



## Useful Vocabulary

A Select Glossary of Ceramic Terms, published by The Rufford Craft Centre, UK

### **Bisque or Biscuit:**

The first firing a pot undergoes to prepare it for glazing. In industry this is sometimes done at a higher temperature than the subsequent glaze firing, the reverse is usually true of the studio potter.

### **Burnishing:**

A technique where the **Leather Hard** clay is polished with a hard instrument to force the smallest clay particles to the surface creating a soft sheen. This surface remains after the pot is fired so long as the firing temperature is kept below 1100°C.

### **Clay:**

$Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$ . The decomposition of Granite through the process of Kaolinization creates clay. Clay is a mineral with a plate (platelet) like structure; it is these plates, (about 0.5 microns across) when lubricated with water, slide against each other to form the plastic mass we know as clay. 'Primary ' clays are those found close to the area of Kaolinization and hence the purest (China Clays). Secondary clays are those moved by water away from the site of Kaolinization and get progressively more plastic and less pure (Ball Clays, fire clays, **Earthenware** and marls).

### **Coil construction (coiling):**

A technique of creating *pottery* or sculpture by rolling out coils and stacking them to create height and width.

### **Cones:**

Pyrometric cones are composed of glaze material and designed to melt and bend at specific temperatures. By observing them through a small 'Peep Hole' in the kiln it is possible to ascertain the exact conditions in the kiln. Cones are a better indicator than temperature alone as the degree of glaze melt is a combination of time and temperature ('heat work done'), thus a fast firing needs to go to a higher temperature to get the same results as a slow firing to a lower temperature.

### **Dunting:**

Cracks which occur on a pot being fired either on the heating cycle or the cooling cycle. They are usually caused by the **Silica** inversion at 573°C (Alpha to Beta phase) or the Crystobalite (one of the 'phases' of silica) inversion at 226°C, in both cases there is an expansion and contraction of around 2-3% in the heating and cooling cycles.

### **Earthenware:**

A low fired form of pottery (below 1100°C). The clay can be any color although iron red is usually associated with **Earthenware**. The low temperature vastly expands the range of glaze colors available which are often **Alkaline** or **Lead** based (Also see **Clay** and **Slipware**).

### **Engobe:**

Colored *slip* that is applied to the surface for decoration.

### **Firing:**

The process which changes clay into ceramic. Up to 600°C the chemically bonded water in **Clay** is driven off ( $\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O} - \text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$ ). This is an irreversible change.

### **Greenware:**

Clay before it is *fired*.

**Handbuild:**

To create objects using handbuilding techniques, including coiling, pinching, and slab construction

**High-fire:**

The glaze *firing* for high fire clay (claybody #'s 153, 182, 380...). The pieces are loaded into a large gas kiln and fired in a reduction (or reduced oxygen) atmosphere and the *clay*, at this point (cone 10 or 2300 degrees F), becomes fully matured or vitrified (fired to the point of glassification). (3-5 day process).

**Incised:**

A decorative technique of engraving in *greenware*.

**Kaolin:**

A china clay in its purest form  $\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot \text{H}_2\text{O}$ . See **Clay**.

**Kiln:**

Basically, an insulated box which is heated to fire pots.

The draught refers to the direction the combustion gasses have to travel from input to exit flue. Since no combustion takes place in an electric kiln there is no input or exit flues and they are genuinely heated boxes. The fuels used to heat a kiln are gas, oil, wood, coal (now almost obsolete) and electricity. Each fuel source used to fire a kiln offers different possible outcomes for the pots fired in them. The maximum operating temperature for most pottery kilns is about  $1300^\circ\text{C}$  although many **Woodfired** kilns may be fired up to  $1350^\circ\text{C}$ .

**Leather Hard:**

A stage in the drying process of clay when the clay is pliable but strong enough to handle. It is ideal for **Trimming** and the addition of appendages such as handles and spouts. Relatively wet clay can be attached to the pot at this stage and the resulting bond will not form cracks.

### **Low-fire:**

Some *clays mature* at lower temperatures and therefore need to be *glaze fired* at lower temperatures (claybody #'s 105, 103...). There are special low fire glazes for this kind of clay. Pieces are fired in the electric kilns to 1920 degrees F (cone 04). If low fire clay gets into a high fire kiln, it WILL melt and make a mess of the kiln. Please be wary.

### **Lustres:**

There are two types of lustre in use today by potters. Firstly and, most commonly, commercial lustres, these are metallic chloride compounds suspended in an oil/resin based medium which is applied to the already glazed and fired pot. In a subsequent firing (to around 750°C) the resin/oil burns out creating a **Reduction** which draws the oxygen out of the metallic chlorides to create a thin film of pure metal on the surface of the pot. Secondly there are 'transmutation lustres' where the reduction is provided by the kiln (often a wood kiln). In this case the metallic oxides are mixed into a paste with clay and painted onto an already glazed and fired pot. The glaze on the pot must be a low fired glaze, (usually a tin glaze) which will soften slightly in the subsequent lustre firing. During the lustre firing (temperatures between

A heavy **Reduction** is introduced converting the oxide in the paste into a metal which is then trapped by the softening glaze. After the firing the clay paste residue is cleaned off to reveal the lustre trapped in the glaze.

### **Maturity:**

The point at which a *glaze* has reached complete fusion or *clay* has become completely **vitriified**.

### **Overglaze:**

Glaze applied to a *fired clay* object and then re-fired.

### **Oxidation:**

A **Firing** where there is either no combustion taking place (electric **Kiln**) or where there is sufficient oxygen in the kiln to allow the fuel to burn cleanly. The atmosphere of the kiln (**Oxidation** or **Reduction**) dramatically affects the resulting clay and glaze colors, for example; copper in oxidation is green (as is copper oxide) while in **Reduction** it becomes red (more like copper metal).

### **Oxides:**

Colorants that can be applied before or after the *bisque firing*, but most effectively the latter. They can also be applied over glazes.

### **Pinching:**

A method of forming clay, which is well described by its name.

### **Plaster:**

$2\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ . An invaluable mold making tool for the potter, also used extensively in industry. It can be poured or carved to virtually any shape. When it is dry it can be used to press clay into or **Slip cast** with.

### **Plasticity:**

The plastic properties of clay are principally determined by the size of the platelets (see **Clay**). The smaller the platelets the more plastic the clay is. Aging or souring is also relevant to a clay's plasticity, with time bacterial action creates a colloidal gel which aids the lubrication of the platelets.

### **Porcelain (also see kaolin):**

A white, highly vitrified clay body that is translucent where thin (often fired up to 1350°C). The translucency is a result of silica glass fused into the fired clay. To achieve this high amount of flux is added to a kaolin based clay body. The flux to clay ratio is often flux greater than clay; indeed some of the original Chinese porcelains had as little as 20% clay- like minerals. The low clay content makes porcelain very difficult to throw and trimming wares is almost unavoidable. At the home of porcelain, Jingdezhen

(China), all the pots are thrown in small thick sections, joined and trimmed. Accurate trimming is regarded as more of a skill than throwing.

**Pottery:**

A term used to describe *ceramic ware*.

**Potter's Wheel:**

A machine used to create *thrown* vessels.

**Press Mold:**

A technique of casting *ceramic ware* by pressing a sheet of clay into a mold.

**Raku:**

Originally a Japanese seal given to a prominent family of potters (1598) who developed the technique. The term describes a low fire form of pottery where the pots are removed from the kiln as soon as the glaze has melted and then left to cool or doused with water. In the mid-20th century Paul Soldner introduced the now popular process of post-firing **Reduction**. In this case, the red hot pot is placed in a lidded bin filled with straw or sawdust. The glazes are dramatically altered by the **Reduction**; particularly noteworthy are the colors achieved with Copper.

**Reduction:**

Also see **Oxidation**. A situation where too much fuel is introduced into the **Kiln** to be able to burn with the available oxygen, consequently oxygen is 'stolen' from the pots in the kiln; it affects the clay and the glaze color. A good example is iron, which changes from  $\text{Fe}_2\text{O}_3$  to  $\text{FeO}$ , even the tiny amount of iron present in porcelain changes its hue from a creamy color in **Oxidation** to a slight grey blue in Reduction.

**Resist:**

A decorative technique where a wax based medium is used to create a pattern which is then covered in another coat of glaze or slip. The wax resists the subsequent coating creating the pattern. Paper stencils or tape can create a similar effect.

**Score/Scoring:**

A method of scratching into the clay surface in order to join together two or more pieces.

**Sgraffito:**

An Italian term for the decorative technique of applying *slip* and then scratching or carving in it.

**Silica:**

The primary glass forming oxide used in pottery. Boron is the other glass forming oxide used although more commonly as a flux than as a glass former due to its low melting point (577 °C). A glass forming oxide must be present in any glaze and as Silica's melting point is 1800 °C a flux is always present to reduce the melting point to a workable range. Pure boron glasses are water soluble so of little use but Borosilicate glasses have a very low thermal expansion and is the main constituent of 'Pyrex' etc. See also **Dunting**.

**Slab construction:**

A technique of creating *pottery* or sculpture by rolling out flat pieces of clay and joining them to create height and width.

**Slip:**

A clay with enough water added to become a 'cream' like consistency. Most often colored with oxides and painted or poured onto pots for decoration.

**Slip casting:**

Plaster molds are filled with a deflocculated slip; defloculation reverses the electric charges in the clay particles which reduce the water

content in a slip to that of most plastic clays, around 30% of total weight. A common deflocculant is Sodium Silicate. The remaining moisture is absorbed by the plaster leaving sediment of clay over the entire interior surface of the mold. The excess slip is drained off and the cast can be removed from the mold soon after. This approach is used widely by industry and some studio potters.

### **Stains:**

*Ceramic* colorants used to color **overglazes, china paints, engobes, low fire glazes,** and body colorants.

### **Stoneware:**

Highly vitrified ceramics fired to above 1200°C. Most of the **Silica** in a fired stoneware body is melted into a glassy matrix and the resulting body is of high density and usually has a water absorption rate of less than 1%.

### **Terra cotta:**

An **earthenware** body that is red to brown in color.

### **Terra Sigillata:**

A **Slip** comprised of the smallest particles of clay which consequently resembles a **Burnished** surface. The technique was used to impressive effect in the Greco-Roman period.

### **Throwing:**

A delicate balance which defies gravity and centrifugal force as clay is coaxed up by hand from a spinning turntable.

### **Trimming:**

(also termed 'Turning'). Certain forms made on the potter's wheel will not support themselves unless excess clay is left at the base, alternatively, extra definition on the foot of a pot may be needed. The solution to both these problems is turning, which is done at the **Leather**

**Hard** stage. The pot is inverted onto a potter's wheel and a cutting tool is applied to the bottom of the pot until the desired finish is achieved.

### **Underglaze:**

Ceramic colors applied under a glaze, usually a clear glaze. Although a durable method of decorating, colors can run especially if colorants which double as fluxes are used.

### **Vitrification:**

The degree of melt in a **Clay** body as the Silica forms a glass with fluxes present. See **Stoneware**.

### **Wedging:**

A hand process used to homogenize the clay, thus making it workable. The techniques for wedging are called; Spiral wedging, Rams head wedging and wire/slab wedging. Both Rams head and Spiral wedging involve the folding of the clay on itself to build up an ever tightening spiral of clay platelets. Wire wedging builds up increasing layers of clay platelets and is the best for introducing other clays and fillers into an already plastic clay body.

### **Wet:**

**Greenware** that is still wet to the touch; before **leather hard**.

### **Woodfiring:**

See also **Kiln** and **Ash**. Wood is the original fuel used by the potter, and if significant temperatures (1200°C-1400°C) are achieved it has a dramatic effect on the unprotected pots. The results from wood ash landing on clays/slips vary from subtle greys and browns to oranges and a runny green glaze. Careful packing of the kiln is vital if the best results are to be achieved as the flame leaves its mark travelling through the kiln. Usually large areas of the pottery to be wood fired are left unglazed as the interaction between clay and ash is more fruitful than its mark travelling through the kiln.