

UNIVERSITY OF MISSOURI DEPARTMENT OF ART SAFETY GUIDELINES

OVERVIEW

The MU Department of Art has a commitment to protecting the health and safety of each of its students through supervision and training.

It has been shown in the recent Strategic National Arts Alumni Project that roughly 70% of people who graduate with degrees in the arts go on to work independently and/or form multiple and serial small businesses of their own. Because they often work alone, arts professionals can be uninformed about the hazards associated with their work.

Artists are also economically vulnerable to long-term loss of work. Because they may lack the shelter of a larger organization, they often risk losing hard-won resources like housing and workspace if they are unable to work for any length of time because of illness or accident.

It follows that colleges and universities with art programs must not only protect their students' immediate safety, but also prepare their graduates for a career with their long-term health in mind. Because each student will chart a different course throughout their work life, the institution should teach their students in the safe use of materials and equipment as life habits.

The purpose of this policy is to set forth general safety guidelines for the Department of Art and safety procedures for individual studio practice and create the safest possible working and educational environment for faculty, staff, and students. The safety rules and procedures of the Department of Art will follow the provisions of the Environmental Health and Safety Program at the University and other applicable local, state, and federal regulations.

I. RESPONSIBILITIES

Safety is a shared responsibility among the faculty, staff, graduate teaching assistants, student employees, and students.

A. Faculty, Staff, and Teaching Assistants

Each faculty member, staff member, and teaching assistant is subject to all campus health and safety regulations, and is responsible for the dissemination of information to student employees and students under their active academic jurisdiction. Their responsibilities include, but are not limited to, the following:

- Explain to students the University and Department of Art safety regulations and procedures pertinent to their specific tasks or activities.
- Assure the safe and appropriate labeling as well as the proper use and storage of materials in lab and studio areas.
- Require students to use personal protective devices and clothing as needed for the proposed instruction or activity. Such devices and equipment must be maintained in good repair.
- Inspect instructional areas frequently for identification and prompt elimination of unsafe practices and conditions. Advice and assistance is available from Environmental Health and Safety on campus and from the Safety Supervisor.
- Seek prompt medical treatment for any student injured by calling 911.
- Notify the Safety Coordinator and Department Chair of all accidents involving students, faculty, or staff, even for those who do not require medical attention. This information can be used to formulate future safety policies.
- Submit recommendations for the improvement of the immediate academic environment to the Safety Committee or Department Chair.

B. Students and Student Employees

University students are subject to all campus health and safety regulations. They are responsible for understanding and complying with all University and Department of Art Safety Instructions, both written and oral.

- Use only tools and equipment approved or provided by the supervisor or instructor.
- Use all appropriate safety equipment and guards, and follow all safety procedures that pertain to your planned operation.
- Report any unsafe conditions, practices, or equipment to the instructor or supervisor.
- Inform the instructor or supervisor immediately of all injuries or accidents, and assist injured persons in obtaining prompt medical treatment when necessary.
- Request information about any equipment, material, or procedure you expect to be exposed to that has not been explained to you. Ask for clarification about any aspect you do not understand.
- Keep the Department of Art studios clean and organized by cleaning your work area every time you finish using any studio space or lab.

- Ask permission from the instructor before beginning your work if you come to a studio outside of your regularly scheduled class time and there is another class in session.
- Follow of all posted signs and instructions—they are for your safety.
- Report broken equipment and tools to your instructor or the shop supervisor.
- Make your work area safe by removing clutter, scrap, and unused tools. Keep the floor clear of cords and debris.
- Never prop any locked door open.
- Handle other students' work even more carefully than you would your own.
- Report any suspected thefts to your instructor.
- Avoid the use of alcohol, illicit chemical substances, and tobacco in all Department of Art studios since consuming alcoholic beverages and using drugs and tobacco products are prohibited.

C. General safety conditions and procedures

1) Building and lab hours and supervision

- a) During the regular school year, the Fine Arts Building is open for your use Monday through Friday from 7 a.m. until approximately 11 p.m. However, students are often able to work later than 11 p.m if they are in the studio prior to the doors being locked. Hours will vary during holiday and recess periods.
- b) Guests are allowed in studios only with permission. Guests are not permitted to use any University equipment or facilities without specific permission from staff or faculty member.
- c) Undergraduate students may not use University equipment without supervision.

D. Accident and emergency preparedness

1) Fire procedure

- a) Activate the fire alarm (if your building is not equipped with an alarm, notify building occupants in a loud, clear voice.)
- b) Alarm stations are usually located at or near building exits.
- c) Exit the building using the nearest marked exit and call 9-1-1.
On your way to the exit, identify people who are disabled or unable to leave the building under their own power.
- d) Assemble outside as a group to ensure everyone has left the building safely.
- e) Do not return to the building until the all clear is given.

2) Tornado procedure

- a) During bad weather, check your phone or tune your radio to get the updated information. Take shelter immediately inside the building.
- b) Move to the lowest interior corridor or stairwell.
- c) Stay far away from exterior glass doors and windows.
- d) Cover your head and face. Kneel facing walls.

3) Active threat procedure

- a) Stop what you are doing and call 911.
- b) If it is safe to do so, try to escape from the building. Notify others of the danger as you exit.
- c) If escape is not feasible, close and lock the door. Barricade the doorway.
- d) Turn out lights, get out of view and hide until police arrive or you can escape.
- e) Call MU Police at 882-7201 if you are concerned about suspicious individuals or activity in the building or on campus.

4) Administering first aid

- a) Assess the injury and situation, and call 911 if necessary. If you have called 911, post students at the entrances to assist arriving paramedic personnel.
- b) Check to see that there is no other safety threat (i.e., turn off running equipment).
- c) Do not move seriously injured people unless there is an immediate risk of further harm.
- d) Apply first aid, if able. Wear rubber gloves and avoid getting bodily fluids on your person.
- e) If a student needs to go to student health services, they must have an escort from the department.

5) Emergency equipment

- a) Know the location of the closest first aid kit. If you do not see one, ask your instructor. First aid kits are located in every building where Art is taught, and in all studios in the Fine Arts Building.
- b) Know the location of the closest eyewash stations. They are located in the Photography and Printmaking labs.
- c) Know the location of the closest fire extinguisher. If you do not see one, ask your instructor. Fire extinguishers are located in every classroom in the Fine Arts building.

6) Communication with the Department Administration and staff

- a) Call 911 on a school phone to reach campus police at any time—day or night.
- b) Report all emergencies or major injuries to the Art office and to the department chair, and complete an incident report form.

7) Personal safety

a) Lifting

Back injuries can occur from lifting heavy objects. Lift in pairs if the object weighs more than 50 pounds. Proper lifting includes flexing your knees, keeping your back straight, holding the load close to your body, and lifting with your legs. Never lift and twist your waist at the same time.

b) Motion-related injuries

To prevent motion-related injuries, select appropriate tools and use neutral postures (for example, a straight wrist) while performing tasks. Take frequent rest breaks to stretch muscles, and alternate tasks to use and rest different muscles. Use as light a grip as possible when holding tools. If you cannot relieve joint pain by taking time off or reducing stress on the joint, seek medical assistance. Repetitive motion disorders can be disabling if not treated early.

- **Repetitive motion injuries**

Repetitive motion, particularly of the hands, wrists, and arms, can lead to painful inflammation of muscles, tendons, and nerves over time and cause the eventual deterioration of those tissues. The symptoms associated with repetitive-motion disorders can include pain, warmth, swelling, and difficulty moving the joint involved. Continuous, often extreme bending of wrist, elbow, and shoulder joints leads to these disorders.

- **Carpal tunnel syndrome**

Grip positions that use high-force finger pinching along with a bent wrist have been associated with the disorder called carpal tunnel syndrome. Hand polishing and sanding, and drawing and painting in awkward postures, are examples of high-risk repetitive tasks.

- **Vibration injuries**

Using power tools for long periods of time may result in vibration injuries. Vibration injuries can affect the nerves, vascular system and muscles to varying degrees; if allowed to progress, they can cause irreversible loss of function in fingers and hands. Early signs are tingling, numbness and whitening of fingers and hands, and impaired sensibility and dexterity.

7) Existing health conditions

Be sure to let your instructor know about any health conditions that may affect your safety or ability to perform the tasks that will be expected in studio.

a) Pregnancy

If you are pregnant, nursing, or planning a pregnancy you should avoid the following materials:

- Dye materials
- Solvents
- Epoxies
- Some adhesives
- Photography chemicals
- Gases from welding, cutting and brazing

Please inform a faculty member and they will work with you to substitute technical procedures.

b) Asthma

If you have asthma, be sure to let your instructors know. Always carry your inhaler or other supplies you may need. Tell your instructor where you keep these items so they can help in case of an episode.

Avoid photo fixing chemicals

Please inform a faculty member and they will work with you to substitute technical procedures.

c) Allergies

If you have serious allergies, be sure to let your instructor know. Always carry any supplies you may need to suppress a reaction. Tell your instructor where you keep these items so they can help in case of an episode.

8) Prescription drugs

If you are using any prescription drug that can influence your ability to operate machinery, you must notify your instructor. Do not risk injury by attempting to work while impaired.

9) Alcohol and recreational drugs

As is the case in all campus facilities, alcohol and smoking are prohibited in all Department of Art studios. Never use hazardous materials, tools, or equipment while under the influence of alcohol or drugs.

10) Proper attire

a) Shoes:

In most labs it is advisable to wear closed-toe shoes, and in the wood and metal shops it is mandatory. Avoid flip-flops on days when you have a studio class.

b) Jewelry

Keep jewelry to a minimum, or remove it and keep it in your locker when using machinery or working with tools.

c) Hair

Tie back long hair to avoid getting it caught in spinning machinery.

d) Contact lenses

In dusty environments, contact lenses can trap dust against your eye and cause irritation. When working near acids and solvents they can trap gases or in some cases even partially melt and adhere to your eyes. Wearing glasses instead can offer you additional protection in any environment where your eyes may be at risk.

e) Clothing

Avoid loose clothing when working near machinery. In labs where you may be exposed to intense heat or open flame, wear natural fiber clothing. Artificial fibers

are very combustible and can melt when exposed to heat or flame, adhering to skin and causing severe burns. When welding or cutting using arc equipment, wear long sleeves and pants and be sure not to leave any skin exposed; arc processes produce intense ultraviolet radiation and will burn exposed skin.

11) Personal protective equipment

a) Safety glasses and face shields

Use safety glasses when handling any dyes, solvents or chemicals, using spray booths to spray paint or to clean screens, spraying paint outdoors, or working with epoxies, resins or other finishes. When using machinery, safety glasses are a minimum level of protection; a face shield may also be required. When welding or cutting using oxy-gas or arc equipment, or looking into a kiln or furnace, wear the proper goggles or mask with the appropriate shade lens; if you are unsure of the shade required for your activity, ask your instructor.

b) Dust masks and respirators

Use dust masks to keep from breathing nuisance dust, such as wood or clay dust or dust from general cleaning. Protecting yourself from breathing toxic particles, gases and vapors requires a respirator. A wide variety of cartridges attach to respirator masks to protect a user from different kinds of hazards; this means the correct type of cartridge must be installed in the respirator to protect you from a specific hazard. Be sure you have chosen the proper cartridge for your brand of respirator, and that it is rated to protect you from the hazard you will be exposed to. Test your respirator before each use to be sure it is functioning properly.

c) Gloves, barrier creams

Consider using barrier creams or latex gloves to prevent casual contact with toxins and solvents, particularly if you have sensitive skin.

d) Lab coats and aprons

Consider wearing a full-length smock or coveralls in the studio and do not wear them outside the studio. Wash them frequently and separately from other clothing. If toxic materials are being used, wear a full-length disposable smock or coveralls that are removed and properly disposed of in the studio. This not only provides an additional barrier between you and potentially harmful chemicals, it also protects your clothing.

II. HAZARDOUS MATERIALS

Almost every media area in the department of art uses materials that can pose a health hazard if handled improperly. It is important to learn the risks inherent in the use of these materials to yourself and others and how to minimize those risks, for your future health and for the safety of those around you.

Always read labels carefully before handling any material. Do not treat any material as safe to come in contact with until you have researched it. Many substances can do damage without the

user feeling any ill effects; often this damage is permanent and results in debilitating illness later in life. The only way to use a material safely is to research it.

It is each student's responsibility to communicate any health or safety concerns about chemicals, materials and equipment to the teacher before using them.

Although most labs allow eating and drinking, an important step toward limiting exposure to possible toxins is to avoid eating and drinking in the Department of Art studios, and to wash thoroughly after working, especially before touching food or smoking.

A. Material Data Safety Sheets

Material Data Safety Sheets (MSDS) are an important source of information about the contents of the materials you are working with, and their hazards. If your instructor does not show you the location of the binder containing MSDS sheets for your studio, be sure to ask. If a material you plan to work with does not have a sheet in the binder, Google it and print the MSDS, and add it to the binder. Read all the information carefully and follow all recommendations for protecting yourself while using, handling and storing your material. Ask your instructor about terms or concepts you don't understand so that you are fully informed about materials you are in contact with.

A University guide to reading and understanding an MSDS can be found here:
<http://ehs.missouri.edu/chem/pdf/msds-guide.pdf>

B. Safe handling

Never smell or taste chemicals, and always assume an unknown chemical is hazardous. Always place chemicals back from the edge of shelves or tables. Use the smallest amount of the chemical needed to get the job done. Do not mix chemicals unless you have been instructed to do so.

Only authorized individuals may have access to concentrated chemicals. Chemicals must be stored in their designated storage areas and in approved storage cabinets. Chemical waste must be handled in accordance with University EHS policies.

1) Solvents

Solvents can be used in pure form for cleaning, or added to paints, finishes, and resins to improve flow and mixing qualities. Most solvents evaporate quickly, but can find their way into the body through inhalation and absorption through the skin. Most are at least moderately toxic. Be sure to wear eye protection and the proper gloves when handling solvents. Keep in mind that some solvents will melt some kinds of plastic gloves and containers; be sure your protection and containers are resistant to your solvent.

If you will be applying a pint or more of a product that contains a flammable solvent, remove all sources of ignition from the area. All flammable materials must be stored in a flammable-storage cabinet -- never in your locker or cubby. Place all solvent-soaked rags and paper in the designated waste cans. Do not put them in the regular trash can and do not put regular trash in the paint rag can.

The solvent provided by the University of Missouri is called “Crystal Clean.” It is in a “parts cleaner” sink at the back of the classroom. When using this solvent, please follow the instructions:

- Take only as much as you need. Put it into one of the white plastic buckets that are provided. Make sure you use a warning sticker and follow the labeling procedure for “Crystal Clean.”
- When you have finished work for the time being and are leaving the room, swish your brushes in the solvent in the bucket to remove the majority of the oil paint and dump the solvent back into the parts cleaner.
- The remaining paint can be washed off the brushes using soap and water in the regular sink.

a) Inks and paints

- **Paints**

Paints are usually a mixture of a solvent, a vehicle, and a pigment. The different components each contribute their own properties to the quality of a type of paint. For guidelines about solvents, see above. The component in paint that requires the most caution is usually the pigment:

Be aware of the difference between paint labeled as a “hue” and paint that is not. Paint labeled as a “hue” does not use that actual pigment but typically a less expensive substitute. Cobalt paint uses actual ground up cobalt. “Cobalt hue” uses a substitute. This is primarily done to keep the cost of paint down, but it also has safety implications. Any paint that is listed as “cadmium” will contain actual cadmium. Avoid using the latter; be sure to substitute the “hue” color. For example, use “cadmium yellow hue” instead of “cadmium yellow.” This will be both a safer and more economical choice.

“Flake White” is another name for “lead white” and should be avoided. Use “zinc white” or “titanium white” instead.

- **Inks**

Inks are also usually a mixture of a solvent, a vehicle and a pigment. The different components each contribute their own properties to the quality of a type of ink.

b) Spraying

Choose brushing techniques rather than spray applications if possible.

- **Inhalation risks**

Spray guns, airbrushes, and aerosol spray cans release very fine mist particles that can remain in the air for several hours and are readily inhaled. All of the materials identified above (solvents, pigments, resins, and paint vehicles) may be present. Spraying dramatically increases your risk of exposure to these toxic materials. Go to a designated spray hood or area to do any aerosol spraying.

- **Flammability**

Many of the solvents in spray materials are also flammable and spraying them into the air creates a flammable atmosphere. Be sure to remove all sources of ignition from the area before spraying.

- **Pressure injection**

High-pressure spray guns can inject paint or wash chemicals directly under exposed skin. Never put any part of your body in the spray path. Seek medical help immediately if subjected to a high-pressure spray injury and clearly notify the medical staff of the nature of your injury.

d) Airborne dusts and pigments

- **Powdered pigments and chemicals**

May be toxic by ingestion or inhalation (if mixing dry powders, sanding paints, or using pastels). Many inorganic pigments contain highly toxic metals and some organic pigments may cause long-term effects such as cancer. Wherever possible, substitute less toxic materials for pigments containing lead, cadmium, or mercury, particularly if you are using powdered pigments. Spills of these materials in liquid medium will quickly dry and become airborne, so must be cleaned up immediately.

- **Glazes**

Glazes are mixtures of silica, alumina, metal fluxes (such as barium, lithium, calcium, or sodium), and colorants. Some colorants contain highly toxic metals such as chromium and manganese. Know which of the glazes you are using could be toxic and protect yourself from exposure. Use safer substitutes whenever possible.

- **Silica dust**

Clay contains crystalline silica. In addition, cutting and carving stone can release silica dust, and silica sands and powders are used in making investment and sand molds in foundry work. Exposure to crystalline silica can lead to the debilitating lung disease silicosis. Water is often used to prevent silica dusts from becoming airborne.

- **Sanding dust**

Fine sawdust suspended in the air in any enclosed environment can explode if it comes in contact with an ignition source. Keep vents on, dust collection activated, and doors open during operations producing a lot of sawdust.

e) Acids

Acids are corrosive to metals as well as organic tissues of your body.

- Nitric acid solution is used full strength or diluted to 70% and is used for etching lithography stones or spit biting copper plates. Nitric acid gives off toxic fumes and will destroy skin and tissues on contact.

- Iron perchloride solution is a mix of ferric chloride, citric acid, and water, and is used for biting copper plates. Iron perchloride acid produces no toxic fumes, but does attack skin, eye tissues, and clothes. It leaves a yellowish-brown stain on surfaces, so you'll know when you see it. Beware!
- Keep all acid trays covered when not in use, because acid will evaporate into the air.
- Put only copper into printmaking acid baths; other metals will ruin the bath.
- Always wear protective gear when using acids: goggles, apron, and a good pair of rubber gloves.
- Put on goggles first, and take them off last to avoid getting acid on them.
- Use a tray to transport the printmaking plate to the sink for rinsing to avoid dripping acid.
- Wash gloves, hands, and any equipment with soap and water after using acid.

f) Photographic Chemistry

A variety of chemicals are used within the photographic process. Said chemicals are the most prominent safety concern within the medium. Individual chemicals have their own level of hazard. For specifics concerning each specific chemical compound, consult the MSDS sheets located within the photography lab. Minimizing exposure, especially to chemical concentrates and powders, is the best way to protect oneself from potential harm.

- **Mixing Photochemicals**

Photographic chemicals are most hazardous when found in their concentrated form. Photochemical concentrates are available in liquid or powder form. It is strongly recommended that powder concentrates be avoided when possible. In addition to the contact risks associated with liquid concentrates, powder chemicals are highly toxic by inhalation. Please adhere to the following instructions who using photographic chemicals:

Gloves, goggles, and a protective apron should be worn when mixing concentrated liquid photographic chemistry.

When mixing powdered developers, use a glove box, local exhaust ventilation, and/or wear a NIOSH-approved toxic dust respirator.

Pregnant women, in particular, should not be exposed to powdered developer. Always add any acid (stop bath concentrate) to water-- never the reverse.

In case of skin contact, rinse with lots of water. In case of eye contact, rinse for at least 15-20 minutes, preferably using an eyewash station; then seek medical attention.

- **Storage**

Store concentrated acids and other corrosive chemicals on low shelves so as to reduce the chance of face or eye damage in case of breakage and splashing. Photographic chemistry should not be stored directly on the floor or in glass containers. Be sure to label all solutions carefully for proper identification, use, and disposal.

- **Developers**

Developer solutions and powders are often highly alkaline. Glacial acetic acid, used in making the stop bath, is also corrosive by skin contact, inhalation, and ingestion.

Developer powders are highly toxic by inhalation and moderately toxic by skin contact, due to the alkali and developers themselves. Please take the cautions when using developers:

Use liquid chemistry whenever possible, rather than mixing developing powders. Pregnant women, in particular, should not be exposed to powdered developer.

When mixing powdered developers, use a glove box (a cardboard box with glass or plexiglass top, and two holes in the sides for hands and arms), local exhaust ventilation, or wear a NIOSH-approved toxic dust respirator.

Wear gloves, goggles and protective apron when mixing concentrated photochemicals. Always add any acid to water, never the reverse.

In case of skin contact, rinse with lots of water. In case of eye contact, rinse for at least 15-20 minutes, preferably using an eyewash station, seek medical attention.

Store concentrated acids and other corrosive chemicals on low shelves so as to reduce the chance of face or eye damage in case of breakage and splashing.

Do not store photographic solutions in glass containers.

- **Stop Baths and Fixer**

Stop baths are usually weak solutions of acetic acid. Acetic acid is commonly available as pure glacial acetic acid or 28% acetic acid. Some stop baths contain potassium chrome alum as a hardener.

Fixing baths contain sodium thiosulfate ("hypo") as the fixing agent, and sodium sulfite and sodium bisulfite as a preservative. Fixing baths also may also contain alum (potassium aluminum sulfate) as a hardener and boric acid as a buffer.

Acetic acid, in concentrated solutions, is highly toxic by inhalation, skin contact, and ingestion. It can cause dermatitis and ulcers, and can strongly irritate the mucous membranes. The final stop bath is only slightly hazardous by skin contact. Continual inhalation of acetic acid vapors, even from the stop bath, may cause chronic bronchitis.

Potassium chrome alum or chrome alum (potassium chromium sulfate) is moderately toxic by skin contact and inhalation, causing dermatitis and allergies.

In powder form, sodium thiosulfate is not significantly toxic by skin contact. By ingestion it has a purging effect on the bowels. Upon heating or long standing in solution, it can decompose to form highly toxic sulfur dioxide, which can cause chronic lung problems. People with asthma are particularly sensitive to sulfur dioxide.

Sodium bisulfite decomposes to form sulfur dioxide if the fixing bath contains boric acid, or if acetic acid is transferred to the fixing bath on the surface of the print.

Alum (potassium aluminum sulfate) is only slightly toxic. It may cause skin allergies or irritation.

Boric acid is moderately toxic by ingestion or inhalation and slightly toxic by skin contact (unless the skin is abraded or burned, in which case it can be highly toxic).

• **Toners**

Toning a print usually involves replacement of silver by another metal, such as gold, selenium, uranium, platinum, or iron. In some cases, the toning involves replacement of silver metal by brown silver sulfide, for example, in the various types of sulfide toners. A variety of other chemicals are also used in toning solutions:

Sulfides release highly toxic hydrogen sulfide gas during toning, or when treated with acid.

Selenium is a skin and eye irritant and can cause kidney damage.

Treatment of selenium salts with acid may release highly toxic hydrogen selenide gas. Selenium toners also give off large amounts of sulfur dioxide gas.

Gold and platinum salts are strong sensitizers and can produce allergic skin reactions and asthma.

Thiourea is a probable human carcinogen.

Carry out normal precautions for handling toxic chemicals as described in previous sections. In particular, wear gloves and goggles. Toning solutions must be used with local exhaust ventilation. Take precautions to make sure that sulfide or selenium toners are not contaminated with acids. For example, with two bath sulfide toners, make sure you rinse the print well after bleaching in acid solution before dipping it in the sulfide developer. Avoid thiourea whenever possible because it is a probable carcinogen.

g) Epoxies and adhesives

Some of the glues and adhesives used in woodworking (epoxy, cyanoacrylate, formaldehyde resin, and contact adhesives) are moderately toxic and may cause skin and respiratory irritation.

A wide variety of resins (acrylic, phenolic, epoxy, polyester silicone, and polyurethane) may be used to mold, cast, and form plastic sculpture. As resins cure, some of the chemical components volatilize. They may reach high concentrations if used in large volume or if the work area is poorly ventilated. These materials are often irritants and may be toxic by skin contact or inhalation. Some are skin and respiratory sensitizers. Two-component urethane resin systems release extremely toxic isocyanates for which there are no approved air-purifying respirators. They may only be used with a supplied air hood.

h) Plaster and cement products

Plaster dust (calcium sulfate) and Portland cement (the binder in mortars, stuccos and concrete) absorb water rapidly from any moist surface, such as skin or eyes, and can be very irritating to the skin, eyes, and respiratory system. Sometimes lime (calcium oxide), acetic acid, potassium sulfate, or other compounds are added to both materials to either slow or hasten curing. These materials are also irritants. Avoid skin contact with any of these substances.

i) Wood

- **Preserved wood**

Many of the preservatives used to treat wood are toxic (for example, pentachlorophenol, chromated copper arsenate, zinc, and copper naphthenate). Exposures can occur from sawing wood or from handling the wood with bare hands. Pressure treated wood is not allowed in the wood shop without special permission.

- **Dust from exotic woods**

The dusts from many hardwoods are sensitizers, and both hardwoods and softwoods can cause allergic reactions of the eyes, skin, and respiratory system. Wood dust can also be toxic (for example, ebony, rosewood, blackwood, sequoia, and redwood). It is believed that some hardwoods cause a particular type of nasal carcinoma after an extended exposure and a long latency period. Softwoods are generally considered safer to work with. If possible, use less-toxic softwoods instead of rare tropical hardwoods and more highly toxic hardwoods, particularly if you have a history of allergies. All floor-mounted woodworking equipment in the wood shop has local exhaust ventilation at the point of operation. Turn this ventilation system on and be sure to open the inlet for your machine.

2) Storage

Labeling

Labels on incoming containers from manufacturers should not be removed or defaced. Labels for secondary containers not intended for immediate use must identify the chemical's name. In accordance with EHS policy, all containers for use in the classroom, such as jars for grounds and solvents, must be labeled with the name of the chemical contents to avoid containers of unknown substances.

No chemical storage in lockers

No toxic or flammable chemicals may be stored in personal lockers.

Flammable storage

All containers of flammable chemicals must be stored in flammables cabinets.

3) Disposal

Latex

Brushes with latex paint on them can be washed in the sink.

Watercolor and acrylic

All water contaminated by acrylic paint and watercolor should be dumped into the provided plastic drum.

Solvents

All solvents should be disposed of in the proper solvent disposal container in compliance with EHS regulations.

Plaster

Never pour liquid plaster down a sink. Allow it to harden, break it up and dispose of it in the trash.

Darkroom chemicals

The chemical fixer cannot be poured down the drain. This chemical is environmentally hazardous and collects silver particles from your film. Once fixer is exhausted it must go into the fixer recycle jug. Use the funnel and pour the bad fixer in to the barrel with a graduated cylinder. When you are done rinse out the funnel and make sure to replace the recycle jug cap onto the barrel.

Fixer can be reused several times for film processing before becoming exhausted. Use the hypo-check bottle to test the strength of the fixer. If a white precipitate forms from the drop then the fixer is not usable anymore.

Fixer Remover can be used repeatedly for film processing until it is exhausted. Fresh fixer remover should be blue or light blue/clear, and is not usable anymore when it turns green. It can be poured down the drain after its final use.

Developer for film processing and printing is not reusable. This chemical is safe to pour down the drain after using it.

Sharps

All used blades and other sharp objects must be disposed of in a provided disposal container. Do not throw sharps directly into trash cans.

III. Processes

Etching

A variety of acids and caustics are used to etch and clean various media in intaglio and lithography. These materials are very corrosive to the skin, eyes and respiratory system, especially when concentrated. Be sure to use the exhaust fan when working with the chemicals.

Developing film and prints

Be sure the exhaust system is on when working with chemicals. To prevent the release of toxic gases, never mix stop bath solutions directly with fixer, toner, or any bleaching solutions.

Welding, cutting and brazing

The physical hazards associated with welding include electric shock (arc welding), burns, fires, and exposure to infrared and ultraviolet radiation. Lead and zinc are sometimes found in brazing rods, and fluoride and lead are common hazards associated with soldering.

Heat

The heat from welding, cutting and brazing processes remains in the workpiece for a long time after the work is complete. Always wear heavy gloves to avoid burns. Take care to protect your clothing and nearby objects from catching fire through contact with flame or heated metal.

Particulates and gases

Welding and cutting processes generate toxic air contaminants, including metal fumes. If high energies are involved, such as in arc welding, oxides of nitrogen, ozone, and highly irritating acidic gases can also be created. If the metals being welded are coated with metals such as lead paint, zinc, chrome, cadmium, or other toxic materials, these metals will become vaporized and could be highly toxic if inhaled. Cobalt, chromium, cadmium, nickel, and beryllium are carcinogenic and cause brain damage. The ultraviolet radiation emitted from arc welding can transform chlorinated hydrocarbons into extremely toxic phosgene gas. Oxyacetylene torches produce carbon monoxide. Always turn on the exhaust system and position an exhaust intake near your work.

Arc and torch light

The intense light produced by arc and oxy-acetylene processes will damage your eyes and burn your skin. Be sure you are wearing eye and face protection at the proper shade for the process you are using, and

wear a protective coat or long sleeved, flame retardant shirt when welding or cutting.

Weight

Objects built from metal can be very heavy and care should be taken in lifting or moving them. Remember when cutting metal that the portion being cut away will drop if unsupported, and can land on your toes.

Edges

Sheet metal and ground or cut sections of metal projects and scrap can hold very sharp edges. Wear gloves when handling your materials and workpiece.

Washing

Wash your hands thoroughly when you finish working or leave the studio. Never wash your hands in a solvent. If your hands have cuts or are chapped, wear gloves. Chemicals can pass through breaks in your skin and enter directly into your bloodstream. Use skin moisturizer to prevent dry, cracked and broken skin. Good personal hygiene is one of the most important ways you can reduce exposure to toxins.

IV. Equipment safety

Common facility and tools

Utility, X-Acto and mat knives

Cuts from X-Acto and utility knives are the most common injury in the Department of Art.

- Keep your hands out of the cut line, and back from the edge of any guides you may be using.
- Do not cut toward your other hand, or hold something you are cutting in your hand. Place the work piece on a table protected with a cutting mat and cut downward into the table. Hold your work piece behind the cut you are making or clamp it.
- Always store and transport knives with blades retracted, or protective caps in place. If a cap is not available, place it in a container that will not leave the blade exposed.
- Dull, chipped, or broken blades require more force to perform the cutting operation. Change them regularly, or if you notice that it takes more effort to cut.
- Dispose of old blades by placing them in a designated sharps container. Never throw them into the trash.
- If you get badly cut, tell your instructor and sit down as soon as possible. People can feel faint after receiving a serious cut and you could sustain additional injuries if you fall.

Ladders

- You should not stand higher than the second rung below the top of the ladder.
- Do not reach or lean more than a comfortable arm's length from where you stand.
- Never leave tools or fasteners on the top or rung of a ladder. These items will fall when the ladder is moved and could cause injury.

Lighting and electrical cords

- Do not use electrical cords if they are worn, or if the inner wires are exposed. Show worn out cords to your instructor.
- Arrange cords to avoid creating a trip hazard.
- Unplug cords by grasping the plug and pulling; do not pull them out by the cord.

Hot glue guns

- Do not allow hot parts of the gun to come in contact with skin, clothing, or flammable objects.
- Make sure to use proper ventilation.
- Do not come in contact with the heated glue. It will stick to skin and can produce serious burns.

Heat guns

- Do not allow hot parts of the gun to come in contact with skin, clothing, or flammable objects.
- Make sure to use proper ventilation.
- Do not heat easily flammable objects or materials.

Sewing machines

- Carefully follow all instructions provided by instructor.
- Make sure to keep loose clothing, hair, and body parts away from needles and machine parts.
- Take frequent breaks and be sure to stretch to avoid injuries.

Computers

- Take frequent breaks and be sure to stretch to avoid injuries.
- Arrange your workstation to avoid injuries from improper posture or keyboard position.

Painting and Drawing facility and tools

Easels and tables

When using an easel or table, be sure to securely tighten all moving parts to prevent them from moving or dropping suddenly, or falling on you or your neighbor. The drawing furniture is heavy and could easily hurt someone if it were to fall over. Do not trust that the last person that used it set it up properly; always check that it is securely set up before using.

Airbrush

Airbrush equipment is available for student use in room A-131. If you use the airbrush, do not spray solvents or oil paint as the fumes may be toxic. The airbrush is for water-based paints only.

Sculpture facility and tools

Metal welding, brazing and cutting equipment

Welding, cutting and brazing processes use intense heat to soften or liquefy metal and then cut, manipulate or join it. These processes are inherently dangerous and should only be performed after complete training and while wearing all required protective clothing and equipment.

- Users must wear proper eye protection, a welding jacket or leather apron and leather sleeves, and welding gloves. Clothing and footwear must be cotton, wool or leather- no synthetic materials due to their flammability. Long pants are required.
- Keep a fire extinguisher close by and know how to use it.
- Follow all operational and safety instructions for your equipment. Carefully review the manufacturer's operational and safety procedures for all electrical equipment, compressed gas cylinders, regulators, and torches. After reviewing this information, obtain additional instruction and assistance in using the equipment from your instructor.
- Report any damaged welding equipment to your instructor immediately.
- Use local exhaust ventilation to collect air contaminants generated while welding and cutting.

MIG welder

MIG welding requires a welding mask with a minimum #9 shade.

Arc welder

Arc welding requires a welding mask with a minimum #9 shade.

Plasma cutter

Plasma cutting requires a welding mask with a minimum #5 shade.

Oxy-Acetylene torch

Oxy-acetylene welding and cutting require goggles with a minimum #4 shade.

Cutting and grinding equipment

Chop Saw

- Wear a full face shield and safety glasses.
- Remove loose clothing and jewelry, and tie back long hair.
- All guards must be in place and operating.
- Hands and fingers must be kept clear of the path in which the blade travels.

Horizontal band saw

- Wear safety glasses when operating the metal cutting bandsaw.
- Never wear loose clothing, or jewelry when operating the metal cutting bandsaw.
- Keep the blade cover in place at all times.
- Disconnect the electrical power when servicing the saw or replacing blades.
- Never adjust the metal cutting bandsaw while it is in operation.
- Use a support when cutting heavy or long stock.
- Clamp metal securely before sawing.
- Keep the floor free of coolant-water and metal.
- Never leave the saw unattended while in operation.

Other equipment

Sand blasting cabinet

- Check all parts of the blast gun and replace worn parts before operating the blast cabinet.
- Wear a respirator to avoid inhaling aluminum oxide dust or particles of the materials being removed from your workpiece.
- Do not blast toxic surfaces to avoid creating toxic dust.
- Do not blast with the cabinet door unlatched or open.
- Use the exhaust system to help clear remaining dust when opening the cabinet.

Portable sand blaster

- Check all parts of the blast gun and replace worn parts before operating the portable blaster.
- Wear a full sandblasting suit while operating this equipment.
- Operate the portable sandblaster only in an area designated for sandblasting.

Foundry area and furnaces

Never leave the furnace and burnout kiln running unattended. Furnaces generate high heat that can lead to heat stress, skin burns, and possible cataracts. Molten metal can cause severe burns. Breaking up molds can release high levels of silica dust.

- Work in pairs to pour metals into molds or use mechanical lifting aids.
- Never pour directly over cement. Never let molten metal come in contact with water, grease, oil, or other organic materials.

Melting kiln and centrifugal casting equipment

Pneumatic tools

Pneumatic tools are powered by compressed air and include chippers, drills, hammers, sanders, spray guns, air ratchets, grinders, nibblers, needle scalers and many more.

- Wear safety glasses and gloves when using any pneumatic tool.
- Use the tool at the recommended air pressure only.
- Arrange the air line to avoid tripping or obstructing yourself or others, or damaging the line.

Drill press

A drill press is a powerful drill mounted above a table for precisely and squarely drilling holes in many materials. The usefulness and power of this tool is completely dependent on the use of the correct drill bit. The bit must be the right type for the material, and must be sharp.

- Never leave the drill press running unattended.
- Remove gloves, jewelry and loose clothing. Tie back long hair.

Wax pots

Overheating wax can result in release of decomposition products that are highly irritating if inhaled. Heating wax containing water may lead to an explosion. Solvents used to dissolve wax may be moderately to extremely toxic.

- Do not overheat wax. Use a temperature-controlled crock pot or a double boiler.
- Dissolve wax in the least hazardous solvent.
- Do not use chlorinated synthetic waxes. They are extremely toxic.

Wood Shop Facility and Tools

General wood shop safety

In general, it is advisable to think through an operation before performing it. Do a dry run with the machine turned off. Plan ahead. Familiarize yourself completely with the tool before operation. Ask an instructor about things you feel unsure about.

- Use only the tool necessary for an operation. Hand tools are often a better answer than a large power tool.
- Make your work area safe by removing clutter, scrap and unused tools. Clear the floor of cords and debris.
- Do not operate any piece of equipment without all safety guards in place. Safety guards may only be removed or adjusted by an instructor or woodshop assistant.
- Always make all adjustments to the machine and gather necessary tools (push sticks, block etc.) before turning on the tool.
- Always let tools come up to full speed before starting a procedure, and let the machine come to a full stop before leaving it. Never start a tool with its blade in contact with your work.
- Pay attention to the machine you are using. Odd sounds, excessive vibration or any smoke are signs that your tool needs adjustment or repair. Do not use a machine you suspect is malfunctioning! Inform the instructor about anything out of the ordinary.
- Never leave any equipment running unattended.
- Stay away from tools being operated by others and stay focused while using any tool.

- Never try to open, make any major adjustment or change a blade on any stationary machine. An instructor or the woodshop assistant must do all maintenance. If a tool needs adjustment, a new blade, etc. turn off the machine and ask your instructor or the assistant to make the adjustment.
- Watch out for each other in the shop. If you see someone operating a tool incorrectly, teach him or her proper technique and contact the assistant or instructor immediately.
- If you are uncomfortable or unsure of yourself, turn off the machine and ask for help from your instructor or the woodshop assistant.
- If you are tired, hurried or unfocused you are more likely to get injured. Never work under these conditions.
- Wear eye protection at all times. If you are not wearing eye protection you cannot work in the shop.
- Hearing protection is available in the PPE cabinet and can be helpful when working in noisy conditions.
- Start with a clean tool and working area, and clean up completely after yourself. Put tools you are finished with away to avoid filling your workspace with clutter.
- Do not use the stationary tools as work tables or storage areas. Do not allow any glue, solvents or water to come in contact with the metal tables.
- Clean up any spilled glue, paint or solvents immediately. Remove all hot glue that has dripped onto tables or the floor before you leave the shop.
- In the event of an accident, immediately push a kill switch to shut down all shop equipment. Kill switches are located in three places in the woodshop. Help the injured person to sit down and inform the instructor or attendant immediately. Do not reset the kill switch yourself after an emergency; ask the instructor to reset it.

Stationary tools

Table Saw

Table saws are circular saws used to make precisely straight, square cuts and slots at exact sizes. Because of its accurately calibrated fence and table, a table saw can cut stock to size without spending time laying out the cuts first.

- Check that the blade guards and splitter are in place. Do not operate the saw without all the guards.
- Never cut freehand. Always use a fence or miter gauge to guide your cut.
- Work only on the fence side of the blade. The powerful rotation of the blade is exerting a constant backward force on your work, and if the work is not fed straight and tight against the fence, and if the splitter is not in place or not functioning properly, this force will cause your work to be thrown back toward you. This is called kickback. Standing directly in line with the blade means that if kickback occurs the wood will be thrown into your body.
- The wood must be pushed completely beyond the blade so that kickback does not occur.
- If you are cutting a large piece of wood, have someone help you.

- After finishing a cut, turn off the machine and walk around it to retrieve your wood. Never reach over the blade, either with or without the power on.

Band saws

Band saws are more versatile than circular saws; they are able to make many of the same kinds of cuts as well as others. Unlike circular saws, cuts on band saws can be made free hand (without fence or miter gauge) as long as the pieces are given adequate and stable support throughout the cut. This means that curved cuts can be made as well as straight. However, the band saw does not cut as precisely as a table saw.

- Wood must be flat against table and held firmly. Never cut round or unstable wood without secondary support (such as a jig). The downward force of the blade will twist round or unstable stock as it cuts, causing the blade to bind, kink, and break.
- Never force a curved cut tighter than what is allowed by the blade width. Noisy cutting or burning can be signs you are trying to make a cut that is too tight.
- Keep your fingers clear of the cut line, especially at the end of the cut.
- Never back out of long cuts with the machine running. Backward pressure can cause the blade to jump its guides, hang up, and break.

Scroll saws

Scroll saws can make tightly curved, complicated cuts in thinner panels. Their up-and-down reciprocating action means work must be held firmly against the table using a foot-shaped hold.

Miter saw

The compound miter saw is used to cut long stock to length squarely or at a precise angle to make frames and boxes.

- Work only on one side of the blade; never reach over the blade either with or without the power on.
- Turn on the machine and let the blade come to full speed before cutting.
- Lower the blade into the cut at a controlled speed. Tilted blade bevel cuts are most prone to binding, and will require slower feed rates and solid control.
- Unclamp the slider arm if you are making a cut wider than 4 inches. Pull the cutter arm out to the end of the slide, start the saw, then cut by pushing toward the fence.

Belt and disc sander

The large stationary sander is used primarily for shaping and coarse sanding. These sanders can remove material very quickly and must be used carefully. Deep gouges can be quickly cut into the wood surface, and edges can easily be sanded crooked. Always hold the piece securely, and sand with light, even pressure, moving the piece constantly. Use the tables and guides whenever

possible to get a straight or beveled edge. Sanding too quickly will result in poor accuracy and sloppy work. It is easy to underestimate the hazards of power sanders because there are no blades. They can however be just as dangerous as saws. The hazards of power sanders include (1) the radial forces of the spinning parts, and (2) the abrading power of the sanding surfaces. This tool must always be operated with the dust collector running.

- Never leave sanders running unattended.
- Remove gloves, jewelry and loose clothing. Tie back long hair.
- Never lean over or reach under running sanders.
- Be aware of belt tracking and tension. Shut off machine and alert instructor if belt tracks wrong, especially if sparks are created.
- Never power sand metals, including nails, screws, or other fasteners in the wood; sparks can ignite airborne sawdust. Countersink any fasteners below wood surface before sanding.
- Never power sand painted wood; it can release lead or other harmful substances into the air. Always run the dust collector when sanding.
- Do not power sand small pieces of wood. Use sandpaper or carving tools.

Drill press

A drill press is a powerful drill mounted above a table for precisely and squarely drilling holes in many materials. The usefulness and power of this tool is completely dependent on the use of the correct drill bit. The bit must be the right type for the material, and must be sharp.

- Never leave drill press running unattended.
- Remove gloves, jewelry and loose clothing. Tie back long hair.

Hand held tools

- Set up extension cords and pneumatic hoses so they will not be in your way, or pull you up short. Make sure they are not going to trip anyone else.
- Clamp your material securely to the worktable, making sure your planned cuts will not take the tool into the table surface.
- Do a dry run before turning on the tool.

Jig saws

Jigsaws move an interchangeable blade in an up-and-down reciprocating motion to make curved or straight cuts in panels. The cuts are often sloppier and require some cleanup, but for curved cuts in large panels this tool is the best option. Because of the reciprocating action, securely clamping your work to a table is essential to successfully use the jigsaw.

Belt sanders

Belt sanders use a wide loop of abrasive belt travelling between a pair of wheels to aggressively remove unwanted material. Because this tool takes a lot of material off quickly, lack of attention, clumsiness or excessive enthusiasm while using the belt sander can quickly ruin a project.

Routers

Routers are very versatile tools that use a motor with different cutters and bases in a modular system to do many different jobs. Routers require attention and practice to use successfully and bad planning, inattention or clumsiness will quickly result in ruined work. Undergraduates may not use a University router without specific permission, specific training, and direct supervision.

Die grinders and electric rotary tools

- Do not wear loose clothing or jewelry. Keep your hair, clothing, and gloves away from moving parts. Loose clothes, jewelry, or long hair can be caught in moving parts.
- Be sure the trigger is off before connecting to the air supply. Carrying pneumatic tools with your finger on the trigger, or connecting pneumatic tools to the air supply with the trigger on, invites accidents.
- Remove adjusting keys or wrenches before turning on the tool. A wrench or a key that is left attached to a rotating part of the tool may result in personal injury.
- Keep proper footing and balance at all times. Proper footing and balance enables better control of the tool in unexpected situations.
- Wear safety glasses underneath a full face shield, and hearing protection.

Angle grinder

Always use two hands to operate an angle grinder. One hand should grip the handle while the other hand supports the weight of the tool.

- Allow the grinder to reach operating speed before applying it to the work piece. Use minimum pressure, so the disc does not “dig in” and cause it to kickback.
- Keep the grinding disc at a 15 to 30 degree angle to the object. Ensure the work piece is held firmly, either as part of a larger item or in a bench vise.
- Adopt a comfortable, balanced stance with feet apart. Where possible, work at waist height.
- Never put a grinder down until the disc stops rotating.
- Unplug the tool before changing discs.
- Never use a cut-off wheel for grinding or a grinding disc for cutting.
- Disconnect the power and place the grinder on a bench with the disc facing upwards when not in use.
- Use goggles, safety glasses or a face shield as well as hearing protection when grinding.

Brad and staple guns

Pneumatic brad guns use compressed air to drive brad nails quickly without hammering. Brads are a kind of nail with a very small head used for light assembly and finish work.

- Always wear eye protection.
- Keep all body parts a safe distance away from the area of nailing.

- Never point the brad gun in the direction of others.
- Avoid nailing in areas of knots or metal.
- Always have the gun pressed against the wood when nailing.
-

Hand tools

- Hand tools rely on sharpness; be sure they are indeed sharp, and don't allow them to cut you.
- Clamp your material securely to the worktable, making sure your planned cut will not take the tool into the table surface.
- Exert the cutting force through the work into the table or floor.

Ceramics facility and tools

- If you mix your own clay, turn on the exhaust. Always wear a respirator when mixing clay.
- When lifting heavy items such as bags of clay, clay additives, or glazing compounds, use appropriate lifting techniques, get help from another person, or use mechanical aids.
- Regularly hose down and wet mop the studio—particularly the dry mixing area—to remove potentially toxic dust such as silica and heavy metals. Do not allow spilled clay to dry; it can crumble into an airborne dust. Use sweeping compound whenever sweeping up dust.
- Mix glazes under local exhaust ventilation or wear a respirator. Avoid spraying techniques that will aerosolize the glazes. Instead, brush or drip glaze on your clay. If you must use spraying techniques, do so in the spray booth.
- Because your hands become contaminated while working, do not eat, drink, or smoke in the studio. Wash your hands thoroughly when you finish working or leave the studio. Good personal hygiene is one of the most important ways you can reduce your exposure.
- Regularly apply hand cream to replace lost oils and to keep your hands from drying out. Cover cuts or other broken skin with gloves to prevent infections
- Keep combustible materials, particularly flammable materials, away from kilns. Keep a fire extinguisher close by and know how to use it.
- Wear appropriate shaded eye protection when looking directly into the kiln.

Clay mixers:

The clay mixer is a powerful machine that could cause serious injury if used improperly. Follow these rules at all times when using the mixer.

- Always use a respirator when dealing with powdered clay and in all dusty environments including while mixing clay. The respirator must be approved for fine particulates, carrying a rating of “N95,” “P95,” or “P100.”
- Always turn on the fan to vent dust.
- Be sure the lid is closed and your body completely clear of the mixer when turning it on.

- Never put hands into the moving mixer. The lid should remain closed whenever the mixer is running. Stay clear of all moving parts. Do not wear loose clothing that could get caught in the mixer.
- Do not lift materials that are too heavy. Use scoops or buckets to break down materials to manageable weights.
- Do not bang or slam the lid to the mixer.
- If the mixer makes any unusual noises, turn it off and report to an instructor or graduate student.
- If mixing with a partner, be sure that he/she complies with all rules on this sheet. Be sure your partner is clear of the mixer when turning it on.
- Keep the mixer area clean and clear of debris.

Kilns

During the firing process, clay releases combustion products and gases whether using a fuel-fired or electric kiln. These emissions include carbon monoxide, formaldehyde, sulfur oxides, chlorine, fluorine, metal fume, and nitrogen oxides. Unless ventilation is excellent, metal fume particles such as lead and cadmium can settle and contaminate other ware and surfaces. In addition, fuel-fired kilns release the products of combustion from their fuel sources.

Infrared radiation emanates from hot (glowing) fired ceramics and can cause cataracts after long periods of exposure. Unloading hot objects from a kiln can cause burns.

Electric kilns

If used improperly, electric kilns can cause serious burns, fires, or electrocution. Always comply with these rules when using electric kilns.

- Never reach inside a kiln which is turned on.
- Never touch the outside of a kiln which is turned on.
- Never open a kiln which is hotter than oven temperature.
- Always open kilns slowly to sense how hot it is. Opening a kiln that is too hot can result in burns to the hands, arms, and face.
- Never wear flammable or meltable clothing close to any kiln.
- Never place flammable material such as wood, paper, or plastic on or near any kiln regardless of whether the kiln is on or not.
- Never place anything on the lid of an electric kiln, including ceramic pieces, bricks, or shelves.
- Never allow the lid of a kiln to drop or slam—you could break it.
- Be sure that the kiln sitter is operating properly and that the proper cone is used.
- Make sure posts, shelves, or debris are not touching any heating elements when loading the kiln.
- Keep all flammable materials including aerosol cans, propane tanks, gas cans, etc. at least fifteen feet from all kiln. Don't store or leave them in the kiln room.
- Never touch an electric element when the kiln is turned on.
- Never use silicon carbide shelves (the black ones) in an electric kiln.

- Never operate an electric kiln unless you have been thoroughly shown how by an instructor.

Gas kilns

All gas kilns are potentially hazardous and could cause serious injury or death. They must be operated with extreme caution and constant vigilance. Students must be trained by participating in several firings with supervision by an instructor or advanced student before taking charge of a firing. A graduate student or instructor must be acting as a supervisor when gas kilns are being fired. A student's instructor must be notified before a firing takes place. Individuals taking part in firings must ensure that safety rules are followed at all times. The responsible individuals must sign out the kiln and provide their phone numbers in case of an emergency.

- Never leave a gas-fired kiln unattended.
- Never wear flammable or meltable clothing close to any kiln.
- Never open a kiln which is hotter than oven temperature.
- Always open kilns slowly to sense how hot it is. Opening a kiln that is too hot can result in burns to the hands, arms, and face.
- Never wear flammable or meltable clothing close to any kiln.
- Never place flammable material such as wood, paper, or plastic on or near any kiln regardless of whether the kiln is on or not.
- Always use caution when looking into a kiln. Stand back from the opening when removing a brick to look inside. Pressure inside the kiln can cause heat or flame to shoot out suddenly.
- When looking into a kiln above 1800°F (bisque temperature), eye protection must be worn. Proper eye protection means welding glasses shade 4 or 5. Didymium lenses are not proper eye protection.

350.4. Kiln shelves and posts:

Kiln furniture can stick together and then break loose suddenly. Falling bricks or shelves can injure your foot or the feet of people working around you. Broken glaze or clay stuck to shelves and posts can be extremely sharp and are capable of inflicting severe cuts. Handle all kiln furniture with caution.

- Never drag or rub hands across shelves, posts, or fired work. Always grasp shelves firmly so your hands do not slide across the surface.
- When removing a shelf from a kiln, always be sure posts are not hanging stuck to the bottom of the shelf.
- Always wear closed-toe shoes. Never go barefoot in the studio.
- Wear leather gloves when handling shelves to prevent cuts. Each student should own a pair of leather gloves and store them in his/her locker.

Bench grinder:

The bench grinder is a powerful piece of equipment and cause serious injury. It must be treated with respect.

- Always wear safety glasses when using the grinder.
- Only use the grinder after your instructor has demonstrated its proper use.
- Keep fingers clear of the wheels at all times.

- Do not wear loose clothing near the grinder. Tie hair back, tuck shirts in, roll up sleeves.
- Never attempt to grind anything which you cannot hold securely or which is inappropriate to the tool.
- Do not apply excessive pressure. If the wheel begins to slow down, you are pushing too hard.
- Do not wear gloves when using the grinder—gloves can catch in the wheel and pull your hand in.

Glaze lab and spray booth:

This area of the studio contains many materials that can be dangerous. Dry materials can be inhaled as dust and most of them are toxic when inhaled. A few of the wet materials are caustic and can cause skin burns after prolonged exposure. Some toxic materials can be absorbed through the skin. Any material is hazardous when inhaled during spraying.

Pottery wheels

- Do not overload the wheel head with clay or force it to stop, as this will shorten the life of the motor. Maximum clay weight should not exceed recommended weight for your wheel.
- Foot pedal must be fully depressed backwards “off” before turning wheel on.
- Take care with long hair, jewelry, and loose fitting clothing. Such items may get caught in the moving wheel head causing damage or injury.
- Do not leave wheel running unattended.
- Stop operation of the wheel if you see or smell smoke, or if you hear unusual noises. Then turn off power, unplug power cord from outlet, and notify instructor.
- Do not attempt to move or hold the wheel during operation, or while the power is on as this could cause serious injury.
- Place the wheel on a flat, even surface away from other objects.
- Equipment must be lifted by two people, never attempt to lift the wheel by yourself.
- Do not let the wheel stand in water.
- It is not safe to operate ungrounded electrical equipment around water.

Gas splitter

Undergraduates may not use the gas splitter without specific permission from faculty.

Chain saw

Undergraduates may not use the chain saw without specific permission from faculty.

Printmaking facility and tools

Press beds

Hazards include moving parts, pinch points, collisions with moving bed, and contact with hazardous substances such as inks, solvent.

Plate cutter

- Only soft metals (copper, aluminum, and soft steel) can be cut on the shear.
- Only one plate at a time may be cut.
- The premeasured and marked plate must be set against the alignment fence before the cutting blade is lowered.
- Check the area around the shear to make sure that there are no obstructions or individuals within the safety zone.
- Place one foot on the foot lever to engage and lower the safety fence (front fence of shear to prevent fingers from coming in contact with blade). Once safety fence is set, increase force and weight on foot lever until the plate is cut completely.
- Cut-off scrap plates must be removed from shear and placed in scrap box.

Paper cutter

- Place paper on cutting board.
- Lift cutting blade arm up, slide paper under finger guard, and align paper to grid.
- Pull cutting blade down with operator's hand holding paper in place, but away from blade.
- Remove cut paper and dispose of waste paper.
- Blade must be left in the lower position.

Acid tank and vent system

- Students are not allowed to mix or replenish etching solutions or acids, this can only be performed by the instructor.
- Personal protective equipment (gloves, aprons, and eye protection) must be worn when using solvents and acids.
- Solvents and etching grounds must be kept capped when not being used.
- Materials (paintbrushes, rags, containers, and paper) with solvent or etching ground must be placed in approved disposal containers.
- Solvents and flammable chemicals must be returned to yellow flammable cabinet after use.
- Cleaning solutions must be stored away from other chemicals on a spill tray.
- Ventilation must be used when etching plates or using the hot plate.
- The eye wash unit and drench shower is available for occasions when accidental exposure occurs. The eye wash unit must rinse the contaminated

eyes for a minimum of 15 minutes. The instructor, studio-monitor or, campus security must be notified if contamination occurs.

Plates removed from etching solution should be drained back into the tank before rinsing plate with water. The etching sink is equipped with a filtration system stopping the acidity and copper from entering the public drain system.

No solvents can be washed down the sink's drain.

The etching room table must be cleaned immediately after use.

Spills must be cleaned up immediately to prevent slips and falls.

Spray out booth and power sprayer

Screen pressure washing unit must be connected and disconnected as instructed during training. Water-hose and electric cord must be returned to unit after cleaning.

Hot plate

- Do not place flammable materials directly on the hot plate.
- Do not touch the hot plate surface.
- Turn off the hot plate when not in use.

Propane torch

Wear gloves, flame-resistant clothing, and eye protection. Point the torch away from your body and other people and objects when you are lighting it. Use an igniting device that allows the torch to be ignited while your hand is far away. Keep torches open flame away from aquatint box!

Aquatint box

Hazards: Exposure to dust. Avoid inhalation/skin contact - rosin dust can irritate the skin & the respiratory channels..

Potential of dust explosion. Fire risk when fusing – produces carbon monoxide/carbon dioxide. Molten rosin can cause burns.

Rosin must be removed with solvent (Methylated Spirit) that is highly flammable and can be absorbed through the skin. Can result in headaches, nausea and skin and eye irritation.

Control measures required: Students given induction prior to carrying out this task.

Provide ventilation to control exposure levels. Use approved dust & fume respirators - 3M 8810 mask is recommended. Cheap nuisance dust masks are not adequate protection. Wear protective gloves to minimize skin contact (not when fusing rosin).

Use an approved vacuum to clean dust spills or a disposable damp cloth or rag to wipe up dust. Provide adequate ventilation & wear gloves when using solvent to remove rosin – no naked flames. Solvents, paper and rags must not be kept in the vicinity. Good housekeeping to be maintained by Print Technician at all times.

Design facility and tools

Letterpress presses

Letterpress machines can be used only after proper training. Protect your fingers from crushing injuries in the many moving parts of these machines.

Paper cutters

Paper cutters can apply powerful force behind extremely sharp cutting surfaces. Be sure to keep your hands clear when cutting.

Photography facility and tools

A faculty member or student assistant must be present when a student is using any of the Photographic Facilities. Only students who are currently enrolled in a course in Photography or students with special permission may use the photographic facilities and equipment

Darkroom Equipment

- Avoid the use of electronics in vicinity of chemicals and sinks used during photographic processing.
- The use of gloves, goggles and a smock is strongly encouraged.
- Clean hands immediately after using the darkroom, or if any contact is made with photographic chemistry.
- Never eat or drink while working in the darkroom or after using the darkroom without first washing hands thoroughly

Photographic Lighting Equipment

- Allow hot bulbs to cool prior to handling, replacing bulb caps or returning them to their cases
- Do not touch bulbs directly. Oily residue can result in the bulbs exploding when hot.
- Do not use electrical cords if they are worn, or if the inner wires are exposed. Show worn out cords to your instructor.
- Arrange cords carefully to avoid creating a trip hazard.
- Unplug cords by grasping the plug and pulling; do not pull them out by the cord.

Film Processing Equipment

- Avoid the use of electronics in vicinity of chemicals and sinks.

- The use of gloves, goggles and a smock when processing film is strongly encouraged.
- Never eat or drink while processing film or after processing without first washing hands thoroughly.

Fibers equipment and tools

Paper beaters

- Before running, make sure machine is empty of foreign debris. Machine can overheat if run without liquid.
- Always keep covers down and in place when turning on machine.
- Never reach under cover when machine is running.

Hydraulic press

- Follow instructions attached to equipment
- Keep fingers (and other body parts) out of the way

Emergency contact information

MU Health Center
1020 Hitt St, 4th floor

(573) 882-7481

MU Office of Student Conduct
G206 MU Student Center Columbia, MO 65211
(573) 882-5543
conduct@missouri.edu

MU Campus Police
901 Virginia Avenue
(573) 882-7201
Emergency 911

MU Environmental Health and Safety
(573) 882-7018

Poison Control: 1-800-222-1222