

# CERAMIC BASICS



A Guide for  
Beginners

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# Glossary

- **Chamotte (grog)**
  - Fire-resistant ceramic chip that is added to clay bodies: app. 15-40%. Chamotte size varies between 0-3 mm. Chamotte enhances workability and decreases shrinkage.
- **Engobe**
  - Coloured clay slip that can be used for decorating. Use on moist or leather-hard clay before bisque firing.
- **Underglaze**
  - Decorative colour that can be painted onto green or bisque fired surface. Often used with transparent glazes.
- **Slip**
  - Clay with a lot of water. Used in joints.
- **Vitrifying**
  - If you want a waterproof object, the clay has to be fired high enough so it vitrifies and becomes nonporous. Follow the manufacturer's firing instructions.
- **Bisque Firing**
  - Pre-firing before glazing. Leaves the object porous so it is easy to glaze. It also gives strength to the object, which makes it easier to handle.
- **Glaze Firing**
  - In glaze firing the glaze melts on the object and merges to the surface of the clay. The clay body vitrifies. Please follow the manufacturer's firing instructions.
- **Stoneware**
  - Durable and nonporous clay types that are fired from 1200-1300 °C. Different colours and roughnesses (chamotte sizes).

# Work Steps

- 1 Planning
- 2 Choosing Clay and Technique
- 3 Making process
- 4 Drying
- 5 Bisque Firing
- 6 Glazing
- 7 Glaze Firing



# Planning

- **Sketch and get inspired!** Take time to plan your work. If you make dinnerware - think about usability. How much a coffee cup weights, how it feels in the hand and what is the dish's capacity after clay shrinkage?
- **Stoneware (app. 1200-1280 °C) or Earthenware (app. 1020-1080 °C)?** Water-resistant pottery or more porous dishes or art?
- Choose the clay body and the glaze that strengthens your artistic vision.

Chamotte is a fire-resistant ceramic chip that is added to clay body app. 15-40%.

Chamotte enhances workability and decreases shrinkage.



## Wheel Throwing

chamotte free or 0,2 mm chamotte



## Hand Building

0,5 mm -> chamotte

- When making dinnerware, choose a glaze that is **dinnerware safe**.
- **Make samples by combining glazes and clays.** Test with different thicknesses. The result is a combination of different variables such as:

Chosen technique

Coarseness and colours (clay body)

Firing temperature and cool down

Glaze thickness (layers) and applying method

- Note the **shrinkage** - app. 8-20%. Chamotte volume and firing temperature affects the shrinkage.

**Tip** Instagram and YouTube offer a variety of guides and ideas for ceramic enthusiasts.



Dinnerware safe glazes can be recognised by a vase-fork symbol or inquiring the manufacturer.



Wire Cutter



Loop Tool



Modeling Tool



Banding wheel



Knife



Brushes



Wooden Board



Wooden Paddle



Rib  
Rubber, metal, wood



Dipping Tongs



Rolling Pin



Bulb Syringe



Sponge



Needle Tool

Ceramic  
Tools

# Ceramic Basics



- **The clay body has to be free of air-pockets.** Wedging the clay before preparation removes the air and increases its plasticity. If your work has any air pockets, it can burst in firing when the object shrinks and vitrifies.



- **At first the clay is moldable but hardens when it dries.** Adapt your work stages in relation to the humidity of the clay. For example while making a large object let the bottom half stiffen before building more. This makes the shape stay in the desired form.



- **Memory of clay** is best noticed when making tiles or dishes - they bend and twist during drying and firing. Twisting can be controlled by choosing a chamotte-rich clay, wedging it to even quality and handling it carefully after the drying process has started. **Only mould moist clay - not leather-hard.**

# Ceramic Basics



- Use porous **wooden boards** to prevent the clay sticking to the table.



- The shrinking starts right after the object is left to dry. Make sure the object can dry freely. Release the work from the mold before it starts to shrink. Use a newspaper under flat works. **The biggest shrinkage happens** during drying and glaze firing.



- **Don't make too thick objects.** The recommended wall thickness is under 5 cm. The work will burst during firing if thick wall holds air. Remember to hollow your sculptures.



- Finished objects should dry slowly. Cover the pieces with newspaper or plastic. **Too fast drying leads to crackling.**



# Work Safety

- If you make **dinnerware for personal use**, use glazes that the manufacturer recommends and **follow the firing instructions**.
- If you make **dinnerware for sale**, follow the **officials' instructions on testing glazes**.



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Kontaktimateriaalit

Mistä voin kysyä apuja sen selvittää?

- Clay dust is a breathing hazard - keep your studio and tools clean. Avoid scraping or dusting dry clay.
- Use gloves and a mask when glazing.



Current info and further reading can be found on  
Finnish Food Authority's website.



# Wheel Throwing

In **WHEEL THROWING** a potter's wheel is used to form clay objects. Potter's wheel usually has an electric motor. The clay has to be centered to the middle of wheel. When the clay body is in movement, it's molded into the desired form using hands and water. The result is a round shaped object. This technique is well-suited for making bowls, plates, cups and vases.

You need a potter's wheel, water, sponge, wooden rib, wire cutter and wooden board for finished work.



## Tips

- **Make sure that there is no air in the clay body.** The air bubbles makes centering hard and causes bursts during firings.
- The clay gets **fatigue** if overworked. **Clay fatigue** means that the clay gets flabby and loses its shape.
- Ruined work can be **recycled and thrown again** by drying it on a plaster slab and wedging again.
- **Spinning speed slows down** the further the process goes.
- Touch the clay body only with moist hands.
- **Patience is the key to success.**



## Favourite Clays

WM2502, Betongrau, WMS2502.  
Chamotte 25% 0-0,2 mm.  
[www.kerasil.fi](http://www.kerasil.fi)



## Favourite Courses

Teemadreijaus  
Dreijs, sorvaa ja lasita.  
[www.septaria.fi](http://www.septaria.fi)



# How to Throw



1. Wedge the clay body, shape it to a ball and **attach it** to the dry wheel. Notice the **spinning direction** according to your handedness (right-handed: counter clockwise).



2. **Damp your hands and center the clay** by moving it away from you and at the same time lifting it up. This forms **a cone**. Keep the wheel spinning fast. Next, press the cone head down with your hand. **The other hand supports** the cone at the bottom. **Repeat** the lift-and-press a few times until the cone doesn't move under your hands. Now the clay body is centered.



3. Smooth the surface and **find the center** by sliding your index finger on the clay towards the center. Press your finger inside the clay body (not through it) and make a hole. **Pull the finger towards you** to enlarge the base. To make an even bottom, slide your finger following the base back and forth.



4. **When lifting a wall** the other hand works on the inside while the other is outside. Press your fingers lightly against each other and lift the clay up. Repeat. You need to form the clay as the shape of a cylinder.



5. **Start forming.** If you want **an open form** press the inner hand more. **In a closed form** do it the other way around. Finally, **finish** your work and edges using a damp sponge. Before lifting the work off the wheel, clean the wheel from excess clay. Then put water on the wheel and pull a wire cutter under the object to take it off the wheel. Lift the work onto **a porous board**.



# Coiling and Scale Technique

**COILING** technique is used to make vases, sculptures and free forms. The clay body is rolled into coils that are joint together. If the clay has dried up, use slip or dampen the joints before attaching the coils. Pat the wall with wooden paddle to **compress and shape it**.

In **SCALING** technique the wall is built with clay pieces that are jointed with slip or water.

## Tools

porous wooden board  
wire cutter  
rolling pin  
rib  
banding wheel  
knife  
wooden paddle

## Tips

- Wedge the clay body well.
- Roll an even slab and cut it in to the desired shape. This will be the bottom of your object.
- Form a "start bar" and start rolling it from the middle to the edges until you have a coil.
- Apply the first coil to the bottom plate with slip and attach the coil to the bottom.
- From this stage on, you can just apply moisture between layers with a damp sponge.
- Attach one coil at a time. The coil ends should overlap. The top coil is pushed over the latter coil. Be systematic. Make sure that no air gets in between the coils and that the joint is strong.
- Even out the wall by patting it with a wooden paddle or working it with a metal rib.



## Favourite Clays

PRNF, PRGF, PRNM, PRGM, Terrazzo.  
Chamotte 20-40% 0,5mm-2mm.  
[www.kerasil.fi](http://www.kerasil.fi)



# Making a Vase with Coiling Method



## Favourite Courses

Urbaanit ruukut, Ruukku,  
Rouheat ruukut, Ruukkuita,  
Värikääät ruukut  
[www.septaria.fi](http://www.septaria.fi)

# Pinching Technique



**PINCHING** basis is a **ball** that is formed into a desired shape. Technique is suitable for **small bowls, cups and vases** with "lively" results. **Hand size** defines the work size.

## Tools

wooden board  
wire cutter

## Tips

- Wedge the clay body and form **a ball**.
- With thumb, push a hole in the ball.
- Build a wall **pinching** the clay spiralling from the bottom to the edge. Don't let the edge spread.
- Make sure that the wall thickness stays **even**.
- Hands' warmth dries up the clay and may cause **crackling**. You can occasionally mist the work to dampen it. When the moisture has absorbed, continue working.



Favourite Clays  
WMS2005GG, W2505.  
Chamotte 20-25 % 0,5  
[www.kerasil.fi](http://www.kerasil.fi)

# Slab Technique



## Tools

wooden board  
rolling pin  
knife  
wire cutter  
plaster mold

**SLAB TECHNIQUE** The clay is rolled into a **slab** that is cut and formed into an object. Technique is suitable to be used **with molds**. The slab can be forced into a plaster mold or textile-lined bowl until it **slightly dries and holds its shape**. If you do a slab object without a mold, let it stiffen a bit before forming.

## Tips

- Always knead the clay body first and remove all air.
- Plaster is the best mold material because clay doesn't stick to it and its cellularity enhances drying.
- Mind if you want the possible pattern to be **inside or outside**.
- Mold can be any open-ended object with some fabric, plastic or paper on it to prevent sticking.
- Obs. **ending** so that the object is removable from the mold.

## Favourite courses

Kulho ja lasite,  
Kevät, Kesä and Syyskattaus courses  
[www.septaria.fi](http://www.septaria.fi)



# Slab Technique



- 1. Press the clay flat and start rolling.**  
Always roll from the center to the edges.  
Lighten the roll towards the edges, **switch directions and turn the slab at times.**



- 2. Cut the slab into the desired shape and decorate the surface with fe. stamping.**



- 3. Press the clay into the mold.** You can finish evening out the surface with **rib.**



4. Remove your work while it's leather-hard. It's leather-hard when no fingerprints appear when you press it lightly. The clay feels cold and holds its shape. You can further setting with a hairdryer or a fan.



5. Finish your work with a knife or a damp sponge.



Plaster molds work the best because of their porous structure. You can also use everyday items like plastic bowls - as long as they are open-ended and covered with fabric, like stockings.



Lace pressing is a popular decorating technique.

**Favourite Clays**  
WMS2005GG ja W2505.  
Chamotte 20-25 % 0,5 mm.  
[www.kerasil.fi](http://www.kerasil.fi)



# Slip Casting



**SLIP CASTING** Liquid clay is poured into a casting mold. Plaster absorbs the water from the clay and forms an object inside the mold. When a proper wall has built, excess clay is poured out. **Wall thickness** is defined by casting time. **Casting time is usually 10-35 min** depending on the mold, form and clay. First, do a **test cast** to know the suitable casting time (wall thickness). This technique can be used to repeat forms or make batches.

## Tools

casting clay  
bucket  
power drill  
jug  
knife  
sponge



1. Mix the mass properly with a blender - avoid mixing air into the mass. If the mass feels heavy, adjust it with a small amount of water. Take a litre of casting clay and weigh it. **Ideal litre weight** is 1750-1800 g/litre.



2. Take some casting clay in a jug and pour it into the mold **overflowing it a bit**.



3. Clock the process and **fill up the cast** so that the **liquid surface stays up**.



Favourite Clays  
Keracast  
[www.kerasil.fi](http://www.kerasil.fi)



Favourite Courses  
Valutekniikka  
[www.septaria.fi](http://www.septaria.fi)



# Slip Casting



4. When the wall is fit (app. 0,3-0,5 mm), pour the excess mass out through a **sieve**. Leave the mold upside down to drain. Put it **slanted on top of a wooden part**, so that the clay doesn't touch the table. Wait until the drops feel cool - you can now turn the mold upside for drying out.



5. **Cut the edge with a knife.** Don't damage the plaster mold. Cut the edge **against the mold** piece-by-piece towards the mold. **The wall shouldn't move** because the object bends easily. Let the work **dry**.



6. When a slit starts to form between the cast and clay (it shrinks), remove the object carefully fe. "tipping it over" with a **wooden paddle**.



7. **Don't finish the object until it's dry.** Mouths of small objects like bowls and mugs, can be finished by rolling them against **stone or plastic board** with water. Use a **knife, water and a sponge** for the final touch.



**Slip casted object is extremely fragile when dry. Handle it with care.**

# Decorating Techniques

## Stamping

When the clay is soft, the surface can be decorated with stamps, art rollers, laces, fabrics or modelling sticks.



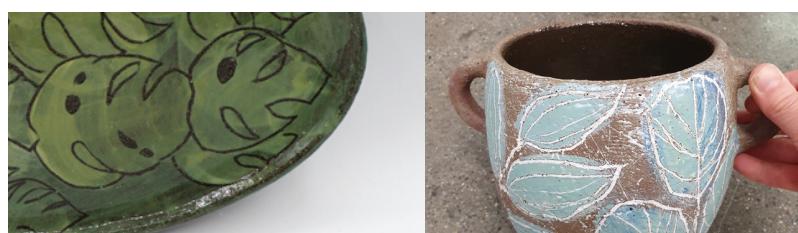
## Slip colors aka engobes

Engobe is a **coloured slip**. It is applied to a damp or leather-dry clay body with brushes, sponges, bulb syringes or pouring it on the surface. You can enhance the colors with **underglazes** on top.



## Carving

Slightly dried out, leather-hard surface can be carved with patterns and lines using loop tools or knitting needles. At this stage, details can also be carved on engobe-painted surface and use **sgraffito**.



# Decorating techniques



**Favourite Products**  
Botz, Kerasil and Spectrum  
underglazes



**Favourite Products**  
Emulsion and Cold Wax  
Wax Pens



## Underglazes

Underglaze is a **decorative colour** sold in liquid, pens and pencils. It consists of water, pigments and fluxes. Underglazes can be used **before the actual glazing** under a transparent glaze or painted **over the glaze**. Underglazes are usually applied with a brush. You can also use **stencils**. You can write or draw on the object with **underglaze pencils (right)**. You can fade the pen marks with a damp brush.



## Wax Resist Decoration

There are peel-off waxes (**cold wax/latex**) and leave-on waxes (**emulsion/embeddish**). Either case, the wax pattern is added before glaze or colour. The **wax prevents the glaze from sticking** and enhances the clay's colour through glazes. Technique can be used to pull shades that emerge on different glaze thicknesses. Wax emulsion can be used to prevent the bottom from fusing to the kiln shelf.



# Firing Ceramics

## Bisque Firing

**Organic matter** starts to burn away in the early stages of bisque firing (200 celsius). Quartz crystallises in 573 °C and clay no longer dissolves in water (Jylhä-Vuorio, 1994). **Heat-up speed should be slow** in the beginning up until 600 °C, so that the organic matter can burn away and vapouring gases don't shatter the object.

**Bisque firing temperature is approximately 900-1000 °C.** Clay work is often bisque-fired before the glazing because that makes it endure glazing and prevents dissolving. Glaze also sticks better to a porous surface. **Bisque-fire example:** 80 °C/h --> 600 °C and 150 °C/h --> 950 °C.



**Clay can be bisque-fired when it's thoroughly dry.** Drying has to be done slowly and it can be enhanced by covering work with newspaper or plastic. The bigger the work, the longer the drying time - it can be up to weeks. Works can explode in the kiln if not dried properly.

## Glaze firing

Glaze firing is done low or high depending on the temperature of the clay and glaze. **Always check the temperature from the label!** **Low Fire** is app. 1020-1080 °C. **High Fire** is 1200-1280 °C. There are also **broad-range glazes** that work in 1020-1280 °C.

### Example program for glaze firing by kiln manufacturers

150 °C/h --> 900 °C and 60 °C/h --> 1240 °C. Braising 5-10 min. **Braising means keeping the temperature in the final temperature.** Braising evens out the glaze surface. Heating element lifecycle is longer when the heat-up velocity is slower at the end of the program.



**During the glaze firing,** the object shrinks and its porosity decreases (**vitrifying**). The object becomes more waterproof. **Problems in the making stage, like twisting and crackling,** might not show up until the glaze firing.

# Firing Ceramics

All glazes and clays have their **maximum temperature that shouldn't be passed**. Over-fired clay can melt into the kiln plate to a shapeless lump or ruin the whole kiln. Over-fired glaze can start bubbling and drip onto the kiln plate. It's essential to read and follow the manufacturer's guidelines for both clay and glazes.

## Decorative firing

Sometimes there is a **3rd** aka decorative firing

- App. 700-900 °C.
- Glaze-fired surface
- Decals (DIY or order from fe. porcelain paint shop)
- Porcelain colours, gilding and lustre (porcelain paint shops)



Decal

## Kiln electricity consumption (approximate)

• Bisque firing  
4-6 \* kiln power = kWh

• Glaze firing 1230 °C  
6-8 \* kiln power = kWh

## Example glaze firing 1250 °C

6-8 \* kiln power 3,5 kW = 21-28 kWh



Edge gilding



See Septaria's firing service  
[www.septaria.fi](http://www.septaria.fi)

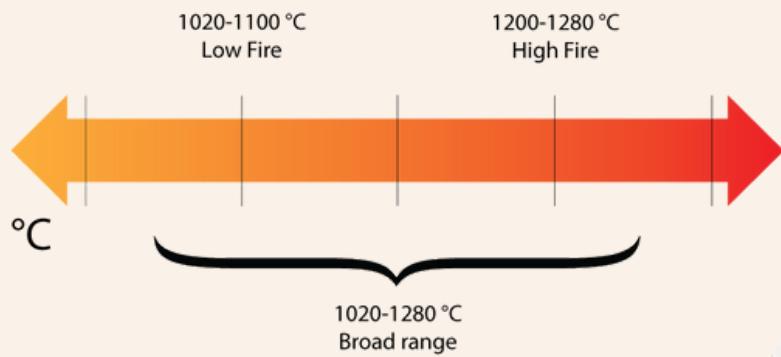


Favourite Products for Ceramic Firing  
Kilns and ware, kiln plates, release agent, gloves,  
cones, automatics and books  
[www.kerasil.fi](http://www.kerasil.fi)



# Glazing

- Glaze is a thin glass-like layer on top of a ceramic object. It protects, patterns and finishes the object. Glazing makes dinnerware more hygienic. There are glossy, matt, transparent, translucent, dinnerware-safe and glazes with different vitrification points etc.
- **Glaze firing is done after the bisque firing.**
- There are **Low Fire, High Fire and broad-range glazes**. Always check the temperature from the product label. Use a clay body that fits the glaze temperature.



- Some glaze manufacturers inform the temperatures as cones. Low Fire glazes are between cone 05-01 and High Fire glazes are between cone 1-9.

# Glazing

- **Powder glazes** are sold as powder and are self-mixed. **Water-glaze ratio is app. 1:1.** Ratio depends on the glaze. Usually it takes a bit more water to get apt thickness.



- Mix well and sieve (min. 80 mesh). Some glazes work best as milky thin, others as sour milk thick.
- If possible, always make samples.
- Use **deflocculant** if needed. It prevents the glaze from sinking to the bottom.
- Powder glaze separates from the bisque-fired object easily. **Touch the surface with dry hands** and avoid chafing.
- **Dip, pour or spray!**



**Favourite Products for Glaze Making**  
Bucket, jug, dry glaze, deflocculant, dense sieve,  
glazing whisk and dish brush  
[www.kerasil.fi](http://www.kerasil.fi)

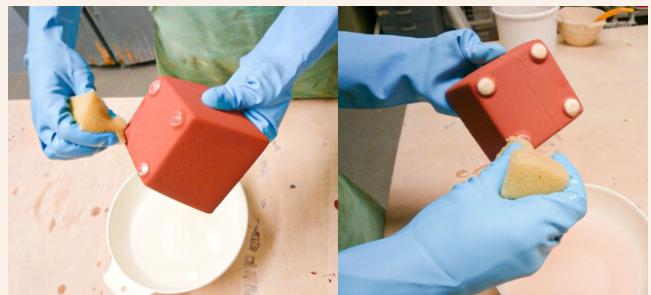


# Glazing

- **Brush-on glazes** - out of the box product. **Brush-on glazes contain glue matter** that makes them easy to use. This means that the glaze-layer holds well on the surface even when it's touched or brushed on with a new layer. Brush-on glazes are **safer** than dusting powder glazes. Spread **1-4 layers** with a brush, following the manufacturer's instructions. A sturdy brush is better than soft. You can adjust brush-on glazes with a small amount of water if needed.



- **Follow the manufacturer's instructions** on the temperature, dinnerware suitability and safe use.
- Glazes can **drip**. If possible, test the drippiness with a **sample**. Tip: Use bisque-fired firing boards under the glazes.



- **Wipe off all glaze from the bottom** with a damp sponge and leave a generous amount of dripping room. You can put a clay-rolled **firing board** to ensure that the glaze doesn't fuse into kiln shelf.

## Favourite Products

### Brush On Glazes

Amaco, Botz, Kerasil, Mayco, Spectrum and TerraColor



### Dry Glazes

GA (pre-order), Kerasil, Scandinavian Ceramics and TerraColor

# Glazing - Decorative Methods

## Powder Glaze Decorating

Some glaze colours vary intensely depending on the layer thickness. This feature can be used to make up a lively surface. Pour, dip in parts, spray, splatter and use wax resistants.



Bubble glazing is fun. You only need a dish, some soap water, glaze and a straw to blow bubbles.

## Decorating with Brush-on Glazes

Brush-on glazes have a wide colour spectrum. You can easily cover areas with different colors or layer them on top of each other.

Brushes can be used to make different textures. Avoid thick layers when mixing glazes.



## Mixing Glazes

First, make sure that the glazes are in the **same firing range**. The first layer can be done by brushing, pouring or dipping - after that, you can continue with brush glazes. Please mind that the glaze layer shouldn't be too thick. **Max. thickness is approximately 1-3 mm**. This varies depending of how sturdy and thick glazes have been used. Remember to always make samples to know what works.



Tools for glazing  
[www.kerasil.fi](http://www.kerasil.fi)



# Reading



Jylhävuorio, H. (1994).  
Keramiikan materiaalit.  
Helsinki: Painatuskeskus.

## Disclaimer

Release information is based on the current knowledge but does not cover everything and should be taken as guidelines. Kerasil Oy is not responsible for any damage that may follow from handling or touching the products mentioned in the release.

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