



ACADIA

UNIVERSITY

WHMIS HANDBOOK

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1. INTRODUCTION

WHMIS (Workplace Hazardous Materials Information System) is a hazard communications system that addresses the **right to know**. WHMIS was created to ensure that people have ready access to the information they need to work safely with hazardous materials. WHMIS legislation was introduced in the late 1980s, and applies to all Canadian workplaces.

WHMIS has 3 components:

1. Employee education
2. Labels
3. Material Safety Data Sheets (MSDSs)

WHMIS legislation relates specifically to a group of hazardous materials intended for use in workplaces, called **controlled products** ([hyperlink to definition](#)). The six classes of controlled products are discussed in section 3 of this handbook.

Because they are addressed through other legislation, the following hazardous materials are exempted from WHMIS:

- Consumer Products
- Cosmetics
- Dangerous Goods in Shipment
- Explosives
- Foods and Drugs
- Hazardous Waste
- Manufactured Articles (such a batteries)
- Pest Control Products (Pesticides)
- Radioactive Materials
- Tobacco and Tobacco Products
- Wood and Wood Products

Complying with WHMIS legislation is certainly a major challenge for an organization as diverse and as complex as Acadia University. Despite the difficulties, the law is quite clear and Acadia is required to comply.

2. RESPONSIBILITIES

WHMIS places duties on everyone involved with controlled products, including the supplier, the employer and the employees. There are many legal duties to ensure the safe and healthful storage, handling and use of controlled products and other hazardous materials.

2.1 Supplier Duties

- Classify controlled products.
- Label controlled products with a WHMIS label.
- Prepare and provide customers with MSDS's.
- Update MSDS's at least every three years.

2.2 Employer Duties

- Train employees in WHMIS,
- Train employees in safe work practices.
- Ensure products are labelled with supplier or workplace labels.
- Provide employees with ready access to MSDS's.

2.3 Employee Duties

- Participate in and apply the training,
- Follow prescribed work practices,
- Wear required protective equipment.

2.4 WHMIS Training Requirements

WHMIS training is required for employees who work with or in proximity to controlled products. Faculty and staff are all subject to this WHMIS training requirement. Each Department Head is responsible for ensuring that new employees are trained as soon as is practical after joining the University. Periodic refresher training, although not required by law, is also recommended.

In a formal legal sense, WHMIS only applies where people encounter controlled products in the course of paid employment. But in programs where they routinely use chemicals, students need to be trained in chemical safety. WHMIS training provides an excellent foundation for that.

WHMIS training at Acadia is delivered in a variety of ways. Visit Acadia's OHS Website and click on [Health & Safety Training](#) for WHMIS training options. In some science-related departments, people have been identified to deliver WHMIS training in-house. Many of these programs are tailored to the needs of people who work in the many different work environments that exist across the University.

As WHMIS regulations are consistent from workplace to workplace and even from province to province, if you can demonstrate that you have been properly trained elsewhere, you may not be required to take WHMIS training at Acadia.

2.5 Requirement to Maintain a Current Chemical Inventory

The NS OH&S Act requires that the University "prepare a list of all chemical substances regularly used, handled, produced or otherwise present at the workplace that may be a hazard to the health or safety of the employees or that are suspected by the employees of being such a hazard, and the list shall identify all chemical substances by their common or generic names, where they are known to the employer."

To meet this requirement, each department is responsible to maintain a current inventory of hazardous substances, including controlled products. Binders that contain the MSDSs for a department or work area would be acceptable as the "list", so long as the binder contains an MSDS for all chemicals "regularly used, handled, produced or otherwise present at the workplace that may be a hazard to the health or safety of the employees or that are suspected by the employees of being such a hazard". Note that various chemicals that may be hazardous may not be "controlled products", and therefore a MSDS may not be available.

2.6 Providing Ready Access to MSDSs

As indicated earlier, WHMIS exempts suppliers of some hazardous materials that are subject to other laws. But Acadia, like other workplaces, needs to respond appropriately to the need for health & safety information. Providing a person with an MSDS is often the simplest way to meet this obligation. Faced with frequent requests, many suppliers will provide MSDS's even for chemicals which are not controlled products and are therefore not subject to WHMIS. However, one must often contact the manufacturer, as the MSDS may not always be available from the distributor or retailer.

Each Department Head must ensure that faculty, staff and students have ready access to MSDSs or equivalent information for every hazardous material in their work areas. Departments can comply by having paper copies of MSDSs on hand, by having computer access to MSDSs, or by a combination of the two. The MSDS or the computer must be within reasonable proximity to the work area, so that faculty, staff and students can gather information in both routine and emergency situations. For example, a binder of MSDSs that is only available from a departmental library between 9:00 and 4:30 would not comply if chemicals are used outside those hours.

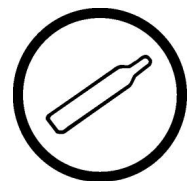
Web-based access to MSDSs is becoming more and more common. In many cases, it is easier and faster to locate an MSDS online, than by manually searching through a binder of data sheets. Visit Acadia's Safety Website and click on [MSDS](#) to access links.

3. WHMIS CLASSES

WHMIS groups controlled products into 6 classes, according to properties of the product. Some of the classes are further organized into divisions and sub-divisions. Each class is represented by one or more symbols, which give a snapshot view of a product's characteristics and hazards.

3.1 Class A - Compressed Gas

Cylinders store compressed gases under pressure. Because gas leaking from a cylinder, a valve or a regulator can cause injury or damage, WHMIS treats all compressed gases as controlled products. Gases which are also flammable, toxic or have other hazardous properties will also be found in other classes. Typical compressed gases are oxygen, propane and nitrogen. Compressed gases may be found in cylinders and in enclosed systems, pipes, etc.



3.2 Class B - Flammable and Combustible Materials

WHMIS groups together into a single class all those chemicals which pose a fire hazard. There are 6 divisions to the flammable and combustible materials class. Chemicals covered by any of these divisions all carry the same stylized flame symbol.



3.2.1 Class B Division 1 - Flammable Gases

All gases such as hydrogen and butane, which can form ignitable mixtures in air, are classed as flammable gases. Cylinders of these gases carry both the compressed gas and the flammable material symbols.

3.2.2 Class B Division 2 - Flammable Liquids

All those liquids which present an extreme fire hazard are called flammable liquids. A spark or other ignition source can easily ignite flammable liquids at or below room temperature. Gasoline is a typical flammable liquid. Even at temperatures as low as -40 C, gasoline gives off enough vapour to form a vapour/air mixture that will burn.

3.2.3 Class B Division 3 - Combustible Liquids

Although they are more difficult to ignite, when a combustible liquid is heated, it gives off enough vapour to form a vapour/mixture that will burn. Combustible liquids are those liquids which present a fire risk when the liquid is heated to temperatures between room temperature and about 100° F. Diesel fuel and many other more difficult to ignite liquids are combustible liquids. Many commercial and industrial liquid products that are based upon petroleum or other organic solvents are combustible liquids.

3.2.4 Class B Division 4 - Flammable Solids

WHMIS regulates all those solids that ignite through friction such as white phosphorus, or that can be readily ignited and burn vigorously such as magnesium and a number of other finely divided metals.

3.2.5 Class B Division 5 - Flammable Aerosols

Aerosol products containing flammable ingredients or that use a flammable propellant such as propane, butane and dimethyl ether, present a workplace fire hazard. All such products which pass a flame projection or flash back test are included in the flammable aerosol subdivision.

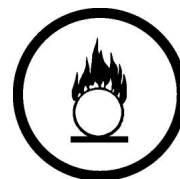
3.2.6 Class B Division 6 - Reactive Flammable Materials

WHMIS places a few particularly dangerous materials in this subdivision. Included are chemicals that are spontaneously combustible under normal conditions of use or chemicals which, when in contact with water, become flammable or give off a flammable gas. This group includes such chemicals as aluminum alkyls, metallic

sodium and lithium aluminum hydride. All of these chemicals are uncommon outside of the laboratory.

3.3 Class C - Oxidizing Materials

Fire is really a chemical reaction involving a fuel and oxygen. Some chemicals, called oxidizers, can provide oxygen that can increase the risk that a fire will break out. Once a fire is underway, oxidizers can cause the fire to burn more intensely.



Oxidizing materials are not particularly common in the office. However, they are found fairly often in laboratories where researchers commonly use oxidizers, such as organic peroxides.

The symbol carried by all oxidizing materials resembles the flammable materials symbol in that it also depicts a flame. But the flame rests on an "O" which signifies that oxidizers contribute oxygen.

3.4 Class D - Poisonous and Infectious Materials

WHMIS considers all the toxic effects of chemicals in this class. Because there are a variety of health hazards that need to be considered, WHMIS deals with the health hazards in 3 divisions:

3.4.1 Class D Division 1 - Materials Causing Immediate and Serious Toxic Effects

Materials included in this subdivision are generally those highly toxic chemicals which cause death within a short period following exposure. At high enough doses, almost any chemical can have serious and even fatal consequences. In reality, though, the massive doses of weakly toxic chemicals that would be needed to produce death are unlikely in the workplace. But those chemicals such as many cyanides, which are sufficiently toxic to cause death following a workplace exposure, are placed in subdivision A. Other chemicals, for which higher doses are needed to produce lethality, are placed in subdivision B.



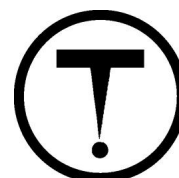
Subdivision A - Very Toxic material

Subdivision B - Toxic material

All the chemicals that meet the criteria for inclusion in the Materials Causing Immediate and Serious Toxic Effects, regardless of whether they fall into the Very Toxic or Toxic subdivisions, carry the skull and crossbones symbol.

3.4.2 Class D Division 2 - Materials Causing Other Toxic Effects

As well as short term poisoning, chemicals can cause other effects. Prolonged exposure to chemicals at exposure levels that are below those which cause short term symptoms can also be harmful to health. WHMIS



places chemicals which irritate the skin and eyes, and chemicals which present a long term health risk, in this class. Containers of these chemicals are marked with the WHMIS "T" symbol. Some people refer to the symbol as "a T over a period" to reinforce the idea that many of the criteria that place chemicals in this division, deal with long term hazards.

Contact with many chemicals, including some as familiar as vinegar, cause skin and eye irritation. As a consequence, when they are sold for industrial or commercial use, these chemicals carry the WHMIS T symbol. People working with these chemicals need to consult the MSDS to find out whether a product is classed as causing "other toxic effects" because it causes irritation or because it poses a long term health risk.

Toxic Effects Included Among "Other Toxic Effects" include:

- Skin and eye irritation and chronic toxic effect:
- mutagenicity - causing genetic damage
- sensitization - causing skin or respiratory allergies
- carcinogenicity - causing cancer
- teratogenicity - causing birth deformities
- embryotoxicity - causing fetal death
- reproductive toxicity

This division is divided into 2 subdivisions to reflect the differing risks presents by highly toxic and less toxic chemicals:

Subdivision A - Very Toxic material

Subdivision B - Toxic material

3.4.3 Class D Division 3 - Biohazardous Infectious Materials

Few people outside a laboratory are likely to encounter a material classed as a Biohazardous infectious agent. Materials which fall into this class include viruses and bacteria which can cause infection in people.

Also included are the toxins that some of these viruses and bacteria produce. Containers of biohazardous infectious materials carry the internationally recognized three broken rings symbol.



3.5 Class E - Corrosive Materials

WHMIS groups together chemicals which can corrode metal or destroy skin into a corrosive materials class. Included in the class are many of the common acids such as sulfuric acid, (used in automotive batteries) hydrochloric (muriatic) acid and others. Lye (also called caustic soda or sodium hydroxide) is another corrosive chemical that is present in many commonly used products such as household oven cleaner. The symbol demonstrates the corrosivity of these chemicals in attacking metal and human skin.



3.6 Class F - Dangerously Reactive Materials

The last WHMIS class brings together all those chemicals which present a hazard as a result of their tendency to undergo violent reaction. The chemical reaction can sometimes lead to a fire or an explosion. This class also includes a few chemicals such as sodium cyanide which can react with water to produce a toxic gas. Dangerously reactive chemicals are not common outside of the laboratory.



4. SUPPLIER LABELS

Containers of controlled products that are sold for use in Canadian workplaces must display a supplier label that contains 9 required elements.

The WHMIS Supplier Label Includes:

- Name of the product
- WHMIS classification symbols
- Precautionary measures
- Statement that an MSDS is available
- Distinctive crosshatched border
- Supplier's name and address
- Risk phrases
- First aid measures
- Text in both official languages



4.1 Controlled Products from Laboratory Supply Houses

Relaxed supplier labeling provisions are made for laboratory chemicals that are:

- provided by a laboratory supply house
- sold for use in laboratories
- packaged in containers of less than 10 kg.

To meet the requirements of WHMIS, the supplier label for lab chemicals that meet the above criteria should provide a product identifier, risk phrases that are

appropriate to the nature of the chemical, precautionary measures, first aid measures where appropriate, and a statement about the availability of an MSDS (when one exists).

5. WORKPLACE LABEL

If the supplier label is destroyed or chemicals are transferred from the supplier container to another, a workplace label is required. Because it assumes that people in the workplace are familiar with the chemicals they are using, WHMIS sets less stringent requirements for an acceptable workplace label. A workplace label can be any size, shape or colour, as long as it provides the basic information, below.

Workplace Label Requirements:

- Name of the chemical
- Safe handling information and
- Reference to the MSDS
- Must be visible on the container and easily read

5.1 Workplace Labeling of Laboratory Chemicals

Requirements for workplace labeling of controlled products also extend to the laboratory. See the [Interpretation Guide for Nova Scotia's WHMIS Regulations](#) for these special labeling details:

- Laboratory samples of controlled products
 - Decanted products in a laboratory
 - Products produced and kept in a laboratory
 - Placard identifiers
-
-

6. MATERIAL SAFETY DATA SHEET

While the label presents the essential information that one needs to work with a chemical, the Material Safety Data Sheet provides additional background information and the manufacturer's suggestions on the precautions that should be considered when people use the product. MSDSs must be kept current (i.e. they must be dated within the past **three years**).

6.1 The Nine MSDS Topics

WHMIS gives the supplier flexibility in the form and layout of the MSDS, but the regulations require that at least nine topics be covered. The required topic headings and the type of information that must be presented in each are:

6.1.1 Product Information

This section provides the basic information about the product and the supplier.

- Product name
- Supplier's name and address
- Emergency phone number

6.1.2 Hazardous Ingredients

The MSDS must identify all the ingredients that meet WHMIS criteria and provide some data on the short term toxicity of either the product or the ingredients.

For Each Hazardous Ingredient:

- Name
- Concentration or concentration range
- Chemical Abstracts Registry Numbers
- LD50 (Lethal Dose 50% - the dose which kills half of the animals in an acute toxicity test).

6.1.3 Physical Data

The MSDS provides a range of technical data which allows people to assess how the chemical behaves under differing situations and plan safe work procedures.

- Physical state
- Appearance and odour
- Vapour density, per cent volatile and evaporation rate for products with
- Volatile components
- Boiling and freezing points and PH (if appropriate) for liquids
- Specific gravity
- Coefficient of oil/water separation
- Water solubility

6.1.4 Fire and Explosion Data

The MSDS provides information on which the workplace can plan fire prevention and which emergency responders may need in the event that a fire occurs.

Fire Data:

- Indication of whether the product is flammable and the conditions under which a fire might occur
- Means of extinction
- Flash point (the temperature at which enough of the material evaporates to form an ignitable mixture with air)
- Flammable limits (concentration range over which the vapour/air mixture will burn)
- Auto ignition temperature
- Hazardous combustion products
- Explosion data
- Sensitivity to impact
- Sensitivity to static electric ignition

6.1.5 Reactivity Data

WHMIS requires that the supplier provide information about the possible hazardous chemical reactions that might occur. Many of our laboratory chemicals are highly reactive. Even some of the trades or custodial chemicals can react with other chemicals or can react if exposed to heat or mixed with catalysts or activators.

Reactivity Data:

- Stability
- Sensitivity to shock or temperature or pressure changes
- Reactivity
- Incompatibility - chemicals which, if allowed to contact the product, could create a reaction hazard
- Hazardous decomposition products

6.1.6 Toxicological Properties

WHMIS requires the supplier to describe how people might come into contact with the product and what the short and long term effects would be if someone was overexposed.

Toxicological Properties:

- Route of entry into the body
- Effects of acute (short term) exposure
- Effects of chronic (long term) exposure
- Legal exposure limits

6.1.7 Preventive Measures

One of the most useful sections of the MSDS is the preventive measures section. In this part of the MSDS, the supplier lists suggestions for the precautions which should be taken in storing, handling, using and disposing of the product. These suggestions need to be considered carefully. But the supplier cannot always know, in detail, how we are going to use the chemical. You should review the information in this section with your supervisor and assess how appropriate the supplier's suggestions are in your particular work situation.

Preventive Measures:

- Engineering controls - equipment needed to prevent over-exposure
- Personal protective equipment - gloves, respirators, impervious clothing, etc.
- Use and handling procedures
- Storage requirements
- Leak and spill procedures
- Shipping information
- Disposal practices

6.1.8 First Aid Measures

The MSDS provides first aid information similar to that presented on the product label. This information will assist with proper administration of first aid. In all but the most minor cases, the affected person should be treated at the Student Health Services clinic (for students), or at the Eastern Kings Memorial Health Centre. The medical personnel will need a copy of the MSDS, or at least label information, to most effectively treat the victim.

6.1.9 Preparation Information

As people may need information that is not present on the MSDS and need to ensure that the MSDS is current, the regulations require the supplier to indicate who prepared the MSDS, when it was prepared and a phone number to contact the person who prepared the document. This is usually the last section of the MSDS, but some suppliers choose to include transportation, disposal, ecological and other information at the end of the MSDS.

6.2 MSDS's for Laboratory Chemicals

In general, departments must obtain a supplier MSDS for a controlled product used in a laboratory. There is an exception to this requirement, for controlled products that:

- are provided by a laboratory supply house
- are sold for use in laboratories
- are packaged in containers of less than 10 kg.
- have a label that discloses all the information normally required on a supplier material safety data sheet

Despite the exemption, suppliers of laboratory chemicals invariably do provide MSDS's. Some suppliers, however, use the exemption to justify creating an MSDS that is somewhat less detailed than might otherwise be required. Whenever possible, departments and laboratory supervisors should ignore the laboratory chemical exemption and behave as if the full requirements for MSDS's apply to laboratory chemicals.

If a sample of a controlled product is being tested in a laboratory, there is no requirement for the employer to provide a MSDS for the sample if all of the following conditions are met:

- no data sheet is available for the controlled product itself
- the sample of controlled product is less than 10 kilograms
- the sample of controlled product has a proper label

Regardless, if a MSDS has been produced for the controlled product, then this must be made readily available to persons who work in the laboratory.
