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Quantum Systems 2000 Inc.

P.O. Box 92010 – 1562 Danforth Ave.

Toronto M4J 5C1

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## What is WHMIS?



WHMIS is a nation-wide legislated system of communication to provide information about the hazards of materials produced, sold in, imported to, or used within the workplace.

***Workplace Hazardous Materials Information System (WHMIS) is a nation-wide communications system that provides information about hazardous materials, which are produced, sold in, imported to, or used within workplaces.***

The system has three components that provide you with information about the materials you work with, about the physical agents you are exposed to and the hazards that exist in the working environment.

- Labels
- Material Safety Data Sheets
- Worker Education Programs

WHMIS was enacted federally in 1987, and has been implemented in all provinces and territories through a combination of federal and provincial legislation. ([See Appendix A for complete list](#)). In Ontario, WHMIS is a legislated requirement of the Occupational Health and Safety Act.

Because the school board is a workplace, the employer must ensure that employees are provided with information necessary to protect themselves when using hazardous products in the workplace.

Using the information provided by the WHMIS system, suppliers, employers and workers can work together to minimize the risks of hazardous materials in the workplace.

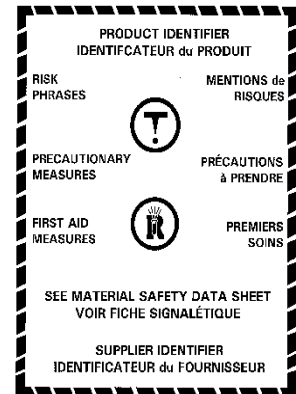
WHMIS requires manufacturers and suppliers of controlled products to provide information to employers and employees about:

- Whether a controlled product is hazardous
- The associated risks
- How the material should be stored, handled, used and disposed of safely

There are three key communication components of WHMIS:

### Standardized Warning Labels

- A label displayed on each package or container of a controlled product used in the workplace.
- Standardized warning symbols are part of the WHMIS Classification System.



### Material Safety Data Sheets (MSDS)

- Basic information about the specific material including: how it should be handled and/or stored, protective measures, and emergency procedures.



### Employee Education

- Training programs such as this must be provided to every employee.



# Responsibilities

## Supplier -

- Classify all products intended for use in a Canadian workplace to determine if supplier labelling and MSDS requirements apply.
- Provide hazard information through standardized labels and MSDS's on all controlled products or containers of controlled products.

## Employer -

- Where the employer imports a product directly into the workplace from a source outside Canada, that employer is considered to be the supplier and has the classification responsibilities of a supplier.
- Ensure that all containers of controlled products in the workplace have WHMIS labels, identifiers and MSDS's.
- Ensure that MSDS's are up-to-date (no more than three years old, and are readily available to employees.
- Ensure that an annual chemical inventory is done and available to emergency personnel and employees.
- Provide effective worker education to ensure an understanding of the WHMIS labels, MSDS's, and precautionary measures concerning hazardous materials.

## Worker -

- Participate in training provided by the employer and follow WHMIS regulations.
- Handle controlled products in a safe manner.
- Inform the employer about damaged or missing labels.
- In Ontario, workers also have a responsibility under the Occupational Health and Safety Act to report unsafe conditions. By this definition, knowledge of the improper classification of a controlled product could be considered knowledge of an unsafe condition.

# Terminology

<b>Supplier</b>	Manufacturer, processor or packager of a controlled product or a person who, in the course of business, imports or sells controlled products.
<b>Controlled Product</b>	Any product, material or substance specified by the Hazardous Products Act. To determine whether a product is a controlled product, an assessment of potential hazards must be carried out using the criteria of each of the hazard classes.
<b>Employer</b>	The user of a controlled product in the workplace or the manufacturer of a controlled product as part of a workplace process.
<b>Hazard</b>	A dangerous object, event, behaviour or condition, which can interrupt or interfere with the expected orderly process of an activity.
<b>Risk</b>	The probability during a period of activity that a hazard will result in an accident with definable consequences.

## Class A: Compressed Gas

The symbol for compressed gas is the outline of a compressed gas cylinder.



A compressed gas product is in a gaseous state and is kept under pressure.

Class A materials include compressed gases, dissolved gases or gases liquefied by compression or refrigeration.

Some compressed gases are also flammable and combustible. Others are also materials causing immediate and toxic effects. Whenever a controlled product falls into two or more classes, two or more hazard symbols are provided.

### Hazards:

- Explosion danger because the gas is being held under pressure;
- Container may explode if heated in a fire;
- Container may explode if dropped.
- Severe injuries can be caused to unprotected skin and tissues when exposed to compressed gas.

### Precautions:

- Do not heat the container;
- Keep container tightly closed;
- Store containers in a properly designated area;
- Handle with care. Do not drop cylinder.
- Wear Protective Equipment when using compressed gas
- DO NOT blow compressed gas towards the body

# Class B: Flammable and Combustible Material



The symbol for Flammable and Combustible is a flame.

This classification refers to a solid, liquid or a gas that will ignite and continue to burn if exposed to a flame or ignition.

Flammable materials will burn easily at or about room temperature (Flash point 38 degrees C or below) and Combustible material will burn when heated.

## Six types of materials belong to this class:

1. **Flammable Gases:** Examples propane and hydrogen.
2. **Flammable Liquids:** Examples gasoline and BBQ starter fluid
3. **Combustible Liquids:** Examples paint thinner and diesel fuel
4. **Flammable Aerosols:** Examples hair spray, engine starter fluid and penetrating oil
5. **Reactive Flammable Materials:** Examples celluloid and metallic sodium
6. **Combustible Solids:** Examples; Wood and paper.

## Hazards:

- Will burn and is therefore a potential fire hazard;
- May cause a fire when exposed to heat, sparks, or flames as a result of friction;
- May burn at relatively low temperatures (flammable materials catch fire at lower temperatures than combustible materials).
- Death and severe injuries due to burns and smoke and gas inhalation.

## Precautions:

- Store flammable material in a cool, fire-proof area;
- Keep the material away from heat and ignition sources;
- Keep container tightly closed;
- Take precautionary measures against static discharges or impacts that could cause sparks.
- When required, wear flame-resistant protective equipment

## Class C: Oxidizing Materials



The symbol for Oxidizing Material is a flame above an "O", which stands for "Oxygen".

Oxidizing materials will cause or assist to cause fires in surrounding materials by supplying oxygen. Oxygen is required for all fires, and any substance that increases the supply of oxygen will increase the chance of fires. Examples include: peroxide bleach, nitrites and chlorates.

### Hazards:

- May react violently;
- Fire and /or explosion risk in the presence of flammable or combustible material;
- May cause fire when it comes into contact with combustible materials such as paper;
- May cause an explosion when it comes into contact with flammable material, such as fuel;
- May burn skin and eyes upon contact.
- Death and severe injuries due to burns and smoke and gas inhalation

### Precautions:

- Keep the material away from flammable and combustible materials;
- Keep the material away from sources of heat and ignition;
- Store containers in a proper designated area;
- Avoid shock and friction;
- Wear the proper protective equipment, including eye, face and hand protection, and protective clothing.
- When required, wear flame-resistant protective equipment

## **Poisonous and Infectious Material**

### **Class D1: Materials Causing Immediate and Serious Toxic Effects**



The symbol is the familiar skull and crossbones.

Examples include bleach, hydrogen sulphide, chlorine, strychnine and cyanides.

#### **Hazards:**

- Potentially fatal poisonous substances;
- May cause permanent damage if it is inhaled, swallowed or if it enters the body through skin contact;
- May burn eyes or skin upon contact;

#### **Precautions:**

- Store the material in designated areas only;
- Handle the material with extreme caution;
- Do not breathe gas or vapours;
- Avoid inhaling by working in well ventilated areas and/or wearing respiratory equipment;
- Avoid contact with the skin or eyes by wearing the proper protective equipment, including eye, face and hand protection and protective clothing;
- Wash and shower thoroughly after use.

## Poisonous and Infectious Material

### **Class D2: Materials Causing Other Toxic Effects**



The symbol is a "T" made into an exclamation mark that stands for 'TOXIC'.

These are materials that may cause harmful effects usually some time after the first or repeated exposures. Examples include: vapours of solvents, mercury, some herbicides and aromatic solvents.

#### **Hazards:**

- Poisonous, dangerous to health;
- May cause permanent damage as a result of repeated exposures over time;
- May cause death;
- May cause birth defects or sterility;
- May be a sensitizer, which produces an allergy;
- May be a skin or eye irritant.

#### **Precautions**

- Store the material in designated places only;
- Avoid inhaling by working in well ventilated areas and/or wearing respiratory equipment;
- Avoid skin or eye contact by wearing all protective equipment necessary, including eye, face, and hand protection and protective clothing;
- Wash thoroughly after use.

## Poisonous and Infectious Material

### Class D3: Biohazardous and Infectious Material



This symbol looks like a cell that is dividing.

Biohazardous infectious materials are organisms (and the toxins of organisms) that cause diseases such as viruses, bacteria and fungi. These organisms are frequently encountered in hospitals, laboratories and research facilities. Examples include: vaccines and science laboratory classes.

#### **Hazards:**

- May cause a serious disease resulting in illness or death.

#### **Precautions:**

- Handle the material in designated areas where engineering controls are in place to prevent exposure;
- Handle the material only when fully protected by the proper, designated equipment;
- Keep container tightly closed;
- Wear suitable protective equipment;
- Take every measure to avoid contamination

## Class E: Corrosive Material

The symbol for Corrosive material is liquid being poured onto a hand and a piece of solid material causing damage to the hand and the material.



Corrosive materials may cause burns and destroy tissues. They can also destroy other materials.

Examples: sulphuric acid, hydrochloric acid and anhydrous ammonia.

### Hazards;

- May be harmful if inhaled
- Cause severe tissue damage on contact
- Cause severe eye and skin damage on contact.

### Precautions:

- Keep containers tightly closed
- Avoid inhaling by using in well ventilated areas and wear proper respiratory protection
- Avoid skin and eye contact by wearing protective equipment, such as eye, face and hand protection and other protective clothing.

## Class F: Dangerously Reactive Materials

The symbol is an exploding test tube inside a capital "R", which stands for "REACTIVE".



A substance is considered to be dangerously reactive when it will:

- } react with water to produce a poisonous gas
- } self-react if the container is heated, pressurized, or shaken; or
- } self-react because of age.

### Hazards:

- Very unstable material;
- May explode as a result of shock, friction or increase in temperature;
- May explode if heated when in a closed container;
- May undergo vigorous polymerization;
- May react with water to release toxic or flammable gas

### Precautions:

- Store the material in a cool, flame-proof area;
- Keep the materials away from heat;
- Open containers carefully, do not drop them;
- Avoid contact with water;
- Avoid shock and friction;
- Wear suitable protective clothing.

# WHMIS Labels

WHMIS labels are affixed or attached to the containers of controlled products, and provide information that:

- Alerts the user to the hazards of the product
- States what precautions to take when handling the product.
- Refers the user to a material safety data sheet (MSDS) for more detailed information about the product.

The labels can be marks, signs, stamps, stickers, seals, tickets, tags or wrappers. They can be attached to, imprinted, stencilled or embossed on the controlled product or its container.

There are two specific types of labels outlined in WHMIS legislation:

## Supplier Labels

Suppliers of WHMIS controlled products to workplaces in Canada, whether importing, producing, or selling these products, must affix a supplier label

## Workplace Labels

Employers that produce controlled products in the workplace, or transport controlled products in a pipe, piping system or valves, must affix or attach a workplace label.

In addition, a workplace label must be placed on containers that are filled from suppliers' containers, and/or when a supplier label becomes illegible or is removed from the product.

## Supplier labels must:

- have the distinctive cross-hatch border in a colour that will contrast with the background on which it appears.
- be placed on the hazardous material or container so that it is visible under normal storage and use.
- show all text in both French and English

## Supplier labels must include:

### 1. Product Identification

The common name, chemical name, trade name, generic name, brand name, code name, or code number of a hazardous material

### 2. Hazard Symbol

A specific WHMIS symbol that represents one or more of the hazard classifications that apply to the product

### **3. Risk Phrase**

A brief description of the hazard and the effects of harmful exposure to the body

### **4. Precautionary Measures**

Brief instructions for the safe use of the material

### **5. First Aid Measures**

A brief description of treatment for exposure to the material

### **6. Supplier Identifier**

The name of the supplier

### **7. Reference to the MSDS**

A statement indicating that a copy of the applicable MSDS is readily available in the workplace.

Each container of controlled materials in the workplace must have a WHMIS label.

If a supplier does not provide a supplier label, the employers may not use the controlled product. It can be stored until a proper label is obtained.

The employer is also responsible for ensuring supplier labels are not removed, altered or destroyed and that the material is used with the correct label attached.

If a supplier label is accidentally lost or destroyed, and a spare supplier label for that product is not available, a workplace label may be used.

Controlled products that are shipped in bulk follow special rules:

- If containers are crated inside other containers for shipping, the supplier may provide the labels separately. The receiving employer must ensure the supplier labels are in place, and that labels meet the WHMIS requirements.
- If material is moved into containers for resale or delivery out of the workplace, a supplier label must be placed on each container.

*(See [Workplace Labels](#) for information about transferring bulk material into smaller containers.)*

# Supplier Label Sample

<p><b>METHANOL</b> <b>DANGER</b> POISON FLAMMABLE VAPOUR HARMFUL MAY CAUSE BLINDNESS IF SWALLOWED</p> <p>Keep away from heat, sparks and flame. No smoking. Container must be grounded when being emptied. Vapour may travel long distance. Avoid contact with eyes and skin. Do not inhale vapours or mist. Do not take internally. Harmful if absorbed through the skin.</p> <p><b>FIRST AID:</b> In case of contact, immediately flush eyes and skin with plenty of water for at least 15 minutes.</p> <p>If swallowed, induce vomiting by sticking finger down throat, or by giving soapy water to drink. Repeat until vomit is clear.</p> <p>If affected by vapour, move to fresh air.</p> <p>If breathing has stopped, apply artificial respiration.</p> <p><b>GET MEDICAL ATTENTION IMMEDIATELY.</b></p> <p><b>PRECAUTIONS:</b> Wear chemical-goggles and resistant gloves. Wash thoroughly after handling. Use with enough ventilation to keep below TLV. Keep container closed. Never use pressure to empty container.</p>	 	<p><b>MÉTHANOL</b> <b>DANGER</b> POISON INFLAMMABLE VAPEURS NOCIVES PEUT PROVOQUER LA CÉCITÉ, SI AVALÉ</p> <p>Garder loin de la chaleur, des étincelles et des flammes. Ne pas fumer. Brancher le contenant à une prise de terre avant de le vider de son contenu. Les vapeurs peuvent s'étendre sur de longues distances. Éviter tout contact avec les yeux et la peau. Ne pas respirer les vapeurs. Ne pas absorber. Nocif si absorbé par la peau.</p> <p><b>PREMIERS SOINS:</b> En cas de contact avec les yeux ou la peau, laver à grande eau pendant au moins 15 minutes. Si avalé, provoquer le vomissement en introduisant un doigt dans la gorge ou en faisant absorber de l'eau savonneuse à la victime. Répétez jusqu'à cessation du vomissement.</p> <p>Sortir au grand air, si indisposé par les vapeurs.</p> <p>Si la respiration est interrompue, recourir à la respiration artificielle.</p> <p><b>OBTENIR DES SOINS MÉDICAUX IMMÉDIATS.</b></p> <p><b>PRÉCAUTIONS:</b> Porter des lunettes protectrices (pour produits chimiques) et des gants résistants. Se laver minutieusement après usage. Utiliser dans un endroit bien aéré, afin de maintenir un niveau de vapeurs tolérable. Garder le contenant fermé. Ne jamais user de pression en vidant le récipient.</p>
<p><b>SEE MATERIAL SAFETY DATA SHEET FOR PRODUCT VOIR FICHE SIGALÉTIQUE</b></p>		
<p>ABC Company Anytown, Ontario Telephone 123-4567</p>		

# Workplace Labels

Workplace labels are designed and attached by the employer, and are required for:

- storage containers of controlled products produced on-site
- storage containers intended to receive bulk shipments (unless the supplier provides a label)
- portable containers into which product has been transferred
- supplier containers with illegible labels (unless a supplier label is available)

These labels must include:

## 1. Product Identification

The common name, chemical name, trade name, generic name, brand name, code name, or code number of a hazardous material

## 2. Safe Handling Instructions

This includes unique risks associated with the normal use of the controlled product and the possible emergencies.

## 3. Reference to the MSDS

A statement indicating that a copy of the applicable MSDS is readily available in the workplace

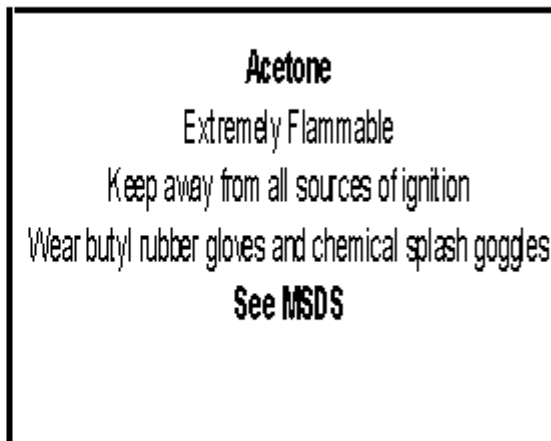
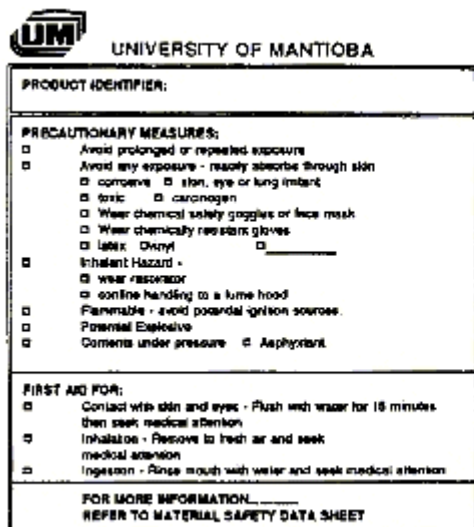
The employer may use other means of identifying hazardous materials in some cases. The information above must be included.

Bulk material	- Sign or placard
Pipes	- Code letters and/or numbers
Reaction vessels	- Diagram or Process Flow Charts

The workplace label may be any size, shape or colour and there are no language requirements, but it must be clearly visible and easy to read.

The cross-hatch border, WHMIS symbols and phrases may appear on the workplace label, but they are not requirements.

Both of the labels pictured below are acceptable.



## Comparison of Supplier and Workplace Labels

<b>Supplier Label</b>	<b>Workplace Label</b>
Provided by supplier	Provided by employer
Must appear on all controlled products: <ul style="list-style-type: none"> <li>• received at workplaces in Canada</li> </ul>	Must appear on all controlled products: <ul style="list-style-type: none"> <li>• produced in a workplace</li> <li>• transferred or transported in other containers</li> </ul>
Must include: <ul style="list-style-type: none"> <li>• Product identifier</li> <li>• Supplier identifier</li> <li>• Standardized hazard symbols</li> <li>• Risk phrases</li> <li>• Precautionary measures</li> <li>• First aid measures</li> </ul>	Must include: <ul style="list-style-type: none"> <li>• Product identifier</li> <li>• MSDS statement</li> <li>• Information for the safe handling of the product</li> </ul>
Must have the cross-hatch border	May contain WHMIS border or symbols, but not required
Must be in both French and English	No language requirement
	May be in other formats including placards, signs, codes, or diagrams.

# Consumer Labels

The statutory mandate for the WHMIS and consumer product warning labels is contained in the [Hazardous Products Act](#), an omnibus piece of federal legislation that was designed to ensure that products do not present a danger to the health and safety of the general public.

The act, administered by the Product Safety Branch of Health Canada, can be used to ban especially dangerous products from the marketplace, set performance standards for specific products and require the use of mandatory warning labels.

The scope of the *Hazardous Products Act* includes, among other things, consumer products that are poisonous, toxic, flammable, explosive, corrosive, infectious, oxidizing or reactive. The Hazardous Products Act establishes two separate but complementary sets of labelling requirements:

Labelling on consumer products uses "signal words", hazard statements and familiar pictograms to warn consumers about possible hazards to their lives and health.

There are four standardized warning signs:

- skeletal hand in the vat of acid which marks a corrosive;
- skull and crossbones for use on toxic products;
- exploding ball on explosives;
- open flame on flammables.

The shape of the border around the warning signs conveys the magnitude of the hazard.

- The octagonal "stop" sign means DANGER and is reserved for the most hazardous products.
- The "go-slow" diamond shape means WARNING and indicates a product that can cause serious injury.
- The inverted triangle of the "yield sign" means CAUTION and is used on products that could cause a minor injury if misused.

The pictograms are augmented by signal words, danger, caution or warning

Also included are primary and secondary hazard statements. The primary hazard statements refer to the most immediate or serious health threats, i.e., "harmful if absorbed through skin". The secondary hazard statements provide more detail on protective measures such, i.e. spill cleanup.

First aid information must also appear on the label in the event the product is swallowed, inhaled or splashed onto the skin or into the user's eyes.

These warnings must only appear on potentially hazardous chemical consumer products listed in the *Hazardous Products Act*.

# Material Safety Data Sheet (MSDS)

The Material Safety Data Sheet provides health and safety information to help about protection (including protective equipment), safe handling procedures, and emergency measures.

A Material Safety Data Sheet is a technical document which:

- } Lists all hazardous ingredients of a product;
- } Provides information related to safety and health hazards during handling, storage and use of a controlled product;
- } Outlines protective measures for workers;
- } Includes information about emergency procedures.

An MSDS must contain these 9 categories of information.

## 1. Product Identification

This information can be used to organize the data sheets for quick retrieval. The information in this section must be identical with the identifier on the supplier label.

## 2. Hazardous Ingredients

This information will list the chemicals in the product. It can help determine the exposure time when working with the material.

## 3. Physical Data

This block of information describes the product's physical characteristics under normal conditions. Descriptions will include appearance, colour, consistency and odour.

## 4. Fire or Explosion Hazard

This category explains how to prevent a fire or an explosion. Emergency Procedures can also be established based on this information

## 5. Reactivity Data

This information will indicate how stable the product is and whether it can react with other chemicals or unusual circumstances.

## 6. Toxicological Data

This information describes how a material can enter the body and what short-and long-term health effects may occur due to over-exposure.

### **7. Preventative Measures**

This block of information describes the protective measures for worker health and safety.

### **8. First Aid Measures**

This section describes what to do for the immediate treatment of short-term (acute) health effects due to over-exposure.

### **9. Preparation Information**

This section will show the date that the data sheet was prepared.

In addition, it is usually necessary to supplement this with safe handling procedures that are specific to the workplace.

## Supplier Responsibilities

- Develop or obtain an MSDS for each controlled product. and provide it with each purchase.
- Ensure that the MSDS is current at the time of sale, and that it was prepared no more than three (3) years before the date of sale or importation.

## Employer Responsibilities

- Obtain an up-to-date MSDS the first time a controlled product is received in the workplace
- Obtain up-to-date MSDS when the production date is 3 years old.
- Add any new hazard information to the MSDS if the supplier is unable to provide an updated data sheet. New information must be added as soon as possible, within 90 days of notification.
- when the production date of the sheet is longer than 3 years

- Ensure that all copies of data sheets are readily available
- Ensure that workers who use (or are in proximity to) a controlled product receive training in the content data sheet and the significant of the information it provides.
- Provide medical professionals with relevant MSDS information in the event of a workplace accident.

## MSDS Terminology

Acute Exposure	A single exposure to a substance or multiple exposures occurring within a short time, usually 24 hours or less.
Allergens	Substances, which trigger the body's immune response and produce an allergic response.
Asphyxiants	Substances, which replace oxygen, eventually, making breathing impossible.
Auto-ignition Temperature	Temperature at which the vapour from a liquid will ignite without a source of ignition such as a spark or flame.
Carcinogens	Substances or agents capable of causing cancer in mammals.
Ceiling Exposure Limit [C or CEL]	The maximum concentration of a chemical to which one may be exposed at any time. This value is never to be exceeded without special precautions.
Chronic Exposure	Repeated exposure to a substance over a relatively long period of time [typically more than ten per cent of lifetime in laboratory studies]
Combustible Liquid	Liquids with flash points 100 F [37.8 C] or more, but less than 93.3 F [200 C] when tested in accordance with an established procedure.
Flammable Limits	The upper and lower concentrations of a gas or vapour in air between which an explosion or propagation of flame will occur when an ignition source is present.
Flammable Liquid	A liquid with a flash point below 100 F [38.7 C.] when tested in accordance with an established procedure
Flash Point	The minimum temperature at which a liquid gives off enough vapour to ignite in the presence of a source of ignition under specified test conditions.
Half Life	The period of time for a chemical or radioactive substance to lose half its concentration or activity due to metabolic uptake, decay, or other chemical change.

I.D.L.H.	<p>Immediately Dangerous to Life and Health</p> <p>An atmosphere where the concentration of oxygen or flammable or toxic air contaminants would cause a person without respiratory protection to be fatally injured or would cause irreversible and incapacitating effects on that person's health.</p>
Irritants	Substances, which cause reddening, itching or pain to exposed bodily parts.
LC50 and LD50	These are not exposure criteria, but represent the concentrations taken orally or inhaled, which killed about 50% of a test population. A low LC or LD50 quantity indicates the relative toxicity of a substance.
Mutagen	Substances that cause genetic mutation in living cells. May occur in either reproductive or body cells.
Odour Threshold	The lowest airborne concentration of a chemical that can be perceived by the sense of smell
PPM	Parts per million. A measure of the concentration of a gas or vapour in the air.
Pictogram	Refers to the stylized graphical material, which appears within a hazard symbol.
Poisons	Any substances which injurious to health when taken into the body.
Polymerization of energy	A chemical reaction in which one or more small molecules combine to form larger molecules. A hazardous polymerization is one that takes place at a rate, which releases large amounts.
Risk Phrase	A statement identifying a hazard that may arise from the nature of the controlled product or the class, division or subdivision of controlled products.
Sensitizer	A substance which on first exposure causes little or no reaction in human or test animals, but which on repeated exposure may cause a marked response not necessarily limited to the contact site. Skin sensitization is the most common form in industry, although respiratory tract sensitization also occurs.
Short Term Exposure Limit [STEL]	The maximum exposure limit to which one may exposed for a brief (generally 15 minute) period for a maximum of 4 such periods per day, without suffering serious health effects.
Solvent	A liquid, which will dissolve another substance.
Synergist	An agent or substance that augments or increases the activity or effects of another agent or substance. Often increases the dangerous effects of the mixture.

TDG	Refers to Transportation of Dangerous Goods Act
Teratogen	Substances that can deform a fetus or cause birth defects.
Threshold Limit Value [TLV]	A term used by the American Conference of Governmental Industrial Hygienists [ACGIH] to express the airborne concentration of a material to which nearly all persons can be exposed day after day, without adverse effects.
Time Weighted Average [TWA]	The airborne concentration of a substance to which a person is exposed when calculated as a weighted average over a period of time [usually 8 hours].
Vapour	The gaseous form of a substance that is found in a solid or liquid state at normal atmospheric pressure
Vapour Pressure	The pressure exerted by a saturated vapour above its own liquid in a closed container.
Warning Properties	The capability of chemicals to be noticed by human senses at levels in the air below those which may cause ill health effects

# MSDS Sample

## MATERIAL SAFETY DATA SHEET

SECTION 1 - PRODUCT IDENTIFICATION AND USE				
PRODUCT IDENTIFIER ⇒ Sodium hydroxide, Caustic soda			PRODUCT IDENTIFICATION NUMBER (PIN) S-318	
PRODUCT USE ⇒				
MANUFACTURER'S NAME La Bell Industries		SUPPLIER'S NAME Omega Chemicals		
STREET ADDRESS 18 Rue LeJour		STREET ADDRESS P.O. Box 1989		
CITY Montreal	PROVINCE Quebec	CITY Sumware	PROVINCE Ont.	
POSTAL CODE MON 0C0	EMERGENCY TELEPHONE NO. (522) 555-4433	POSTAL CODE C1H 201	EMERGENCY TELEPHONE NO. (416) 555-4321	
SECTION 2 - HAZARDOUS INGREDIENTS				
HAZARDOUS INGREDIENTS	%	CAS NUMBER	LD <sub>50</sub> OF INGREDIENT (Specify species & route)	LD <sub>50</sub> OF INGREDIENT (Specify species)
Sodium Hydroxide	96	1310-73-2		
Sodium Carbonate (Na <sub>2</sub> CO <sub>3</sub> )	0.5-2.5			
Sodium Chloride (NaCl)	0.0-2.1			
Sodium Sulphate (Na <sub>2</sub> CO <sub>3</sub> )	0.02-0.1			
Potassium, Calcium, and Magnesium	0.1			
Sodium Dioxide (SiO <sub>2</sub> )	0.03			
Other Metals (total)	0.01			
SECTION 3 - PHYSICAL DATA				
PHYSICAL STATE Other	ODOUR AND APPEARANCE White/off-white odourless, hygroscopic		ODOUR THRESHOLD (ppm) odourless	
VAPOUR PRESSURE (mm Hg) Not appl.	VAPOUR DENSITY (AIR = 1) Not appl.	EVAPORATION RATE Non-volatile @ room temp	BOILING POINT (°C) 1388°C	MELTING POINT (°C) 318°C
pH Not appl.	SPECIFIC GRAVITY 2.13	COEFF. WATER/OIL DIS Not appl.		
SECTION 4 - FIRE AND EXPLOSION DATA				
FLAMMABILITY YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> IF YES, UNDER WHICH CONDITIONS?				
MEANS OF EXTINCTION Although it is non-combustible, it can be hazardous in a fire area. The following should be known for fire fighting: 1) it can melt and flow when heated (mp 318°) 2) Hot or molten material can react violently with water (splattering). 3) Can react with certain metals, such as aluminum to generate flammable hydrogen gas.				
FLASHPOINT (°C) AND METHOD Not flammable	UPPER FLAMMABLE LIMIT (% BY VOLUME) Not flammable	LOWER FLAMMABLE LIMIT (% BY VOLUME) Not flammable		
AUTOIGNITION TEMPERATURE (°C) Not flammable	HAZARDOUS COMBUSTION PRODUCTS Not flammable			
EXPLOSION DATA ⇒ SENSITIVITY TO IMPACT Not appl.		SENSITIVITY TO STATIC DISCHARGE Not appl.		
SECTION 5 - REACTIVITY DATA				
CHEMICAL STABILITY YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> IF NO, UNDER WHICH CONDITIONS? ⇒				
INCOMPATIBILITY WITH OTHER SUBSTANCES Strong acids, many organic compounds, leather, wool, aluminum, zinc, and tin. YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> IF SO, WHICH ONES ⇒				
REACTIVITY, AND UNDER WHAT CONDITIONS Slowly picks up moisture and CO <sub>2</sub> from the air to form Sodium carbonate				
HAZARDOUS DECOMPOSITION PRODUCTS None				

PRODUCT IDENTIFIER

**SECTION 6 - TOXOLOGICAL PROPERTIES**

ROUTE OF ENTRY

SKIN CONTACT  SKIN ABSORPTION  EYE CONTACT  INHALATION  INGESTION

**EFFECTS OF ACUTE EXPOSURE TO PRODUCT** Damage to any human tissue particularly skin, eyes, and respiratory tract.

**EFFECTS OF CHRONIC EXPOSURE TO PRODUCT** Dust and mist can cause damage particularly to the respiratory tract.

<b>EXPOSURE LIMITS</b> 2 mg/m <sup>3</sup> Ceiling limit.	<b>IRRITANCY OF PRODUCT</b> Causes burning sensation	<b>SENSITIZATION TO PRODUCT</b> Not known	<b>CARCINOGENICITY</b> Not listed
<b>TERATOGENICITY</b> Not known	<b>REPRODUCTIVE TOXICITY</b> Not known	<b>MUTAGENICITY</b> Not listed	<b>SYNERGISTIC PRODUCTS</b> Reacts violently when molten

**SECTION 7 - PREVENTATIVE MEASURES**

PERSONAL PROTECTIVE EQUIPMENT

<b>GLOVES (SPECIFY)</b> rubber, polyethylene	<b>RESPIRATOR (SPECIFY)</b> filter type	<b>EYE (SPECIFY)</b> goggles, face shield
<b>FOOTWEAR (SPECIFY)</b> rubber boots where needed to prevent contact	<b>CLOTHING (SPECIFY)</b> rubber apron where needed to prevent contact	<b>OTHER (SPECIFY)</b> Lab coat, overalls

**ENGINEERING CONTROL (SPECIFY E.G., VENTILATION, ENCLOSED PROCESS)** local exhaust

**LEAK AND SPILL PROCEDURE** When spilled in a dry condition, it can be promptly shovelled up for recovery or disposal. Flush surfaces with water, neutralize with diluted acid (vinegar).

**WASTE DISPOSAL** Disposal must meet with local requirements. Waste must never be discharged directly into sewers or surface waters. (Neutralize and dilute with much water)

HANDLING PROCEDURES AND EQUIPMENT

**STORAGE REQUIREMENTS** Store in well-sealed containers, have abundant water (running preferred) at hand.

**SPECIAL SHIPPING INFORMATION** This material is classified as **Corrosive**

**SECTION 8 - FIRST AID MEASURES**

SPECIFIC MEASURES

**Eye Contact:** Wash eyes immediately with plenty of running water for no less than 15 min. (including under the eyelids). Speed is important to avoid permanent injury. If one eye is injured, keep the injured eye at a lower level to avoid contaminating the uninjured eye.

**Skin Contact:** Wash contact area promptly with much water. (Dilute acetic acid, vinegar, can be used to neutralize). Remove contaminated clothing under the shower. Prolong washing until medical help arrives.

**Inhalation:** Remove from exposure to mist or dust and get prompt medical help.

**Ingestion:** Immediately phone 911 and ask for poison treatment. Describe the chemical that has been swallowed, and follow the advise of emergency personnel.

**SECTION 9 - PREPARATION DATE OF MSDS**

PREPARED BY (GROUP, DEPARTMENT, ETC.)	PHONE NUMBER	DATE
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# Physical Agents – Heat Stress

Working in hot environments can be uncomfortable and also, may adversely affect our health.

## Hazards

- Exposure to heat may cause:
- Heat Stroke
- Heat Edema
- Heat Rashes
- Heat Cramps
- Heat Exhaustion
- Heat Syncope (fainting)

## Precautions:

- Wear loose cotton clothing, which provides adequate protection in hot and humid conditions.
- A schedule of work-rest periods is generally recommended for working in hot conditions.
- You should drink plenty of cool (10 - 15 degrees Celsius) water or fruit drink every 15 to 20 minutes even though you may not feel thirsty.

# Physical Agents – Cold Stress

Working in cold conditions can be dangerous to those unprepared, and without adequate protective clothing.

## Hazards:

- Hypothermia results from the cooling of the deep inner body or "core" to a temperature below 34.5 degrees Celsius due to prolonged exposure to cold which can be very fatal.
- Frostbite is freezing of the body tissues as a result of extremely cold temperatures or contact with extremely cold metallic objects such as an automobile or a fence.

## Precautions:

- Wear multiple layers of light weight loose fitting clothing.
- Eye protection must be separate from respiratory channels (nose and mouth).
- The outer layer of clothing should be water proofed for work in wet conditions.
- Clothing should be kept clean and dry

- Gloves should be used below 4 degrees for light work and below -7 degrees for moderate work. For work below -17.5 degrees mittens should be used.
- Felt lined, rubber bottomed, leather-topped boots with removable felt insoles are best suited for heavy work in cold.

## Physical Agents – Radiation

Exposure to Radiation may affect the body both externally and internally, it is measured in millisieverts (mSv) or REM.

1 rem = 10 mSv Exposure

- } x-rays
- } Laser
- } Radio Frequency
- } Microwave
- } Ultraviolet
- } Visible and Infrared
- } Low Frequency

### Hazards:

- Cancers in exposed persons
- Growth abnormality and cancers in children from exposure during pregnancy
- Genetic diseases in descendants of exposed parents
- Eye damage
- Retinal damage
- Central Nervous System Effects

### Precautions:

- Limit exposure time
- Use barriers and shields
- Use approved Personal Protective Equipment

# Physical Agents – Noise

Noise is unwanted sound that is measured in decibels - dB, dB(A).

## Hazards:

- Causes hearing loss and stress

## Precautions:

- Use of hearing protectors

# Physical Agents – Vibration

Vibration exposure occurs in two ways :

    } **Whole body vibration exposure** While driving a tractor over bumpy terrain

    } **Hand-arm vibration exposure** while operating a vibrating hand-held tool such as a chain saw.

Vibration is measured in units of meters per second squared

Exposure by contact from vibrating machines and tools.

## Hazards:

- White finger disease
- Musculoskeletal disorders

## Precautions:

- Ergonomic tools
- Breaks

# Laboratories

Supplier labels from laboratory supply houses, packaged in quantities of 10 kilograms or more, and intended for laboratory use, must have:

- product identifier
- risk phrases
- precautionary measures
- first aid measures
- reference to availability of MSDS

Small containers (less than 100 ml) are permitted to carry a shorter version of the supplier label.

# School Boards

## Labeling

The Ontario Ministry of Labour considers school science classrooms to be laboratories and therefore workplace labels for decanted products are required.

If the controlled product is decanted or transferred to a secondary container, like a beaker or a flask, it must be clearly marked with the product name. No other labelling information is required. This also applies to chemical reagents that are decanted into smaller containers, like a beaker.

## Controlled products typically used in school boards:

Formaldehyde, mercury	- Science labs
Varsol, paint	- Auto shop
Stains, paint, contact cement	- Woodworking shop
Developers, fixers	- Photo lab
Toner, whiteboard cleaner	- Office cleaning products, waxes
Floor strippers	- Custodial
Degreasers, adhesives, epoxy resins, aerosol lubricants	- Maintenance
Boiler treatment chemicals, anhydrous ammonia	- Plant
Gasoline, varsol	- Landscaping
Degreasers, oven cleaners	- Food Services

## Art Supplies

Many art materials are labelled non-toxic. These products should provide an extra margin of safety compared to products that have acute and/or chronic health warnings. However be aware of the following when you are using "non-toxic" art products.

1. In addition to being labelled non-toxic, the label must also state that the product conforms to ASTM D-4236. Be suspicious of products simply labelled non-toxic.
2. Chemicals, which have never been tested for toxicity, may be labelled non-toxic even if those chemicals are related to substances known to have chronic hazards.
3. Products containing substances known to be toxic in industrial settings may be labelled with cancer warnings if the user is warned not to spray to apply the paint.

## Exemptions from WHMIS

Some products are exempted from WHMIS and do not have to be classified by their suppliers. This includes certain types of hazardous materials that are exempt fully and partially because they are already regulated under other existing federal or provincial legislation, or because they are regarded as being a low hazard.

There are ten (10) types of products that are exempted, in whole or in part, from WHMIS.

These include:

- Explosives covered under the Explosive Act.
- Cosmetics, drugs, food and devices covered under the Food and Drug Act.
- Pest control products covered under the Pest and Control Products Act.
- Radioactive substances covered under the Atomic Energy Control Act.
- Wood or products made of wood
- Manufactured articles
- Controlled products that cannot endanger worker health due to their physical shape or size (e.g. gravel containing silica)
- Tobacco or tobacco products
- Hazardous wastes
- Restricted products when packaged as consumer products.

# Safe Work Practices

Working with hazardous materials requires additional safety precautions.

Safe work practices include:

1. [Personal Protective Equipment](#)
2. [Engineering Controls](#)
3. [Leak and Spill Procedures](#)
4. [Waste Disposal](#)
5. [Handling Procedures and Equipment](#)
6. [Storage Requirements](#)
7. [Special Shipping Information](#)

## 1. Personal Protective Equipment

- Gloves
- Respirator
- Safety glasses
- Footwear
- Clothing
- Other items as necessary

## 2. Engineering Controls

- Ventilation
- Exhaust system
- Workplace design

## 3. Leak and Spill Procedures

Adequate spill control measures can usually be found in the MSDS. For practical purposes, however, it is generally necessary to train designated individuals in specific spill control procedures as it applies to the use and concentration found in the workplace. Containment and neutralization using acceptable compounds intended for that purpose are preferred method of spill control.

Spills should be contained and cleaned up by employees thoroughly familiar with the substances and the proper safety procedures. Chemicals should be disposed of according to approved procedures.

## 4. Waste Disposal

- Ministry of Environment Regulations
- Transportation
- Hazardous Waste Disposal Site

## **5. Handling Procedures and Equipment**

- Specialized tools to be used for the safe handling of materials.

## **6. Storage Requirements**

- Some materials require special storage facilities.

## **7. Special Shipping Information**

- Specific information for safe work practices can be found in the MSDS.

# **Emergency Procedures**

Emergency procedures are specific to workplaces. However, there are standard guidelines that apply. Detailed information for your workplace should also be reviewed.

### **Identifications:**

- Alarms (automatic and manual)
- Evacuation Routes (posted)
- Exits (marked and lighted)

### **Emergency Evacuation**

Upon discovering an emergency:

- Leave the area, closing doors
- Sound the alarm
- Inform administration/ call emergency 911

On hearing an alarm:

- Leave the building through the nearest safe exit
- Go to an assigned Assembly Area
- Participate in Roll Call
- Wait for further instructions from the Fire Department and/or Supervisor/Principal