out, to evenly coat the inside. With preparation to capture the glaze, the outside of a piece can also be poured. Move very quickly to remove excess glaze from the pot. It is *highly* recommended to pre-rinse each piece before pouring the exterior of any piece.

## **UNDERGLAZES AND SLIPS:**

**Slips:** may be applied to leather hard clay or wet clay. If applied too late, they will peel off. Slips can be fired to high-fire and will retain their color. Mayco Stroke and Coat underglaze should not be applied to the bottom of your pot. It contains a high amount of flux that causes a shiny

surface that will stick to the kiln shelf. Regular underglaze, such as Speedball, may be applied to the bottoms with no problems as it will not stick.

## GENERAL GLAZING PROCEDURES

- Clean counters thoroughly before and after you glaze your work.
- Do not leave small, open containers of glaze on the tables. If you put a small amount of glaze in a cup, return the remaining glazes to the original bucket if it is not contaminated. Wash the small containers and return them to the storage shelves.
- Return lids to glaze buckets immediately after use to avoid contamination.
- Only one open glaze bucket per glazer is allowed at a time.
- Clean all equipment and containers after use.
- Clean sink area after use.
- Do not pour glaze or glaze water down sink, use water bucket in throwing room.

## COMMON GLAZE FAULTS:

**Blistering.** Blistering or bubbling is apparent in the glaze or on the surface of the glaze. Dampen the bisque ware before glazing to hinder a too thick glaze layer.

**Crazing.** Cracks formed in the glaze in irregular patterns. Glaze layer is too thick and causes too much surface tension or the glaze does not "fit" the clay body. Apply the glaze in thinner coats or use another glaze. Also referred to as "crackle" and "spider-webbing", it is considered a defect in the glaze brought about by a difference in the amount of shrinking in the clay and the glaze. Usually undesirable, it is sometime used as a decorative element, but should be avoided for pieces intended for dinnerware and kitchenware.

**Crawling** The glaze clumps, leaving bare areas on the surface. Glaze is too thick, use a thinner glaze coat. **DO NOT ADD WATER TO BUCKET**, please ask Martie or Christine if the glaze is too thick. Drying the glaze after application too quickly does not let the glaze application dry normally. Layering certain glazes on top of each other may cause the glaze layers to separate from the clay. As the glaze melts in the kiln it does not smooth out over all places leaving gaps. Greasy or dirty bisque can also cause crawling. Double glazing where the first glaze is too dry can also result in crawling, apply second glaze while the first glaze is still fresh being careful not to contaminate the second glaze.

**Glaze running.** Glaze runs down the sides of the pot, pooling at the base and leaving thin areas at the top. Too many different glaze layers or just a bad combination can cause running. Each glaze is formulated to perform without running, but once a different glaze is applied over or under, a totally new glaze is formed with a very complicated chemistry. Keep all layering inside and at the top third of the pot. Applying glaze too thickly can also cause running.

**Pinholing.** Small, bare clay, pinholes in the surface of the glaze. Rinse the bisque before glazing which will take off any dust. The dust particles do not let the glaze penetrate the clay and it moves away from the clay leaving small unglazed areas.

**Rough surface.** Rough, sandy, or grainy surface on the glaze. The piece is glazed too thinly and the actual clay is too close to the surface causing a rough texture.

**Shivering.** Fired glaze breaking away from the body. Takes place when the glaze shrinks more than the clay, causing a buckling of the glaze. This usually happens at sharper curves like rims and handles. The easiest fix is to layer another glaze on top in order to change its chemistry and make it more flexible.

**Speckling.** Surface marred by specks of non-glaze material are caused by foreign material getting into the glaze mix. Re-close lids when done to protect glaze them from contamination. Speckling can also be caused by dust or foreign material falling on your glaze ware.

## **COMMON TERMS USED IN POTTERY:**

**Bisque.** This first firing is to a temperature that brings a physical and chemical change to clay. Atomically attached molecules of water are driven off the individual clay particles and they are fused together transforming them into one solid piece. This intermediate step in glazed ceramics gives bisque ware the ability to absorb water of the glaze solution causing the glaze materials to adhere to the piece while it maintains its shape. Considered to be in the "low-fire" range, some pieces are never fired above this and are therefore usually less durable and have less long-term food safety due to porosity.

**Burnishing.** Leatherhard clay is made smooth by rubbing it with a hard smooth object like a stone, spoon or plastic bag. This procedure gives the bare clay a polished look. Burnished pots are usually left unglazed but sometimes fine slips (terra sigillata) are applied to add soft color. Burnishing not only adds a glossy surface, it also contributes to the durability of the clay by making it more resistant to water absorption. Burnished surfaces generally diminish in shine as the clay fires to higher stoneware temps.

**Ceramic change.** A transition that takes place in clay when it is heated to approximately 1100 F or higher. At that temperature, chemically combined water molecules are separated from the clay particles. These clay particles are fused together and the ceramic object is permanently changed. Prior to the transformation, when clay objects are re-introduced to water the clay particles will slake (fall apart) and re-dissolve into the water. They can then be re-constituted into workable clay and used again. Low fired pottery is heated to only slightly beyond this point and will tend to be less durable than high-fired pieces. See also firing.

**Cheesehard.** The first stage in the drying process of a piece of pottery where it is still soft but is less plastic than when it is wet and soft.

**Claybody.** As used by the potter, a claybody, is a combination of various types of clay, minerals, and other materials. Each formula is determined by the intended use of the final product to be produced. This is one of the reasons a combination of clays is used to create a claybody suitable to the potter's needs. There are numerous types of claybodies used in ceramics today. The most popular of these include earthenware, stoneware and porcelain.

**Coiling.** A hand building technique where snake-like pieces of clay are placed in a spiral formation, thereby building a cylindrical shape. The coils are then smoothed out so that the piece takes on a continuous contour, sometimes the coils are left showing. Because coiling is a slow process and coiled pieces have an increased chance of weak points at any of the joints between the coils, coiled pieces generally do not lend themselves well to functional pieces

**Cones.** Small, elongated, three sided pyramids made of materials designed to melt at a specific temperature. They are designed to melt at the same temperature as the glazes used. Cones indicate the progress of the melting. Cones are placed just inside the kiln during a firing so they can be seen through a peephole. The cones are one-time use only, and are available for a wide range of temperatures. They are numbered according to the temperature at which they melt. When discussing the temperature to which a piece/glaze is fired, reference is usually made to the cone used. The low fire range usually includes cones 06 through 01, intermediate fire includes cones 1 through 6, and high-fire includes cones 7 and up. Digital kilns do not use actual cones, but are computer controlled to simulate firing results using real cones.

**Contraction.** A decrease in size due to a temperature change. It should not be confused with shrinkage, which is a non-reversible occurrence. Contraction is reversible with a reverse in the temperature change. As a piece of ceramics heats and cools, it expands and contracts. The rate of expansion and contraction of a glaze must be compatible with that of the claybody, otherwise flaking off or separation of the glaze may occur. In pottery, this should be a concern when considering glaze fit.

**Decorative.** A general term describing a ceramic piece that has no purpose other than art or decoration. Typical examples include sculptures, and wall hangings. Some seemingly functional pieces are only decorative pieces are actually decorative only because of how they are produced.

**Dunting.** During the firing, clay goes through what is called a "silica inversion" at slightly over 400 F and again at slightly over 1000 F. This transformation puts a lot of stress on the clay. All pottery goes through this stress but most are strong enough to withstand it without cracking. Dunting is not always evident immediately upon removal from the kiln. It sometimes occurs as much as a month or more later but it should not be confused with cracks caused by "thermal shock".

**Earthenware.** A type of claybody usually associated with low-fired ceramics. Earthenware tends to be more porous than higher fired clays. The relatively low physical hardness of both the clay and the glaze tend to make earthenware less durable than higher fired claybodies and less appropriate a choice for functional pieces.

**Firing.** During firing, the clay and/or glaze go through a transformation fusing them together into one solid piece. Unfired clay will dissolve in water, fired clay will not.

**Frit.** Glaze materials that have been combined by melting and are reground to powder to be used in subsequent glaze formulations. There are several reasons why this process may be necessary. Some glaze materials are highly soluble in water. Soluble minerals cause problems for the potter when present in glaze recipes. The fritting process renders them insoluble.

**Glaze.** A mixture of various materials and colorants, which are ground into a fine powder, mixed with water, and applied to ceramic pieces. This mixture, when exposed to high temperature during firing will melt and vitrify, forming a glass-like surface that is fused onto the ceramic piece.

**Glaze fit.** The compatibility between the glaze and the clay. The match does not have to be exact but it must fall within an acceptable range. If not, various problems may occur with the

piece, such as cracks in the glaze, shivering and shelling (glaze flakes off the clay) or dunting (various types of cracks in the claybody).

**Greenware.** A stage in the production of pottery where a vessel is going through the drying process necessary before it can be safely fired. There are several sub-stages in greenware. They are: Cheesehard, Leatherhard, and White-hard. Several decorative techniques are possible during these different stages of the drying process.

**Grog.** Grog is high-fired clay that has been ground into a granular state. Because it has already gone through the firing process, it lessens the shrinkage of the claybody. In clays that require great resistance to thermal shock, such as Raku, large amounts of grog are usually present.

**Hand building.** Various techniques for creating ceramic objects that do not involve the use of a potter's wheel. These methods include coiling, slab building, and pinch pots. Hand built pieces are usually decorative instead of functional, primarily because the seams make them less durable and the unevenness of the surface makes them more difficult to clean.

**Lead.** Lead was a key ingredient in many older glaze formulations and some low-fire products. Since lead can leach into liquids and foods, you should take this into account when shopping for ceramic pieces to be used for food. Fortunately, most functional ware is fired to higher temperatures where lead, commonly used as a flux (melting agent) in lower fired glazes, will not be present or would tend to have been burned off during the glaze firing. Lead is not used in any product offered for use at Zen And Now Clay Studio.

**Leatherhard.** A stage in the drying process when a clay object can be carefully handled without danger of the shape being deformed, but the clay is still pliable enough so alterations, like carving, can be made if desired. Many ceramic artists take great advantage of this relatively short period of time to add personal and unique characteristics to their creations. It is also the stage when attachments, such as handles, are added to wheel-thrown pieces.

**Lusters.** Metallic materials applied on glazed surfaces. Lusters are pure metals dissolved by hydrochloric acid, which are then suspended in an oil base that can be applied with a brush. Lusters are generally only used as highlights such as pinstripes or small applications. The firing is at an extremely low temperature (1200 F). The oil resin is burned out leaving a very thin deposit of metal that can be easily rubbed off with extended use of the piece.

**Oxidation.** In pottery this refers to a process that takes place during the firing stage of production. Oxygen in the air is allowed to enter the kiln to combine with elements in the clay and glaze. This is particularly important so that carbon and sulfur naturally occurring in clay can be "burned off". This takes place between temperatures of 1300 F and 2100 F. While all pottery firings go through a stage of oxidation, when it is allowed to continue throughout the entire process, it is called an "oxidation firing". An opposite effect is known as a "reduction firing". Electric kilns fire in oxidation and any fuel burning kiln fires in reduction.

**Pinching.** A technique of building pots entirely by molding the clay with the hands without coiling, using slabs, or throwing. Called pinching because it usually starts by a potter inserting a finger into a ball of clay and pinching the walls to thin and shape the pot.

**Porcelain.** Introduced in Europe by Marco Polo after his excursions to China, true porcelain is a very high-fired (2300+ F) white ware, which, when thin enough, has a translucent quality. At

these high temperatures, the body and the glaze mature together, creating a thick bonding layer. This gives porcelain great strength and durability. Due to many difficulties of working with old school porcelain, several modifications have been developed. Newer porcelain claybodies fire to lower temperatures and are capable of being glazed with stoneware glazes.

**Porosity.** The fired clays ability to absorb water by capillary action. Over a period of time, porosity tends to weaken a fired claybody. A desired porosity of 1% to 2 is obtainable with stoneware or porcelain. However, low-fired pieces must be covered with a non-crazing glaze to minimize the effects of water absorption. This is not to say that low-fired ware should necessarily be avoided, but it may be less appropriate for functional uses.

**Raku.** Raku is a classification of pottery that falls into the low-fire range. The term "raku" describes the piece as well as the firing process used to create it. Originally developed in Japan as a technique for quickly producing small functional vessels, in Western Civilization, because the process has been somewhat altered, raku ware is primarily created as decorative pottery. The most interesting aspect of the technique is that a piece is taken directly from the red hot kiln placed in a metal container of newspaper or other combustible it is still very hot. The combustible materials immediately ignite causing blackening of bare clay areas. The container is covered, and the resulting fire and smoke add a wide variety of finishes to the piece. The piece is then placed in water to cool it. The process is quick, exciting, and predictable only within a certain range of possibilities. The uniqueness or "one-of-a-kind" aspect of a raku piece is impossible to reproduce. This, along with its shortcomings for functional use, is the reason raku is popular primarily for decorative purposes.

**Reduction.** A firing process that uses some type of natural fuel, such as gas or wood. What is actually being reduced is the quantity of oxygen that is chemically bonded to any metal oxides in the clay or glaze mixture. To bring about the removal of oxygen molecules, when the kiln temperature reaches the melting point of the glazes used the kiln atmosphere is "flooded" with combustible material, such as gas or wood, thus causing the fire to pull oxygen from the pieces being fired. The duration of the stage varies, but it can be as long as an hour or more. The removal of iron oxide in clay causes a "fluxing" (melting) action thus creating a stronger bond between clay and glaze. In the glaze mixture, reduction brings about a wide array of colors depending on the combination of materials used in the glaze. In general, reduction fired glazes tend to have what is considered warmer tones than those of oxidation glazes. Both have the potential for beautifully produced pieces.

**Shrinkage.** An irreversible reduction in the clay and glaze size/volume which is caused during the drying and firing process. This differs from expansion and contraction, which occurs naturally as a piece heats and cools. All pieces usually undergo a small amount of shrinkage.

**Slab.** Various techniques for creating ceramic objects that do not involve the use of a potter's wheel. In this technique, the clay is pressed or rolled into thin slabs that are then cut, assembled, and shaped into the desired form.

**Stain.** A compound added to glazes to add coloring, sometimes applied directly onto a clay body without mixing with a vitrifying glaze.

**Stoneware.** A strong, hard, vitrified ware, usually fired above 2,200 F, in which the claybody and glaze mature at the same temperature, forming an integrated clay-glaze layer. This high-

firing process brings the clay to a point of maximum solidification without danger of distortion, creating pieces very suitable for kitchenware and other functional pieces.

**Vitrification.** Water-tight clay such as porcelain or stoneware. The firing process causes the clay and glaze to melt and fuse together, thereby becoming solid and glass-like. This quality must be present to make a good quality, functional and long-term food safe product.

**Wedging.** A manual process of preparing clay for use by a potter. Similar to kneading dough, wedging accomplishes three things: a) it removes air pockets present within the clay mass, b) it helps to align the individual clay particles making the process of throwing slightly easier and the clay stronger, and c) it is a final mixing process that tends to even out water concentrations in the clay as well as homogenize the various ingredients in the clay mixture.