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1.0 Introduction

1.1 Purpose

This safety manual provides basic information for working safely with chemicals and equipment involved in Visual Arts. This manual is intended to supplement, but not replace safety instruction provided by the faculty in Visual Arts. If additional information is needed, students should consult their Visual Arts instructor, contact the Environmental, Health & Safety Office (EHSO) at 404-727-5922 or visit the EHSO website at www.ehso.emory.edu.

1.2 Scope

This program is inclusive of Emory University employees, including faculty, staff, students, employees, contractors, and other people who conduct any activities in Visual Arts.

1.3 Definitions

Eye protection. Equipment designed to provide protection to the eyes during exposure to such hazards as flying particles, molten metal or sparks, liquid chemicals, acids or caustic liquids, or potentially injurious light radiation (i.e., lasers, welding, etc.)

Hand protection. Equipment designed to provide protection to the hands during exposures to potential hazards such as sharp objects, abrasive surfaces, temperature extremes and chemical contact.

Hazardous chemical. Any chemical that is a physical or health hazard

Personal Protective Equipment. Any devices or clothing worn by the worker to protect against workplace hazards. Examples include respirators, gloves, chemical splash goggles, safety glasses, lab coats, etc.

Projectiles. Flying objects such as large chips, fragments, particles, sand, and dirt. Activities that produce these hazards include chipping, grinding, masonry work, woodworking, sawing, drilling, chiseling, riveting, and sanding

Respirator. A device designed to protect the wearer from inhaling harmful dusts, fumes, vapors, and/or gases.

1.4 Responsibilities

Environmental Health and Safety Office (EHSO) Safety/IH

- Providing safety information, training and consultation to faculty and staff;
- Conducting periodic audits of Visual Arts facilities, as well as health and safety practices to ensure regulatory compliance.

Instructors

- Ensuring that students work safely in Visual Arts;
- Ensuring students understand the potential health and physical hazards of the chemicals and equipment used;
- Contacting EHSO to conduct industrial hygiene monitoring and assessments, as needed;
- Submitting chemical inventory lists to EHSO to ensure that the most current

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Safety Data Sheet (SDS) is available in the online database for each chemical used in Visual Arts;

- Ensuring students know how and where to find SDSs;
- Instructing students about proper procedures for handling hazardous substances and equipment; and
- Providing appropriate personal protective equipment (PPE) or information about where to obtain the appropriate PPE that will allow students to work safely.

Student Assistants and Staff

- Assisting with Visual Arts facility processes and procedures including;
- Safe operation and set up of equipment;
- Facility clean up;
- Ensuring that all tools and equipment are stored securely after use;
- Ensuring compliance with policies and safety procedures.
- Reporting any damage or safety issues to Visual Arts Faculty;

Students

- Follow procedures and practices outlined in this safety manual;
- Report all accidents, near-miss incidents, and potential chemical exposures to the instructor;
- Obtain an instructor's approval for any work to be conducted in the studio;
- Consult with an instructor if in doubt about the use of any tool, machine, or procedure; and;
- Notify an instructor if a violation of safety procedures is observed.

1.5 Training Requirements

- Ensure that all employees, students, and faculty are instructed on the location and proper use of emergency eye wash and shower units;
- In the event the eye or body comes into contact with a chemical, dust, or particles, wash the affected area for 15 minutes and then seek medical attention.

2.0 General Safety for All Visual Arts Studios**2.1 Incidents and Injuries**

- All accidents, near miss incidents, and injuries occurring in the Visual Arts Department involving students must be reported to an instructor as soon as possible, even if no medical attention is required.
- If an incident requires medical treatment, the individual should seek medical attention immediately.
- Contact EHSO as soon as possible after the incident to coordinate a follow-up investigation.
- Students or faculty suffering from life threatening injuries should seek immediate medical attention. Call an ambulance by dialing 911 from any campus phone.
- Students suffering from non-life threatening injuries or illnesses should seek medical care at Student Health Services (SHS) at 1525 Clifton Road, 2nd Floor

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Atlanta, GA 30322, 404-727-7551. SHS hours of operation are Monday thru Thursday 8:00 am – 6:00 pm, Friday 8:00 am – 5:00 pm and Saturday 9:00 am – 1:00 pm.

- Faculty and staff injuries should be reported to Occupational Injury Management (OIM) within Employee Health Services (EHS) located in Emory Hospital, 2nd Floor, D Wing, 404-686-8587. EHS is open Monday thru Friday 8:00 am – 3:45 pm.

2.2 Emergency Eyewash and Shower Equipment

Emergency eyewash and shower equipment is used to physically wash the eyes and any body part that may become contaminated from contact or exposure to chemicals, dust, and particulates.

- Ensure that emergency eyewash equipment is installed within 10 seconds (55 ft) walking time from the location of a hazard;
- Ensure that emergency eyewash and shower equipment is installed on the same level as the hazard;
- Keep the path of travel from the hazard to the equipment free from obstructions and as straight as possible;
- Keep flip top dust covers, which protect eye wash spray heads, in place when the unit is not in use;
- Ensure that emergency eyewash locations are clearly identified with a highly visible sign. The area surrounding the emergency location should be well lighted; and
- Emergency eyewash and shower units must be connected to drain piping or floor drains.

2.3 Eating, Drinking, Smoking, and Other Activities

- Eating, drinking, smoking, applying cosmetics, lotion or lip balm, handling of contact lenses, and storage or preparation of food or drinks is prohibited in all of the following Visual Arts Studios: Sculpting, Ceramics, Drawing and Painting, Photography, and any other area where chemicals are used or stored.
- Food used for art projects is allowed with the permission of the instructor.
- Store food items in a separate refrigerator from chemicals marked “Refrigerator for Food Only.”
- The food-only refrigerator must be stored outside the Studio area.

2.4 Personal Hygiene

- Individuals working in studios containing paints, inks, clays, or chemicals should frequently wash their hands in order to avoid these materials entering the eyes, mouth, or penetrating the skin.
- Thoroughly wash hands at the end of a class and before leaving the studio.

2.5 Safety Data Sheets (SDS)

A SDS is a document containing chemical hazard identification and safe handling information and is prepared in accordance with the OSHA [Hazard Communication Standard](#). For additional information, please refer to the [Emory University Hazard Communication Program](#).

- Chemical manufacturers and distributors must provide the purchasers of

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hazardous chemicals an appropriate SDS for each hazardous chemical/product purchased.

- The SDSs for all hazardous chemicals used in Visual Arts are available to all personnel and students through the SDS Online System on the EHSO website at www.ehso.emory.edu.
- A SDS should be received with the first shipment of a hazardous chemical and after the SDS has been updated by the manufacturer. If a SDS is not received with the first shipment of a hazardous chemical, notify EHSO immediately.
- EHSO will review every SDS for chemical make-up and missing or inadequate content. If a SDS is deemed insufficient, EHSO will contact the manufacturer or distributor to request a complete SDS.
- Instructor approval is required before any student is allowed to bring in outside chemicals into a studio. Furnish the instructor with the name and hazards associated with the chemical.
- Read the SDS of a hazardous chemicals prior to using the chemical;
- Students are responsible for removing and disposing of all student-purchased chemicals at the conclusion of their coursework.

2.6 Chemical Labeling and Storage

- When chemicals are transferred from the manufacturer's original container to a secondary container, appropriately label the new container with the chemical name, (i.e., acetone) and associated hazards (i.e., flammable).
- Store all flammable liquids (i.e., mineral spirits, turpentine, etc.) in National Fire Protection Association (NFPA) Code 30 compliant cabinets.
- Store corrosive compounds in areas that reduce the potential for accidents and contact with other chemicals.
- Only use chemicals that have received instructor approval in Visual Arts classrooms.
- Ensure all containers have a properly fitting lid. Foil and plastic wrap cannot be used as lids;
- Cover chemical containers, solvent waste containers, and rag waste containers tightly at all times when not in use.

2.7 Chemical Waste Disposal

- Examples of waste that can be generated in Visual Arts and must be disposed of through EHSO include oily rags, solvent wastes (turpentine, paint thinner, alcohols, etc.), paints, oils, adhesives, aerosol cans, cleaning products, compressed gas cylinders, batteries (lithium ion (Li), lithium hydroxide (LiH), mercury (Hg), nickel cadmium (NiCad) or nickel hydride (NiH, NiMH), lead acid, etc.) and photographic chemicals.
- Instructors and students are not expected to determine if chemicals are regulated. Therefore, dispose of all chemicals through EHSO.
- Do not dispose of chemicals in the sanitary sewer or by mixing with regular trash. Evaporation of volatile wastes is also unacceptable.
- Store chemical waste from each specific process separately unless approval is received from EHSO (404-727-5922).
- Store waste in containers made of compatible material. For example, do not store strong acids in plastic bottles, and do not store hydrofluoric acid in glass

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bottles.

- Return batteries to the supplier for recycling if possible. Otherwise, dispose of all batteries, except standard dry cell alkaline or zinc air batteries, through EHSO as chemical waste. This includes, but is not limited to, lead acid, lithium ion (Li), lithium hydroxide (LiH), mercury (Hg), nickel cadmium (NiCad), or nickel hydride (NiH) batteries.
- Anyone handling used batteries must be trained in these procedures.
- Cover terminal ends with non-conductive (i.e., electrical) tape.
- Package batteries into a box and label "Used Batteries" and the date the first battery was removed from service. Larger lead acid batteries, similar to the size found in vehicles, do not need to be boxed.
- Photochemical pickups are pre-scheduled for every Wednesday.
- Contact Environmental Compliance at chemwaste@emory.edu to request additional waste pickups.
- Do not transport chemicals in personal vehicles.
- For additional information on chemical waste disposal and battery disposal, please refer to the [Emory University Visual Arts Chemical Disposal Guidelines](#).

2.8 Asbestos Containing Material

- Asbestos containing materials (ACM) may be found in older building materials such as floor tiles, ceiling tiles, and countertops, as well as in equipment such as kilns, tong holders, and high temperature gloves.
- Do not disturb, remove, replace, or attempt to repair ACM. These materials must be removed and handled only by a State licensed, Emory-approved asbestos abatement contractor in accordance with all Federal, State and local regulations;
- Notify EHSO at 404-727-5922 before performing any renovation activities or disposing of materials/equipment which may contain asbestos.

2.9 Hand Tools

- Always use sharp tools (power or hand) and cut away from your body. Dull tools, including knives, chisels, etc., are dangerous because you must apply extra force to make them cut.
- When using a chisel, keep both hands on the chisel or use a mallet. Never allow your free hand to be in front of the chisel blade.
- When possible, use a vise, clamp, or stop to steady or stabilize the work piece.

2.10 Manual Handling

Many of the techniques used in Visual Arts require the use of repetitive actions. Performing repetitive tasks for long periods can lead to injury; therefore, it is important to:

- Ensure all the equipment or materials are kept within easy reach;
- Maintain a comfortable posture while working. Avoid working in awkward postures, such as bending and stooping, or static postures for any period of time;
- Take frequent work breaks when performing repetitive tasks;
- Vary the work routine and activities throughout the day;
- Periodically change hands if you are continuously using one hand.

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In certain studio areas, heavy objects may need to be moved or lifted. To avoid back injuries, always use a hand truck or ask someone for help when handling large items. Stones, crates and bags of clay and plaster are examples of objects that can be moved with hand trucks. It is also important to use proper lifting techniques as listed below:

- Plant the feet. Center body weight to provide a powerful line of thrust and good balance.
- Bend at the knees. Never bend from the waist to pick up objects.
- Lift with the legs. Leg muscles are stronger than back muscles- let your strength work in your favor.
- Get a good grip. Grasp the load firmly. Use gloves if they allow for a better grip.
- Keep it close. Grasp the load firmly and lift towards the belt buckle. Hold the load close to the body to avoid putting pressure on the back.
- Lift smoothly. Raise, carry and lower the load smoothly. Never jerk a load.
- Avoid twisting. If turning is required while lifting or carrying a load, turn the feet and body instead of twisting the back.
- Push. Push rather than pull the load.

2.12 Fire Hazards

- Never have a cigarette lighter on your person while working in an area where there is a heat or fire source.
- In the event your clothing is on fire, remember to fall on the ground and roll over until the flames are extinguished.
- Dispose of any oily rags in a closed safety container after use.
- Never attempt to extinguish a minor fire with water. Each studio has a fire extinguisher which can be used to extinguish minor fires.
- In the event that a fire extinguisher has to be discharged, notify the Director of Fire Safety immediately so that the fire extinguisher can be recharged or replaced.
- In case of any fire, the evacuation and safety of people is the primary concern. If you cannot safely extinguish a fire using a fire extinguisher, evacuate the area immediately, close the door behind you, and call University Police by dialing 7-6111, or 404-727-6111 if using a non-campus phone.
- In the event that the smell of gas occurs in a studio, leave the area immediately. Do not turn on or off any lights or electrical devices in an area where a gas odor is detected. Once the area has been evacuated, notify the nearest instructor or staff member.
- For more information on fire safety, emergency evacuation, and fire extinguisher use refer to the [Fire Safety Website](#).

2.13 Electrical Safety

The major hazards associated with electricity are electrical shock and fire. Electrical shock occurs when the body becomes part of an electrical circuit, either when an individual comes in contact with both wires of an electrical circuit, one wire of an energized circuit and the ground, or a metallic part that has become energized by contact with an electrical conductor. Electrical equipment can serve as an ignition source for flammable or explosive vapors.

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- There are various ways of protecting people from the hazards caused by electricity, including insulation, guarding, grounding, and electrical protective devices. Electrical hazards can be significantly reduced by following these basic precautions:
- Inspect wiring of equipment before each use. Do not use any equipment that has damaged or frayed electrical cords or that is missing the grounding pin;
- Know the location and how to operate shut-off switches and/or circuit breaker panels. Use these devices to shut off equipment in the event of a fire or electrocution;
- Do not overload an outlet with too much equipment. Cords or outlets that become warm to the touch or smell of hot or burning plastic may indicate insufficient capacity.
- Always disconnect equipment from outlets by pulling the plug rather than the cord. This will prevent cords from being damaged.
- Unplug extension cords to which no equipment is connected; and
- Minimize the potential for water or chemical spills on or near electrical equipment.

2.14 Appropriate Clothing

- Avoid wearing synthetic clothes around heat sources such as kilns, grinders and welding processes. Synthetic clothes have a low flash point and will burn very quickly, causing severe burns;
- Always wear shoes which cover the entire foot in chemical use areas, woodworking areas, in areas where metal and glass are used, and when welding. Avoid wearing perforated shoes and cloth sneakers;
- Do not wear loose clothing (such as overly large smocks or ties), torn clothing, and jewelry in any studio, as it may pose additional hazards.
- Restrain all long hair.

2.15 Personal Protective Equipment (PPE)

- When used properly, PPE protects the wearer from specific hazards of a substance.
- PPE is a last resort protection system to be used when substitution or engineering controls are not feasible. It should be understood that PPE does not reduce or eliminate the hazard.
- PPE includes hand protection, respiratory protection, eye protection, hearing protection, and protective clothing. The need for PPE is dependent upon the type of operations and the nature and quantity of the materials in use, and must be assessed on a case by case basis.
- Employees and students who rely on PPE must understand the function, proper use, and limitations of the PPE used.
- For additional information, please refer to the *Emory University PPE Guidelines*.

Safety Glasses and Goggles

The prevention of eye injuries requires that persons in areas where potential eye hazards (projectiles, chemicals, injurious light radiation) exist wear protective eyewear. This applies

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not only to employees but to contractors, students, visitors, and others working in or passing through the area.

- Wear safety glasses when using power tools, filing, sanding, grinding, or polishing an object.
- If there is a potential for an eye splash, wear safety goggles.
- Students are responsible for purchasing American National Safety Institute (ANSI) approved safety glasses unless they are provided for use in the studio. Safety glasses with side protection that meets ANSI Z87.1 (current) standard is the minimal allowable eye protection when protecting the eye from flying fragments, particles and objects. Glasses that meet the ANSI standard will have Z87 stamped somewhere on the glasses frame. **NOTE:** Most regular glasses do not meet the ANSI standard and thus are not acceptable.
- Persons who wear prescription lenses while engaged in operations that involve eye hazards must wear eye protection that incorporates the prescription in the design, or wear eye protection that can be worn over the prescription glasses.

Face Shields and Welding Helmets

- Face shields provide protection to the face and eyes and are considered secondary protectors. Face shields must be used in conjunction with safety glasses or goggles.
- When using welding equipment in sculpting, the use of proper shaded eye protection is essential. The class instructor will provide information and the necessary eye protection for welding.
- For additional guidance, refer to the Emory University PPE Selection Guidance Document.

Hand Protection

- Hand protection is required when there is a potential for exposure to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns and harmful temperature extremes.
- No single type or style of glove can provide protection against ALL potential hand hazards. However, general use gloves such as disposable latex or nitrile are appropriate when using small amounts of most chemicals for short periods of time. Otherwise, the glove that offers the best resistance to the chemical should be used
- For more information, consult the manufacturer's guide or the chemical's SDS.
- Change gloves whenever they become compromised or contaminated with a chemical.

Respiratory Protection

- A respirator (including disposable dust masks) may be used only when engineering controls, such as general ventilation, fume hood, or dust collection systems are not feasible or do not reduce the exposure of a respiratory hazard to acceptable levels.
- Respirators must also be worn while engineering controls are being installed.
- The use of a respirator is regulated by the Occupational Safety and Health Administration's (OSHA's) Respiratory Protection Standard and is therefore subject to prior review by EHSO.

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- Any worker who believes that respiratory protection is needed must notify EHSO for evaluation of the hazard and enrollment in the Respiratory Protection Program. This program involves procedures for respirator selection, medical evaluation, employee training, proper fitting, respirator inspection, maintenance, and record keeping.
- For additional information, refer to the Emory University Respirator Protection Program.
- Photography, Painting and Drawing, Ceramics, and Sculpture Studios have filtration/ventilation systems designed for the activities conducted in these areas. Instructors teaching in these studios will provide information concerning the proper operation of the studio ventilation system. Students are required to operate the studio ventilation system when working in the studio where hazardous material may be generated.

Hearing Protection

Anyone who believes that hearing protection is needed must notify EHSO for evaluation of the noise hazard. For additional information, refer to the *Emory University Hearing Conservation Program*.

3.0 Sculpture General Safety

When used improperly or without proper safeguards, persons operating woodworking equipment can suffer injuries, such as lacerations, amputations, severed fingers, and blindness. The following guidelines for working in the Sculpture Studio must be followed at all times. If any questions arise regarding the safe operation of any tool, students are free to ask the instructor. Students are responsible for knowing, understanding and adhering to these guidelines.

3.1 Plaster and Plaster Molds

Plaster can be cast, carved, and modeled. Varieties of plaster include: Plaster of Paris, casting plaster, white art plaster, molding plaster, and Hydrocal. These are all varieties of calcined gypsum, composed of calcium sulfate. The following are required practices for working with plaster and plaster molds:

- Always carve or cut in a direction away from the body and keep hands behind the tool.
- If a tool falls, don't try to catch it;
- Wear safety glasses or goggles when chipping plaster.

3.2 Modeling Clays

See Ceramics in section 4 for information about clay compounds. Modeling clays of the plasticine type usually contain China clay in an oil and petrolatum base. Additives are often present, including dyes, sulfur dioxide, vegetable oils, aluminum silicate, preservatives, and turpentine. These are modeled and carved with simple tools. There are also a variety of polymer clays that are self-hardening, or oven-hardening. These are often based on polyvinyl chloride. The following are required practices for working with modeling clays:

- Use gloves if skin irritation results from using plasticine modeling clays.
- Wash hands with soap and water after contact.
- Obtain the SDS from the manufacturer or supplier, and make sure the

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temperature of decomposition is not reached.

3.3 Woodworking

Wood is one of the most commonly used materials in art, crafts and home hobbies. Woods can be hand carved with chisels, rasps, files, hand saws, sandpaper, etc., or they can be machined with electric saws, sanders, drills, lathes and other woodworking machines. Students will be instructed in the correct and safe use of all machines before any work is done with or on that machine.

- Get approval from the instructor: All work to be done in the shop must have the instructor's approval.
- Never work alone – use the “buddy” system: At least two people must be present when power tools are being used.
- Never work when under impairment: This includes when being too tired, stressed or hurried to work carefully.
- No horseplay allowed. Do not distract anyone using equipment.
- If the job cannot be done safely, then it cannot be done: There are limits to what can be built.
- Only the operator may start and stop a machine: After a machine is turned off, the operator should stand by until it has stopped running.
- Never remove machine guards: Machine guards must be kept in place at all times. If it is believed that an operation requires removal of the guard, the instructor must be consulted.
- Always wear closed-toe shoes: Tools, chips and fixtures are sharp, and often hot. Shoes will help protect the feet from injury. Leather shoes provide the best protection.
- Always wear eye protection: Wear safety glasses when using power-driven equipment. Wear face shield and safety glasses when using machines which may produce wood chips. Wear goggles if working with corrosive substances.
- Always wear hearing protection: Wear hearing protection when using powered equipment.
- Restrain long, loose hair: Long, loose hair can easily be caught in revolving machinery and ripped out, causing serious scalp laceration. Keep hair under control, tied back or tightly covered.
- Remove jewelry and personal electronic equipment (bracelets, rings, chains, beads, headphones): Any accessory that can get caught in machinery must be removed.
- Fasten or remove loose clothing: Loose clothing (such as overly large smocks or ties), torn clothing, etc., may get caught in equipment and cannot be worn. Fasten or remove loose clothing before you operate any machine. Roll long sleeves above the elbows. Apron fastenings should be such that they will break if the apron becomes entangled in a machine.
- Keep objects clear of machinery: Keep rags away from machines that are in operation.
- Never wear gloves when operating power-driven machinery: Gloves may get caught in moving parts.
- Keep hands away from sharp tools: Use push sticks.
- Never remove chips and shavings from machine with your bare hands. Use a brush or hook.

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- Never operate equipment you are unfamiliar with: Ask the instructor or shop technician for assistance if you are unsure about the use of any tool, machine, or shop procedure.
- Clean up after yourself: Before you leave each day tools must be returned to their appropriate location. Clean the areas and equipment of all sawdust to avoid fire hazards;
- Allow machines to come to a complete stop: Machines must come to a complete stop and the power disconnected before oiling, cleaning, or adjusting;
- Disconnect portable electric tools: All portable electric tools and appliances must be disconnected when not in use, when making adjustments, inserting cutters, bits, etc.
- Properly unplug tools: When disconnecting an electric tool from an electrical outlet, pull from the plug instead of from the wire;
- Keep wiring in good repair: Keep all machines and wiring in good repair and when possible avoid extension cords, which can pose a tripping hazard;
- Use the dust collection system: Cut all wood products using a dust collection system when possible.
- Report broken tools and equipment. Inform the instructor of any broken tools and equipment.

3.4 Welding

The intense heat and sparks produced by welding and the welding flame can cause fires or explosions if combustible or flammable materials are in the vicinity. Therefore, only perform welding in areas that are free of combustible materials including trash, wood, paper, textiles, plastics, chemicals, flammable dusts, liquids and gases.

- Never weld on containers that have held a flammable or combustible material unless the container is thoroughly cleaned or filled with an inert (non-reactive) gas. Explosions, fires or release of toxic vapors may result.
- Assume containers with unknown contents are flammable.
- Ensure fire extinguishers are nearby and available for instant use and a fire inspection is performed by the fire watcher before leaving the work area.
- Ensure fire watchers know how to sound an alarm in the event of a fire.
- Ensure fire watchers watch for fires in all exposed areas.
- Only attempt to extinguish fires if you have had fire extinguisher training and when the fire is obviously within the capacity of the equipment available.
- Maintain a fire watch for at least one hour after completion of welding or cutting operations to detect and extinguish possible smoldering fires.

Procedures

- Before any welding, cutting and/or creating any open flame is planned in any building, complete a Hot Work Permit and have it signed by the Visual Arts authorized representative. Hot Work Permits can be obtained from EHSO or Fire Safety;
- Keep the work area clean. Remove combustible or flammable items from the work area or cover with a tight-fitting flame-resistant material prior to a welding operation;
- Before welding activities are performed, place a welding screen in the area to prevent people in the vicinity from being exposed to the intense light from the

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welding process;

- Keep oxygen, acetylene and all other compressed gas cylinders in an upright position and secured in place by means of a chain or other suitable method.
- The instructor will provide instruction in the safe use of fuel gas in gas welding and cutting operations and in the safe means of arc welding and cutting operations.
- When electrode holders are to be left unattended, remove the electrodes and place or protect the holders so that they cannot make electrical contact with any person or conducting objects.
- Ensure all welding equipment is properly grounded.
- Ensure all arc welding and cutting cables are completely insulated and free from repair or splices within 10 feet of the electrode holder. Repair or replace defective cables.
- Ensure the fuel gas hose and oxygen hose are easily distinguishable from each other. The contrast may be made by different colors or by surface characteristics readily distinguishable by the sense of touch. Oxygen and fuel gas hoses must not be interchangeable. Do not use a single hose having more than one gas passage.
- General welding, cutting and heating operations may normally be done without mechanical ventilation or respiratory protective equipment. However, if unusual physical or atmospheric conditions cause an unsafe accumulation of contaminants, ensure that suitable mechanical ventilation or respiratory protective equipment is available.
- Inspect welding equipment to ensure it is in good working condition.
- Follow operating instructions on all equipment.
- Obtain the SDS for all compressed gases prior to use.
- Wear properly shaded welding helmets and goggles during welding activities.
- Wear protective leather gloves, long-sleeved wool, or flame-retardant cotton shirt and pants, and a leather apron to protect against flying sparks and hot metal. NOTE: Ensure clothing does not have any cuffs, pockets or other folds in which sparks can be trapped.

3.5 Compressed Gas Cylinders

Compressed gases can be toxic, flammable, oxidizing, corrosive, or any combination of these hazards. In addition to the chemical hazards, the amount of energy resulting from the compression of the gas makes a compressed gas cylinder a potential rocket. Appropriate care in the handling and storage of compressed gas cylinders is essential.

Procedures

- **Know and Understand Gas Properties:** Know and understand the properties, uses, and safety precautions before using any gas or gas mixture. Consult the SDS for safety information on the gases that you will be using.
- **Handle compressed gas cylinders safely:** Move all cylinders with material handling equipment. Always secure the cylinders when in storage or use. Wear safety glasses, work gloves, and appropriate work shoes.
- **Do not damage cylinder valves or pressure relief devices.** Ensure that compressed gas cylinders are not subjected to any mechanical shock that could cause damage to their valves or pressure relief devices. Do not drop,

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drag, slide, or use as gas cylinders as rollers for moving material or other equipment.

- Use cylinder caps: Cylinder caps protect the valve on top of the cylinder from damage if it is knocked over. Do not remove cylinder caps until the cylinder is secured in place and ready for use.
- Follow safety precautions during storage of compressed gas cylinders: Store full and empty cylinders separately. Store cylinders upright and secured at all times. Store oxidizers (i.e. acetylene) and flammable gases (i.e. oxygen) in areas separated by at least 20 feet or by a fire resistant wall. Do not store cylinders near radiators or other heat sources.
- When in doubt, ask your instructor or contact EHSO: If you are unfamiliar with the hazards associated with a particular gas or unsure of the correct handling and storage procedures, ask your instructor or contact EHSO at 404-727-5922.

4.0 Ceramics General Safety

Ceramic art and pottery have a wide variety of hazards. The specific hazards and precautions can be divided into three general areas: working with clay; glazing and coloring; and firing in a kiln.

4.1 Working with Clay

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

Procedures

- Use premixed clay to avoid exposure to large quantities of clay dust.
- Wear separate work clothes while in the studio. Choose clothes of material and design that don't trap dust.
- To prevent back problems, always follow safe lifting procedures as described in Section 2.11.
- Keep hands and wrists in alignment as much as possible to prevent muscle strain and fatigue. Take frequent work breaks.
- Floors and work surfaces should be wet mopped daily to minimize dust levels and prevent dry scraps from becoming pulverized.

4.2 Glazing and Coloring

Glazes used to color or finish clay pieces are a mixture of silica, fluxes and colorants. Common fluxes include lead, barium, lithium, calcium and sodium, and are used to lower the melting point of silica. The actual colorants, which are an assortment of metal oxides, usually account for less than 5% of the glaze by weight. An assortment of metal oxides or other metal compounds produce particular colors when fired. These are added in such small amounts to the glaze that they aren't usually a significant hazard.

Powdered glazes are weighed, sorted, and mixed with water. Since these materials are in powdered form, they can result in high dust exposures. However, wet glazes are not an inhalation hazard. Glazes can be dipped, brushed, poured, or sprayed onto the ceramic piece.

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- Use lead-free glazes. If the glaze does not state “lead-free or “leadless” on the label, assume it contains lead until proven otherwise;
- If possible don't use colorants that are known human carcinogens and avoid probable human carcinogens. There is no known safe level of exposure to carcinogens;
- Wet mop spilled powders. Good housekeeping procedures and cleanup of spills reduces the risk of inhalation or ingestion of toxic dusts;
- Wear gloves while handling wet or dry glazes;
- Apply solvent-containing glazes outside;
- Follow basic personal hygiene rules, including washing hands after work.

4.3 Firing in a Kiln

Electric kilns and fuel-fired kilns are used to heat the pottery to the desired firing temperature. The most common type used in Visual Arts is the electric kiln. Heating elements heat the kiln as electric current passes through the coils. The temperature continually rises until the kiln is shut off. The instructor will provide information concerning proper procedures for operating the kiln.

Procedures

- Ensure only trained individuals operate kilns;
- Do not touch the heating elements with anything;
- Do not leave kilns unattended while firing. Firing should only be done while someone is in the building;
- Keep the kiln lid or door closed when the kiln is not in use to keep dust out of the kiln;
- If you smell burning plastic, turn the kiln off and notify your instructor immediately. The instructor will examine the wall outlet and supply cord for signs of fire.
- Do not look directly into a high-firing kiln without shaded eye protection. ANSI-approved infrared goggles or hand-held welding shields should be worn when looking into the operating kiln. Shade number from 1.7 to 3.0 is recommended, but a darker shade may be required if spots appear in front of one's eyes after looking away from the kiln;
- Wear gloves that provide thermal protection when removing ware while the kiln is still warm;
- Only fire materials approved by the instructor. Do not fire marbles, pieces of concrete, or rocks. Rapid heating to high temperature can cause violent reactions in many materials;
- Do not use lead compounds at stoneware temperatures since the lead will vaporize;
- Never fire tempered glass inside a kiln. It could explode;
- Lumber, paper, solvents, or other combustible and flammable materials should not be stored in kiln areas;
- Do not open the lid until the kiln has cooled to room temperature and all switches are off;
- Always ensure that the kiln has turned off.

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5.0 Photography General Safety

There are many hazards associated with photographic chemicals. Typical substances utilized in photo processing include developers, stop baths and fixers, intensifiers and reducers, and toner. It is important that anyone working in the photography studio be aware of these hazards and that every effort is made to minimize exposure to the chemicals. Instructors and students should consult the SDS of the photographic chemicals before using these chemicals.

5.1 Developer

Developer solutions and powders are often alkaline with moderate to high toxicity. They are also sources of the most common health problems in photography. Developers are skin and eye irritants and many are strong allergic sensitizers.

Procedures

- Do not put bare hands in developer baths. Use tongs instead;
- If developer solution splashes on the skin, rinse with copious amounts of water;
- If developer solution splashes in the eyes, flush the eyes at the emergency eyewash for at least 15 minutes and seek medical attention.

5.2 Stop Baths and Fixers

Stop baths are usually weak solutions of acetic acid. Stop baths can cause dermatitis, skin ulceration and can severely irritate the respiratory system. Continual inhalation of acetic acid vapors, even from the stop bath, may cause chronic bronchitis. Stop baths may contain:

- Acetic acid
- Sodium acetate

Most fixer solutions contain sulfites. When in contact with strong acids or if heated, sulfites may generate sulfur dioxide gas. Sulfur dioxide gas is irritating to the respiratory tract and is of particular concern for asthmatics or hypersensitive individuals using the product.

Fixer solutions may contain:

- Sodium sulfite
- Boric acid
- Acetic acid

Procedures

- All darkrooms require good ventilation to control the level of acetic acid vapors and sulfur dioxide gas produced in photography. Therefore, ensure the ventilation system is in operation when the dark room is in use;
- Wear gloves and goggles;
- Cover all baths when not in use to prevent evaporation or release of toxic vapors and gases.

5.3 Intensifiers and Reducers

A common after-treatment of negatives (and occasionally prints) is either intensification or reduction. Common intensifiers include hydrochloric acid and potassium dichromate. Reduction of negatives is usually done with Farmer's reducer, consisting of potassium ferrous cyanide and hypo eliminators. Reduction has historically been done with

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iodine/potassium cyanide, ammonium persulfate, and potassium permanganate/sulfuric acid.

Procedures

- Chromium intensifiers are probably the least toxic intensifiers, even though they are probable human carcinogens. Wear gloves and goggles when preparing and using these intensifiers. Mix the powders in a glove box;
- Do not use mercury, cyanide or uranium intensifiers, or cyanide reducers because of their high or extreme toxicity;
- The safest reducer to use is Farmer's reducer. Do not expose Farmer's reducer to acid, ultraviolet light, or heat.

5.4 Toner

Toning a print usually involves replacement of silver by another metal, for example, 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 the toning solutions.

Procedures

- Use toning solutions under local exhaust ventilation;
- Wear gloves and goggles;
- 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 of its probable cancer causing status.

5.5 Additional Hazards

Many other chemicals are also used in black and white processing, including formaldehyde as a pre-hardener, a variety of oxidizing agents as hypo eliminators (e.g., hydrogen peroxide and ammonia, potassium permanganate, bleaches, and potassium persulfate), sodium sulfide to test for residual silver, silver nitrate to test for residual hypo, and concentrated acids to clean trays. Electrical outlets and equipment can present electrical hazards in darkrooms due to the risk of splashing water.

Procedures

- Handle cleaning acids with great care;
- Wear gloves, goggles and an acid-proof, protective apron;
- Always add acid to the water when diluting;
- Do not add acid to, or heat hypochlorite bleaches;
- Keep strong oxidizing agents separate from flammable substances.

6.0 Painting and Drawing General Safety

The health hazards associated with painting and drawing have long been understood. Working safely in the arts can involve changes in how you select your art materials and how you handle them.

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Care should be taken when using support equipment such as drawing horses and easels in the Painting and Drawing classroom. Drawing horses hold a drawing board while the user straddles the narrow bench. The following are required practices when using drawing horses or easels:

- Do not sit towards the back on a drawing horse. Sitting towards the back can cause the horse to fall backwards;
- Three point easels must be set up correctly for properly use and to avoid tipping or collapsing;
- The stabilizing bar must be parallel to the central axis, with all three support points in the form of an equal triangle and tightened properly;
- The painting support bar must be parallel to a line drawn between the two front support points and tightened properly.
- Employ proper lifting techniques, as detailed in section 2.11, when moving easels or horses.
- Never exceed the manufacturer's recommended weight limit.

6.2 Pigments

Paints are pigments mixed with a vehicle or binder. Both inorganic and organic pigments are used as colorants. Painters use pigments in oil paints, acrylics, watercolor paints, gouache, encaustic, poster paints, casein paints and tempera. Sometimes commercial paints such as oil, enamel, epoxy paints and automobile paints are used. Dry pigments can be especially hazardous because they are easily inhaled and ingested. They are used in encaustic, paper-marbleizing and in the fabrication of paint products.

Most paints used in Visual Arts do not contain metal pigments and are considered non-toxic. These are most easily identified by the product name. If the paint is described as hue, such as "chromium yellow hue", there is little to no toxic metal contained in the product.

Procedure

- Obtain SDSs on your paints to find out what pigments you are using. This is especially important because the name that appears on the tube of color may or may not truly represent the pigments present. Manufacturers may keep the name of a color while reformulating the ingredients;
- Use the least toxic pigments possible. Do not use lead or carcinogenic pigments;
- Avoid using dishes, containers, or utensils from the kitchen to mix and store paints and pigments.

6.3 Water Based Paints

Water-based paints include water color, acrylic, gouache, tempera and casein. Water is used for thinning and cleanup. All water-based paints contain a preservative to prevent mold or bacterial growth. Sometimes artists add preservatives when they make their own paints. Although present in small amounts, certain preservatives may cause allergic reactions in some people.

Procedures

- If you add your own preservative, avoid using sodium fluoride, phenol or

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mercury compounds. For tempera, a small amount of pine oil works for short periods of time;

- If you experience eye, nose or throat irritation while using acrylics, get fresh air by leaving the area and contact EHSO at 404-727-5922.

6.4 Airbrushing and Spray

Artists use many products in spray form, including fixatives, retouching sprays, paint sprays, varnishes, and adhesive sprays. To apply these products, airbrushes and aerosol spray cans may be used. Spray mists are particularly hazardous because they are easily inhaled. Aerosol spray paints have an additional hazard besides pigments and solvents. They contain propellants, usually isobutanes and propane, which are extremely flammable and have been the cause of many fires. Other aerosol spray products such as retouching sprays, varnishes, etc. also contain solvents, propellants and particulates. Airbrushing produces a fine mist which is a serious inhalation hazard because artists work so close to their art work.

Procedures

- Try to brush items rather than spraying if possible;
- Apply spray fixative outside;
- Use water-based airbrushing paints and inks rather than solvent-based paints;
- Contact EHSO for an evaluation to determine if ventilation is adequate or if respiratory protection is needed.
- Never try to spray paint by blowing air from your mouth through a tube. This can lead to accidental ingestion of the paint

6.5 Dry Drawing Media

Dry drawing media includes dust-creating media such as charcoal and pastels which are often fixed with aerosol spray fixatives, and media such as crayons and oil pastels which do not create dust.

Procedures

- Use types of pastels, chalks, etc., that create the least amount of dust;
- Do not blow off excess pastel or charcoal dust with your mouth. Instead tap off any excess dust so that it falls to the floor;
- Wet-mop and wet-wipe all dust containing surfaces;
- If inhalation of dust is a problem, a respirator may be appropriate. Contact EHSO for evaluation, selection and fit-testing.

6.6 Liquid Drawing Media

Liquid drawing media includes both water-based and solvent-based pen and ink and felt tip markers. Hazards of dry erase or white board markers can be considered here, although they are more commonly used in teaching or commercial art. Drawing inks are usually water-based, but there are some solvent-based drawing inks. These usually contain toxic solvents such as xylene. Xylene, a toxic aromatic hydrocarbon, is also a common ingredient in permanent felt tip markers that are used in design or graphic arts. Newer brands of permanent felt tip markers often contain the less toxic propyl alcohol (although this can be an eye, nose and throat irritant). The major hazard from using permanent markers results from using a number of them at the same time at close range.

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- Use water-based markers and drawing inks if possible;
- Alcohol-based markers are less toxic than aromatic solvent-based markers;

7.0 Film and Video General Safety

The most common hazards associated with film and video are ergonomic hazards resulting in repetitive stress injuries and electrical hazards. Film and video production may appear to be a low hazard activity when viewed from a total body perspective, but maintaining postures or performing highly repetitive tasks for extended periods can lead to problems in localized areas of the body. Film and Video faculty and students should take short breaks (micro breaks or rest pauses) to rest, stretch, change positions and posture (refer to section 2.13 for guidelines on Electrical Safety).

8.0 References

- [Emory University Personal Protective Equipment Guideline](#)
- [Emory University Hazard Communication Program](#)
- [Emory University Visual Arts Chemical Disposal Guidelines](#)
- [Princeton University Art Safety Training Guide](#)
- American National Standard for Emergency Eyewash and Shower Equipment ANSI Z358.1(current)