Studio Arts Chemical Safety Guidelines

Students, faculty members, technicians and visitors working in Concordia University studios or workshops with artist materials must be aware of the hazards associated with arts supplies and equipment. They must know where to obtain more information on the products they use, how to interpret this information, how to protect themselves and how to properly dispose of hazardous waste materials.

Even though work involving visual arts materials should cause no concern for health or safety, there are risks associated with a few of the arts materials themselves, such as pigments, paints, solvents and solid materials such wood or stone. These guidelines describe possible risks associated with some arts materials and how such risks can be minimized.

Chemical Safety Training

Safety is the responsibility of everyone at Concordia University. The Faculty of Fine Arts collaborates closely with Concordia’s Environmental Health & Safety (EHS) office by providing a safety seminar for Fine Arts faculty, staff and graduate students.

WHMIS (Workplace Hazardous Material Information System) training is provided by EHS and mandatory for anyone directly working with chemicals or in areas where chemicals are being stored or used. Until December 1st, 2018, both versions of WHMIS (1988 & 2015) are valid and therefore workshop and studio users must be trained for both versions of the legislation.

Furthermore, people who are responsible for the management of the hazardous waste resulting from the workshop/studio activities must take the Hazardous Waste Disposal for Fine Arts training. This training ensures that any hazardous waste generated at the University is disposed of properly in order to protect the public and the environment.

A new EHS training calendar is posted each academic semester and available at http://www.concordia.ca/campus-life/safety/training.html#calendar. Certain courses are also available on-line via Moodle, including:
- WHMIS 1988 for Fine Arts
- WHMIS 2015

People can choose to either attend a live training session or to do the training on-line. Details EHS concerning safety trainings are available on the EHS Safety Training web page.

Chemical Hazards

WHMIS stands for Workplace Hazardous Materials Information System. It is a comprehensive plan for providing information on the safe use of hazardous materials in Canadian workplaces. WHMIS 1988 was created in response to the Canadian workers' right to know about the safety and health hazards that may be associated with the materials or chemicals they use at work.

Information is provided by means of product labels, material safety data sheets (MSDSs) or safety data sheets (SDSs) and worker education programs. MSDSs or SDSs are provided by the supplier to give users detailed information about the hazards and safe use of products. Before using any product for the first time, students and staff should review this information.

The WHMIS 1988 legislation defines six classes of hazardous materials with defined chemical hazards associated with each class. Certain arts materials are included in one class or more, with the potential of having several chemical hazards associated with them.

### WHMIS 1988 Classification of Materials

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Classes</th>
<th>Definition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="A Symbol" /></td>
<td>A Compressed gases</td>
<td>Products held under pressure</td>
<td>Propane Butane Acetylene Cryogens</td>
</tr>
<tr>
<td><img src="image" alt="B Symbol" /></td>
<td>B Flammable and combustible materials B1 Flammable gases B2 Flammable liquids B3 Combustible liquids B4 Flammable solids B5 Flammable aerosols B6 Reactive flammable materials</td>
<td>Products that will burn or catch on fire easily</td>
<td>Acetone Toluene Paint thinner Varnish Varsol Spray paint Oily rags</td>
</tr>
<tr>
<td><img src="image" alt="C Symbol" /></td>
<td>C Oxidizing materials</td>
<td>Products that can cause or promote combustion of another material (whether or not they are themselves combustible) or products that are organic peroxides.</td>
<td>Peroxides Nitric acid Javel Nitrates</td>
</tr>
</tbody>
</table>
WHMIS 2015

The *Globally Harmonized System of Classification and Labelling of Chemicals (GHS)* was adopted by the UN Economic and Social Council (ECOSOC) in July 2003. The purpose of this system is to regroup all existing hazard communication systems on chemicals in order to develop a single, globally harmonized system to address classification of chemicals according to their hazards and communicate the related information through labels and safety data sheets.

On February 11, 2015, the Government of Canada published the Hazardous Products Regulations (HPR, SOR/2015-17), repealing at the same time the former Controlled Products Regulations (SOR/2015-17, s. 21). The new HPR modified the Workplace Hazardous Materials Information System (WHMIS) 1988 to incorporate the *Globally Harmonized System of Classification and Labelling of Chemicals (GHS)* for workplace chemicals. This modified WHMIS is referred as **WHMIS 2015**.

The change to WHMIS 2015 will bring new standardized:

- classification rules and hazard classes based on:
  - physical hazards
  - health hazards
  - environment hazards *(not proposed to be adopted in Canada under WHMIS)*
- format for Safety Data Sheets (SDSs) *(formerly known Material Safety Data Sheets)*
- label requirements:

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D1</strong> Materials causing immediate and serious toxic effects</td>
<td>Products that can rapidly cause harmful health effects, including death</td>
<td>Pigments, Paints/varnishes, Solvents, Turpentine, Silica dust, Wood dust, Developers, Accelerators</td>
</tr>
<tr>
<td><strong>D2</strong> Materials causing other toxic effects</td>
<td>Products whose health effects generally appear over time following one or several exposures</td>
<td>Blood, Cells, Bacteria</td>
</tr>
<tr>
<td><strong>D3</strong> Bio hazardous infectious materials</td>
<td>Living organisms or their toxins that can cause disease in people or animals</td>
<td></td>
</tr>
<tr>
<td><strong>E</strong> Corrosive materials</td>
<td>Products that can corrode metal surfaces or cause burns to skin</td>
<td>Acetic acid, Film developers, Ferric chloride, Javel</td>
</tr>
<tr>
<td><strong>F</strong> Dangerously reactive materials</td>
<td>Products that can be health or safety hazards under certain conditions (pressure, temperature, impact, violent reaction with water or air)</td>
<td>Solid ferric chloride, Epoxies, Peroxides</td>
</tr>
</tbody>
</table>
In order to give suppliers, employers and workers time to adjust to the new system, implementation of WHMIS 2015 will take place over a three-stage transition period that is synchronized nationally across federal, provincial and territorial jurisdictions. During the different transition phases proposed, both WHMIS 1988 and WHMIS 2015 versions can be used. By December 1st, 2018, the WHMIS 1988 version will be repealed and only WHMIS 2015 will be used. More details concerning the different WHMIS transition phases can be obtained from Health Canada WHMIS Transition web page.

The new WHMIS 2015 legislation proposes new classification rules and hazard classes based on physical and health hazards. The following table shows the new WHMIS 2015 pictograms associated with the different hazard classes.

<table>
<thead>
<tr>
<th>Pictogram</th>
<th>Hazard Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explosives*</td>
<td>Self-reactive substances and mixtures</td>
</tr>
<tr>
<td></td>
<td>Organic peroxides</td>
</tr>
<tr>
<td>Flammables (gases, aerosols, liquids, solids)</td>
<td>Self-reactive substances and mixtures</td>
</tr>
<tr>
<td></td>
<td>Pyrophoric liquids, solids and gases</td>
</tr>
<tr>
<td></td>
<td>Self-heating substances and mixtures</td>
</tr>
<tr>
<td></td>
<td>Substances and mixtures, which, in contact with water emits flammable gas</td>
</tr>
<tr>
<td></td>
<td>Organic peroxides</td>
</tr>
<tr>
<td>Oxidizing gases, liquids and solids</td>
<td></td>
</tr>
<tr>
<td>Gases under pressure</td>
<td></td>
</tr>
<tr>
<td>Serious eye damage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skin corrosion</td>
</tr>
<tr>
<td></td>
<td>Corrosive to metals</td>
</tr>
</tbody>
</table>
Acute toxicity (severe)

Skin sensitization
Skin irritation
Eye irritation
Acute Toxicity (harmful)
Specific target organ toxicity – single exposure (Category 3)
Hazardous to the ozone layer*

Carcinogenicity
Respiratory sensitization
Reproductive toxicity
Specific target organ toxicity – repeated exposure
Specific target organ toxicity – single exposure (Categories 1 & 2)
Germ cell mutagenicity
Aspiration hazard

Hazardous to the aquatic environment*

Biohazardous infectious materials

*The environmental and the explosives hazard classes are not covered under WHMIS 2015.

Consumer Chemical Products

If arts materials are bought in Canada through a retail store/outlet network (e.g. Rona, Canadian Tire...), then that product must meet the requirements of the Consumer Chemicals and Containers Regulations 2001 (SOR/2001-269), and therefore bears different hazards pictograms. These arts materials are to be considered as dangerous as those who bear WHMIS labels.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Classes</th>
<th>Definition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Toxic Product</td>
<td>May be lethal or cause serious or irreversible effects</td>
<td>Paints, Varnishes, Acetone, Solvents</td>
</tr>
<tr>
<td></td>
<td>Corrosive Product</td>
<td>Cause chemical burns. May form dangerous fumes when mixed with other chemicals</td>
<td>Javel, Muriatic acid, Acetic acid, Household cleaners</td>
</tr>
</tbody>
</table>
# How Chemicals Enter the Body

## Inhalation

This is the major route of entry for airborne chemicals (dust, mist, vapors). The chemicals can have a direct effect on the nose, upper respiratory tract and the lungs or they can enter the blood stream and thus affect the blood, bone, heart, brain, liver, kidneys or bladder.

## Ingestion

This is not normally a direct route of entry from exposure except by wilful or accidental ingestion. Materials can also enter the stomach through indirect means. For example, the lung has a cleaning mechanism which pushes material out of the lung where it can be swallowed. This can result in an exposure to most of the internal organs or even in a local action on the stomach wall. Direct mouth contact with contaminated hands while eating or drinking can also lead to involuntary ingestion of hazardous materials.

## Skin Contact

Some materials are absorbed through the skin and therefore, when they enter the bloodstream, they can be transported throughout the body and accumulate in, or affect, the most sensitive areas of the body. Skin contact can also result in allergic reaction, the removal of the protective skin oil, or dermatitis. In some cases, the chemical contact may result in a cancerous lesion.

## Potential Health Effects of Chemicals

### Acute Effect

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

**Reproductive Health Effects**
Many arts materials used can also affect the reproductive system. Some chemicals have specific effects on the male reproductive system (e.g. cadmium, manganese, and lead) while others are more specific for the female reproductive system (e.g. toluene and xylene which cause menstrual irregularities).

**Pregnant and Breast-Feeding Women**
Certain chemicals are known to cross the placental barrier and possibly cause damage and birth defects (e.g. lead, cadmium, mercury, copper, carbon monoxide, dyes and many organic solvents). Furthermore, many chemicals, especially those containing heavy metals (e.g. lead, mercury, cadmium, copper) and solvents (e.g. xylene, acetone, toluene) can be found in a woman's milk several hours after exposure and can affect the infant.

**Some Materials Used in Arts**

**Solvents**
Solvents are defined as liquids that can dissolve other substances. They are used in many arts techniques, either as part of the art material itself (such as paints, inks, thinners or adhesives) or for cleaning up. The primary hazards are flammability and solvent vapours. Aqueous (water) based solvents are not flammable and do not produce toxic vapors. Therefore, their use should always be preferred over those containing organic solvents.

Examples of arts materials containing solvents:
- thinner, petroleum based oils
- oil paints, varnishes
- adhesives, glues
- degreasers

Potential health effects of solvents:
- some can be poisonous (e.g. methanol) if swallowed
- can create skin irritation / allergy reactions
- vapors can cause dizziness, headaches and in extreme cases asphyxiation
- 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
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, often toxic, can include:

- lead
- cadmium
- arsenic
- chromium
- mercury
- manganese

The use of pigments containing toxic metals should be avoided or minimized as much as possible. New pigments are available from certain suppliers that do not contain toxic metals. The following table gives a list of known toxic pigments.

<table>
<thead>
<tr>
<th>Highly Toxic Pigments (known/probable carcinogens)</th>
<th>Moderately Toxic Pigments</th>
</tr>
</thead>
<tbody>
<tr>
<td>• antimony white (antimony trioxide)</td>
<td>• alizarin crimson (lakes of 1,2-dihydroxyanthraquinone or insoluble anthraquinone pigment)</td>
</tr>
<tr>
<td>• barium yellow (barium chromate)</td>
<td>• carbon black (carbon)</td>
</tr>
<tr>
<td>• burnt umber or aw umber (iron oxides, manganese silicates or dioxide)</td>
<td>• cerulean blue (cobalt stannate)</td>
</tr>
<tr>
<td>• cadmium red or orange (cadmium sulfide, cadmium selenide)</td>
<td>• cobalt blue (cobalt stannate)</td>
</tr>
<tr>
<td>• cadmium yellow (cadmium sulfide)</td>
<td>• cobalt green (calcined cobalt, zinc and aluminum oxides)</td>
</tr>
<tr>
<td>• cadmium barium colors (cadmium colors and barium sulfate)</td>
<td>• chromium oxide green (chromic oxide)</td>
</tr>
<tr>
<td>• cadmium barium yellow (cadmium sulfide, cadmium selenide, barium sulfate, zinc sulfide)</td>
<td>• manganese blue (barium manganate, barium sulfate)</td>
</tr>
<tr>
<td>• chrome green (Prussian blue, lead chromate)</td>
<td>• Prussian blue (ferric ferrocyanide)</td>
</tr>
<tr>
<td>• chrome orange (basic lead carbonate)</td>
<td>• toluidine red (insoluble azo pigment)</td>
</tr>
<tr>
<td>• chrome yellow (lead chromate)</td>
<td>• toluidine yellow (insoluble azo pigment)</td>
</tr>
<tr>
<td>• cobalt violet (cobalt arsenate or cobalt phosphate)</td>
<td>• viridian (hydrated chromic oxide)</td>
</tr>
<tr>
<td>• cobalt yellow (potassium cobalt nitrate)</td>
<td>• zinc white (zinc oxide)</td>
</tr>
<tr>
<td>• lead or flake white (basic lead carbonate)</td>
<td></td>
</tr>
<tr>
<td>• lithol red (sodium, barium and calcium salts of soluble azo pigment)</td>
<td></td>
</tr>
<tr>
<td>• manganese violet (manganese ammonium pyrophosphate)</td>
<td></td>
</tr>
<tr>
<td>• molybdate orange (lead chromate, lead molybdate, lead sulfate)</td>
<td></td>
</tr>
<tr>
<td>• naples yellow (lead antimonate)</td>
<td></td>
</tr>
<tr>
<td>• strontium yellow (strontium chromate)</td>
<td></td>
</tr>
<tr>
<td>• vermilion (mercuric sulfide)</td>
<td></td>
</tr>
<tr>
<td>• zinc sulfide</td>
<td></td>
</tr>
<tr>
<td>• zinc yellow (zinc chromate)</td>
<td></td>
</tr>
</tbody>
</table>

Potential health effects of paints and pigments:
• ingestion or inhalation of heavy metals over time can lead to poisoning and chronic effects.
• skin irritation from solvents found in paints

**Acids and Alkalis (Corrosives)**
Several arts activities use acids or alkalis. If diluted solutions have to be made up from concentrated acids or alkalis, always make sure to add the acid or alkali to the cold water, and not vice versa, to avoid possible splashes. Precautions are essential because concentrated acids or alkalis are highly corrosive to the skin and eyes.

Examples of arts materials containing corrosives:
• glass etching liquid (acid)
• pickling baths for metals
• dyes
• photography chemicals (stop bath, developers, accelerators)
• ferric chloride etching solutions

Potential health effects of corrosives:
• ingestion can lead to the digestive tract irritation or poisoning
• skin irritation (weak solution) or skin burns (strong solution)
• vapors can cause lung irritation, dizziness and asphyxiation (in extreme cases)

**Wood, Stone and Other Sculpture Media**
The primary hazards from woodworking and stonework are cuts and abrasions. You should receive instruction or training before beginning to use this type of equipment. However, the dust generated from the different work processes can cause lung irritation, asthma and can potentially also be toxic (e.g. silica dust, wood dust). Furthermore, sawdust can be a fire hazard if stored near flammables. For this reason, the workshop must be cleaned daily.

Potential health effects of dusts:
• 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
• some naturally occurring rocks contain arsenic, asbestos or other heavy metals
• clay dust is very fine and can also damage the respiratory tract
• some wood dusts are reported to be carcinogens (see table below)
<table>
<thead>
<tr>
<th>Organisms</th>
<th>Common Name</th>
<th>Human Carcinogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH (2008)</td>
<td>Western red cedar</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Oak and beech</td>
<td>Confirmed</td>
</tr>
<tr>
<td></td>
<td>Birch, mahogany, teak, walnut</td>
<td>Suspected</td>
</tr>
<tr>
<td></td>
<td>All other wood dusts</td>
<td>No</td>
</tr>
<tr>
<td>CIRC (1995)</td>
<td>Wood dust</td>
<td>Confirmed</td>
</tr>
<tr>
<td></td>
<td>Wood dust (except beech and oak wood dust)</td>
<td>Animal models only</td>
</tr>
<tr>
<td>DFG (2007)</td>
<td>Beech wood dust</td>
<td>Confirmed</td>
</tr>
<tr>
<td></td>
<td>Oak wood dust</td>
<td>Confirmed</td>
</tr>
<tr>
<td>NIOSH (1992)</td>
<td>Wood dust</td>
<td>Potential (professional exposure)</td>
</tr>
<tr>
<td>NTP (2005)</td>
<td>Wood dust</td>
<td>Reported</td>
</tr>
<tr>
<td>RSST (2001)</td>
<td>Wood dust (red cedar)</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Wood dust hard and soft, except red cedar</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Ceramics**

Clays are minerals composed of hydrated aluminum silicates, often containing large amounts of crystalline silica. Other impurities may include organic matter or sulphur 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. Clays can be worked by hand or on the potter’s wheel, or cast in a clay slurry into moulds.

Potential health effects of clays:

- Inhalation of large amounts of clays dust during mixing can create a condition known as “silicosis” or “potter's rot”, arising from exposure to the free silica found in clays.
  - Symptoms include: shortness of breath, dry cough, emphysema, and high susceptibility to lung infections such as tuberculosis.
- Silica dust exposure is not hazardous by skin contact or ingestion.
- Asbestos inhalation may cause asbestosis, lung cancer, mesothelioma, stomach cancer, and intestinal cancer.
- Sand, perlite, grog, and vermiculite contain free silica and are, therefore, highly toxic by inhalation.
- Vermiculite is also frequently contaminated with asbestos.
- Hypersensitivity pneumonia, asthma, or other respiratory problems may occur with exposure to months, or with inhalation of dry aged clay.

**Photography**

The greatest risk involved with photographic processing is the mixing of the stock solutions. 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.
Chemicals used on photo processing:
- developer (corrosives)
- stop-bath (acetic acid)
- fixer (acids and salts)
- intensifiers (acid and chrome salts)
- colour dyes (organic solvents)
- hardeners and stabilizers (some contain formaldehyde)

**Artificial Smoke or Mist**
If artificial smoke is to be produced on stage, precautions must be taken to avoid anyone inhaling fumes. The area must always be well ventilated and the smoke has to be properly evacuated out of the room. The only substances that should be used to produce artificial smoke should be propylene glycol and glycerine.

Other substances can also be used, but only in smaller amounts and for short period of times such as:
- cryogens (dry ice, liquid nitrogen)
- butylene glycol, polyethylene glycol or triethylene glycol

However, the following chemicals should not be used to produce artificial smoke or mist:
- ethylene glycol and diethylene glycol
- mineral oil
- petroleum spirits
- charcoal
- hexachloroethane or cyclohexylamine

**Fibres and Textiles**
Health hazards in fibre or textile arts, include dusts, gases, fumes and vapours that are inherent in the materials or are produced in the work process, and can be inhaled or affect the skin. Chemical hazards may include the use of dyes, paints, acids, alkalis or mothproofing agents.

Vegetable fibre materials may be contaminated with biological materials, such as moulds or mildew, which can cause allergic reactions. Exposure to vegetable dusts may cause lung irritation or other effects such as asthma, hay fever, bronchitis and emphysema. Animal products such as wool, hair, hides and feathers may also be contaminated with bacteria, moulds, lice or mites and must therefore be treated or fumigated before use.

Synthetic fibres (polyesters, nylon, acrylic, rayon and acetates) may release gas or other toxic residues which are left in the fabric after processing, as in the case of formaldehyde released by polyesters or permanent-press fabrics. Heating, scorching or otherwise altering synthetic materials chemically may release potentially hazardous gases or fumes.
The use of corrosive solutions and the treatment of fibers with boiling liquors create potential risks of burns and scalds. Hydrochloric acid and sulphuric acid are used in dying processes while sodium hydroxide (caustic soda) or hypochlorite solutions (bleach) are used for bleaching.

Potential health effects of fibre/textile work:
- exposure to organic solvent, organic dyes
- toxic fumes or vapors
- chemical burns (acids/bases)
- allergic reactions

**Gas Welding**

Gas welding typically uses an oxyacetylene gas flame (mixture of acetylene and oxygen gases) as a source of heat. Acetylene is an extremely flammable gas. It is different from other flammable gases because it is also unstable. A flashback can occur if there is a flammable mixture of fuel gas and oxygen in the hoses when the torch is lit. If it is not stopped, the flame will ignite the mixture and will travel backwards from the torch, along the hoses, through the regulator and into the cylinder. A flashback can trigger decomposition of the acetylene in the fuel hose, in the regulator and in the cylinder itself. Therefore, flashback arresters have to be installed onto the pressure regulators on both the acetylene cylinder and the oxygen cylinder with check valves for every 15 ft. of hose used.

Some types of gas welding, such as soldering, use other fuel gasses such as propane or butane, which are highly flammable. The welding process generates a number of toxic air contaminants, including metal fume. 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. Lead and zinc are sometimes found in brazing rods, and fluoride and lead are common hazards associated with soldering.

Potential health effects of gas welding:
- toxic gas by-products (ozone, nitrogen oxides, carbon monoxide)
- toxic metal dust and fumes
- heat, burns, flashes and noise
- highly flammable

**Basic Preventative Measures**

- **DO NOT** eat, drink, or smoke in the studios or workshops:
  - Do not store food, drinks or cigarettes in studios or in close proximity to chemicals.
  - Do not store arts materials in refrigerators that also contain food or drinks.
• SUBSTITUTE less hazardous materials or techniques whenever possible. There are many instances where highly toxic chemicals can be replaced by less toxic materials.

• KNOW the materials and their hazards. If labels do not have adequate information regarding contents, hazards, and precautions, read the SDS of the product.

• STORE materials safely:
  o ALWAYS use unbreakable containers and label them clearly.
  o It is important to label containers into which a controlled product is transferred, or brought into the workplace. The required information is minimal:
    ▪ Product Identifier (name)
    ▪ Safety precautions (hazards, storage, handling...)
    ▪ Reference to an SDS
  o This information should appear on all non-original containers and on containers brought into the workplace (such as commercial products) that the product is stored in. For example, a workplace label is required when pouring thinner into smaller, unlabelled containers.

**Example of a workplace label**

- Containers should always be tightly covered when not in use to prevent evaporation of the contents into the environment. NEVER store materials in containers which are normally used for food or drink (i.e. cups, pop bottles, Tupperware, jars, etc.).

• Store containers in appropriate cabinet:
  o flammable cabinet (yellow) for flammable and combustible liquids
  o corrosive cabinet (blue) for acids or caustics

• ENSURE proper, effective ventilation (room ventilation or local exhaust, shown below) before performing any work.

**Examples of local exhaust systems**
• Always wash your hands after working on your projects and before exiting the studio or workshop.
• Long / lose hair must be tied up.
• Dispose any hazardous waste in a responsible manner, following Concordia University procedures concerning hazardous waste management. More info can be obtained at hazardouswaste@concordia.ca
• Never place hazardous chemicals in regular garbage.
• WEAR appropriate personal protective equipment (PPE) such as respirators, gloves, face shields, ear muffs, and footwear. The type of equipment used must match the hazard you are trying to protect yourself from (see next section).

**Personal Protective Equipment (PPE)**

Personal protective equipment (PPE) is not the best method of protection from the hazards associated with some of the arts, but in the absence of elaborate engineering control systems (e.g. ventilation), it is the best alternative. PPE is designed to protect the wearer from specific hazards, either physical or chemical, and is intended for short term or limited use. Choosing the right type, along with the right size of PPE, ensures to fully protect the person against the type of hazard which is being controlled. Failure to ensure this will result in the person thinking that they are being protected when they are not.

**Limitations**

Certain types of PPE (e.g. gloves or respirators) have limitations caused by exposure to chemical substances. The type of PPE to be selected will vary depending on the type of substance or hazard to which the person is being exposed. One type or brand of PPE does not protect against all hazards and often a combination of PPE is required. Furthermore, single-use PPE, such as disposable gloves, are not meant to be re-used and should be discarded.

**Chemical Resistant Gloves**

Synthetic gloves of a suitable material are required to protect your skin from absorbing the chemical that it may be exposed to. The most common types of gloves are made of rubber (i.e. Neoprene, Nitrile, or Latex) or plastic (PVC, polyethylene, urethane). Leather gloves do not provide any protection from chemicals. Not all types of synthetic gloves are resistant to all types of chemicals. The type selected must be matched against the chemicals that you are handling. For example: Nitrile gloves have good resistance to 50% acetic acid, but natural rubber (latex) gloves have poor resistance. It is essential that the proper type of glove is chosen which will provide the greatest protection from the chemical being handled.
It is also important that gloves should be CHANGED REGULARLY, with the old (contaminated) ones being discarded and replaced with new ones. The longer that synthetic gloves are exposed to the chemicals that they are repellent to, the greater the deterioration in the gloves.

**Respiratory Protection**

This type of protection is necessary where there is a potential hazard of inhaling toxic dusts or mists. Although there are several types of respiratory protection available, the two most common types are dust / mist respirators (masks) and chemical cartridge respirators. Again, the proper type of respirator must be chosen for the work being done and the substance being used or no protection will be provided. Respiratory protection equipment is intended for individual use and not intended to be shared with other people. Before using or purchasing any kind of respirators, users must be fit-tested to ensure proper fit. Contact the Environmental Health & Safety office (ehs@concordia.ca) to request a fit testing appointment in order to get assistance in properly adjusting these devices and for guidance in respirator maintenance.

**Filtering Face-piece Respirators (FFRs)**

Filtering Face-piece Respirators (FFRs) (commonly called dust respirators) are disposable masks composed of thick layers of filter materials which is worn over your nose and mouth and held in place by two elastic straps. These masks provide some degree of protection from certain dusts or particles and coarse spray mists of chemicals with low toxicity according to their rating:

- **N**: not resistant to oil particles
- **R**: somewhat resistant to oil particles
- **P**: strongly resistant to oil (oil proof) particles
- **95, 99 or 100**: protection rating (%) in NIOSH test

Only types which carry a NIOSH approval number are acceptable (e.g. 3M Brand Model 8210). They provide a physical barrier against breathing the material, **but do not purify or clean the air that you are breathing**. Their use is very limited and will not provide any protection against very toxic chemical vapors.

**Air Purifying (Cartridge) Respirators**

Air purifying respirators (APR) consist of a half- or full-face rubber mask, worn over the nose and mouth and held in place by adjustable straps which go over and behind your head. The mask is fitted with two removable filter cartridges consisting of either:

- **High Efficiency Particulate Air (HEPA) filter cartridges:**
  - they consist of several layers of high density filter paper folded within a plastic container which is at least 99.97% efficient in collecting 0.3 micron diameter aerosol particles. It is useful for protection from hazardous particles or fine dusts (e.g. asbestos, silica)

- **Chemical vapor cartridges:**
they contain a form of activated charcoal that filters out and traps the potentially harmful chemical vapours. The cartridges are chemical-specific (e.g. organic vapors, acid vapors...) and must therefore match the hazard you are trying to protect yourself from.

These units are heavier than the dust/mist masks, but provide far better protection for the wearer, provided that they are fitted properly.

This type of respiratory protection has some limitations:

- they cannot be used in areas of low oxygen concentration (i.e. an oxygen deficient atmosphere)
- they cannot be used with very toxic chemicals
- they should not be used with chemicals which have no smell or odour

Eye Protection

These devices are intended to protect the wearer's eyes from physical or chemical injury. Where any signs of damage or deterioration are noticed, these devices should be replaced without delay.

**Impact Protection for Eyes / Face**

Safety glasses (with side shields) and safety goggles (with open vents) are intended to protect the wearer from any physical injury from flying particles or dusts which might enter the eye and cause damage. These devices do not seal off the eye area and are not suitable for use for protection from chemicals. Plastic face shields are intended to protect the face area and do not adequately protect the eyes when used by themselves. Safety glasses or goggles must be worn with face shields to ensure adequate protection.

**Chemical Splash Goggles**

Chemical splash goggles fit snugly against the wearer's face to prevent chemicals from entering the eyes and causing damage. These devices have protected air vents which will prevent liquid chemicals from coming in contact with the eyes in the event of a splash or splatter. These devices are not intended to be used in atmospheres with high concentrations of toxic chemical vapours. For those environments, a supplied air respirator which provides full facial protection would be required.
Body Protection
Where potentially hazardous chemicals are being handled, mixed, or used, the person performing this function should make sure to minimize skin exposure by wearing pants, long-sleeves and closed shoes. A closed lab-coat or chemically resistant apron must also be worn for added protection. These are intended to prevent contact with clothing or skin by the chemical.

Fire Safety

Workshops and studios are provided with one or several fire extinguisher(s) suitable for the hazardous materials used and stored within the space. Fire extinguishers must be unobstructed and located in clear view. Workshop staff and students should know the location and proper use of the fire extinguishers in their work areas.

There are 4 types of fire extinguishers, each efficient to fight a specific type of fire; fire extinguishers of type ABC are commonly present in workshops.

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>Used for fires from combustible materials such as paper, wood, cardboard, and plastics.</td>
</tr>
<tr>
<td>Class B</td>
<td>Used for flammable or combustible liquids such as solvents, gasoline, kerosene, grease and oil.</td>
</tr>
<tr>
<td>Class C</td>
<td>Used for electrical equipment, such as appliances, computers, wiring, circuit breakers and outlets. You should never use water to extinguish a class C fire due to the risk of electrical shock.</td>
</tr>
<tr>
<td>Class D</td>
<td>Used for combustible metals, such as magnesium, titanium, potassium and sodium.</td>
</tr>
</tbody>
</table>

In the event of a fire, workshop users are not expected to extinguish the fire themselves. Users who have been trained to use a fire extinguisher may attempt to extinguish the fire safely.
To do so:
- Use a fire pull station, alert security at extension 3717, or assign someone to do so before dealing with a fire.
- Make sure a clear escape route is available before attempting to deal with the fire.
- If a workshop user is trained to use a fire extinguisher and feels that the fire can be controlled, they may use the PASS method to extinguish the fire:
  - P – Pull and turn the locking pin to break the seal
A – Aim low by pointing the nozzle or hose at the base of the flames
S – Squeeze the handle to release the extinguishing agent
S – Sweep from side to side until the fire is out

- Extinguishers work for approximately 15-30 seconds: if the fire has not been extinguished in that time, leave the area immediately.
- When leaving, close the door and do not lock it.

First-Aid Measures

If your skin comes in contact with chemicals (corrosives, toxic) flush the affected area with plenty of water. If you get abrasive dust or splash any chemicals in your eyes, rinse your eyes with water for at least 15 minutes (preferably from an eyewash fountain). Emergency eyewash and shower stations, along with first-aid kits, are available in areas where chemicals are being stored or used. Workshop users must always ensure a clear access to such emergency equipment. If medical attention is required, please contact Security at extension 3717 or 514-848-3717.

Spills

Only small spills should be handled by users and only if they are comfortable or know how to clean it. A small spill consists of a release of a limited quantity of hazardous materials which does not pose a significant safety or health hazard to employees in the immediate vicinity or to the employee cleaning it up (e.g. 1L of paint).

A large (or emergency) spill consists of a release of a hazardous material that poses a significant safety or health hazard to persons in the immediate vicinity due to its properties (toxicity, volatility, flammability...) or by the release itself (quantity, space considerations, ventilation...).

Large spills should not be handled by users; they should readily:
- Advise and warn co-workers.
- If necessary, evacuate the area immediately.
- Do not touch the hazardous material
- Notify Security at extension 3717 or 514-848-3717
- Provide security with the following information
  - Location of spill
  - Name of hazardous material
  - Quantity involved
Related health hazards and precautions to be taken

- Provide the chemical SDS or appropriate documentation

**Injury or Near-miss Reporting**

In case of fire, spill or injury, immediately contact Security at extension 3717 or 514-848-3717 and complete an incident form available at [www.concordia.ca/ehs](http://www.concordia.ca/ehs) under the “Report an injury or a near-miss” section. All completed forms must be submitted to the EHS office.

**Contact Information**

For more information concerning chemical safety in studios or workshops, please contact the Environmental Health & Safety Office (EHS) at:

**Environmental Health & Safety (EHS)**

514-848-2424 ext: 4877  
[ehs@concordia.ca](mailto:ehs@concordia.ca)  
[www.concordia.ca/ehs](http://www.concordia.ca/ehs)

**References**

- Occupational Safety and Health Administration: [www.osha.gov](http://www.osha.gov)
- Commission de la Santé et Sécurité du travail: [www.csst.gc.ca](http://www.csst.gc.ca)
- Health Canada: [www.hc-sc.gc.ca](http://www.hc-sc.gc.ca)
- Canadian Centre for Occupational Health and Safety: [www.ccohs.ca](http://www.ccohs.ca)
- Canada’s National WHMIS Portal [www.WHMIS.org](http://www.WHMIS.org)

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