



**Vernon  
Community  
Arts Centre**

# Clay Studio Manual

Procedures, Protocol, Best  
Practices, Etiquette &  
Rules of Engagement for  
all users at the Vernon  
Community Arts Centre  
Clay Studio

Revised Edition, November 2016



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# Introduction

## Studio Manual

This studio manual aims to foster a safer, more efficient and greener community-based studio. The purpose of this manual is to:

- provide an accessible, transparent and standardized base of knowledge and best practices for all users of the clay studio;
- prepare users for working in a community studio environment and give technical guidance.

Studio policy is based on the contents of this manual. **Users of the clay studio must agree to abide by the rules and guidelines set forth in this manual.** This manual is written for ALL USERS of the Clay Studio at the Vernon Community Arts Centre and will be available to EVERYONE for reference. The manual covers procedures, protocol, best practices, etiquette and the rules of engagement that apply to everyone who uses the studio.

## Failure to Comply

In the case that a studio user, regardless of that person's role (i.e. drop-in user, volunteer, instructor, student, etc.) fails to comply with the rules, etiquette, guidelines and/or protocol, the Studio Technicians will work with that person to educate them of necessary changes to their habits in studio operation.

**VCAC accepts no responsibility for injury resulting from improper use of the studio and its facilities or equipment. Please be safe in our community centre and exercise all necessary precautions. It is imperative that all studio users take it upon themselves to be familiar with the contents of this manual.**

## The Role of the Studio Technician

The role of the Studio Technician is to oversee the operation of the VCAC clay studio, to organize and delegate studio concerns including maintenance, volunteers, health and safety, supplies, equipment, consumables, etc. The Technician is the only person authorized to fire the kilns and mix the glazes.

Any comments, questions or concerns regarding the Studio should first be directed to the Technician, the Technician may take the comments, questions or concerns to the VCAC Manager.

## About the Studio at the Vernon Community Arts Centre

The Vernon Community Arts Centre (VCAC) is operated by the Arts Council of the North Okanagan (ACNO). The Centre is located at 2704A Hwy 6 in Polson Park, Vernon. Our phone number is 250.542.6243. The Clay Studio is one of the professionally equipped studios available to the community of Greater Vernon at the VCAC. The VCAC is operated by the Arts Council of the North Okanagan pursuant to the agreement with the City of Vernon and NORD signed May 1, 2000.

The Clay Studio is open for drop-in use, by ACNO members only, any time that the studio is not in use by a class. Call ahead to avoid disappointment. Fees are as follows (subject to change):

3 hour session	\$6	
10x punch pass	\$54	
3 month pass	\$180	
6 month pass	\$275	Plus applicable taxes

## Please Sign In...

Funding to the Vernon Community Arts Centre and the Arts Council of the North Okanagan is partially based on attendance statistics. Please sign in at the front desk in the attendance log every time you visit the studio.

Your signature in the log book is your voice to funding bodies that our studio-based facility is important to you and your community. Remember to sign in even for short visits just to check on your projects.

## For sale to enhance your studio session...

Our clay prices include the cost of glazing and firing. For control purposes, only clay sold by VCAC and only studio glazes will be fired in our kilns. Prices are subject to change without notice.

Clay type	½ box	full box
M340	\$20.5	\$41
M370	\$28.5	\$57
IMCO Sculpture	\$31.5	\$63
F95	28	56
P300	\$32.5	\$65
Navajo	\$33	\$66

WSO	\$26.5	\$53	
Pottery tool kit	\$16.25		
Locker rental (monthly)	\$10		Plus applicable taxes

## What Makes Our Studio Different?

This studio is an open studio for all current members of the ACNO. The only prerequisite for using the studio is an introductory clay class either with us or with somebody else. Please see the Front Desk at the Centre to take out or renew your membership to the ACNO.

As a community facility, we are open to everyone. You don't need to be a member of a guild or be juried into the studio. If you wish to get involved, you should visit the Front Desk at the Centre or speak with one of the studio users. An orientation will be conducted for new members to familiarize you with particulars relating to this studio. Please note that we do not allow outside instruction, so if you are excited to bring a friend to join the studio community, they will need to have taken a class and have basic experience, in addition to the pre-requisites listed above.

## Our Studio Philosophy

We strive to be a welcoming, friendly studio of potters working and sharing together. We strive to provide a clean, safe and engaging studio experience for people of all skill levels. Our goal is simply to create an enriching and creative environment for anyone interested in clay.

## Volunteering

Our studio relies on volunteers to keep it functioning. Everything extra that you do helps our studio to function smoothly. Are you interested in volunteering? Talk to the Technician to identify a role that suits your schedule and supports the studio.

When you volunteer in the studio, please remember to log your volunteer hours with the Front Desk in order that we may track volunteer hours for statistical purposes. As with studio sign in records, we give records of volunteer hours to funding bodies to show how important our facilities are to the community.

## Annual Studio Clean Up

Each year around the end of spring or in early summer, the clay studio undergoes a major clean up and all Studio Users are encouraged to pitch in and take part.

The Clean Up takes place over 2-3 days. In preparation for the annual cleaning of both the main and glaze studios, all personal items and all works (finished or in progress), boxes of clay and tools must be removed from the studio.

The date for the clean-up and the due date to have items removed will be posted and advertised on the chalk/cork boards, ACNO newsletter, Facebook Group and by word of mouth.

## Keeping in Touch

There are 2 cork boards and a chalk board in the main studio where studio users and the studio Technicians may post items of interest to others. We have a Facebook Group called “VCAC Clay Studio Users” as another means to keep in touch and communicate ideas with each other. We also have a YouTube channel where we post videos shot around the VCAC, mainly of the clay studio. The address is [www.youtube.com/vernoncac](http://www.youtube.com/vernoncac).



# Using the Studio

## Rules of Engagement

All clay artists have a responsibility to maintain a proper working environment in the clay studio. The following guidelines are designed to ensure that everyone has a positive experience.

### General

- No outside clay, ever. No exceptions.
- Be respectful to the studio, other studio users and Centre staff at all times.
- The studio is available for drop-in use by members of the ACNO, and students of classes at the Vernon Community Arts Centre who are 16 years of age and older.
- Do not touch any pieces that you did not make.
- Identify your works in progress by labeling plastic coverings.
- The plaster table is for clay reclamation only. The plaster will draw moisture out of the wet clay. Please wait until the clay can be “peeled” from the plaster surface – DO NOT use scrapers on this table.
- The glaze area is for mixing and applying glazes only.
- Write or stamp your name or mark on your work for easy identification. Ensure that your name and mark are recorded on the ID sheet located near the kilns. **Unmarked works will not be fired.**
- In order to use shelf space effectively, everyone must keep their work moving through the studio, a maximum of 2 weeks grace per stage/shelf will be granted.
- If you choose to throw on a bat, please do not leave thrown pieces on the bats. Move them to ware-boards to make bats available for other studio users.
- Please allow up to 30 minutes for clean-up and put away.
- You are responsible for cleaning all areas/surfaces where you have worked. Leaving a mess will only compromise someone else’s studio enjoyment (see also: Health & Safety).
- Clay is not to go in the sink or down the drain. Please use the reclamation buckets for scraps and the rinse bucket system for

cleaning tools and yourself. Specific instructions are supplied in writing at the rinse station and in video on our YouTube channel.

- Only **bone dry** pieces will be accepted on shelves by the bisque kiln. There is insufficient space on the shelves in the kiln area to allow works to dry on these shelves.
- You are responsible for moving your own works to the greenware shelves for firing. When your work is ready for bisque firing, place it on the shelves labelled “#1 Bone Dry Greenware to be Bisque Fired” next to the bisque kiln.
- Bisqued work will be unloaded onto either “#2 Bisqueware for Glazing (drop-in users)” or “#2 Bisqueware for Glazing (students only).”
- Following the bisque firing, glazed work should be placed on the shelves next to the glaze kiln labelled “#3 Glazed Bisqueware for Firing”.
- Finished work will be unloaded onto “#4 Finished Work to go Home”.

**When pieces come out of the glaze kiln, they are considered complete. Please take complete pieces home or store them in your locker.**

Unfortunately we do not have the space to hold work in progress or completed work indefinitely. There is a grace period of 2 weeks per shelf/stage. If work remains on the shelves beyond the 2 week grace period, you will be sent one email notification with a ‘remove by date’. Any unclaimed/abandoned pieces remaining on the shelves after this date will be disposed of to ensure that there is adequate room for active studio users. It is your responsibility to make sure we have your correct contact information on file.

## Youth and Family Drop in

Your safety and the safety of all our drop-in users is top priority for us. All new studio users, including children, must take a studio orientation. This way, you can learn all the ins and outs of our studios firsthand.

- We encourage fun, but please do your best to avoid using excessive volume and disruptive behaviour.
- Children under 10 should be within arms-reach at all times.

- Children of any age should not be left unattended.
- No running, no climbing, no jumping.
- Please note dust in the studio may aggravate respiratory conditions.
- Children are not allowed in the glazing area. They may be accompanied by a supervisor to see the area only. Close supervision in the glaze studio is essential! Hot kilns can cause serious burns.
- Glazing with children will be performed on paper-covered tables in the area adjacent to the glazing space.
- Glazes are made of assorted chemicals. Adults and youth ages 10+ should wear gloves when glazing, and children under 10 should have their supervisor glaze for them. As an alternative to glazing, acrylic paint on bisque-ware works very well and is available in a wide range of bright colours for affordable prices at many stores.
- Hands should be thoroughly washed with soap after handling clay.
- Please remember: if it's not yours, don't touch!

## Students of VCAC Clay Classes or Workshops

- Students will receive an assigned mark to use for the duration of their class. The mark will be the student's initials plus the initial of the day of the week. For example, if Bob Potter is enrolled in the Thursday class, his mark would be BP Th. Remember that unmarked work will not be fired. No exceptions.
- Some free studio time is included in the cost of your class. You will receive a punch card for drop-in use outside of class time, valid during the weeks the class is in session. No instructor is present during these free times.
- When your class is finished, you must be a current ACNO member and pay a drop-in fee to continue your work in the studio.
- Place your work in the STUDENT designated areas when you are an active student, and on general shelving when your class has finished.
- All of your clay/work must be removed from the studio at the end of the course.
- Work that is "in progress" at the end of your course can be completed using drop-ins (via punch pass, etc.) and must be attended to in a reasonable period of time.

- Students will have the usual grace period of 2 weeks from the course end-date to complete or take home their work. Any unclaimed/abandoned pieces remaining on the shelves after this date will be disposed of to ensure that there is adequate room for active studio users.

## A Note for Instructors

People interested in teaching courses and workshops in clay (i.e. potter's wheel, clay sculpture, etc.) may make an application to the VCAC Manager by submitting a package including a resume with references and examples of your work. Include a course description of the proposed course and a detailed outline of the workshop/class you wish to instruct. Consideration of how many hours you will require to complete your proposed workshop should be included in the outline.

Once the Instructor is hired by the VCAC Manager, the new Instructor will receive an orientation to the studio, its workings and access to this manual from the Studio Technicians. We do not allow outside instruction.

### General for All Instructors

New instructors will be given orientation to the studio practices and procedures and will receive a copy of this manual. Shelving will be identified and allocated before the start date and will be available for a specific period of time relative to the course dates.

**All instructors are responsible for ensuring that the studio is cleaned properly after each session** whilst adhering to the recycling program outlined in this manual. It is the responsibility of instructors of adult students to teach the proper methods of cleaning work spaces and recycling so that students will be prepared for work in the studio outside of class time or when their class has finished. Ultimately, the instructor must ensure that the studio has been properly attended to before leaving after each session.

**Work produced by students is the responsibility of the instructor until the student has taken it home.** Ensure that student work is completed and placed on the appropriate shelves for drying and awaiting firing. Or, ensure students understand that they may complete their work during drop-in after the class has finished, keeping in mind

that work must move through the studio and that there is a 2 week grace period.

**Instructors must arrange for the firing of student work** by ensuring that bone dry work is placed on the shelves adjacent to the bisque kiln labelled “#1 Bone Dry Greenware to be Bisque Fired”. The Technician is not responsible for moving student work from the wet studio to the glaze studio. Once the student’s work is on the greenware shelves, the Technician will attend to firing it. The work will be unloaded onto “#2 Bisqueware for Glazing (students only)”.

For those instructors that teach workshops taking place over a week or a weekend (and where student work is produced without attention to firing during the course), students work will need to be fired as per multi-week courses described above.

### Instructors of Youth Classes

Instructors of our youth classes will be provided with an amount of clay purchased with materials fees taken in by VCAC at the time that students register for classes. Youth classes will use recycled clay unless other arrangements have been made with the Manager. The amount of clay provided for the class equates to approximately 1 box of clay per 5 students per 10 hours of instruction. Access to clay will be through the VCAC Manager. Most often, youth clay art is bisque fired only. The instructor will:

- ensure that all work is fired;
- remove work from the glaze area;
- place work on the shelving reserved for class use, and then contact students when work is ready for pick up. It is the instructor’s responsibility to make sure that parents/caregivers understand that unclaimed pieces remaining on the shelves longer than two weeks from the course end-date will be disposed of to ensure that there is adequate room for upcoming classes.

Because children’s work is most often only fired to bisque, some instructors choose to use acrylic paint with the students on the final day of class. This is optional and up to the instructor.

Occasionally, it is desired by the instructor that work produced by children be glazed. We must ensure that for safety’s sake, we limit

children's exposure to glazes. Glazing of youth clay art is to be done either by the instructor without the children present, or as follows:

- Children must be strictly supervised at all times for maximum safety.
- Children have no access to the glazing area. They may be accompanied by an instructor to see the area only.
- Glazing will be performed on paper-covered tables in the area adjacent to the glazing space.
- Instructors are responsible for ALL clean up and children are not to assist in the clean up of glazing.
- Only a limited number of glazes may be used – **discuss this with the Studio Technician.**
- Glazes will be portioned into plastic cups and children will apply it with brushes as paint.
- Waxing and dipping by youth is not allowed under any circumstances.
- Children will wear gloves at all times.
- Unused cups of glaze will not be returned to the glaze buckets and instead will be disposed of into the catch bucket underneath the spray booth so that glaze contamination can be kept to a minimum.

## Clean Up; Respect our Community Facility

The method of cleaning up after session use in our clay studio may be a bit different than the methods used in other studios in which you have worked. This is a result of our efforts to maintain an eco-friendly studio and to reduce our footprint. It is our effort and intent to recycle as much as is possible.

The major difference between our studio and most other studios is the use of a rinse bucket system to replace the use of fresh water from the taps. In the main studio space, a series of rinse tubs have been placed near the sinks. There are two tubs for white clay rinse and two tubs for red clay rinse, each with a heavy and final rinse.

- Begin by scrapping all excess clay and slip into the appropriately marked 20 gallon reclamation bin. These bins are marked by clay body or type.
- Next, rinse all dirty tools and equipment in the Heavy Rinse tub, followed by the Final Rinse tub.

- When items have been rinsed in the Final Rinse bucket, they should be clean enough to put away.
- Sediment is periodically removed from the rinse tubs and added to the reclamation bin to circulate through the recycling program.

Clay dust in the studio is a HEALTH HAZARD (see section “Safety in the Studio”). Be sure to clean up after yourself. Allow yourself enough time at the end of your studio visit to do a good and thorough clean up job.

#### In the Main Studio

- Clean your chair, wheel, foot pedal, table surface. Place chair and pedal on top of the wheel. Also wash the floors around your work area - wheel, table, sinks, etc.
- Wash surfaces used for wedging or hand-building and mop up underneath.
- Gently sweep clay bits from the floor keeping dust to a minimum.
- Wash bats before putting away - front and back.
- Try to avoid sanding. If sanding is absolutely necessary, wet the area first to reduce the production of dust. Any sanding of work in bone dry or bisque stages will be done outside and away from other studio users; use a mask.
- When pieces are taken off the shelves, remove all ware-boards boards, plastic and newspaper.
- Wash and hang to dry any towels/aprons used to ensure they are clean for the next user.

#### In the Glaze/Kiln Studio

- When you move your **bone dry** pieces to the kiln area, remove them from their ware-boards boards and return the boards to the main studio.
- When stirring glaze buckets, please pay attention to using the proper paddles for stirring white/clear glazes, RIO (red iron oxide) glazes (appearing orange, red or brown coloured in the bucket) and glazes that do not have RIO (appearing blue or green in the bucket).
- When finished glazing, ensure all surfaces are washed down, including outside surfaces of glaze buckets and dollies.

- Scrape the inside of glaze buckets down to the level of the glaze. Wipe excess glaze from the level above the glaze.
- Clean all brushes, tools, paddles making sure that all traces of glaze/oxide are removed. Ensure tools used for mixing, etc. are clean before putting them away. And then put them away.
- Wash and hang to dry any towels or aprons used to ensure they are clean for the next user.
- Using clean water, wash the floors around the glaze table and sinks.

## Glazing Without Wax

Our studio has recently transitioned to become waxless. This means that we no longer rely on wax to keep the bottoms of work clean. Until recently, wax has been handy in our studio and because of the ease of use, this has been the way our instructors have taught their students. We realize that many of us will need to change our habits. If you are new to our studio, if you have never glazed without wax before please see the technician anytime during regular hours or by appointment for a free tutorial on the method. There is a poster with instructions in the glazing area. Here is a brief rundown on how to glaze your work without using wax.

- Prepare the bisque-ware as you normally would. If this includes wiping with a sponge and allowing to dry, or doing any pre-glaze decoration, do that now.
- Glaze your work as you normally would.
- Use a wet sponge to clean the bottom and a quarter inch up the sides. Instructions are posted in the glaze studio.
- Place the glazed work on the shelf.

The studio does supply cold resist for detail work such as masking, or around lids and rims. It is not appropriate for use on pot bottoms in lieu of hot wax, so please do not use it this way.

## Common Use Equipment

The facilities available in the Studio support a wide range of processes and techniques. We encourage a studio environment where no particular process takes precedence over or is considered more important than another.

The use of practices and technologies that are thousands of years old are as important as those that are still being developed. Safety,



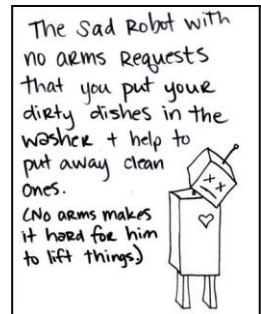
community building, technical effectiveness, and environmental consciousness are the chief principals that govern our facilities, equipment and practices.

With this in mind, the studio has a variety of equipment for common use:

- Wheels:
  - 8 Pacifica GT400
  - 2 Shimpo RK10 Basic
  - 2 Shimpo RK Whisper
- North Star extruder with full complement of die
- Slab roller
- 4 hand building tables for use with white clays
- 2 hand building table for use with red clays
- Plaster reclamation table
- A variety of studio glazes
- 1 Critter spray gun with air compressor
- 1 Laguna spray booth (available for those that have been trained in its proper use and maintenance)
- Assorted community tools found in the Resource Cubby and the grey cabinets near the rinsing station.

## VCAC Kitchen Facilities

The kitchen is located through the red door in the hall. You are welcome to use our kitchen but please respect the “your dishes are your responsibility” philosophy. You are welcome to use the refrigerator but please don’t leave the contents for long term decomposition.



## Facilities & Equipment for Authorized Personnel

Certain facilities and equipment are to be used only by authorized personnel. These include:

- Kilns
  - 2 Skutt automatic electric
  - 1 Shimpo Cone Art
  - 1 portable raku barrel
  - 1 portable barrel (for barrel firing)

- 1 Shimpo pug mill
- Assorted tools and equipment for glaze mixing

## Firing the Kilns

The only person authorized to fire the kilns is the Studio Technician. There is no schedule for firings. Kilns will be fired when there is a quantity of work equal to a full load. The Technician is the only person authorized to unload or to designate someone to load/unload the kilns. Each firing is recorded in the firing log for the appropriate kiln.

## Maintenance

Any working studio and its equipment will require periodic maintenance. Minor repair to studio facilities, equipment and accessories may be done by the Technician or by a volunteer delegated by the Technician. Repair beyond the scope of knowledge or technical ability of the Technician will be referred to an outside professional of the Technician's choosing.

# Health and Safety

## Safety in the Studio

The studio is a working space akin to any other workshop where activities and practices affect other people and may be potentially dangerous. It should be respected and treated appropriately.

SILICOSIS (also known as Grinder's Disease and Potter's Rot) is a form of occupational lung disease caused by inhalation of crystalline silica dust. Silicosis is a progressive, disabling and often fatal lung disease. Silicosis is an irreversible condition with no cure.

Silicosis is an occupational hazard to mining, sandblasting, quarry, ceramics and foundry workers, as well as grinders, stonecutters and those continually exposed to silica dust.

When small silica dust particles are inhaled, they can embed themselves deeply into the tiny alveolar sacs and ducts in the lungs where oxygen and carbon dioxide gases are exchanged. There the lungs cannot clear out the dust by mucous or coughing.

Protective measures such as respirators have brought a steady decline in death rates due to silicosis in western countries. The best way to prevent silicosis is to identify workplace activities that produce crystalline silica dust and then to eliminate or control the dust.

## General Studio safety rules include:

- Try to avoid the need for sanding wares by paying special attention to work in its leather-hard stage and making necessary adjustments at that time.
- Sanding of work in bone dry or bisque stages is to be done outside and away from other people and at your own risk. If sanding must be performed, dampen the area first to reduce airborne dust. Do not sand dry work.
- Dusk masks should be worn when sanding greenware or bisque-ware and Studio Users should purchase their own good dusk mask (N95) for this purpose.
- Gloves should be worn when glazing.
- Wear stable, comfortable closed toe shoes and comfortable clothing with nothing dangling that can get caught in machinery.
- Long hair should be tied back.

- Children will be accompanied by an adult at all times.
- No running in the studio.
- Wet floors are slippery! Take care after mopping.

## Safety specific to working with clay

Working in clay art has a variety of hazards of which studio users should be aware. The specific hazards and precautions can be grouped into four areas: Clay, Kilns, Raku, and Glazing processes.

## Clay; General Information and Protocol

Clays are composed of hydrated aluminum silicates, often containing large amounts of crystalline silica. Other impurities may include organic matter or sulfur compounds. Sometimes, grog (ground firebrick), sand, talc, vermiculite, perlite, and small amounts of minerals such as barium carbonate and metal oxides, are added by manufacturers to modify clay body properties.

### Hazards

- Chronic inhalation of kaolin is moderately hazardous, and can result in kaolinosis, a disease in which the lungs become mechanically clogged.
- Sand, perlite, grog, and vermiculite contain free silica and are, therefore, highly toxic by inhalation. Vermiculite is also frequently contaminated with asbestos.
- Hypersensitivity pneumonia, asthma, or other respiratory problems may occur with exposure to moulds growing in wet clay that is being soured or aged in a damp place, in slips that stand for months, or with inhalation of dry aged clay. Moulds can cause or exacerbate skin problems and change the workability of clay.
- Throwing on a potter's wheel for long periods of time can result in carpal tunnel syndrome because of the awkward position of the wrists. Pain, numbness and/or pins and needles in the thumb and first three fingers, are common symptoms. Back problems can occur from bending over the potter's wheel for long periods of time.
- Clay scraps on the floor, benches and other surfaces can dry and pulverize, producing an inhalation hazard due to the presence of free silica. Similarly, reconditioning clay by pulverization and sanding

finished greenware, can create very high concentrations of hazardous silica dust.

### Precautions

- Use premixed clay, such as that sold by VCAC, to avoid exposure to large quantities of clay dust, rather than mixing your own. Please remember that we are unable to fire outside clays, and only those purchased from VCAC will be fired.
- Wear separate work clothes while in the studio. Choose clothes of material and design that don't trap dust. Wash these clothes weekly and separate from other laundry.
- Avoid contact of clay with broken skin. Use a skin moisturizer.
- To prevent back problems, always lift with the legs, not with the back. Exercise and massage may relieve minor muscular pain.
- Keep wrists in unflexed position as much as possible to prevent carpal tunnel syndrome. Take frequent work breaks.
- Finish greenware while still wet or damp with a fine sponge instead of sanding when dry. Do not sand greenware containing fibrous talc.
- Wet mop floors and work surfaces daily to minimize dust levels and prevent dry scraps from becoming pulverized.

### **Kilns; General Information and Protocol**

Electric kilns and fuel-fired kilns are used to heat the pottery to the desired firing temperature over a desired length of time. The following information is supplied in order to impart important knowledge; not all of the methods listed/mentioned below are used in the VCAC Studio.

In electric kilns, heating elements work as electric current passes through the coils. The temperature rises until the kiln is shut off.

Fuel-fired kilns are heated by burning gas (natural or propane), oil, wood, coke, charcoal or other materials. Propane gas or natural gas is used most often. These kilns can be either located indoors or outdoors, depending on their inherent properties. The fuels produce carbon monoxide and other combustion gases. Fuel-fired kilns are usually vented from the top through a chimney.

Firing temperatures can vary from as low as 1,382°F for raku, to as high as 2,372 °F for stoneware, and 2,642 °F for certain porcelains.

The early stages of bisque-firing involve the oxidization of organic clay matter to carbon monoxide and other combustion gases.

Sulfur breaks down later producing highly irritating sulfur oxides. Also, nitrates and nitrogen-containing organic matter break down to nitrogen oxides.

Galena, Cornish stone, crude feldspars, low grade fire clays, fluorspar, lepidolite and cryolite can release toxic gases and fumes during glaze firings. Carbonates, chlorides, and fluorides are broken down to release carbon dioxide, chlorine, and fluorine gases.

At or above stoneware firing temperature, lead, antimony, cadmium, selenium and precious metals vaporize and the metal fumes can either escape from the kiln, or settle inside the kiln or on ceramic ware in the kiln. Nitrogen oxides and ozone can be generated from oxygen and nitrogen in air.

### Hazards

- Many metal fumes generated at high temperatures are highly toxic by inhalation. Since lead vaporizes at a relatively low temperature, it is especially hazardous.
- Carbon monoxide from fuel-fired kilns or the combustion of organic matter in clays is highly toxic by inhalation and can cause oxygen starvation. One symptom of carbon monoxide poisoning is an intense frontal headache, unrelieved by analgesics.
- Hot kilns produce infrared radiation, which is hazardous to the eyes. There have been reports of cataracts, from years of looking inside the hot kilns.
- Heat generated by the kiln can cause thermal burns. The Edward Orton Jr. Ceramic Foundation reported that when a kiln was operated at 2370 °F, the surface temperature was at and above 595 °F, and the temperature one foot away from the peephole was 156 °F.
- Heat produced by even small electric kilns can cause fires in the presence of combustible materials or flammable liquids.
- If an electric kiln fails to shut off, the heating elements melt which can cause fires. Gas kilns also generate a lot of heat, and room temperatures often exceed 100 °F.

### Precautions

- Infrared goggles approved by the American National Standards Institute (ANSI) or hand-held welding shields should be worn when looking into the operating kiln. Shade number from 1.7 to 3.0 is

recommended, but a darker shade may be required if spots appear in front of one's eyes after looking away from the kiln.

- Do not use lead compounds at stoneware temperatures since the lead will vaporize.
- Lumber, paper, solvents, or other combustible and flammable materials should not be stored in kiln areas.
- Always check that the kiln has shut off.
- If gas leaks are suspected (e.g. gas odor): shut off gas at the source; shut off power to the kiln room at the circuit breaker; and call the gas company.

## Raku; General Information and Protocol

Raku involves first firing ware at a low temperature in a gas-fired kiln (or more commonly, a kiln built for the specific purpose) and then removing the still-hot pieces and placing in them in sawdust, leaves or other combustible organic materials for a reduction phase.

### Hazards

- See above for the hazards relevant to working with kilns.
- Open flames are often present in raku firing.
- The reduction step produces large amounts of smoke and carbon monoxide.
- Treated wood or other materials can yield an exposure to highly toxic preservatives or pesticides, such as arsenic and chromium compounds.

### Precautions

- See above for the precautions relevant to working with kilns.
- Raku should only be done outdoors because of smoke and fire.
- Be careful to not locate raku near air intakes or open windows of buildings.
- Do not use materials that have been treated with preservatives or pesticides for the reduction phase.

## Glazes and Glazing; General Information and Protocol

Glazing is often integral to the successful completion of work. As glazes are comprised of materials that may be considered harmful or hazardous to health and the environment, care should be taken in using them. This section outlines methods and practices related to glazing with which all

users need to be familiar. The following information is supplied in order to impart important knowledge; not all of the materials or methods listed/mentioned below are used in the VCAC to produce studio glazes.

Glazes used to color or finish clay pieces are a mixture of silica, fluxes and colorants. Please consult the recipes for particular studio glazes to find out what materials and compounds are contained therein.

Common fluxes include lead, barium, lithium, calcium and sodium, and are used to lower the melting point of silica. The actual colorants, which are generally an assortment of metal oxides usually account for less than 5% of the glaze by weight.

Alkali earth or alkaline earth fluxes can be used for low-fire conditions instead of lead. Silica may also be removed from leadless type glazes. The substitution can be based on boric oxide as the glass-former, instead of silica. Alkali earth fluxes include sodium, potassium, and lithium oxides; alkaline earth fluxes include calcium, magnesium, barium, and strontium oxides. Minerals containing these fluxes include certain feldspars, nepheline syenite, petalite, bone and plant ashes, whiting, and dolomite.

An assortment of metal oxides or other metal compounds produce particular colors when fired. These are added in such small amounts to the glaze, that they aren't usually a great hazard. Lustre or metallic glazes are fired in a reduction atmosphere, as in raku firing. These glazes can contain mercury, arsenic, highly toxic solvents such as aromatic and chlorinated hydrocarbons, and oils such as lavender oil. The common metals are often resins of gold, platinum, silver, and copper. Some under-glazes and over-glazes use mineral spirits as the vehicle instead of water.

Glaze components are weighed, sorted and mixed with water. These materials are often in fine powdered form, and result in high dust exposures. Glazes can be dipped, brushed, poured, or sprayed on the ceramic piece.

### Hazards

- Labels on commercial glazes and under-glazes marked "lead-safe" means that the finished ware, if fired properly, will not release lead into food or drink. The actual glaze is still hazardous to handle and fire and may contain lead. Adequate control over firing conditions is very difficult in the craft studio.



- Lead compounds are highly toxic by inhalation or ingestion. Symptoms of lead poisoning include: damage to the peripheral nervous system, brain, kidney, or gastrointestinal system, as well as anemia, chromosomal damage, birth defects and miscarriages.
- Other fluxes such as barium and lithium are also highly toxic by inhalation, but less so than lead.
- Certain colorant compounds of particular metals are known or probable human carcinogens, including: arsenic, beryllium, cadmium, chromium (VI), nickel, and uranium.
- Antimony, barium, cobalt, lead, lithium, manganese, and vanadium colorant compounds are highly toxic by inhalation.
- Antimony, arsenic, chromium, vanadium, and nickel compounds are moderately toxic by skin contact.
- Free silica occurs in many of the clays, plant ash, flint, quartz feldspars, talcs, etc. used in glazes. See the discussion above for the hazards of silica and the disease silicosis. Weighing and mixing glazes can result in the inhalation of these toxic materials.
- Soda ash, potassium carbonate, alkaline feldspars, and fluorspar used in glazes are skin irritants.
- Spray application of glazes is very hazardous because of the potential inhalation of glaze mists.
- Dipping, pouring, and brushing certain glazes may cause skin irritation and accidental ingestion due to careless personal hygiene habits.
- Glazes containing solvents are both flammable and hazardous.

### Precautions

- Use lead-free glazes. If the glaze does not state "lead-free" or "leadless" on the label, assume it contains lead until proven otherwise.
- Lead glazes should only be used on non-foodware items. Design lead-glazed pieces so that they won't be used for food or drink. Lead-glazed pottery should be labeled as lead-containing.
- If possible, don't use colorants that are known human carcinogens and avoid probable human carcinogens. There is no known safe level of exposure to carcinogens.
- Wear a respiratory mask when weighing and mixing powdered ingredients. Wet glazes are not an inhalation hazard. Good

housekeeping procedures and clean up of spills reduces the risk of inhalation or ingestion of toxic dusts. Wet mop spilled powders.

- Gloves should be worn while handling wet or dry glazes.
- Basic personal hygiene rules should be followed including restricting eating and drinking in the studio, and wearing personal protective equipment such as gloves, and separate work clothes or coveralls. Wash hands after work.

### Chemical Room/Glaze Lab

The chemical room or glaze lab is strictly off-limits to Studio Users and may be accessed only by authorized personnel. The chemical room must be locked at all times to ensure that access is controlled.

### Studio Glazes

Studio glazes are identified as those glazes, stains, washes and under-glazes in the studio that are available to all users. They are found under the glazing area work table while stains, washes and under-glazes are found on specific shelves. Each studio glaze is labeled by name.

All studio glazes may be used by any studio user with the exception that Students may be restricted by their Instructor to the use of particular glazes (as in raku workshops, youth classes, etc.). The price of clay includes the cost of glazing and firing; therefore, when users purchase their clay through the Centre, they are entitled to work with any glaze they choose and aside from studio access fees, there are no additional fees to finish work.

Studio glazes have been chosen based on certain criteria such as the need to be reliable, stable and inexpensive to produce. There is also a selection of under-glazes that have been donated and users are welcome to use these. Please understand that these have been donated and are not something provided for use by VCAC.

Some studio glazes have specific properties that limit their effectiveness and are best used with specific purposes. Where this is the case, studio glaze tubs have information regarding these properties on them (e.g. "X glaze runs and should only be used on insides of vessels"). Unless otherwise marked, studio glazes are food-safe.

### Using Glazes

Each glaze has its own particular recipe made from specific materials. Foreign materials introduced to glazes causes glaze contamination, the result of which is unpredictable glaze behavior and properties. Some glazes are particularly susceptible to contamination and care should be taken to avoid glaze contamination.

### Lead in Glazes

Studio glazes mixed on site do not contain lead or cadmium. Commercial glazes and under-glazes that have been donated to or purchased by the Centre may contain hazardous materials and users should read the labels of such products before using.

### Mixing Glazes

Mixing studio glazes is only performed by the Studio Technician. Safety guidelines described above will be observed at all times.

### Wax and Resist

We do not allow waxed bottoms in our studio. See USING THE STUDIO section Glazing Without Wax for details. Resists are used prior to glazing to keep glaze off the certain parts of wares.

An excellent article on wax and resist techniques has been published by Ceramic Arts Daily<sup>1</sup>.

Before setting glazed wares on the shelf to be fired, be sure to wipe away any excess glaze from the underside with a damp sponge. This is important because glaze will melt in the kiln and bond your ware to the kiln shelf when glazing is performed messily, carelessly or is applied in too heavy a quantity. Kiln shelves are expensive to replace and arduous to repair, so please be conscious of your glazing.

Glazing on the bottom of pots (to be fired on stilts) is not permitted in the Clay Studio. Keep glaze a minimum of ¼” from the bottom or foot of the work.

Some glazes are highly fluid and these should be kept ½” or more from the bottom or foot of the work.

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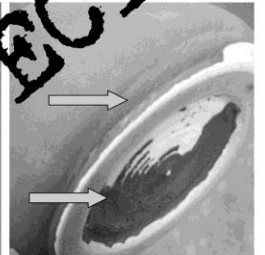
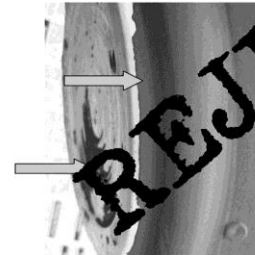
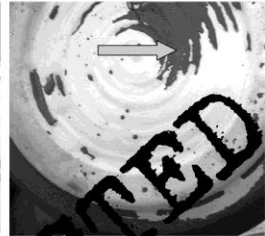
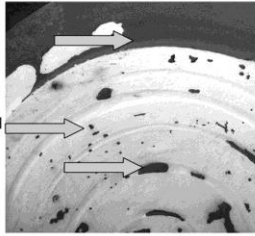
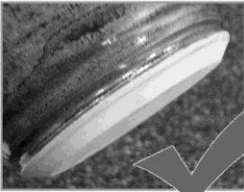
<sup>1</sup><http://ceramicartsdaily.staging.10floor.com/feature/featuredetail/2008-07/beyondwaxresist.aspx>

Wares that are not fit to be fired (i.e. have excess glaze on the underside, etc.) will not be loaded into the kiln until the artist has attended to them. Work may be turned away from firing if the Technician feels that the glaze is applied improperly, the work has not been cleaned well or there are other concerns regarding how firing the work may affect the kiln or its furniture. The Technician will communicate with the Studio User the reason for works being turned away.

## Why wasn't my piece fired?

Items will be rejected from the glaze kiln if they have not been properly cleaned of excess glaze.

- Look at your piece. Does it resemble any of these improperly cleaned items?
- The foot of the pot should be properly waxed to 1/4 inch or more, depending on your glaze(s).
- The bottom of the piece should be void of glaze speckles (even the tiniest ones).
- Use a damp sponge to clean any extra glaze off of the wax resist area.



**REJECTED**

# Frequently Asked Questions

**Technical info please?** We bisque at cone 06 and glaze at cone 6, electric.

**Any tips for moving my work through the studio at maximum speed?** Follow all the rules, be a respectful member of the studio community and do your best to keep your work moving from shelf to shelf.

**When does the kiln fire?** The technician will load and fire the kiln when there is an amount of work on the waiting shelves equal to a full load. Sometimes this is only a few days, but at other times this may take a week or more.

**When will the kiln be unloaded?** There is a small white board kept on the kiln alcove divider wall with this info on it. Please check this spot before asking the front desk. The front desk staff has answers to a lot of things, but the kiln schedule is not on their radar.

**How long will the firing take?** Generally, there is a 48 hour turn-around from when the kiln is loaded to when it is unloaded. The test kiln takes about 24 hours.

**Can I unload the kiln?** Nope. However, occasionally the Technician will assign a knowledgeable and qualified volunteer for this task.

**I'm in a rush, can you get mine into today's firing?** If there's space. The technician will try their best to make sure everyone's work is fired in a timely fashion and generally following a first-come, first-served order. When there is more work on the shelf than what will fit in the kiln, the technician will attempt to fairly accommodate everyone. If you're on a deadline (like approaching Christmas), make sure you leave yourself plenty of time to finish your work. Priority is given only to student work.

**Can I work at home and bring my work in for firing?** We are a community-based studio. Without our studio users, there would be no community. As such, and for control purposes, we require that all work, from beginning to end, be done in our studio. We do not offer fee for service, meaning that our studio is not a place for outside artists to drop off their work for firing.

**I want a cookie!** Don't we all? Seriously though, a cookie is a small disc of clay used to set "questionably glazed" wares on in order to protect the kiln shelves. Cookies should only be used by the technician. Stop and ask yourself if your work needs a cookie. Why do you think so? Could you spend a moment and clean it up a bit more? If you did this, could you avoid using a cookie? If you aren't sure whether or not your piece needs a cookie ask the studio technician's advice. The goal is to fire work without cookies for maximum success.

**Where do you keep the waxing pan?** Actually, we threw it in the garbage and no longer use wax in our studio. The smoke from melting and burning wax is a carcinogen. Every time the wax pan is turned on, and every time a glaze load is fired, it produces smoke from burning wax and puts harmful chemicals into the studio air. Additionally, when the wax pan is left on and forgotten about, it creates a fire hazard. So, for studio health and safety, we have become a waxless studio. For an explanation of how to glaze without wax, please refer to USING THE STUDIO section on Glazing Without Wax.

**I had some work on the shelves but I haven't been into the studio in 6 months. Do you know where it is?** Gone. Sorry, but we just do not have the space for long term storage. If you know that you will not be in for a long time, take your work home or rent a locker, regardless of that stage it is at. You would have been sent one email notification with a 'remove by date'. Any pieces remaining on the shelves after this date have been disposed of to ensure that there is adequate room for active studio users. It is your responsibility to make sure we have your correct contact information on file.

**Are the studio rules written in stone?** Yes. However, exemptions may be granted with direct approval from the technician. Each individual must get their own approval for any exemptions they hope to receive from the technician. If another potter is using/doing something, it doesn't mean it's automatically approved. Requests will be granted on a case by case basis. Failure to follow the rules may mean that your work does not get fired.

## Appendices

### Appendix 1 – Glossary of Terms Used in This Manual

Arts Council of the North Okanagan (ACNO) – Refers to the umbrella organization in whose mandate it is to operate the Vernon Community Arts Centre pursuant to an agreement with the City of Vernon. A current membership to the ACNO is required to work in the Studio.

Bisque-ware – A related term is biscuit. Defined as pottery that has been fired but not yet glazed. Biscuit earthenware is porous and readily absorbs water; vitreous ware and bone china are almost non-porous even in the biscuit state. The temperature of biscuit firing is usually at least 1000°C, although higher temperatures are common. The firing of the ware that results in the biscuit article causes permanent chemical and physical changes to occur. These result in a much harder and more resilient article which can still be porous, and this can ease the application of glazes.

Bone dry – Clay which has not been fired and has been allowed to dry from wet so that all excess moisture has evaporated away. Very fragile. Related term, Greenware.

Centre – Refers to the VCAC

Commercial glazes – Those glazes and under-glazes that have been produced by a manufacturer and are available for sale through various retailers.

Drop-in User – Refers to all studio users using the studio recreationally and not as students, volunteers or instructors.

Greenware – Pottery that has not yet been fired.

Instructor – Refers to those people who are currently teaching classes, workshops or courses in clay methods and techniques at the VCAC.

Primitive firing – Those processes used to finish clay art which do not utilise standard kilns, such as raku and barrel firing methods.

Raku – Described in detail above. See Table of Contents for direction.

Students – Refers to those people currently enrolled in classes, workshops or courses in clay methods and techniques at the VCAC. Once said class, workshop or course has come to an end, that person is no longer a student.

Studio Glazes – See section on Studio Glazes, Table of Contents for direction.

Studio Technician – Described in detail above. See Table of Contents for direction.

Studio User – Refers to any person using the studio, regardless of their role. Studio users may be students, instructors, volunteers, drop-in users, etc. Studio users who are not students or instructors must be members of the ACNO in order to use the studio.

Technician – See Studio Technician.

VCAC – Vernon Community Arts Centre.

Volunteer – A person who performs unpaid duties and tasks in the Studio, cooperating with the Technicians.



## Appendix 2 – Kiln Firing Chart

### KILN FIRING CHART

Firing converts ceramic work from weak greenware into a strong, durable form. As the temperature in a kiln rises, many changes take place in the clay; and understanding what happens during the firing can help you avoid problems. The following chart provides highlights of what happens when firing clay.

Temperature		Color	Cone (approx.)	Event
C°	F°			
1400	2552	Brilliant white	14 13 12	End of porcelain range
1300	2372	White	11 9	End of stoneware range
1200	2192	Yellow-white	7	End of earthenware (red clay) range
		Yellow	4 2	
1100	2012	Yellow-orange	1	
		Orange	04 05	Between 1100-1200°C, mullite and cristobalite (two types of silica) form when clay starts converting to glass. Clay and ceramic particles start to melt together and form crystals. These changes make the material shrink as it becomes more dense. Soaking (holding the end temperature) increases the amount of fused matter and the amount of chemical action between the fluxes and the more refractory materials.
1000	1832	Red-orange	06 07	
		Red-orange	08	
900	1652	Cherry red	010 012 013	Between 800-900°C sintering begins. This is the stage where clay particles begin to cement themselves together to create a hard material called bisque.
800	1472	Dull red	015 016 017	Between 300-800°C, the temperature must be raised steadily and ample air must be present to permit the complete burning of carbonaceous materials (impurities in the clay along with paper, wax, etc.). After 800°C, the clay surface will start to seal off, trapping unburned carbonaceous materials and sulfides, which could cause bloating and black coring.
700	1292	Dark red	018 019	
600	1112	Dull red glow	020 021 022	
500	932	Black		Quartz inversion occurs at 573°C. When clay is refired for a glaze firing, quartz crystals change from an alpha (α) crystal structure to a beta (β) crystal structure. The inversion is reversed on cooling. This conversion creates stresses in the clay so temperature increase and decrease must be slow to avoid cracking the work.
400	752			Between 480-700°C chemical water (referred to as "water smoke") is driven off.
300	572			Upon cooling, cristobalite, a crystalline form of silica found in all clay bodies, shrinks suddenly at 220°C. Fast cooling at this temperature will cause ware to crack.
200	392			
100	212			Water boils and converts to steam. Trapped water will cause clay to explode so all water should be evaporated below 100°C. Begin a firing by keeping the kiln below 100°C until all water has evaporated.

## Appendix 3 – Pyrometric Cone Chart

<b>Cone Chart</b>						
based on Orton Pyrometric Cones <sup>1</sup>						
Degrees Farenheight				Degress Celcius		
108F/hr	270F/hr	540F/hr	Cone	60C/hr	150C/hr	300C/hr
1087	1094	1166	<b>022</b>	586	590	630
1112	1143	1189	<b>021</b>	600	617	643
1159	1180	1231	<b>020</b>	626	638	666
1252	1283	1333	<b>019</b>	678	695	723
1319	1353	1386	<b>018</b>	715	734	752
1360	1405	1443	<b>017</b>	738	763	784
1422	1465	1517	<b>016</b>	772	796	825
1485	1504	1549	<b>015</b>	791	818	843
1485	1540	1598	<b>014</b>	80	838	870
1539	1582	1616	<b>013</b>	837	861	880
1582	1620	1652	<b>012</b>	861	882	900
1582	1620	1652	<b>011</b>	875	882	915
1657	1679	1686	<b>010</b>	903	915	919
1688	1706	1751	<b>09</b>	920	930	955
1728	1753	1801	<b>08</b>	942	956	983
1789	1809	1846	<b>07</b>	976	987	1008
1828	1855	1873	<b>06</b>	998	1013	1023
1888	1911	1944	<b>05</b>	1031	1044	1062
1945	1971	2008	<b>04</b>	1063	1077	1098
1987	2019	2068	<b>03</b>	1086	1104	1131
2016	2052	2098	<b>02</b>	1102	1122	1148
2046	2080	2152	<b>01</b>	1102	1122	1178
2079	2109	2163	<b>1</b>	1137	1154	1184
2088	2127	2174	<b>2</b>	1142	1164	1190
2106	2138	2185	<b>3</b>	1152	1170	1196
2124	2161	2208	<b>4</b>	1162	1183	1209
2167	2205	2230	<b>5</b>	1186	1207	1221
2232	2269	2291	<b>6</b>	1222	1243	1255
2262	2295	2307	<b>7</b>	1239	1257	1264
2280	2320	2372	<b>8</b>	1249	1271	1300
2300	2336	2403	<b>9</b>	1260	1280	1317
2345	2381	2426	<b>10</b>	1285	1305	1330
2361	2399	2437	<b>11</b>	1294	1315	1336
2383	2419	2471	<b>12</b>	1306	1326	1355

# Appendix 4 – Relationship Between Strength and Dryness

