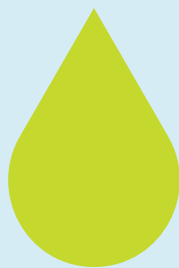
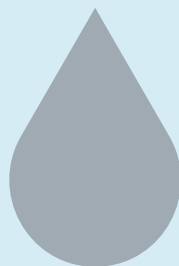


Glaze Lab

Ceramics Studio
Emily Carr University
of Art + Design



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Introduction

Welcome to the ECU Ceramics Glaze Lab. Please familiarize yourself with best practices in this space.

Safety

PERSONAL PROTECTIVE EQUIPMENT

Ventilation fan should be turned on when working in the lab. Wear respirator when measuring and blending stains or oxides. Wear gloves when touching colourants and coloured glazes, slips and clays. When in doubt, defer to wearing personal protective equipment.

SAFETY DATA SHEETS

Safety data sheets are posted throughout Ceramics and in the Glaze Lab. These provide safety information for hazardous materials.

Equipment + Cleanup

All required equipment is available in the lab. After use, wash and dry all equipment before returning it to its original location.

Material Disposal

Excess slip and glaze material must be disposed of in the labelled waste buckets in the lab. These materials should not be put down the drain due to toxins.

Technician Assistance

If you need assistance with any lab processes or are unsure about safety measures, ask a technician. Stains and oxides are kept in a locked cabinet, and will require a technician for access.





SDS SHEETS

Safety data sheets are found on hazardous materials throughout Ceramics.

WEAR PPE

Masks and gloves are required when working with toxic substances.



Colouring a Prepared Glaze

Our studio is equipped with standard white and clear glazes that can be coloured using commercial stains. For your convenience, a ratio guide has been developed for adding dry stain to a volume of wet glaze.



Preparation Instructions

- 1 Choose glaze and measure volume to be coloured in a graduated cylinder (50, 100, 500 or 1000 ml).
- 2 Consult ratios for mixing dry stain to a volume of glaze (next page).
- 3 Zero out scale with container and weigh dry stain. For small stain percentages under 1 g use digital scale.
- 4 Hydrate stain with a small amount of water (just enough to dissolve) and mix with a frother.
- 5 Add hydrated stain to measured liquid glaze and mix with hand blender.
- 6 Screen coloured glaze with 80 mesh screen to remove lumps and better disperse colourants. Use brush to help move glaze through screen.
- 7 Using a ceramic underglaze pencil, label a test tile with firing temperature, glaze name / number and stain name / percentage.
- 8 Dip test; glaze should be about as thick as a about 2-3 postage stamps.
- 9 Verify colour by test firing. Samples can be added to cone 6, cone 10 or cone 04 firing cart.

Clean-Up + Storage

Label container with glaze name / number, stain name / percentage and your name. When no longer needed, dispose of coloured glaze in labelled waste buckets. Wash and return all containers.

Before You Start

TRAINING

Orientation required.

WORK SAFELY

Turn on ventilation, put on respirator and gloves.

EQUIPMENT + MATERIALS

- Prepared Glaze
- Commercial Stain (See Technician)
- Graduated Cylinder
- Scale
- Containers
- Water
- Frother
- Hand Blender
- 80 Mesh Screen
- Brush
- Test Tiles
- Ceramic Underglaze Pencil

RECOMMENDED BATCH VOLUMES

50 ml dipping a test tile

100 ml line blends

500 ml glazing or spraying a small piece

1000 ml dipping or pouring a large piece

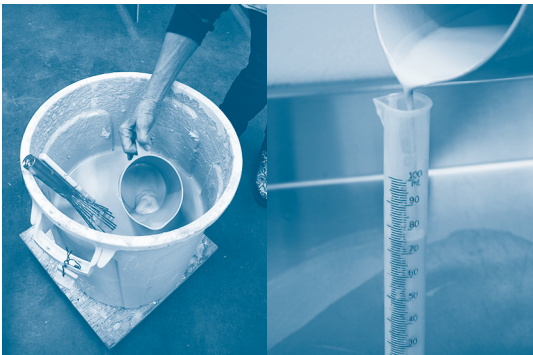
Stain Mixing Proportional Ratio Guide

		STAIN PERCENTAGE BASED ON DRY INGREDIENT WEIGHT (GRAMS)			
		1%	2.5%	5%	10%
GLAZE VOLUME (MILLILITRES)	50 ml	.33 g	.88 g	1.66 g	3.33 g
	100 ml	.67 g	1.76 g	3.32 g	6.66 g
	500 ml	3.35 g	8.8g	16.6 g	33.3 g
	1000 ml	6.7 g	17.6 g	33 g	66.6 g

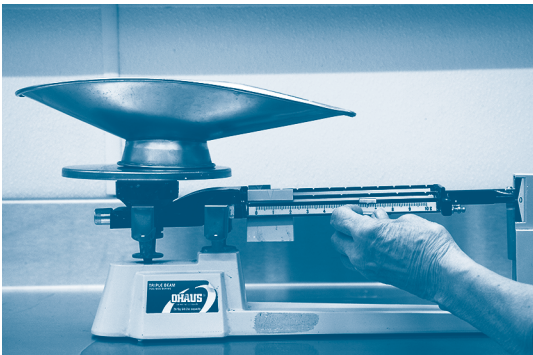
RATIO GUIDE
 This guide has been developed in-house to simplify the process of colouring a pre-prepared glaze.

10% MAXIMUM
 Stains can be added in weights up to 10% of dry ingredients; any higher may change the nature of the glaze.

Step-By-Step



1 Choose glaze and measure volume in graduated cylinder.



2 Zero out scale with container.



3 Weigh dry stain.



4 Hydrate stain with just enough water to dissolve, mix with frother.

STEP 2
 For small stain percentages that weigh under 1 g, use a digital scale.

Colour Tips

SEEING PINK?

Any grey stain combined with white matt cone 6 glaze will turn pink. To avoid this, use a white matt glaze that does not contain tin or make your glaze from scratch and remove the tin.

OXIDE ALTERNATIVE

Oxides are raw materials that can be used as an alternative to stains when colouring a glaze. Less stable than stains, oxides can produce unexpected colour results after firing.

TEST TILE CHARTS

Examples of coloured glazes at different stain percentages are available in the studio for your reference. See examples of Mason commercial stain colour options below.



6030
MANGO



6242
BERMUDA



6591
GUN METAL



6376
ROBIN'S EGG



6410
CANARY



6001
ALPINE ROSE



- 5** Add hydrated stain to measured liquid glaze in a container, mix with hand blender.

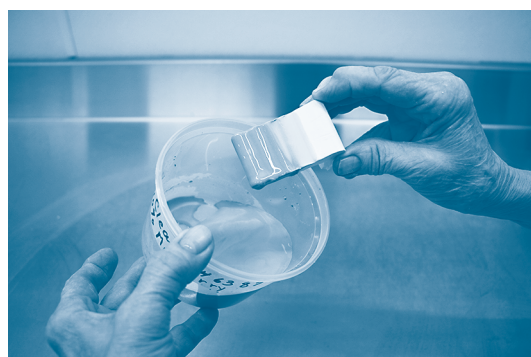


- 6** Screen with 80 mesh screen, use brush to help move glaze through screen.

STEP 7
Wipe tile with sponge
before labelling:
CONE 6, CLEAR A123,
ROBIN'S EGG 2%
(SAMPLE LABEL)



- 7** Label a test tile with firing temperature, glaze name / number and stain name / percentage.



- 8** Dip test; glaze should be about as thick as a sheet of paper.



STUDIO GLAZES

Pre-prepared glazes are available for use in the studio.

GLAZE DISPOSAL

Extra or unused glaze should be disposed of in the labelled waste buckets.



Colouring Casting Slip

Casting slip is a liquefied clay which can be poured or brushed into a mold. Coloured slip can be applied as a thin coat in a mold, and layered with a thicker coat of uncoloured slip. Coloured slip can also be brushed onto the inside of the mold as a decorative layer. Different colours can be layered and then carved into as a decorative technique on the cast object.



Preparation Instructions

- 1 Choose liquid casting slip. For cone 6: M370C, Polar Ice, Glacier, or DM Porcelain. For cone 04: White Star. For cone 10: Polar Ice, Glacier.
- 2 Measure volume of slip in a graduated cylinder (recommended test volume: 50 ml, recommended batch volume: 500 ml).
- 3 Consult ratios for mixing stain to a volume of casting slip (next page). and weigh dry stain on a scale. For small stain percentages, weigh with a digital scale.
- 4 Hydrate stain with a small amount of water (just enough to dissolve) and mix with a frother.
- 5 In an appropriately sized container, slowly add small amounts of the measured liquid casting slip to hydrated stain. Mix with hand blender.
- 6 Screen coloured casting slip with 60 mesh screen to remove lumps and disperse colourants.
- 7 Pour casting slip into test tile molds to create samples for firing, let dry.
- 8 Label test tile with firing temperature, slip name and stain name / percentage. If test tile is leather hard, carve information in. If test tile is bone dry, use a ceramic underglaze pencil or a small brush.
- 9 Verify colour by test firing; test tiles can be added to cone 6 or cone 04 firing cart.

Before You Start

TRAINING

Orientation required.

WORK SAFELY

Turn on ventilation, put on respirator and gloves.

EQUIPMENT + MATERIALS

- Liquid Casting Slip
- Commercial Stain (See Technician)
- Graduated Cylinder
- Containers
- Scale
- Digital Scale
- Water
- Frother
- Hand Blender
- 60 Mesh Screen
- Test Tile Molds
- Ceramic Underglaze Pencil

RECOMMENDED BATCH VOLUMES

50 ml dipping a test tile

100 ml line blends

500 ml brushing into molds

1000 ml skim coats

Clean-Up + Storage

Label container with name of slip, stain name / percentage and your own name. When no longer needed, dispose of slip in labelled waste buckets. Wash and return all containers.

Stain Mixing Proportional Ratio Guide

		STAIN PERCENTAGE BASED ON DRY INGREDIENT WEIGHT (GRAMS)			
		1%	2.5%	5%	10%
SLIP VOLUME (MILLILITRES)	50 ml	.33 g	.88 g	1.66 g	3.33 g
	100 ml	.67 g	1.76 g	3.32 g	6.66 g
	500 ml	3.35 g	8.8g	16.6 g	33.3 g
	1000 ml	6.7 g	17.6 g	33 g	66.6 g

RATIO GUIDE
 This guide has been developed in-house to simplify the process of colouring a pre-prepared slip.

10% MAXIMUM
 Stains can be added in weights up to 10% of dry ingredients; any higher may change the nature of the slip



AVAILABLE STAINS
 Many stains are available for use; see technician for access and to purchase.

START LIGHT

Start with a lesser amount of stain and add as needed until desired colour is achieved.



Colour Tips

START LIGHT

Always start with a lesser amount of stain and test a sample tile by firing it to the appropriate temperature. Add more stain as needed to make the colour darker. Colour will intensify when clear glaze is applied and fired to glaze temperature.

STRONG COLOURANTS

Some stains such as cobalt blue, wedgwood blue, dark green, and peacock are very strong colourants and can be added in smaller percentages. See samples available in Glaze Lab.

UNWANTED EFFECTS

Stain can affect the character of the slip if percentage of stain exceeds 10%. Strong colourants can also have a refractory effect or may flux the clay body.

DISPOSAL + SAFETY

Stain percentages of 5% - 10% or less are preferable when colouring liquid casting slip. Higher percentages result in toxic waste that is difficult to dispose of. Dust from finishing coloured slip pieces may also contaminate a workspace.

Colouring Clay: Bag Mixing

Coloured clay can be used for both traditional and experimental decorating techniques. Possible uses of coloured clay include solid colouring, inlay, marbling and patterning (neriage, millefiori). The bag mixing method that follows will result in a coloured clay paste that can be used for the above techniques.



Preparation Instructions

- 1 Measure up to 2 tbsp of stain into a 4 L heavy-duty plastic bag.
- 2 Hydrate stain with a small amount of water (just enough to dissolve).
- 3 Weigh 1 lb of clay on a scale.
- 4 Wedge clay to soften and break up into smaller pieces.
- 5 Add clay to plastic bag with hydrated stain and seal.
- 6 Mix stain and clay together by squeezing bag; continue until stain is fully absorbed and a homogenous blend is achieved.
- 7 Cut plastic bag with a pair of scissors along both edges.
- 8 Peel bag off of clay and scrape clean.
- 9 Mix clay with spatula until consistency is even.
- 10 Verify colour by test firing a small sample. Samples can be added to cone 6 or cone 04 (if sample is very thin) firing cart.

Before You Start

TRAINING

Orientation required.

WORK SAFELY

Turn on ventilation, put on respirator and gloves.

EQUIPMENT + MATERIALS

- Commercial Stain (See Technician)
- Measuring Spoons
- 4 L Heavy-Duty Double Seal Plastic Bag
- Water
- Clay
- Scale
- Scissors
- Board
- Spatula
- Container

RECOMMENDED QUANTITIES

1 lb of clay enough to make a mug

2 tbsp of stain is general maximum due to strength of colourants

Clean-Up + Storage

Wash plastic bag and board in a bucket of water to remove stain. Let stain settle out of wash water and dispose of contaminated water in labelled waste buckets. Wash and return all containers. Store clay in an appropriately sized container.

Step-By-Step



1 Measure up to 2 tbsp of stain into a 4 L plastic bag.



2 Hydrate stain with a small amount of water.



3 Weigh 1 lb of clay on a scale.



4 Wedge clay to soften and break up into smaller pieces.

HOMOGENOUS BLEND

Stain is distributed
evenly throughout
the clay.



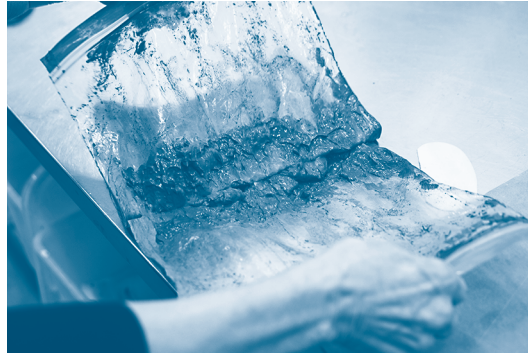
5 Add clay to plastic bag with hydrated stain and seal.



6 Mix stain and clay together by squeezing bag; continue until a homogenous blend is achieved.



7 Cut bag along both sides using a pair of scissors.



8 Peel bag off of clay.



9 Scrape bag clean, placing clay on a clean board.



10 Mix clay with spatula until consistency is even.

Tips + Reference

CLAY SELECTION

Colouring clay is most successful when using a clay that fires white; white porcelain or porcelainous clay is preferable.

TEST TILE CHARTS

For a visual on how stains will colour clay, refer to test tile charts for slips coloured with a 10% concentration of stain (outcome will be similar).

COLOURED CLAY USES

Unique uses of coloured clay include: inlay, marbling and creating patterns in clay (neriage, millefiori).

Colouring Clay: Solid or Marbled

Coloured clay created using the bag mixing method can be used for colouring a larger quantity of clay or marbling. Clay slab layers are sandwiched with the coloured paste, and when fully absorbed can be wedged to produce the desired outcome. From there, the clay can be rolled, press-molded, thrown, or modeled.

Preparation Instructions

- 1 Weigh 1 lb of clay on a scale.
- 2 Wedge clay to soften, and slice into ¼ inch slabs.
- 3 Spread coloured paste (created through bag mixing method) on each slab of clay, sandwiching layers.
- 4 Store in a plastic bag and let sit for 24 hours until texture is consistent.
- 5 For solid colouring: slice and layer across grain to mix (repeat until thoroughly combined). Wedge to remove any memory of slab cuts or streaks of colour.
- 6 For marbling: wedge minimally until desired marble effect is achieved. Roll clay out.
- 7 Verify colour by test firing a small sample (roll sample thinly). Samples can be added to cone 6 or cone 04 (if sample is very thin) firing cart.

Clean-Up + Storage

Wash plastic bag and board in a bucket of water to remove stain. Let stain settle out of wash water and dispose of contaminated water in labelled waste buckets. Wash and return all containers. Store clay in an appropriately sized container.



Before You Start

TRAINING

Orientation required.

WORK SAFELY

Turn on ventilation, put on respirator and gloves.

EQUIPMENT + MATERIALS

- Clay
- Scale
- Coloured Clay Paste
- 4L Heavy-Duty Double Seal Plastic Bag
- Board
- Rolling Pin
- Cutting Wire
- Container

TIME TO PREPARE

This process involves wait times of 24 hours.

Step-By-Step



1 Weigh 1 lb of clay on a scale.



2 Wedge clay to soften.



3 Slice clay into $\frac{1}{4}$ inch slabs.



4 Spread stain paste (created through bag mixing method) on each slab of clay, sandwiching layers.



5 Store in a plastic bag and let sit for 24 hours until texture is consistent.



6 For solid colour: slice and layer across grain to mix. Repeat until thoroughly combined.

STEP 5

This step involves a 24 hour wait time.



7 For solid colour: wedge to remove any memory of slab cuts or streaks of colour.



8 For marbling: wedge minimally until desired marble effect is achieved.



8 Slice clay to view desired marble effect.



8 Roll clay out for use in final application.

Tips + Reference

WATCH YOUR WEDGE

The more coloured clay is wedged, the finer the marbled pattern. Too much wedging will result in a homogenous coloured clay.

CLAY COMPATIBILITY

Ensure that the two clays being mixed (whether for solid colour or marbling) are compatible with similar cone firing temperatures.

COLOURED CLAY USES

Unique uses of coloured clay include: inlay, marbling and creating patterns in clay (neriage, millefiori).

Making + Applying Sigillata Slip

Sigillata slip (meaning: sealed earth) is a fine-grained slip that is used to coat and seal the surface of ceramic vessels where glaze is not wanted and a natural clay colour is desired. Sigillata is also a substitute for burnishing with a stone, and can be accomplished with just a couple of thin coats.



Making the Slip

- 1 Measure 2000 ml water into 1 gallon jar.
- 2 Zero out scale with container and weigh 800 g of dry clay and 8 g of soda ash.
- 3 Add soda ash to water, mix, and then add dry clay. Mix well with hand blender.
- 4 Let stand undisturbed for 24 - 48 hours to settle.
- 5 Siphon off water when: water is clear at the top, a middle band of sigillata is visible and a darker settling layer is seen at the bottom of the jar.
- 6 Siphoning technique (it is helpful to have two people for this process):
 - » Place two small buckets on floor, or on a lower level than jar containing sigillata separation.
 - » Fill plastic hose with water and pinch both ends.
 - » Place one end of the hose into the water portion of the sigillata separation and the other end into one bucket.
 - » Release both pinched ends; water will flow into the bucket.
 - » When the colour of the flow changes to sigillata, pinch both ends of the hose again.
 - » Switch the hose to the second bucket, and repeat the process to collect the sigillata.
 - » Siphon until the darker level of sediment is reached.
- 7 Repeat steps 4 – 6 if too much water or sediment gets into the sigillata.
- 8 For a thicker sigillata, re-settle for 24 hours and remove excess water with a sponge.

Before You Start

TRAINING

Orientation required.

WORK SAFELY

Put on dust mask.

EQUIPMENT + MATERIALS

- Water
- 1 Gallon Jar (Clear Plastic With Lid)
- Graduated Cylinder
- Scale
- Dry Clay (Red Art / Ball Clay)
- Soda Ash
- Sodium Silicate (optional)
- Hand Blender
- Containers
- 1 M ¼" Siphon Hose (Clear Plastic)
- 2 Small Buckets
- 1 Pint Jar (With Lid)

TIME TO PREPARE

This process involves wait times of 24 -48 hours.

Applying the Slip

Sigillata is best applied on greenware that has been dry and then rehydrated with a wet sponge. Apply two coats and then buff with a soft cloth or thin plastic. Buff in a circular motion while the sigillata is firm and does not smudge; the sigillata will buff to a soft sheen.

Clean-Up + Storage

Dispose of leftover sediment in labelled waste buckets. Wash and return all containers. Store sigillata in an appropriately sized container.



Tips + Reference

CLAY SELECTION

Different clays will produce differing amounts of sigillata; clays with varied particle sizes work best. Firing temperature of the clay should also be considered.

SEPARATION

Clays will also settle at different rates; some types of clay may need a few drops of sodium silicate to improve settling.

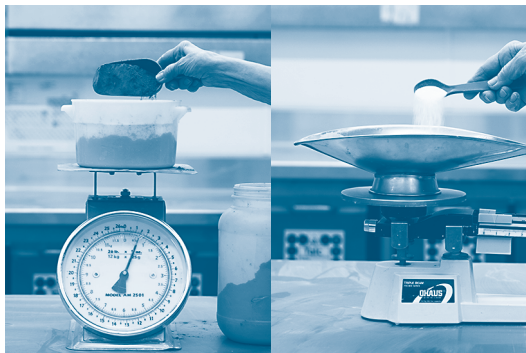
FIRING

Fire sigillata-coated pieces at a low temperature (Cone 012) to preserve the soft sheen achieved through buffing.

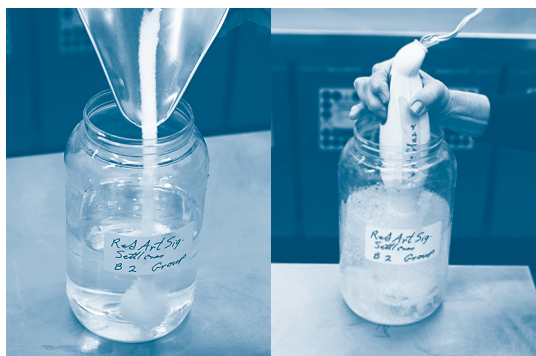
Step-By-Step



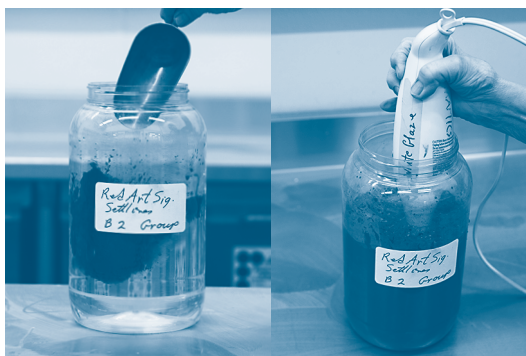
- 1 Measure 2000 ml water into 1 gallon jar.



- 2 Zero out scale with container and weigh 800 g of dry clay and 8 g of soda ash.



- 3 Add soda ash to water and mix well with hand blender.



- 4 Add clay and mix well with hand blender.



- 5 Let stand undisturbed for 24 - 48 hours to settle.



- 6 Place two small buckets on floor, or on a lower level than jar with sigillata separation.

DISTILLED WATER

Using distilled water may improve the settling process when making sigillata slip.

STEP 5

This step involves a 24 - 48 hour wait time.

CONTAMINATION

Repeat steps 5-12 if too much water or sediment gets into the sigillata.



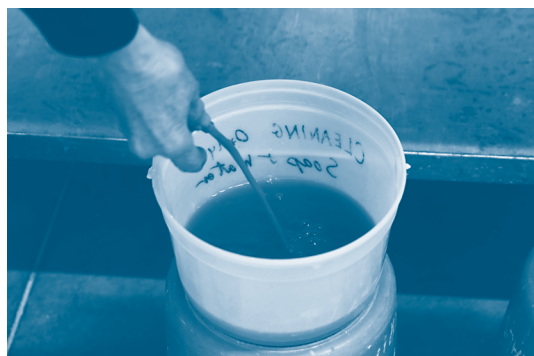
7 Fill plastic hose with water and pinch both ends.



8 Place one end of the hose into the water portion of the separation and the other end into one bucket.



9 Release both pinched ends; water will flow into the bucket.



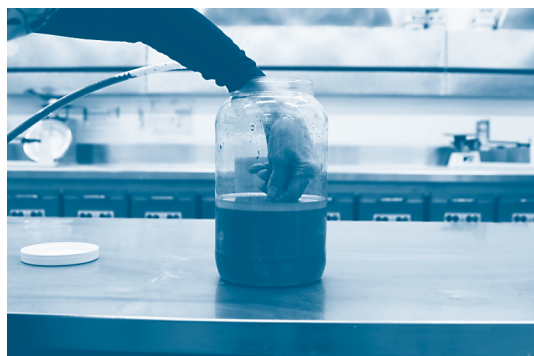
10 When the colour of the flow changes to sigillata, pinch both ends of the hose again.

THICKER SIGILLATA

For a thicker sigillata, re-settle for 24 hours and remove excess water with a sponge.



11 Switch the hose to the second bucket, and repeat the process to collect the sigillata.



12 Siphon until the darker level of sediment is reached.

Making a Glaze

Our studio stocks a number of basic glazes for use, however there are many recipes available should you wish to explore making your own glazes. Learning how to make your own glazes can expand the possibilities of your ceramics practice. Testing glaze recipes before producing them in large batches is always recommended for optimal results.



Preparation Instructions

- 1 Zero out scale with stainless steel measuring bowl.
- 2 Follow glaze recipe to measure out each dry ingredient. See next page for a marked up example of how to follow a recipe.
- 3 Once measured, add each dry ingredient to a mixing container and mix together.
- 4 Add dry ingredients to a second container, adding water until the mixture is the consistency of skim or almond milk. The following chart is a simplified guide for producing test batches (two methods):

DRY INGREDIENTS	50 g	100 g	500 g	1000 g
WATER BY TBSP	~ 2 - 3 tbsp	~ 5 - 6 tbsp	~ 25 tbsp	~ 50 tbsp
WATER BY WEIGHT	Start at 50% of dry weight (25 g)	Keep adding water until correct consistency is achieved, usually 60-80% of dry weight		

- 5 Mix with a frother and thin to desired consistency, finger test.
- 6 Screen glaze with 80 mesh screen to remove lumps and disperse colourants.
- 7 Using a ceramic underglaze pencil, label a test tile with firing temperature, glaze name / number and stain name / percentage.
- 8 Dip test; glaze should be as thick as about 2-3 postage stamps.
- 9 Verify glaze outcome by test firing; tiles can be added to cone 6 or cone 04 firing cart. Use of a firing pan is recommended for test tiles.

Before You Start

TRAINING

Orientation required.

RECIPE APPROVAL

Show glaze recipe to technician for approval, and to verify availability of ingredients.

WORK SAFELY

Turn on ventilation, put on respirator and gloves.

EQUIPMENT + MATERIALS

- Commercial Stain (See Technician)
- Graduated Cylinders
- Containers
- Scale
- Digital Scale
- Water
- Frother
- Hand Blender
- 80 Mesh Screen
- Ceramic Underglaze Pencil
- Firing Pan

RECOMMENDED BATCH VOLUMES

50 ml dipping a test tile

100 ml line blends

500 ml glazing or spraying a small piece

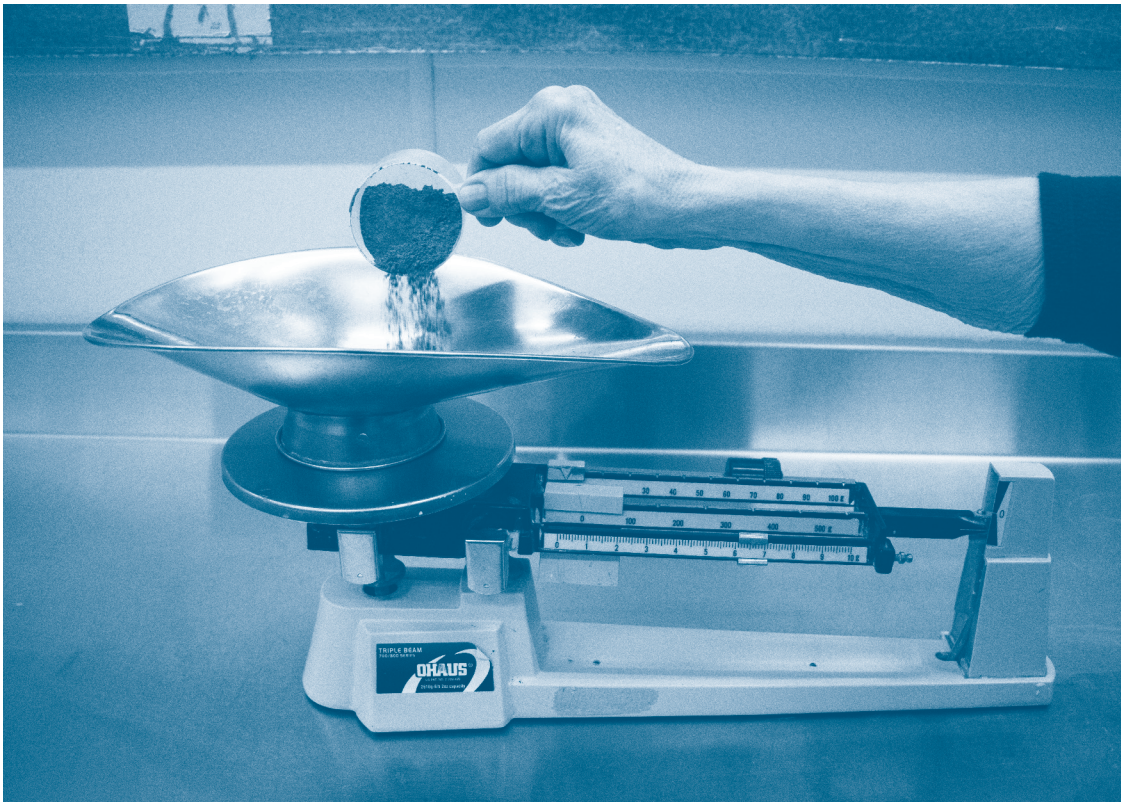
1000 ml dipping or pouring a large piece

Technician Support

If you would like to make your own glaze from scratch, show recipe to technician for approval and to verify availability of ingredients.

Clean-Up + Storage

Label container with glaze name / number, stain name / percentage and your name. When no longer needed, dispose of glaze in labelled waste buckets. Wash and return all containers.



Tips + Reference

FINGER TEST

To test the consistency of a glaze, dip a dry finger into the glaze. Your fingernail should still be visible when coated with the glaze.

MIXING NOTES

Always measure and mix dry ingredients before adding to water; this will ensure an even consistency.

IDENTIFYING STAINS

Label glazes with stain name and percentage. Each stain has a brand, number, and name. For example:

MASON (BRAND)

6376 (STAIN NUMBER)

ROBIN'S EGG (STAIN NAME)

Reading a Glaze Recipe

HYPERGLAZE™ GLAZE RECIPE

White Maiolica (Studio Glaze)

Color: Opaque White

Surface: semi-gloss

Batch: 3750

3

1

2

4

Ingredients: Custer Feldspar 25.00 Frit 3134 25.00 Wollastonite 13.00 epk 10.00 silica 17.00 glomax LL 10.00

Percentage: 25.00 25.00 13.00 10.00 17.00 10.00

Batch: 3750 3750 1950 1500 2550 1500

No image Available

No image file found.

Also add: zircopax 10.00

15000 gm 1500

Hazards and Comments:

Hazards: Custer Feldspar: Feldspars may contain free silica. Wear an approved dust mask.

Comments: (Known as Ron Roy Maiolica) Glazes need 2-3 small scoops of Macaloid in water prior to adding dry ingredients. Longer mixing time needed for glazes that settle out. If glaze has sat over a month, it needs to be rescreened to remove crystals of frit and debris.

Cone: C 6

Firing: oxidation

Tested

Date: 3/15/22

Thermal Expansion: 5.94 x 10⁻⁶ deg. C

Batch Cost: \$ 42.85

Unity Molecular Formula (UMF)

0.097 K ₂ O	0.443 Al ₂ O ₃	3.695 SiO ₂
0.194 Na ₂ O	0.296 B ₂ O ₃	0.008 TiO ₂
0.688 CaO	0.004 Fe ₂ O ₃	ZrO ₂
0.020 MgO	0.000 P ₂ O ₅	SnO ₂
Li ₂ O	Sb ₂ O ₃	0.000 MnO ₂
BaO	Cr ₂ O ₃	F
PbO	V ₂ O ₅	8.3:1 Si:Al Ratio
ZnO		
CuO		
CoO		
NiO		
SnO		

Percentage Analysis by weight:

63.50 % SiO₂

12.92 % Al₂O₃

5.88 % B₂O₃

2.61 % K₂O

3.44 % Na₂O

11.04 % CaO

0.23 % MgO

0.18 % Fe₂O₃

0.18 % TiO₂

PERCENTAGES 1

All glaze recipes are based on a percentage system and add up to 100%. To calculate the amount of each raw material needed to make a large batch, start with the final weight and then multiply the percentage for each material to get the weight.

ADDITIVES 2

Listed below the main ingredient list, these are added in addition to the main ingredients. Glaze modifiers and colourants are examples of additives.

GLAZE ATTRIBUTES 3

Glaze attributes such as colour, surface texture, and firing temperature will be listed on the recipe.

HEALTH + SAFETY 4

Check the hazards and comments section for notes on safety precautions and specific preparation procedures.

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Colouring With Stains + Oxides

Stains and oxides are used as colourants in ceramics, and can be applied in a variety of ways, including: printed onto bone dry clay before firing, as a wash or decorative brushwork on bisque-fired clay, mixed into slips, underglazes, and glazes, mixed into a clay body, and applied under or over a glaze for different effects.



Key Differences

STAINS	Refined version of raw metal oxides (encapsulated into a glaze base, fired, and ground into a powder). Typically brighter, producing a broader range of colours. Colour when fired is very close to colour as a powder.
OXIDES + CARBONATES	Raw material. Have more of a dynamic reaction to other materials in the glaze, and require more testing. Colour when fired can be quite different from colour of raw powder.

Before You Start

TRAINING

Orientation required.

WORK SAFELY

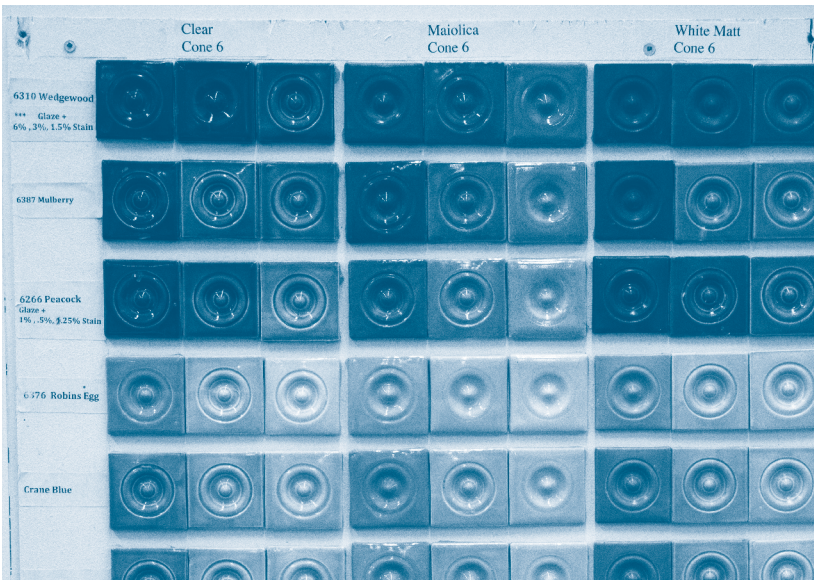
Turn on ventilation, put on respirator and gloves.

MATERIALS

Stains and oxides are kept in the locked cabinet in the Glaze Lab. Reach out to a technician with any questions or to purchase.

OXIDE GUIDE






Consult the oxide usage guide for information on potential colour results and specific safety considerations.








TEST TILE WALL

Consult the test tile wall for examples of stains used in glaze at different percentages.

Oxide Guide

	PIGMENT NOTES	COLOUR AFTER FIRING	APPLICATION
RED IRON OXIDE 	<ul style="list-style-type: none"> ♦ The most common form of iron oxide. 	<ul style="list-style-type: none"> ♦ OXIDATION Shades of red brown. ♦ REDUCTION Blue, green, grey, yellow, purple, orange, black. Metallic effect. 	<ul style="list-style-type: none"> ♦ Add to glazes in percentages of 1-10%. ♦ Brush on bisqueware and sponge off to enhance texture. ♦ Brush over glaze for decoration.
YELLOW IRON OXIDE 	<ul style="list-style-type: none"> ♦ Contains less iron, which results in less staining of hands and textiles. 	<ul style="list-style-type: none"> ♦ OXIDATION + REDUCTION Shades of brown, possibly lighter than those produced by red iron oxides. 	<ul style="list-style-type: none"> ♦ Add to glazes in percentages of 1-10%. ♦ Brush on bisqueware and sponge off to enhance texture. ♦ Brush over glaze for decoration.
BLACK IRON OXIDE 	<ul style="list-style-type: none"> ♦ Contains more iron than both red and yellow iron oxides. 	<ul style="list-style-type: none"> ♦ OXIDATION + REDUCTION Rich browns. 	<ul style="list-style-type: none"> ♦ Add to glazes in percentages of 1-10%. ♦ Brush on bisqueware and sponge off to enhance texture. ♦ Brush over glaze for decoration.
COBALT OXIDE 	<ul style="list-style-type: none"> ♦ Cobalt oxide produces more saturated blues. ♦ Cobalt carbonate is soluble in water. 	<ul style="list-style-type: none"> ♦ OXIDATION Blue. ♦ REDUCTION Blue. Increased metallic effect. 	<ul style="list-style-type: none"> ♦ Add to glazes in percentages of .25 – 2% (will produce a very strong blue). ♦ Use as a wash on bisqueware. ♦ Brush under glaze: brushwork will stay crisp. ♦ Brush over glaze: resulting blue colour will soften when glaze melts.
COBALT CARBONATE 	<ul style="list-style-type: none"> ♦ Pigment can easily smudge or be carried to other pieces. 		

	PIGMENT NOTES	COLOUR AFTER FIRING	APPLICATION
COPPER OXIDE 	<ul style="list-style-type: none"> ✦ Corrosive when it comes in contact with kiln shelves; do not apply to bottom of work. 	<ul style="list-style-type: none"> ✦ OXIDATION Turquoise, blue-green to purple (with alkaline glazes), pink and grey (with magnesium glazes). ✦ REDUCTION Red, purple, black. 	<ul style="list-style-type: none"> ✦ Use as a wash under or over glaze.
COPPER CARBONATE 			
CHROME OXIDE 	<ul style="list-style-type: none"> ✦ Will volatilize when firing and gravitate to other work, especially those with glazes containing tin oxide (causes pink). 	<ul style="list-style-type: none"> ✦ OXIDATION Pink to red (with tin oxide glazes), tan to brown (with zinc oxide glazes). ✦ REDUCTION Green. 	<ul style="list-style-type: none"> ✦ Use as a wash under or over glaze. ✦ Add to glazes and slips.
RUTILE 	<ul style="list-style-type: none"> ✦ Contains iron oxide and titanium. ✦ Affects other colours strongly and produces crystalline reactions in glazes high in lithium, calcium, and zinc oxides. 	<ul style="list-style-type: none"> ✦ OXIDATION Yellow-brown to orange. ✦ REDUCTION Cool blues, blue-grey, streaky purples. 	<ul style="list-style-type: none"> ✦ Use as a wash on bisqueware. ✦ Brush over glaze for decoration.
MANGANESE DIOXIDE 	<ul style="list-style-type: none"> ✦ Corrosive when it comes in contact with kiln shelves; do not apply to bottom of work. 	<ul style="list-style-type: none"> ✦ OXIDATION Grey to black. ✦ REDUCTION Grey to black. Metallic effect. 	<ul style="list-style-type: none"> ✦ Use as a wash on bisqueware. ✦ Brush over glaze for decoration.

EMILY CARR
SHOPS + STUDIOS