

Guide To Working With Controlled Products In Visual Arts University of Ottawa

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Applicability

All personnel working with artist materials at the University of Ottawa must be aware of the hazards associated with arts supplies, where to obtain more information on the products, how to interpret this information and where to dispose of hazardous waste materials.

General

As a rule, working with visual arts materials should cause no concern for health or safety. What may be less obvious is that there can be risks from a few of the arts materials themselves, such as some pigments and solvents. Most of the materials used in arts courses are typical of the materials we encounter in daily life – from our work or our hobbies, in dust, in the food we eat and the liquids we drink. Many arts materials are, in fact, natural substances that have been prepared in forms useful to artists.

This guide describes what is known about the possible risks associated with some arts materials, and how such risks can be minimised.

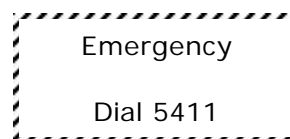
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Acute and chronic effects

An **acute** effect is a reaction that happens immediately, or within about a day, after someone is exposed to a harmful material. It is usually obvious. If it is not serious, an acute effect is generally reversed after the cause is removed. However, some acute effects can be very serious.

A **chronic** effect usually results from prolonged or repeated exposure to relatively small amounts of a harmful substance. Chronic effects do not appear until months or years after the start of exposure (and for this reason their cause can be hard to identify). An example might be brain damage resulting from years of exposure to low concentrations of lead.

In general, there is very little risk of chronic effects to artists if they use something one or two hours per term, and very little more if they work with materials for an hour or two per week. However, as part of the learning process, artists should be taught about the hazards of a technique and proper precautions.



The University Environmental Health and Safety Service has further information available on their web site at <http://www.uottawa.ca/services/ehss/>.

Some Materials Used in Arts

Solvents



Solvents are simply liquids that can dissolve other substances. They are used in many arts techniques, either as part of the art material itself (in paints, inks, thinners or adhesives) or for cleaning up.

The hazard here is flammability and solvent vapours. Aqueous (water) based solvents are not flammable and are preferred.

What products contain solvents?

- Thinner, petroleum based oils
- Oil paints, varnishes
- Adhesives, glues
- Degreasers

What a solvent does to the body:

- Ingestion – many are poisonous if swallowed while a few some are extremely poisonous (methanol). Wash hands after working with products that contain solvents.
- Skin contact – skin irritation can occur. Appropriate impermeable gloves should be worn.
- Inhalation: can cause dizziness, headaches and in extreme cases asphyxiation. Always work in a well ventilated area.

Some solvents are capable of producing chronic effects (notably liver, kidney or nervous system damage) in people who are exposed to them over a period of years. While it is not a good idea to breathe solvent vapours unnecessarily, in most cases it is unlikely that normal exposure to small amounts for a few hours per week would add much to the risk of chronic effects. Personnel in laboratories are more at risk to be exposed to toxic solvents.

To remember

1. Use proper ventilation.
2. Avoid breathing in the vapours. Remove affected individuals to fresh air in case of dizziness.
3. Avoid skin contact.
4. Prevent static electricity discharges. Solvents are often flammable.
5. Dispose of waste solvent and rags by using appropriate red canisters available in work areas. Do not pour solvents down the drain.
6. Spray painting or aerosol use must be done in the spray paint booth.
7. Use disposable gloves when cleaning items with solvent.
8. Turpentine is not permitted for use. The supply store at the Department of Visual Arts has alternative solvents available.

Paints and Pigments



There are pigments that present few, if any, hazards, and some that should be used with care.

In particular, artists' paints and ceramic glazes contain a wide range of pigments and can include heavy metals to produce vivid colours. These metals can include:

- lead,
- cadmium,
- arsenic,
- chromium,
- mercury, and
- manganese.

The supply store has paints available that are less toxic. You must obtain permission from the instructor if you want to use industrial paints.

What pigments do to the body:

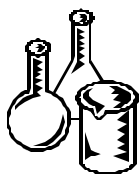
- Ingestion – Ingestion of small quantities of heavy metals over time can lead to poisoning and chronic effects.

- Skin contact –The solvent in paint is more likely to cause skin irritation than the pigment itself. Wash hands after handling these materials.
- Inhalation: pigment dust can contain lead and/or chromates. The long-term inhalation of such pigments can cause chronic effects. Always work in a well ventilated area.

Check the pigments you are using – find out what they contain and what their hazards might be. In many cases the label on the packaging may tell you what pigments a paint contains; when in doubt, contact the supplier or manufacturer for the product MSDS.

To remember

1. The heavy metals in some pigments can cause long term effects if the pigment is ingested over long periods of time.
2. Avoid breathing in pigment dust.
3. After working with pigments, wash your hands before eating.
4. Do not leave your paintbrushes in solvent.
5. Clean all spills/messes before leaving.
6. Keep solvent and paint containers closed.



Acids and Alkalis (Corrosives)

Several arts activities use acids or alkalis. If diluted solutions have to be made up from concentrated acids or alkalis,

precautions are essential because concentrated acids or alkalis are highly corrosive to the skin and eyes. Wear appropriate gloves, protective clothing and safety glasses when you handle photographic chemicals. If your skin comes in contact with corrosive material, flush the affected area with plenty of water.

What products contain corrosive materials?

- Flux used in soldering, flux in certain welding rods
- Glass etching liquid (acid)
- Pickling baths for metals

- Dies
- Photography chemicals, etc...

What corrosive material does to the body:

- Ingestion – most corrosive materials will cause damage to the digestive tract. Some are extremely poisonous. Wash hands after working with products that are corrosive.
- Skin contact – weak solutions can irritate the skin while stronger solutions will burn the skin. Appropriate impermeable

To remember

1. Use proper ventilation.
2. Avoid breathing in the vapours.
3. Avoid skin contact; wear impermeable gloves, and eye protection. Wash skin in large amount of water if skin contact occurs.
4. When diluting acids/alkali always add the product to water slowly.
5. Dispose of waste according to studio supervisor instructions

gloves should be worn.

- Inhalation: can cause dizziness and in extreme cases asphyxiation. Always work in a well ventilated area.

Always add the chemical to the water, slowly. If you splash any corrosive in your eyes, rinse your eyes with cool water for at least 15 minutes (preferably from an eyewash fountain) and get medical attention. Do not wear contact lenses when you work with corrosives – they can trap splashed liquids against the eyeball.



How do you choose gloves?

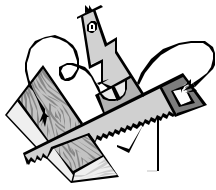
Since each chemical has distinct properties, the gloves recommended to handle the chemicals will vary.

Visit our Science EHS Officer's web site to get more information on selecting gloves.

http://www.science.uottawa.ca/ehss/glove_main.htm

Techniques and their Hazards

Working with Wood, Stone, etc...



equipment.

The primary hazards from woodworking and stonework are cuts and abrasions. You will receive instruction before beginning to use this

All two techniques will require you to wear dust masks, safety glasses, and ear protection (available at work shop).

What are the hazards?

- Sawdust can be a fire hazard if stored near flammables. For this reason, the workshop is cleaned daily.
- Depending on the stone used, the resulting dust will not only be harmful in the long-term. Miner's lung is caused through long-term exposure to fine dust. Some stone contains silica and can produce symptoms similar to miner's lung under long-term exposure conditions. Other naturally occurring rock can contain arsenic, asbestos, and heavy metals.
- Clay dust is very fine and can also damage the respiratory tract.

Students and personnel using hand tools need knowledge and skill to work safely and efficiently with their tools.

The instructor will inform you at the beginning of each session about:

- features of tool design and work design and the associated hazards;
- selecting the right tool for the task;
- safe and efficient work practices and procedures with hand tools;
- inspection and maintenance of cutting edges and striking surfaces;
- inspection and maintenance of safety guards on table saw;
- procedures for reporting and tagging defective tools; and
- daily housekeeping requirements.

Equipment is fully maintained twice a year.

To remember

1. Get instructions on how to use tools and equipment before beginning.
2. Wear hearing protection.
3. Wear dust mask when working in dusty areas.
4. Wear eye protection at all times. Someone else's mishap may injure you.
5. Heat and vibration are often present when working with hand tools.
6. Keep wood dust cleaned up and away from heat sources to prevent a fire hazard.
7. Treated wood is NOT PERMITTED in the workshop.

Photography



The greatest risk involved with photographic processing is the mixing of the stock solutions. The Photography Technician is the only person permitted to perform mixing. The chemicals used can vary depending on the processing performed. Black and white techniques use a handful of chemicals while full colour processing can use several chemicals.

What are the chemicals used on photo-processing?

- Developer (chemicals that are corrosive)
- Stop-bath (acetic acid)
- Fixer (acids and salts)

Advanced students may use the following only with permission from the Technician:

- Intensifiers (acid and chrome salts)
- Colour dyes (organic solvents)
- Hardeners and stabilizers (some contain formaldehyde)

Because of the nature of the chemicals involved, it is very important to read the MSDSs. These will explain the most likely hazards involved, how to handle the chemicals, and what to do in case of a situation.

To remember

1. Turn ventilation units on before working.
2. Wear gloves made available by the Photography Shop, safety glasses and long sleeved/long panted clothing when working with chemicals.
3. Do not wear sandals in the photography labs. They will not protect you from accidents.
4. Read the warning labels to ensure you are properly handling the material. MSDS sheets are the primary source of toxicological information. MSDSs are available on the EHSS web site or in paper format in the basement corridor.
5. Do NOT mix incompatible chemicals.
6. Dispose of waste according to instructions. Photography chemical waste is considered hazardous and must be disposed of in an environmentally responsible manner.
7. Use drip pans when moving dripping materials around.
8. Do not use tweezers assigned to specific baths in other baths.
9. Do not dip your hands in chemical baths.
10. Graduated cylinders are to be used with only one product and rinsed immediately after use.
11. Use of selenium toner is restricted.
12. Watch your step; floors may be wet.
13. Clean up small spills with a wet sponge.
14. Advise the Technician if a hazard is perceived.

Working with Metal



Electric arc and gas welding/cutting are techniques that involve special considerations. There are two types of welding equipment in the Visual Arts at the University of Ottawa:

- Electric Arc

Gas welding/cutting held by the welder and the work, which is connected to the opposite side of the electrical source. In many types of arc welding a shield is provided around the arc to prevent oxidization of the molten metal. In some types of arc welding, the electrode is coated with a flux, which among other things, cleans the joint and helps the molten metals to fuse. The electrode, or rod, may be consumed in the process, in

which case it may be a source of filler metal. Many types of arc welding use non-consumable electrodes.

In **electric arc** welding, heat is created when current flows between an electrode

Gas welding typically uses an oxy-acetylene gas flame as a source of heat. Some types of gas welding, such as soldering, use propane or other fuel gasses.

What are the hazards?

- Gas by-products (ozone, nitrogen oxides, carbon monoxide, carbon dioxide, hydrogen chloride)
- Metal dust
- Heat and noise
- Electrical
- Handling the materials (weight, abrasions, ...)
- Radiation (arc welding produces ultra-violet and/or infrared radiation)
- Compressed gases (acetylene, oxygen and others).

To remember

1. The instructor will provide training on welding and metal cutting techniques at the beginning of each session.
2. Wear of welding face shield, leather work gloves and protective equipment is mandatory.
3. Do not work alone.
4. Areas around equipment must be unencumbered.
5. Work in a well ventilated area.
6. Use portable screens to protect others in your area.
7. Always check condition of equipment before using.
8. Do not disable equipment guards. They are there to protect you.
9. Practical jokes and distracting people using equipment are forbidden.
10. Gas cylinders must ALWAYS be attached to prevent them from tipping.
11. Gas cylinders must ALWAYS be turned off at the end of the day.

Controlling the Risk

Common-sense rules that must be followed by all students:

1. No smoking in the building.
2. Locate the nearest fire extinguisher and fire exit in each room you work in.
3. Locate the first aid kits on each floor.
4. Only products and materials approved by the University are to be used. Turpentine alternatives and mineral spirits are available at the supply store.
5. Identify the hazards involved with the technique you will be using. Learn how to read product label warnings.
 - The Workplace Hazardous Materials Information System (WHMIS) has labelling requirements that are contained in Appendix III. Hazard symbols indicate any hazards applicable to the product. Ex: flammables such as thinners will have a flame hazard symbol as well as a toxic symbol.
 - The Hazardous Products Act has requirements for labelling consumer goods (available to the general public). Learn how to read these labels as well. Appendix IV has a summary of the consumer goods label requirements.
6. Read the product Material Safety Data Sheets (MSDSs). The University of Ottawa provides access to an internet database of MSDSs through the EHSS web site <http://www.uottawa.ca/services/ehss/msds.htm>

A binder is also available in the corridor near room 01 with MSDSs.
7. Use appropriate protective measures. Wear gloves, safety glasses, dust masks, protective clothing as recommended in the MSDS and Technicians. Wear clothing that will not get caught in equipment or photography baths.
8. Understand what types of gloves to wear when using different techniques.
9. Always wash your hands after working on your projects.

10. As directed by signage, keep food and drink away from art materials. If you put an arts material into a new container, make sure the container is properly labelled. Refer to Appendix II as WHMIS has labelling requirements that must be met for containers. For the same reason, do not store arts materials in refrigerators that also contain food or drink.

11. Determine storage requirements. Do not use the same cabinet or cupboard to store substances that can react with each other – if bottles are broken and the substances mix, there could be a dangerous reaction (including a fire). For example, do not store concentrated acids next to concentrated alkalis, or an oxidiser next to a flammable liquid such as lacquer thinner. The MSDS of each product will provide guidance.

A periodic verification of product storage is done and unnecessary products are removed.

12. Products and equipment are to be used in designated areas in order to maximise your health and safety.

13. Dispose of the waste in a responsible manner. The University of Ottawa has a hazardous waste management system that coordinates removal of materials. Ask the studio supervisor where to store waste products.

14. Do not damage the building, use building materials in your arts projects, or modify the building in any manner.

15. Close all windows when leaving a work area.

16. Keep your work area clean and your materials in your designated work space and storage area. Respect the space size you have been provided.

17. Help us respect the sewage use by-law by not pouring solvents and chemicals down the drain.

18. Lined garbage cans are available for non-hazardous waste.

19. Use the spray paint booth when coating surfaces by spray.

Small Spills

1. There are adsorbent materials available in the photography lab areas and in the photography supply store.
2. Advise the studio supervisor immediately.
3. Call 5411 if the situation cannot be handled safely. Protection Services will dispatch an appropriate response team.
4. Contact EHSS at 562-5892 if someone has a workplace accident.
5. Contact the photography lab supervisor if there is missing spill adsorbent.

Accidents/Incidents

In case of injury, please complete an accident/incident form available at <http://www.uottawa.ca/services/hr/rapaccb.pdf>.

Completed forms are to be sent to Human Resources Disability and Leave sector as per the form's heading instructions within 24 hours.

Appendix I

Common techniques and the hazards involved

Technique	Material/Process	Hazard
Air	Pigments Solvents	Lead, cadmium, manganese, cobalt, mercury, etc. Mineral spirits, turpentine
Batik	Wax Dyeing	Fire, wax fumes Dyes
Commercial art	Rubber cement Permanent markers Spray adhesives Airbrushing Photostats	<i>n</i> -Hexane, fire Xylene, propyl alcohol <i>n</i> -Hexane, 1,1,1-trichloroethane, fire See Airbrush proofs Alkali, propyl alcohol
Drawing	Spray fixatives	<i>n</i> -Hexane, other solvents
Painting	Pigments Oil, alkyd Acrylic	Lead, cadmium, mercury, cobalt, manganese compounds, etc. Mineral spirits, turpentine Trace amounts ammonia formaldehyde
Photography	Developing bath Stop bath Fixing bath Intensifier Toning Colour processes Platinum printing	Hydroquinone, monomethyl-p-aminophenol sulfate, alkalis Acetic acid Sulfur dioxide Dichromates, hydrochloric acid Selenium compounds, hydrogen sulfide uranium nitrate, sulfur dioxide, gold salts Formaldehyde, solvents, colour developers Platinum salts, lead, acids, oxalates
Welding	Oxyacetylene Arc Metal fumes	Carbon monoxide Ozone, nitrogen dioxide, ultraviolet & infra-red radiation, electrical Copper, zinc, lead, nickel, etc.

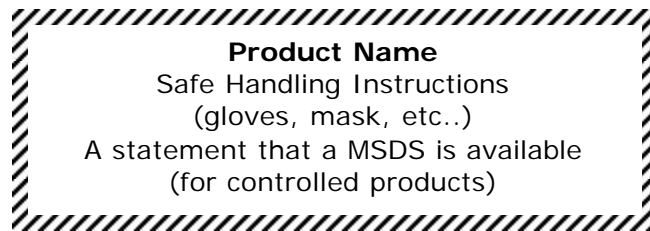
Technique	Material/Process	Hazard
Woodworking	Machining Glues Paint strippers Paints and finishes Preservatives	Wood dust, noise, fire Formaldehyde, epoxy Methylene chloride, toluene, methyl alcohol etc. Mineral spirits, toluene, turpentine, ethyl alcohol, etc. Chromated copper arsenate Pentachlorophenol, creosote

Appendix II

Labelling Containers used in an Arts Studio

It is important to label containers into which a controlled product is transferred. The required information is minimal and should appear on all non-original containers the product is stored in.
Ex: pouring thinner into smaller containers.

1. The label should look like this if the product is not available through a public store (grocery, hardware...):











2. If you are transferring product that can be bought at a public store into another container, remember to label it with:
 - the product name, and date.
3. If the container is to hold hazardous waste (used thinner, paint, oil...), the studio supervisor will follow waste labelling instructions from the EHSS group.





References:

ART TEACHER, BE AWARE, Health Canada, 1994 ISBN 0-660-15435-8
Welding Hazards, Education Safety Association of Ontario Inc., undated
Hand Tools, Education Safety Association of Ontario Inc., undated
SOLVENTS, Education Safety Association of Ontario Inc., undated
Artist Beware, Dr. M. McCann, 1986 (available at the Department of Visual Arts)
Health Hazards Manual for Artists, Dr. M. McCann, 1975

Appendix III Symboles SIMDUT et désignation des divisions/ WHMIS Classes and Corresponding Hazard Symbols

	Gaz Comprimés/ Compressed Gases		Matières ayant d'autres effets toxiques/ Materials Causing Other Toxic Effects
	Matières Inflammables et Combustibles/ Flammable and Combustible Materials		Matières infectieuses/ Biohazardous Infectious Materials
	Matières Comburantes/ Oxidizing Materials		Matières corrosives/ Corrosive Materials
	Matières ayant des effets toxiques immédiats et graves /Materials Causing Immediate and Serious Toxic Effects		Matières dangereusement réactives/ Dangerously Reactive Materials

Appendix IV Système d'étiquetage pour produits consommateurs/ Consumer goods hazard symbols

Symbol	Hazard	Precautions
	Poisonous May be lethal, or May cause serious and irreversible effects.	Do not get in eyes or on skin. Do not breathe fumes. Wear protective clothing and safety equipment as indicated on the label.
	Corrosive Causes Burns Will cause chemical burns to the skin, eyes and lungs. May form dangerous fumes when mixed with other chemicals.	Do not mix with other chemicals. Do not get in eyes or on skin. Do not breathe fumes. Do not swallow. Wear protective clothing as indicated on the label.
	Flammable Fire hazard May ignite if exposed to a spark or flame or May spontaneously ignite	Read the specific instructions on the label. Use only in well ventilated areas. Keep away from flames and objects that spark. Store in a safe location.
	Pressurised container Explosion Hazard Under Pressure may explode if heated. If ruptured hazardous contents will be released	Do not puncture. Do not burn. Store away from heat.
QUICK SKIN BONDING ADHESIVE	Bonds Skin Instantly	Do not get in mouth, eyes or on skin.