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COLLEGE OF VISUAL

AND PERFORMING ARTS

HEALTH & SAFETY MANUAL

SAFETY POLICIES FOR CERAMICS

(In part from Radcliffe College Ceramics Studio, Boston, MA)

THE CERAMICS STUDIO - HEALTH SAFETY

CLAY

Inhalation of all clay materials especially silica can damage your lungs.

- All clay bodies contain some free crystalline silica which can scar your lung tissue and cause irreversible loss of breathing capacity
- Free crystalline silica is present in clay bodies from trace to 50% amounts.
- It is the finest, least visible particles that can hang in the air for hours that are the most dangerous because they are the most easily respirable and because we are less likely to wear a mask when the air seems clear.

Avoid excessive dust exposure.

- Buy premixed, wet clay bodies.
- Wear a HEPA filter mask that fits well when mixing clay or cleaning the studio.
- Clean work area before clay scraps have a chance to dry out. Never sweep your studio.
- Clean studio often with a wet mop, wetvac, or a vacuum equipped with a HEPA filter.
- Provide good fresh air exchange in your work area.
- Wear plastic or vinyl-type aprons rather than porous cloth-type aprons.

Make sure you know what ingredients are in the clays you use.

- Ask your suppliers if “low free silica” clay bodies are available.

- Avoid use of hazardous compounds (see list under GLAZES) to color your clay bodies.
- Avoid use of Barium Carbonate in an earthenware clay body.
- Avoid use of asbestos contaminated talc in low-fire white and raku clay bodies.

Wet clay is a good medium for mold growth and bacterial incubation.

- People with specific types of mold allergies may be affected.
- Shared clay in a group setting could potentially be a medium for bacteria transfer.

Do not eat, drink, or smoke in your work space. Do not interchange tools and eating utensils. Scrub hands thoroughly after working.

Prevent or alleviate back strain and wrist injuries with good work habits.

- Adjust wheel heights, bench heights, and wedging board heights to enable you to work with your back straight.
- Keep your back straight when lifting heavy materials or equipment.
- Try to avoid stressful, repetitive motions by varying your daily routine.

GLAZING

Many glaze materials are hazardous. Those of special concern are listed here:

- Crystalline silica is present in almost all glazes and can scar lung tissue if inhaled.
- Barium Carbonate, Sodium Borates, and Lead compounds can be present as colorless fluxes in glazes.
- Antimony compounds, Cadmium compounds, Chrome compounds, Lead compounds, Cobalt Chloride, Cobalt Sulphate, Copper Chloride, Copper Carbonate, Copper Sulphate, Iron Chromate, Iron Sulphate, Manganese Dioxide, Nickel compounds, Uranium compounds, and Vanadium compounds can be present as glazes, slips and stains.

- Lustre glazes contain toxic mediums as well as toxic metallic compounds.
- Avoid use of these materials whenever possible. If you do use them, take precautions to prevent ingestion as well as inhalation (which can lead to ingested particles) and skin contact. Even though some of these materials cannot be directly absorbed through the skin, invisible particles can become lodged in the crevices of your skin.

Know what you are using.

- Call your manufacturer to see if there are any ingredients of concern to you in the commercial glazes, slips, or stains you may be using.
- Read Material Safety Data Sheets, U.S. Dept. of Labor Occupational Health Guidelines, or New Jersey Dept. of Health Hazardous Substance Fact Sheets for detailed information about the hazardous materials that you use.
- DO NOT assume that industrial threshold limits for exposure are safe guidelines.
- Learn distinctions such as: iron oxide is not toxic but iron sulphate is.
- If you cannot find adequate information about a material, assume hazardous potential.
- Know that individual sensitivities to hazardous materials vary tremendously and can be affected by medications and health histories as well as genetics.

Do not eat, drink, or smoke in glazing area. Do not interchange eating and glazing utensils. Scrub your hands thoroughly after glazing.

Use a Ceramic dust filter mask that fits well when mixing, spraying, or sanding glazes.

- Use a mask for vapors and gases when working with lustre glazes.
- Spray glazes only in a properly constructed, vented and filtered spray booth.
- Make sure that the exhaust of the spray booth is vented so that it does not pollute somebody else's breathing air. Consult DEQE codes for installation guidelines.
- Used spray booth filters for certain glazes may have to be treated as toxic waste.

- Do not pollute the environment when discarding unused toxic glaze materials.
- Reformulate scrap glazes and/or give them to someone who can use them.
- Fire your scrap glazes in a discarded bowl to make them more environmentally stable.
- Take your toxic glaze scraps to toxic waste collection sites.

FIRING

Kilns are potentially hazardous if they are installed or fired incorrectly.

- Kiln installation must be done with strict adherence to stringent fire codes.
- All gas and electrical hookups must be done by a professional. Double check with your electrician to make sure that your electric kiln is properly grounded.
- Firings should only be done by those with firing experience and a thorough understanding of all kiln functions and safety controls.

Touching an element in an electric kiln can be fatal.

- Never reach into an electric kiln unless all of the switches are turned off.
- Electric kilns that are wired for 3 phase may pass electricity through the elements even when the kiln sitter timer is off. Since no kiln sitters are made for 3 phase wiring, manufacturers adapt them by adding a power relay after the kiln sitter. When the power relay becomes old, the relay may allow electricity to pass through even when the kiln sitter is off. If that is the case, one must turn off the switches to be sure no current is flowing through the elements. Since our power relays started to fail after 5 years, we are changing them every two years.
- As an extra precaution, turn off the kiln at the circuit breaker if you vacuum it or insert any other good conductor into it.

Firing of clay materials in electric and gas kilns produces carbon monoxide, formaldehyde, and sulphur dioxide gases.

Firing of glaze materials in electric and gas kilns can produce fumes of the toxic materials discussed above in the glazing section.

- If you fire below the volatilization point for your specific glaze ingredients this may not be a problem. If firing above, a HEPA dust, fume, mist filter might be necessary for protection. Lead, cadmium, and lustre glazes are particularly volatile at low-medium firing ranges.
- Copper, chrome, and tin glazes are volatile in high-firing ranges.

Salt firings emit highly toxic chlorine gas during the salting process.

- Gas masks and eye protection are necessary.

The intense heat and infrared radiation from all kiln firings can damage your eyes.

- Wear welders goggles when looking in the kiln spy holes.

Use of any studio equipment can be hazardous if not operated properly.

- Receive proper instructions and permissions before operating. Never operate equipment if taking any medication, drugs, or alcohol that could impair your judgment.

Use of motorized grinders can be very hazardous.

- Use eye protector goggles, protective gloves, and a HEPA filter mask when grinding.

SAFETY PROTOCOLS STAR STORE KILN ROOM

DOORS TO THE KILN ROOM MUST REMAIN CLOSED AT ALL TIMES.

The first thing to do in any unexplained Kiln Room event is to immediately notify Ceramics Staff (studio manager, kiln room technician, or faculty) to ascertain source. If no clear determination is made, call Security at x 8905 to apprise them of the situation.

Important: you or someone you assign must remain in continual contact with Security until the event concludes. In an emergency leave the 4th floor via the stairways. Ceramics Staff is to help facilitate evacuation from studios and labs.

Gas Odor

If it is strong (stinging to the eyes) report to Security and leave the premises immediately. Otherwise:

1. Determine which kilns are on & who is firing them.
2. Check main burners, determine if any that are on low setting are aspirating.
3. Steps to alleviate aspiration:
 - a. shut down main burners, go through lighting of pilot burners.
 - b. make sure air flaps covering blower fan cages are set at ½ open.
 - c. open main gas valve to ignite burner until there is needle movement on gauge.
 - d. adjust rheostat fan control speed until blue flame appears.
4. For burners that appear to have blown out: shut down all burner systems. Wait at least ten minutes before attempting re-igniting burners. If gas odor persists do not re-ignite burners.

Non-Gas Odor

Should there be any unaccustomed smells coming from the kiln room:

1. Determine which kilns are on & who is firing them.
2. Check for back pressure when opening double doors.
3. Determine direction of draft beneath each hood. Air movement should not be coming in a downward direction.
4. Notify Security that there is a likelihood the intake air fans are off to the kiln room.

Smoke Odor

1. Determine which kilns are on & who is firing them.

2. Find out if any burn-out materials were used, i.e. sawdust placed in saggars, paper armatures, wood panels which large pieces were moved into the kiln. If this is the case, the smell should dissipate by the time the pyrometer reads 1000 F.
3. If no determination is made on the presence of burn-out materials or the smell persists, locate the source and bring faculty and staff together to make decision whether to shut down kiln.

Visible Smoke There are very few reasons smoke that can be seen should appear in the kiln room:

1. Determine which kilns are on & who is firing them.
2. If there is a burning wood smell follow protocol for Smoke Odor.
3. Check log sheet on Soda Kiln (G-6) to see when last induction of soda occurred. If this is the case the vapor will dissipate within 15 minutes.
4. If there hasn't been a recent induction of soda, locate the source and bring faculty and staff together to make decision whether to shut down kiln.

Fire Outside Kiln Chamber If flames are evident anywhere but the chimney or damper flues, spy holes, burner ports or passive dampers:

1. Assess the situation from outside double doors. Inform Security & Staff immediately.
2. If main shut-off valve by the doors can be accessed, use wrench to turn square peg clockwise 90 degrees to off. Leave the 4th floor.

Water Leaks on Electric Kilns Under no condition should any water or liquid be on or near electric kilns.

1. If the kiln is firing DO NOT walk across aluminum diamond plate that the kiln sits on. Shut off kiln at the main breaker panel on the south side of the room.
2. If the kiln is off, protect it from the liquid immediately. Turn main power lever behind kiln until event is resolved. If there is any water damage to circuitry, a full diagnostic check is in order once everything dries out.

Induction of Soda or Salt in G-6 Kiln

1. Once a time frame is determined call the New Bedford Fire Dept non-emergency number: 508.991.6106 to inform them when induction will occur.

Note: from "Keeping Clay Work Safe and Legal" by Monona Rossol, for National Council on Education for the Ceramic Arts (NCECA).

THE PHYSICAL HAZARDS OF STUDIO WORK

In addition to toxic chemicals, there are physical hazards from the heavy work, from noise, and other hazards.

OVERUSE AND STRAIN INJURIES. These injuries are often called "cumulative trauma disorders" because they develop from repeated small injuries to tissue from overuse and strain. They can occur while wedging, throwing, or hand building with clay. "Potter's thumb," for instance, is the term some potters have used to describe symptoms which are now associated with the early stages of carpal tunnel syndrome. Many potters have acquired carpal tunnel syndrome, a debilitating condition involving compression of the median nerve at the wrist. Tendonitis in various locations and tennis elbow are also common.

Hand, back, and wrist muscle injuries can also occur from sitting at the potters wheel for too long, especially if posture is incorrect. Injuries from lifting sacks of clay, moulds, and the like are common among both potters and ceramicists. To prevent these injuries, pay careful attention to your body for signs of fatigue, pain, changes in endurance, weakness, and similar symptoms. Developing good work habits can prevent these conditions and even may resolve early symptoms. These include:

- maintaining good posture
- taking frequent rest breaks
- alternating tasks or varying the types of work
- warming up muscles before work
- moving and stretching muscles during breaks
- easing back into heavy work schedules after a holiday or hiatus rather than expecting to work at full capacity immediately
- modifying technique and/or equipment to avoid uncomfortable positions or movements.

If symptoms do not respond quickly, seek medical attention. Early medical intervention will cause the majority of overuse injuries to resolve without expensive treatment or surgery. Delaying treatment can leave you disabled for long periods or even for life. In response to artists' special needs, a new field called "arts medicine" has been created. Doctors and clinics specializing in arts medicine can be located by consulting your doctor or arts health organizations such as Arts, Crafts and Theater Safety.

HEALTH

To inhale or ingest the dust of any of our clay or glaze materials is unhealthy. Therefore thoroughly clean all wheels, tables, tools and equipment after use and wash up any spills, splatters, or trimmings that land on the floor.

Participate in our "Health Insurance Program" by spending one hour each term on dust-busting duty. (Use a sponge or a mop to clean any floor or table area that threatens to emit dust into our breathing space.)

Buy a good dust filter mask and wear it when mixing dry materials, spraying glazes, and scraping shelves.

Be aware of the specific safety issue of each material you use by discussions with your instructor and by reading "Health & Safety Concerns in the Ceramics Studio."

Observe no smoking policy in the building.

SAFETY

Do not use any wheel, kiln, spray equipment, slab roller, grinder, etc. unless you have received personal instruction and permission from a staff person. Permission to use kilns requires apprenticeship and testing.

You must turn off any electrical equipment after using it - wheels, kilns, fans, hot plate, etc.

If you are the last to leave, make sure that all the windows are closed, and that the lights have been turned off.

Use the buddy system for pedestrian travel at night to and from the studio.

COMMUNAL RESPONSIBILITIES

Please help foster a productive work environment in the studio by respecting the need for

quiet concentration. Conduct extended personal conversations in the lounge, not in the workspace. Use walkmans, not radios.

Leave your work area clean and empty for the next person. All your work should be stored on shelves. Any work left on wheels or tables will be probably be moved to a shelf by someone needing workspace.

Take any heavy personal garbage (broken bisqueware, etc.) directly to the dumpster outside the building.

If you plan to keep any food in the refrigerator label and date the food so that it will not be considered old and forgotten.

STUDENT RESPONSIBILITIES AND RULES

SECURITY

- Students are responsible for keeping their personal items secure.
- NO PROPPING OPEN OF FIRE DOORS.
- NO SMOKING in the building - outside only.
- NO DRUG/ALCOHOL USE.
- NO WORKING IN STUDIO WHEN IMPAIRED.
- WEAR PROPER FOOTWEAR AT ALL TIMES - NO OPEN SANDALS OR BARE FEET.
- RADIO / MUSIC AGREED BY ALL - walkman best bet.
- APPOINTMENTS WITH FACULTY - students must schedule
- CRITIQUES - be prepared and on time to all crits.

KILN ROOM

- No lead firing without signs.
- Policy on kiln damage - you break it, you bought it.
- Policy on kiln shelves - you break it, you bought it.

- No half empty kilns.
- No bisque in electrics.
- Must use visual cones in all electrics, and fire accordingly.
- Flint/kaolin mix as kiln wash in gas kilns.
- Alumina/kaolin kiln wash in salt.
- Grind all shelves after firing - if not, no next kiln.
- Clean area around kiln after loading, and before firing.
- Clean interior and exterior of all kilns after use.
- Return all kiln furniture to racks after use.
- If unable to fire kiln at scheduled time, then you forfeit.

CLAY ROOM RULES

- It is required that you wear personal protective equipment at all times while working in the Clay Mixing Room and that you are exceptionally careful in cleaning up after yourself. Don't leave a mess for others! Juniors, Seniors and Grads have sole privileges to Clay Mixing Room after successfully going through authorization workshop and test for the Soldner & Walker mixers.
- NO mixing of clay without payment.
- Check availability of ingredients before mixing clay.
- Fill out materials form, with current prices and total.
- Mix only at the sign up time, and be on time.
- Use the dust collector at all times.
- Wear a dust mask at all times.
- Clean all mixers by sponging out and sweep floor thoroughly when finished.

- Sweep floor when finished.
- Throw away all empty clay bags into the dumpster outside.
- Leave room clean and organized when finished.

PLASTER ROOM RULES

- It is required that you wear personal protective equipment at all times while working in the plaster room and that you are thorough in cleaning up after yourself.
- Intro, Foundations, and Continuing Ed students are required to have permission from their Instructor to use plaster room facilities. Advanced students must serve as role models and use extreme consideration in working around class schedules.
- Plaster is sold by the 50# bag for 15.00 porcelain and red ware casting slip are provided. Record material purchases daily as you use them by placing form in metal box.
- Please leave lab in excellent condition, it is your individual responsibility to do so for the rest of us using it!

GLAZE ROOM RULES

- It is required that you wear personal protective equipment at all times while working in the glaze room, and that you are thorough in cleaning up after yourself.
- Use the slot hood vent system over the mixing tables when measuring both large and small batches. The switch is a red button to the right of the door as you come in, hold for five seconds to turn on & off.
- Scrub hands thoroughly after glazing. Plastic safety gloves are provided; please use them when you can stand it!
- Know what materials you are using and comply with the department's Health and Safety Manual. Place all scrap glaze in the hazardous waste barrel- do not send quantities of raw glaze into our Bay!
- Intro, Foundations, and Continuing Ed students are required to have permission from their Instructor to use glaze room facilities. It is expected that

Juniors, Seniors, Grads and Special Students serve as role models, and use extreme consideration in working around class schedules. It is your individual responsibility to keep the lab in excellent condition.

- Clean up after yourself Use vent system when mixing both large and small batches.
- Clean Up spray booth after using.
- When a material is low, put on list for re-order.
- Purchase all Mason stains and cobalt at time of use - use material forms

EQUIPMENT AUTHORIZATIONS / ORIENTATION

There are scheduled demos on proper use of clay mixers, gas & electric kilns, ball mill, tile saw, and kiln shelf care, after which all students will be tested and asked to sign a responsibility form for using equipment properly. Students are not authorized to use the above-mentioned equipment without authorization. Failure to comply with department in responsibility and care of equipment constitutes losing the privilege to use that specific piece of equipment. If you break equipment, you will be responsible for its repair or replacement according to the direction of the chair and Dean.

CLASS ROOM & STUDIO CLEANUP

Classroom Studio Use Outside of Class

When classes are not in session in each classroom, area studios are open for individual use. We ask that you care for the studios well and that you leave the studio in better condition than when you found it. When finished working at tables, wheels, extruders, slab rollers etc.:

- Clean up area and put away tools.
- Recycle clay by placing dry scraps in plastic bucket with water to reclaim and then wedge and dry on plaster. All dry scrap clay should be removed from tables.
- Plaster and wooden bats are for throwing classes and remain in the throwing studio. Please clean and scrape bats before stacking for storage.
- Please do not leave your work on tables when leaving the studio. Put all unfinished work on designated shelves. (Marked by instructor's last name.)

- Please do not handle other students' work or remove plastic from students' work in progress. Only individual students, their instructor, studio manager or the chair should discard student projects.
- Do not leave valuables, radios, backpacks, etc. around the studio. Place all personal items in locked lockers or items that need to remain clean on coat hooks outside of classrooms.
- Report any equipment damage or malfunction to Ceramics Office or with the studio manager.
- All plaster processes must take place in the plaster room. (Plaster stays out of studio areas.)
- Lockers should be shared, and labeled with name, class and semester. Remember YOU need to supply your own lock.
- No smoking or eating in studio. Wear proper footwear at all times; no bare feet.
- Radio/music needs to be agreed upon and must be considerate of others.
- Discard all trash before leaving classrooms.

Cleanup Schedules for Classes and Labs

Each instructor has a rotating cleaning assignment schedule. All students enrolled in Foundations, Intro classes and Continuing Education are responsible for cleaning up daily as well as on assigned cleaning days. Non-participation in scheduled clean-ups will result in a hold on your grade.

All Ceramic students are required to work on a committee and have a small weekly task in one of the labs; these assignments are small but require your 15 minutes weekly. Attendance is taken by the studio manager weekly and three free absences are allowed each semester. Absence from the weekly committee tasks beyond three free absences constitutes an incomplete until department responsibilities are completed.

Classrooms at the end of the semester (exam week) must be totally cleaned for the classroom readiness for the following semester. Each instructor is required to remove all leftover work, direct and organize classroom cleanup and not leave for break until classrooms are thoroughly cared for.

Senior and Graduate Studios

To maximize the most positive atmosphere possible, please respect each other's privacy and concentration. Radios/music need to be agreed upon by all otherwise headsets are recommended. Cell phone conversations are encouraged outside the professional studio work area.

Common areas must remain clearly passable and clean. Sink and telephone areas need to remain clean and tidy. Common areas have to be equally cared for by all at midterm and final cleanups.

No curtains or privacy door dividers are allowed in Ceramics. Participation in the community is essential for community success, we are glad you are here!

Midterm and final - all studio cleanups

Midterm and final cleanups are scheduled each semester. All Ceramics students are required to attend and work within committees. An alternate make up cleanup date (Midterm and final) will also be schedule for the unforeseen emergency. Failure to participate in studio cleanups results in a grade for the semester course being withheld.

Note: from "Keeping Clay Work Safe and Legal" by Monona Rossol, for National Council on Education for the Ceramic Arts (NCECA).

TOXIC HAZARDS IN THE CERAMICS STUDIO - SOURCES OF TOXIC KILN EMISSIONS

CARBON MONOXIDE: Formed when carbon-containing compounds are burned in limited oxygen atmospheres. This happens when gas, wood or other fuels are burned in kilns. Reduction firing produces the greatest amounts of carbon monoxide. Electric kilns also produce carbon monoxide from the burning of organic matter found in most clays and many glaze materials, from wax resists, stabilizers in slip clays, tack oils in lustres, and other organic additives in clays and glazes. Amounts of carbon monoxide over the Threshold Limit Value have been measured near electric kilns.

OTHER ORGANIC DECOMPOSITION PRODUCTS: In addition to carbon monoxide, large numbers of other chemicals are created when organic matter burns. A class of chemicals called aldehydes and certain other Formaldehyde, for example, has been measured in significant amounts near electric kilns.

SULFUR OXIDES: Many clays and glaze ingredients contain significant amounts of sulfur-containing compounds. When these are fired they give off sulfur oxides which form sulfurous and

sulfuric acids when they combine with water. These acids etch the metal kiln parts above ports and doors and also are highly damaging to the respiratory system.

CHLORINE AND FLUORINE: These gases are released when fluorine and chlorine-containing clay and glaze chemicals such as fluorspar, iron chloride, and cryolite are fired. Both gases are highly irritating to the respiratory tract. Fluorine also is associated with bone and tooth defects.

METAL FUMES: Fumes are formed when some metals and metal-containing compounds are fired. Complex reactions which occur during glaze firing make it difficult to predict precisely at what temperature metals will volatilize and oxidize to form a fume. Some toxic metals which commonly fume include lead, cadmium, antimony, selenium, copper, chrome, and nickel. The fumes may be inhaled or they may settle on surfaces in the studio. Some fumes can contaminate the kiln and deposit on ware in subsequent firings.

NITROGEN OXIDES AND OZONE: These gases are produced by decomposition of nitrogen-containing compounds or by the effect of heat and/or electricity on air in the kiln. They are strong lung irritants.

OTHER EMISSIONS: One of the strongest arguments for venting all kilns is the unpredictability of emissions. Trade magazines and textbooks often suggest projects which result in the firing of nails, paper, plastic, wood, wire, and many other items: One magazine even suggested throwing mothballs into hot electric kilns to create reduction atmospheres. This practice would release highly toxic emissions including cancer-causing benzene. Projects such as these combined with the unpredictability of clay and glaze composition make ventilation necessary.

CERAMICS TOXICOLOGY REPORT

TOXICOLOGY:

- Hazards of materials - lots of unknowns. Inhalants - hazardous to lungs and mucus membranes. Ingested materials - harmful if eaten. Absorption - through skin, mucus membranes, eyes, cuts.
- Flint - silicosis - related diseases from inhaling materials. Build up of silica molecules in lungs, disables you. Pneumonia may result to kill you.
- Free silica SiO₂ - uncombined flint, pure silica, is the most hazardous. Every clay has some silica.
- Aluminosis - alumui - similar

- Asbestos - No need to use this, very dangerous.
- Ceramic Fiber materials - same needle-like structure as asbestos. A hazard also.
- Gaseous materials given off in firing. By products from salt glazing. Salt is sodium chloride, and becomes dissociated when put in kiln. Chlorine goes up chimney. Combining with water it forms hydrochloric acid which will kill you slowly. Soda has none of these problems.
- Chlorine gas - any chlorine material. Fuming - Raku Salts. Concentrations are what is important. Carbon monoxide - by product of fuel fired-kilns, even electric firing sometimes. Reducing, produces large amounts of carbon monoxide, can't see, smell, or taste it. Blood cells tied up. Symptoms, headaches, fainting, dizziness.
- High temperature firing - oxides of nitrogen produced. Can be fatal. Materials vaporizing, lead will turn into a vapor which can be breathed. Ventilation very important. Any of the metals are hazardous. Smell - aldehydes - hazardous carcinogens. Raku firing - carbon compounds - smoke.

INGESTED MATERIALS:

Large number of compounds. Lead and barium. High toxicity. Any of the metals. Iron, copper, cobalt, nickel (extremely powerful carcinogen) Soluble - more dangerous. Insoluble passes through your body quickly. All materials are hazardous when ingested.

ABSORPTION through skin:

Barium, lead - carcinogens. Soluble materials are absorptive.
Exposure - won't show up immediately. Know how to take necessary precautions.
Respect - not fear.

GLAZING:

Absorption - into mouth. Soluble compounds of any kind are the most hazardous. Sulfides, sulfates, chlorides, chlorates - food, drink, cigarettes.

Radiation - uranium derivatives. Uranium oxide. Storage of bulk materials is the hazard. Sodium urinate - toxic in ingestion, absorption. Radiation hazard not that great.

Infrared radiation from kilns - a wave that travels through the air without warming the air. Retina of the eye, heads up the eye - prolonged exposure causes cataracts. Skin cancer- infrared and ultraviolet. Smoking compounds all these hazards.

- Clays - alumina and silica - free silica. Easily can cause silicosis
- Feldspars - inhalants - silicosis
- Grog - dust bad
- Plastics - caustic
- Lead Frits - relatively innocuous. Silicosis producing, but lead is not a hazard.
- Alumina Hydrate - Aluminosis - hazardous inhalant.
- Barium Carbonate - use barium Frit instead to prevent hazard.
- Borax - a hazard - Boric acid.
- Cadmium compounds - reds in 04 range. Siliamium - copper compounds. Any heavy metals.
- Flint - pure free silica, bad.
- Gums - not a problem unless you are allergic to it.
- Iron compounds - used in psychiatry in small doses. High doses causes schizophrenia.
- Magnesium compounds.
- Manganese dioxide - more hazardous.
- Nickel - one of the most powerful carcinogens know.
- Rare earths - vanadium, no research.
- Selenium
- Spogemene - hazardous to hair, not bad.
- Talc - asbestos in the talc is the problem. Some kinds worse than others.

- Tin chloride - (stannous) soluble - chloride.
- Vanadium - poisonous.
- Zinc compounds - mildly hazardous.

KILNS:

- Gases
- Carbon monoxide - can not be detected, causes dizziness.
- Chlorine - hazardous.
- Sulfur compounds - irritant.
- Ceramic Fiber- hazard, may be as bad as asbestos. Shape of molecules are similar.
- Wood ash - caustic, can burn lungs. Hazardous.

PREVENTION:

- Inhalation hazards - keep it wet, it won't go into the air. Particle size smaller than what you can see.
- Wet Vac
- Use low silica clays. Minimize the hazard.
- Use vent system at the source. Pick up the dust before it gets into the studio.
- Kilns should be vented properly. Good exhaust system. or in another room.
- Ventilation is the key. Time exposure is what matters. Low level constant is the worse.
- Sweep or making clay just before you leave at night allows dust to settle.
- Surgeon's gloves for glazing when you have cuts on hands.
- Dust filter - dust and mists. Only dusts don't work for spraying.

- Personal protective equipment must fit.
- Absorption hazards - rubber gloves. Personal protective equipment when absorption is possible.
- Ingestion - watch out when eating or drinking.
- Wash hands well before eating.
- Beards and mustaches collect materials.
- Throwing - keep moving around. One position is what hurts.
- Lead and cadmium are soluble out of glazes after firing.

Lead Compounds

(Lead Chromate, lead monosilicate, lead sulfide, Litharge) Skin toxicity not significant. Inhalation toxicity high.

Both acute and chronic ingestion or inhalation can cause lead poisoning. Inhalation is more of a problem than ingestion. Lead affects the gastrointestinal system, red blood cells, neuromuscular system, other common effects include weakness, headaches, irritability, malaise, pain in joint and muscles, liver and kidney damage, and possible birth defects.

Lepidolite - Skin toxicity moderate, Inhalation toxicity high. Skin contact may cause burns, Inhalation and ingestion may cause respiratory and gastrointestinal irritation. Chronic inhalation may cause silicosis.

Manganese Carbonate and Manganese Dioxide - Skin toxicity not significant. Inhalation toxicity high. Chronic inhalation may cause manganese poisoning, a serious nervous system disease resembling Parkinson's disease. Early symptoms include apathy, loss of appetite, weakness, spasms, headaches, irritability, etc.

Nepheline Syenite - See Felspathoids

Potash - Skin toxicity moderate. Inhalation high. Alkalis are corrosive to skin and eyes. Inhalation causes severe irritation and possible pulmonary edema.

Potassium Dichromate - Skin toxicity moderate. Inhalation toxicity high. Skin contact may cause irritation, allergies, and skin ulcers. Chronic inhalation may cause perforation of nasal septum and respiratory allergies. Causes cancer in animals, suspected human carcinogen.

Soda Ash - Skin toxicity moderate. Inhalation high. Corrosive to skin and eyes. Inhalation causes severe irritation and possible pulmonary edema.

Talc - Skin toxicity not significant. Inhalation high. Inhalation of talc may cause lung scarring. Chronic inhalation may cause silicosis if silica is present, or asbestosis, lung cancer and mesothelioma if asbestos is present.

Tin Oxide - Tin oxide dusts are irritating to eyes and nose and cause lung changes as shown by chest x-ray, but no ill effects.

Vermiculite - Inhalation toxicity high. Asbestos contaminated, chronic inhalation may cause asbestosis, lung cancer, etc.

Water Glass - (sodium silicate) May cause skin and respiratory irritation.

Wollastonite - May cause skin, eye and respiratory irritation.

Zircon (zircopax) - Inhalation toxicity high. Causes nodules under the skin from skin contact and in the lungs from inhalation. Chronic inhalations may cause silicosis.

HAZARDS OF GLAZE INGREDIENTS AND COLORANTS

Antimony Oxide - Inhalation toxicity high. Skin toxicity moderate. Skin contact may cause severe lesions, including ulcers. Acute ingestion or inhalation may cause metallic taste, vomiting, diarrhea, severe irritation of mouth and nose, slow shallow breathing, and pulmonary congestion. Chronic exposure may cause loss of appetite and weight, nausea, headache, sleeplessness and later liver and kidney damage. May vaporize during firing.

Asbestos - Skin toxicity slight. Inhalation toxicity high. Carcinogen. Inhalation may cause asbestosis (a form of lung fibrosis), lung cancer, stomach and intestinal cancer.

Barium Carbonate - Skin toxicity slight. Inhalation toxicity high. May cause skin, eye, nose and throat irritation. Inhalation or ingestion may cause barium poisoning with symptoms of heart irregularities, intestinal spasms, and severe muscle pains. Chronic poisoning is most likely.

Chrome Oxide - Skin & Inhalation toxicity moderate. Suspected carcinogen. May cause skin and respiratory irritation, causes cancer in animals and possibly in humans.

Chrome Yellow (lead chromate) - Skin toxicity moderate. Inhalation high. Carcinogen. Skin contact may cause allergies, irritation and skin ulcers. Chronic inhalation may cause lung cancer, lead poisoning, etc.

Clays - Inhalation toxicity high.
Chronic inhalation can cause silicosis, a disease involving severe lung scarring.

Cobalt Carbonate - Cobalt Oxide: Skin toxicity slight. Inhalation moderate.

Colemanite - Skin and Inhalation toxicity moderate.
Caustic to skin, eyes, nose and throat, may cause skin ulceration.

Copper Carbonate (malachite) - Skin toxicity slight. Inhalation moderate.
May cause skin allergies and irritation to skin, eyes, nose and throat.

Cornish Stone - Skin toxicity slight. Inhalation high.
Acute inhalation may cause lung irritation, acute ingestion may cause gastric intestinal circulatory and nervous system problems.

Feldspathoids - Skin toxicity moderate, Inhalation toxicity high.
Skin contact may cause burns. Inhalation and ingestion may cause respiratory and gastrointestinal irritation. Chronic inhalation may cause silicosis.

Flint - Skin no significant hazards, Inhalation toxicity high.
Chronic inhalation may cause silicosis.

Iron Chromate - Skin toxicity moderate, Inhalation toxicity high, carcinogen.
Skin contact may cause skin irritation, allergies, ulcers. Chronic inhalation may cause lung cancer, respiratory allergies and irritation.

Note: from Barazani, Gail Coningsby. "Safe Practices in the Arts & Crafts." College Art Association of America, 1978.

CONTACT	SUBSTANCES AND PROCESSES	EFFECTS OF OVEREXPOSURE
Inhalation, ingestion	Dusts and fumes of clay and glaze components. Fumes occur as firing compounds reach melting point and become volatile	
	METALS:	
	Lead and lead compounds: -acetate, -silicate -bisilicate, -monoxide, -oxide, etc.	Highly toxic. First symptoms: fatigue, sleeplessness, constipation, followed by anemia, possibly abdominal pain or "colic," and nerve damage causing weakness of wrists and ankles. Lead is stored in the body and excreted slowly. No exposure is acceptable
	Leaching of lead in glazes	Lead in low-fired glazes (under cone 05, or 1950°F, 1065.56°C) is soluble in contact with weak acids in foods or beverages. Such glazes for food utensils should be lead-free. In high-fire lead glazes the lead escapes (volatilizes) or bonds chemically and is insoluble

Arsenic and arsenic compounds (may be a contaminant in glazes and clays)	May damage kidneys, irritate skin and nose, affect nerves of hands and feet, causing numbness. Some workers develop anemia or lung cancer. No contact is recommended
Antimony and compounds	Eye inflammation, nasal irritation, perforated nasal septum, anemia, or irritation of digestive track
Barium carbonate (used as rat poison in industry)	Muscle and/or intestinal spasms, pain, irregular heartbeat, or narrowing of blood vessels
Bismuth	No report of toxicity in industry
Boric oxide (flux in glazes), boric anhydride	No report of toxicity in industry
Cadmium oxide, sulphide	Fumes may cause severe reaction in lung sacs. been fatal to welders after several hours of exposure. May also damage kidn

Skin absorption

Chromium	Dusts damage mucous membranes. Solutions irritate skin
Cobalt	Allergic skin reaction and possible asthmatic lung reactions

Inhalation, ingestion, skin absorption

Copper (cupric) compounds	"Fume fever," see Metals; irritation to skin Chronic industrial exposure results in irritation respiratory tract and ulceration of nasal septum
Ferric (iron) oxide	May cause metal fume fever
Iron, see Ferric oxide	
Iron chromate, see Chromium	
Lithium, lithium mica (lepidolite), lithiumaluminum silicate (petatite, converts to beta spodumene at 1750°F, 954.4°C)	Dust irritates mucous membranes; corrosive skin; may also damage kidneys
Magnesium	Metal fume fever, skin irritation or blisters
Manganese - P.V. has	Prolonged exposure may cause languor, sleep, weakness, emotional disturbance, spastic gai (like Parkinsonism), or paralysis
Nickel compounds. Firing or welding may produce nickel carbonyl, a toxic vapor	Irritate mucous membranes and skin. Nickel bonyl is highly toxic. Exposure should be avoided by means of ventilation.
Pearl ash	Caustic to skin when mixed with water
Selenium	Chronic poisoning can result from exposure to dusts or skin absorption. Nausea, nervousness, Fatigue, "garlic breath," and liver clamage may be symptoms
Strontium	No evidence of illness in industry, although raclioactive forms are dangerous
Tin, stannic oxide, stannic chromate. See also Chromium	Dusts and fumes in lungs may show in X-rays but apparently do no damage
Uranium, sodium uranate	Prolonged exposure may damage kidneys and liver Absorption by skin causes dermatitis and other systemic effects

Vanadium pentoxide	Dusts irritate respiratory system, may cause nosebleeds, nasal congestion, allergic skin reactions, and intestinal troubles. Industrial workers show abnormal electrocardiograms
Zinc, zinc acetate	Fumes may cause "zinc shakes" or fume fever. No permanent effects. Zinc acetate irritates skin and mucous membranes
Zirconium	Allergic reactions are reported only in deodorant compounds

Inhalation

CLAY DUSTS:

Silica may comprise as much as 40% of a clay body and is encountered in mixing, handling, grinding, or sanding of bisque or greenware, on clothing, and in cleaning operations	Silica particles destroy lung cells and cause continuous damage. Symptoms are similar to asthma form of silicosis is called "potter's asthma" The only cure is avoidance of inhalation of dusts
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COLLEGE OF VISUAL & PERFORMING ARTS

Please read the online CVPA Health & Safety Manual and return the consent form below to a faculty member in your program area. A signed consent form must be on file before you may use studio equipment.

COLLEGE OF VISUAL AND PERFORMING ARTS SAFETY MANUAL CONSENT FORM

I _____(please print your full name)

have reviewed the Safety Manual of the College of Visual and Performing Arts of the University of Massachusetts Dartmouth. All my questions have been answered, and I acknowledge my responsibility to conform to these rules and all others alluded to in this manual. I understand and accept all penalties for failure to conform to these rules.

_____(student signature)

_____(date)