

# WHMIS AT WORK



## MATERIAL SAFETY DATA SHEET — 9 Sections

PRODUCT INFORMATION			
Acetone			
General-purpose cleaning of adhesives, contact cements, printing inks			
Happy Chemical Company			
5556 Helium Lane			
S Bay			
Vancouver, BC			
Vapour Town			
123456 Avenue			
BC			
Vancouver, BC			
Emergency Telephone: (604) 234-5678			
Postal Code: X5X 5X5			
Emergency Telephone: (604) 345-6789			
CAS Number			
LD 50			

**WORK SAFE BC**

WORKING TO MAKE A DIFFERENCE  
[worksafebc.com](http://worksafebc.com)

## **ABOUT WORKSAFEBC**

WorkSafeBC (the Workers' Compensation Board) is an independent provincial statutory agency governed by a Board of Directors. It is funded by insurance premiums paid by registered employers and by investment returns. In administering the *Workers Compensation Act*, WorkSafeBC remains separate and distinct from government; however, it is accountable to the public through government in its role of protecting and maintaining the overall well-being of the workers' compensation system.

WorkSafeBC was born out of a compromise between B.C.'s workers and employers in 1917 where workers gave up the right to sue their employers or fellow workers for injuries on the job in return for a no-fault insurance program fully paid for by employers. WorkSafeBC is committed to a safe and healthy workplace, and to providing return-to-work rehabilitation and legislated compensation benefits to workers injured as a result of their employment.

## **WORKSAFEBC PREVENTION INFORMATION LINE**

The WorkSafeBC Prevention Information Line can answer your questions about workplace health and safety, worker and employer responsibilities, and reporting a workplace accident or incident. The Prevention Information Line accepts anonymous calls.

Phone 604 276-3100 in the Lower Mainland, or call 1 888 621-7233 (621-SAFE) toll-free in British Columbia.

To report after-hours and weekend accidents and emergencies, call 604 273-7711 in the Lower Mainland, or call 1 866 922-4357 (WCB-HELP) toll-free in British Columbia.

# WHMIS AT WORK

**WORK SAFE BC**

WORKING TO MAKE A DIFFERENCE  
[worksafebc.com](http://worksafebc.com)

## WORKSAFEBC PUBLICATIONS

Many publications are available on the WorkSafeBC web site. The Occupational Health and Safety Regulation and associated policies and guidelines, as well as excerpts and summaries of the *Workers Compensation Act*, are also available on the web site: <[www.worksafebc.com](http://www.worksafebc.com)>

Some publications are also available for purchase in print:

Phone: 604 232-9704

Toll-free phone: 1 866 319-9704

Fax: 604 232-9703

Toll-free fax: 1 888 232-9714

Online ordering: <[www.worksafebc.com](http://www.worksafebc.com)> and click on Publications; follow the links for ordering

©1999, 2004, 2005 Workers' Compensation Board of British Columbia. All rights reserved. The Workers' Compensation Board of B.C. encourages the copying, reproduction, and distribution of this document to promote health and safety in the workplace, provided that the Workers' Compensation Board of B.C. is acknowledged. However, no part of this publication may be copied, reproduced, or distributed for profit or other commercial enterprise, nor may any part be incorporated into any other publication, without written permission of the Workers' Compensation Board of B.C.

### 2005 Edition

#### **Library and Archives Canada Cataloguing in Publication Data**

Main entry under title:

WHMIS at work. -- Began with 1999 ed.

Irregular.

Previously published as monograph under title: What's WHMIS? 1995.

Description based on 2002 ed.

ISSN 1703-0935 = WHMIS at work

1. Workplace Hazardous Materials Information System (Canada). 2. Hazardous substances – Canada – Safety measures. 3. Hazardous substances – Law and legislation – Canada. 4. Industrial safety – Canada. 5. Industrial hygiene – Canada. I. Workers' Compensation Board of British Columbia. II. Title: Workplace Hazardous Materials Information System at work.

T55.3.H3W45

363.17'7'0971

C99-960295-0

# Table of Contents

	INTRODUCTION .....	1
<b>1.</b>	WHAT IS WHMIS? .....	3
	Overview of WHMIS .....	4
	How does WHMIS work? .....	5
	Classification of controlled products .....	6
	Overview of responsibilities .....	11
<b>2.</b>	WHMIS LABELS .....	13
	Labelling controlled products .....	14
	Supplier labels .....	14
	Workplace labels .....	19
	Other means of identification .....	20
<b>3.</b>	MATERIAL SAFETY DATA SHEETS .....	21
	Information included on an MSDS .....	22
	Supplier responsibilities .....	27
	Employer responsibilities .....	28
	Confidential business information (“trade secrets”) ...	29
<b>4.</b>	WHMIS EDUCATION AND TRAINING ....	31
	WHMIS education and training for workers .....	32
	Implementing WHMIS in your workplace .....	34
<b>5.</b>	TABLES AND CHECKLISTS .....	37
	Information items on a supplier label .....	38
	Information items on an MSDS .....	39
	WHMIS implementation plan checklist .....	44
	WHMIS education and training checklist .....	46
<b>6.</b>	RESOURCES .....	47
	WorkSafeBC materials .....	48
	Other sources of information .....	50

# Introduction

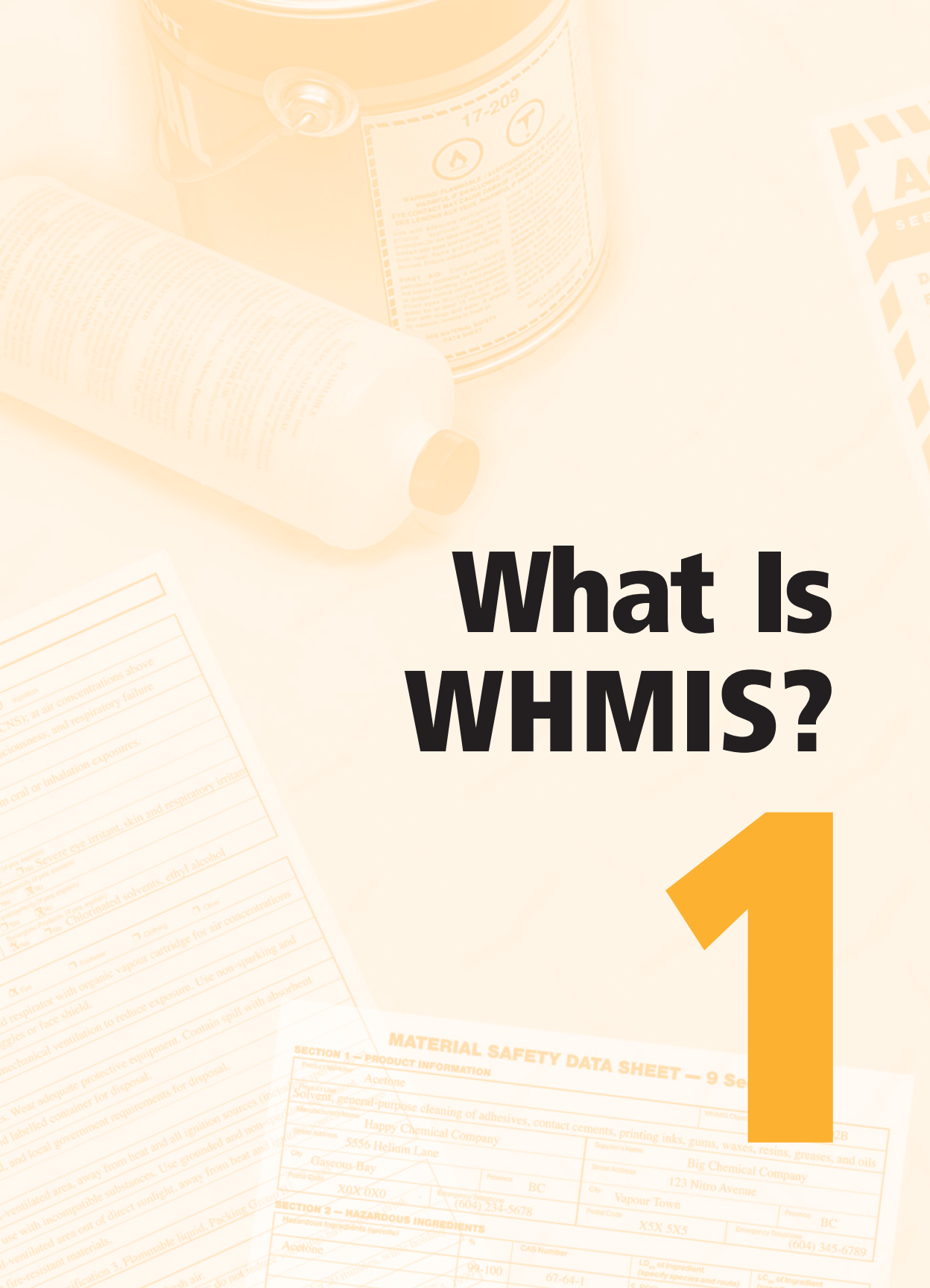
Workers exposed to hazardous materials may be at risk for many serious health problems, such as kidney or lung damage, sterility, cancer, allergic reactions, or burns. Some hazardous materials can also cause fires or explosions. The Workplace Hazardous Materials Information System (WHMIS) provides specific health and safety information about workplace hazardous materials called controlled products. Employers must use this information as well as information specific to their workplace to educate and train workers to work safely with and near hazardous materials.

This booklet, *WHMIS at Work*, explains the basics of WHMIS and answers some commonly asked questions about WHMIS.

- Part 1 describes the three main elements of WHMIS (labels, Material Safety Data Sheets, and education and training); the WHMIS classification system; and the responsibilities of suppliers, employers, and workers.
- Part 2 explains the requirements for WHMIS labels.
- Part 3 describes Material Safety Data Sheets (MSDSs), including the information required on an MSDS and the responsibilities of suppliers and employers.
- Part 4 describes WHMIS education and training requirements and the implementation of education and training programs.
- Part 5 includes tables outlining information on WHMIS labels and MSDSs and provides checklists for implementing WHMIS and education and training programs.
- Part 6 includes a list of resources for more WHMIS information.

After reading this booklet, employers and workers should be able to understand how WHMIS information can help workers to work safely with and near hazardous materials.

# What Is WHMIS?



...at air concentrations above  
...consciousness, and respiratory failure  
...oral or inhalation exposures.  
...Severe eye irritant, skin and respiratory irritant  
...Chlorinated solvents, ethyl alcohol  
...respirator with organic vapour cartridge for air concentrations  
...shield.  
...mechanical ventilation to reduce exposure. Use non-sparking and  
...Wear adequate protective equipment. Contain spill with absorbent  
...and labelled container for disposal.  
...and all ignition sources (in-  
...use with incompatible substances. Use grounded and non-sparking  
...away from heat and direct sunlight, away from heat and  
...Flammable liquid. Packing Group  
...do not inhale

**SECTION 1 — PRODUCT INFORMATION**

Product Name: Acetone  
Manufacturer: Solvent, general-purpose cleaning of adhesives, contact cements, printing inks, gums, waxes, resins, greases, and oils  
Manufacturer's Phone: (604) 234-5678  
Street Address: 5556 Helium Lane  
City: Gaseous Bay  
Postal Code: X0X 0X0  
Province: BC  
Emergency Telephone: (604) 234-5678

Supplier's Name: Happy Chemical Company  
Street Address: 123 Nitro Avenue  
City: Vapour Town  
Postal Code: X5X 5X5  
Province: BC  
Emergency Telephone: (604) 345-6789

**SECTION 2 — HAZARDOUS INGREDIENTS**

Hazardous Ingredients (if any)	%	CAS Number	LD <sub>50</sub> of Ingredient (Specify species and route)	LC <sub>50</sub> of Ingredient (Spec)
Acetone	99-100	67-64-1		

# Overview of WHMIS

The Workplace Hazardous Materials Information System (WHMIS) provides information about many hazardous materials used in the workplace. WHMIS calls these hazardous materials **controlled products**. Under WHMIS, workers have the right to receive information about each controlled product they use—its identity, hazards, and safety precautions. The goal of WHMIS is to reduce injury and disease by communicating specific health and safety information about controlled products so that the information can be used to reduce exposure to hazardous materials.

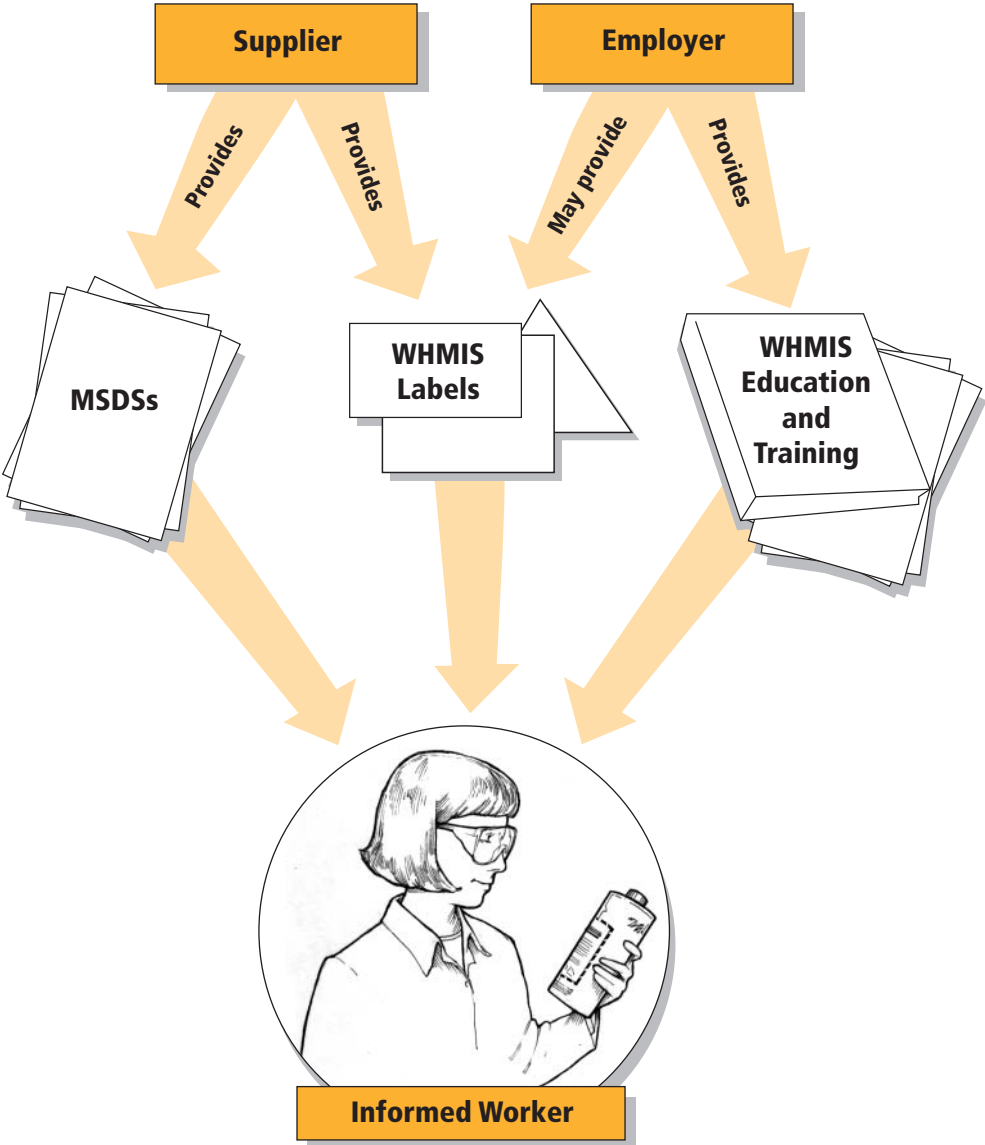
WHMIS has developed a classification system of six hazard classes. These classes are depicted by eight hazard symbols that identify the specific hazards of controlled products. After a controlled product has been classified, the following three WHMIS elements are used to communicate health and safety information:

- **WHMIS labels:** Labels on controlled products alert workers to the identity of the product, hazards, and precautionary measures.
- **Material Safety Data Sheets (MSDSs):** Technical bulletins provide detailed hazard and precautionary information.
- **WHMIS education and training programs:** The employer provides education and training for workers so that they can work safely with and near controlled products. Workers need to know how WHMIS works, the hazards of controlled products in their workplace, and the safe work procedures they must follow.

*Note: Not all controlled products in the workplace are sold with WHMIS labels and Material Safety Data Sheets. Some hazardous materials are sold with labelling and hazard information meeting the requirements of other legislation. These products are either partially or completely exempt from WHMIS requirements (see page 10).*



# How does WHMIS work?



# Classification of controlled products

A controlled product is a product that falls into one or more of the hazard classes described below. Manufacturers and suppliers classify these products and assign one or more of the appropriate hazard symbols. Employers must educate and train workers to recognize the eight hazard symbols and to know what they mean. The following are only brief descriptions of each of the classes.

## **CLASS A: COMPRESSED GAS**



This class includes compressed gases, dissolved gases, and gases liquefied by compression or refrigeration. If the pressure in the container is greater than 40 psi, the gas is a Class A product. The cylinder may explode if exposed to heat or to physical shock (when dropped).

*Examples: oxygen and acetylene in cylinders for welding; propane*

## **CLASS B: FLAMMABLE AND COMBUSTIBLE MATERIAL**



This class includes solids, liquids, and gases capable of catching fire in the presence of a spark or open flame under normal working conditions. Class B has six divisions:

### **DIVISION 1: FLAMMABLE GASES**

These are compressed gases (Class A) that form flammable mixtures in air.

*Examples: butane, propane, hydrogen gas*

### **DIVISION 2: FLAMMABLE LIQUIDS**

These are liquids that have flash points below 37.8°C. A flash point is the lowest temperature at which the vapours from these liquids will catch fire from nearby sparks or open flames.

*Examples: acetone, gasoline, isopropyl alcohol*

DIVISION 3: COMBUSTIBLE LIQUIDS

These are liquids that have flash points of 37.8°C or more but less than 93.3°C.

*Examples: kerosene, mineral spirits, butyl cellosolve*

DIVISION 4: FLAMMABLE SOLIDS

This is a special group of solids (usually metals) that meet very specific technical criteria such as the ability to cause fire through friction or to ignite and burn so vigorously and persistently that they create a hazard.

*Examples: various magnesium alloys, beryllium powder*

DIVISION 5: FLAMMABLE AEROSOLS

These products are packaged in aerosol containers. Either the aerosolized product itself or the propellant may catch fire.

*Examples of flammable propellants: propane, butane, isobutane*

DIVISION 6: REACTIVE FLAMMABLE MATERIALS

These products react dangerously in one of two ways: either (1) they spontaneously create heat or catch fire under normal conditions of use or they create heat when in contact with air to the point where they begin to burn, or (2) they emit a flammable gas or spontaneously catch fire when in contact with water or water vapour.

*Examples: aluminum alkyl compounds, metallic sodium, white phosphorous*

**CLASS C: OXIDIZING MATERIAL**



These materials increase the risk of fire if they come in contact with flammable or combustible materials.

*Examples: perchloric acid, hydrogen peroxide, permanganates, compressed oxygen*

**CLASS D: POISONOUS AND INFECTIOUS MATERIAL**

Class D has three divisions:



**DIVISION 1: MATERIALS CAUSING IMMEDIATE AND SERIOUS TOXIC EFFECTS**

These materials can cause death or immediate injury when a person is exposed to small amounts.

*Examples: sodium cyanide, hydrogen sulphide*



**DIVISION 2: MATERIALS CAUSING OTHER TOXIC EFFECTS**

These materials can cause life-threatening and serious long-term health problems as well as less severe but immediate reactions in a person who is repeatedly exposed to small amounts. Health problems include immediate skin or eye irritation, allergic sensitization, cancer, serious impairment of specific body organs and systems, and reproductive problems.

*Examples: xylene, asbestos, isocyanates*



**DIVISION 3: BIOHAZARDOUS INFECTIOUS MATERIAL**

These materials contain harmful micro-organisms that have been classified into Risk Groups 2, 3, and 4 as determined by the World Health Organization (WHO) or the Medical Research Council of Canada.

*Examples: cultures or diagnostic specimens containing salmonella bacteria or the hepatitis B virus*

**CLASS E:**



**CORROSIVE MATERIAL**

This class includes caustic and acid materials that can destroy the skin or eat through metals.

*Examples: sodium hydroxide, hydrochloric acid, nitric acid*

**CLASS F:**



**DANGEROUSLY REACTIVE MATERIAL**

These products may self-react dangerously (for example, they may explode) upon standing or when exposed to physical shock or to increased pressure or temperature, or they emit toxic gases when exposed to water.

*Examples: plastic monomers such as butadiene; some cyanides*

## Products exempt from WHMIS

Some controlled products are either partially exempt or completely exempt from WHMIS.

### Partially exempt products

Products covered by other federal legislation are exempt from federal WHMIS requirements for supplier labels and MSDSs. However, provincial WHMIS legislation still applies and employers must:

- Provide workers with hazard information about the product
- Educate workers about the hazards of the product
- Educate and train workers in the safe use, handling, storage, and disposal of the product

These partially exempt products are:

- Some consumer products, such as chemicals and pressurized containers
- Cosmetics, medical devices, drugs, and foods (*Food and Drugs Act*)
- Explosives (*Explosives Act*)
- Pesticides (*Pest Control Products Act*)
- Radioactive substances (*Atomic Energy Control Act*)

### Completely exempt products

Products that are completely exempt (sometimes called “excluded”) from both federal and provincial WHMIS legislation are still covered by general provincial occupational health and safety regulations. Workers must still be trained and supervised in the safe handling of these products.

These completely exempt products are:

- Wood and products made of wood
- Manufactured articles (such as appliances and car batteries)
- Tobacco and products made of tobacco
- Goods handled, offered for transport, or transported under the *Transportation of Dangerous Goods Act*
- Hazardous wastes (they must be identified at workplaces where they are produced)

For more information on exempt products, see the WorkSafeBC manual *WHMIS Core Material*.

*The rest of this booklet deals with controlled products that require WHMIS supplier labels and MSDSs (products that are not exempt).*

# Overview of responsibilities

The purpose of WHMIS is to reduce the likelihood of disease or injury in the workplace. WHMIS was developed through the collective efforts of labour and industry, along with federal, provincial, and territorial regulatory agencies.

WHMIS legislation exists at both the federal and provincial levels. **Federal legislation** establishes which products are controlled under WHMIS and deals with either the importation or sale of these materials. Under WHMIS, those who manufacture, import, sell, or distribute controlled products are referred to as suppliers.

**Provincial legislation** covers the use of hazardous materials in the workplace and identifies employers' responsibilities. Workers who work with or near controlled products must know how to handle them safely.

## When an employer becomes a supplier

If employers import or produce a controlled product, even if it is for their own use, they are considered to be the supplier of the controlled product. This means they must provide an up-to-date MSDS and attach a supplier label.

The following table summarizes the responsibilities of the various groups identified by WHMIS legislation. Note that supplier labels and workplace labels are explained starting on page 13 and MSDSs on page 21.

Group	Responsibilities
Suppliers	Provide up-to-date MSDSs (not more than three years old) for all controlled products they sell or produce.
	Provide supplier labels on all containers of controlled products they sell or produce.
Employers	Ensure that workers understand information on MSDSs, supplier labels, and workplace labels by providing effective worker education.
	Provide training in specific safe work procedures to workers who work with or near controlled products.
	Ensure that all containers of controlled products in their workplace have MSDSs and WHMIS labels (supplier labels, workplace labels, or other acceptable means of identification as appropriate).
	Ensure that MSDSs are readily accessible to workers.
Workers	Know and understand the information on labels and MSDSs.
	Use the information they receive through education and training to handle controlled products safely.
	Inform employers if labels are illegible or missing.
WorkSafeBC staff	Administer WHMIS legislation.
	Provide general information about WHMIS to employers and workers.
	Ensure compliance with both federal and provincial WHMIS legislation.





# WHMIS Labels

# 2

... irritates  
... (NCS); at air concentrations above  
... consciousness, and respiratory failure  
... oral or inhalation exposures.  
... Severe eye irritant, skin and respiratory irritant  
... Chlorinated solvents, ethyl alcohol  
... respirator with organic vapour cartridge for air concentrations  
... mechanical ventilation to reduce exposure. Use non-sparking and  
... Wear adequate protective equipment. Contain spill with absorbent  
... and local government requirements for disposal.  
... away from heat and all ignition sources (in-  
... use with incompatible substances. Use grounded and non-sparking  
... fire-resistant materials.  
... Flammable liquid. Packing Group  
... do not inhale

**SECTION 1 — PRODUCT INFORMATION**

Product Name: Acetone  
Hazardous Use: Solvent, general-purpose cleaning of adhesives, contact cements, ...  
Manufacturer Name: Happy Chemical Company  
Street Address: 5556 Helium Lane  
City: Gaseous Bay  
Postal Code: X0X 0X0  
Province: BC  
Emergency Telephone: (604) 234-5678

Supplier's Name: Big Chemical Company  
Street Address: 123 Nitro Avenue  
City: Vapour Town  
Postal Code: X5X 5X5  
Province: BC  
Emergency Telephone: (604) 345-6789

**SECTION 2 — HAZARDOUS INGREDIENTS**

Hazardous Ingredients (if any)	%	CAS Number	LD <sub>50</sub> of Ingredient (Specify species and route)	LC <sub>50</sub> of Ingredient (Specify species and route)
Acetone	99-100	67-64-1		

## Labelling controlled products

Two types of labels are required by WHMIS: supplier labels and workplace labels. In general, suppliers are responsible for providing supplier labels and employers are responsible for providing workplace labels or other means of identification. Employers must also ensure that all labels at their workplace are legible and that they are replaced if damaged.

The purpose of WHMIS labels is to alert workers to the hazards of a controlled product and the safe procedures necessary to work with or near that product. For this to happen, workers must be educated to recognize and understand the information provided on supplier labels, workplace labels, and other means of identification (such as warning signs, colour codes, and placards). Employers are responsible for developing this education and training in consultation with worker representatives or the occupational health and safety committee.

## Supplier labels

WHMIS requires that supplier labels be placed on containers of all controlled products sold for use in the workplace. A supplier who produces or imports a product for distribution and sale in Canada must prepare a supplier label for that product. Supplier labels can be easily recognized by the distinctive WHMIS hatched borders. The label on page 16 is one example of an acceptable supplier label.

Seven items of information must be included within the distinctive hatched border:

1. **Product identifier:** Often the chemical name of a product or the trade name, common name, code name, or code number.

2. **Hazard symbol(s):** One or more of the eight WHMIS symbols indicating the hazard classes of the controlled product.
3. **Risk phrases:** Phrases that alert workers to the specific hazard(s) of the product. There should be at least one risk phrase for each hazard symbol.
4. **Precautionary statements:** Statements that describe essential precautions workers should take and specific personal protective clothing and equipment (PPE) they should wear when handling (using, storing, and disposing of) the product.
5. **First aid measures:** Statements that describe immediate first aid measures required.
6. **Supplier identification:** The name of the supplier (manufacturer or distributor), preferably with the address and telephone number.
7. **Reference to MSDS:** A statement indicating that an MSDS is available.

Additional requirements for supplier labels:

- Only the above seven information items can be printed within the WHMIS hatched borders. Other information, such as directions for use, must be placed outside the WHMIS hatched borders.
- The written information must be shown in both English and French.
- The information must be correct and current.
- Colours that conflict with Transportation of Dangerous Goods (TDG) labelling cannot be used. For example, the colour orange cannot be used because it is used by TDG to identify explosives.
- The label must stand out from the container itself and other markings on the container (for example, the size of the label should be appropriate for the size of the container). See the WorkSafeBC manual *WHMIS Core Material* for more information.

Hazard symbols

# ACETONE ACÉTONE

SEE MATERIAL SAFETY DATA SHEET FOR THIS PRODUCT  
VOIR LA FICHE SIGNALÉTIQUE POUR CE PRODUIT

Product Identifier

Reference to MSDS

Risk phrases

## DANGER! EXTREMELY FLAMMABLE. IRRITATES EYES.

**PRECAUTIONS:** Keep away from heat, sparks, and flames. Ground containers when pouring. Avoid breathing vapours or mists. Avoid eye contact. Avoid prolonged or repeated contact with skin. Wear splash-proof safety goggles or faceshield and butyl rubber gloves. If acetone is present in concentrations greater than 250 ppm, wear a NIOSH-approved respirator with an organic vapour cartridge. Use with adequate ventilation, especially in enclosed areas. Store in a cool, well-ventilated area, away from incompatibles.



**FIRST AID:** In case of contact with eyes, immediately flush eyes with lots of running water for 15 minutes, lifting the upper and lower eyelids occasionally. Get medical attention immediately. In case of contact with skin, immediately wash skin with lots of soap and water. Remove contaminated clothing and shoes. Get medical attention if irritation persists after washing. Wash clothing before reuse. If inhaled, remove subject to fresh air. Give artificial respiration if not breathing. Get medical attention immediately. If swallowed, contact the Poison Control Centre. Get medical attention immediately. Do not give anything by mouth to an unconscious or convulsing person.

**ATTENTION! THIS CONTAINER IS HAZARDOUS WHEN EMPTY. ALL LABELLED HAZARD PRECAUTIONS MUST BE OBSERVED.**

## DANGER! EXTRÊMEMENT INFLAMMABLE. IRRITE LES YEUX.



**MESURES DE PRÉVENTION:** Tenir à l'écart de la chaleur, des étincelles et des flammes. Relier les récipients à la terre lors du transvasement. Éviter de respirer les vapeurs ou les

brumes. Éviter le contact avec les yeux. Éviter le contact prolongé ou répété avec la peau. Porter des lunettes contre les éclaboussures de produit chimique ou une visière de protection, et des gants en caoutchouc butyle. Si l'acétone est présent en concentration de plus de 250 pour un million, porter un respirateur muni d'une cartouche à vapeur organique approuvé par NIOSH. Utiliser avec suffisamment de ventilation surtout dans les endroits clos. Entreposer dans un endroit frais, bien aéré, à l'écart des produits incompatibles.

**PREMIERS SOINS:** En cas de contact avec les yeux, rincer immédiatement et copieusement avec de l'eau courante pendant 15 minutes en soulevant les paupières inférieures et supérieures de temps en temps. Obtenir des soins médicaux immédiatement. En cas de contact avec la peau, laver immédiatement la région affectée avec beaucoup d'eau et de savon. Retirer les vêtements et les chaussures contaminées. Si l'irritation persiste après le lavage, obtenir des soins médicaux. Laver les vêtements avant de les réutiliser. En cas d'inhalation, transporter la victime à l'air frais. En cas d'arrêt respiratoire, pratiquer la respiration artificielle. Obtenir des soins médicaux immédiatement. En cas d'ingestion, contacter le Centre de Contrôle des Empoisonnements. Obtenir des soins médicaux immédiatement. Ne rien faire avaler à une victime inconsciente ou en convulsions.

**ATTENTION! CE RECIPIENT EST DANGEREUX LORSQU'IL EST VIDE. CHAQUE INDICATION DE DANGER SUR LES ÉTIQUETTES DOIVENT ÊTRE OBSERVÉES.**

French version

Precautionary statements

First aid measures

WHMIS hatched border

**BIG** BIG Chemical Company / 123 Nitro Avenue, Vapour Town, BC / 123-4567

An example of a supplier label.

Supplier identification

## Other supplier labels

Some supplier labels may look different from the example on page 16 because less information is required for controlled products that are:

- In small containers (less than 100 mL)
- Chemicals from laboratory chemical suppliers
- Laboratory samples

Information item		Small container	Laboratory chemical	Laboratory sample*
1	Product identifier	●	●	●
2	Hazard symbol(s)	●		
3	Risk phrases		●	
4	Precautionary statements		●	
5	First aid measures		●	
6	Supplier identification	●		●
7	Reference to MSDS	●	●	

\*Laboratory samples must also include chemical identity and an emergency phone number.

For more information about these supplier labels, see the WorkSafeBC manual *WHMIS Core Material*.

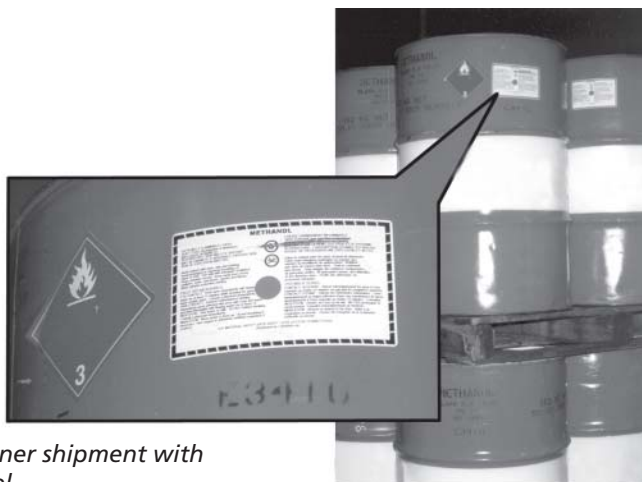
When a supplier ships a product, it will generally be transported in a single container, in a multi-container, or in bulk. If the product is in a **single container**, the supplier must apply the supplier label. If a number of inner containers are packaged into a **multi-container shipment** (such as a box or wrapped pallet), the supplier must apply labels on both the inner and outer containers unless there is a written agreement that the purchaser will apply the supplier labels to the inner containers. For **bulk shipments**, the supplier must send to the purchaser either a supplier label or the information required on a supplier label.

The *Transportation of Dangerous Goods Act* may require additional labels during transport. For multi-container shipments, a supplier label is not required on the outer container if a TDG label is present. Only the inner containers require supplier labels.

Employers are responsible for checking that supplier labels have been applied to the controlled products received at their workplace. With **multi-container shipments**, the employer must apply supplier labels to inner containers if the employer has agreed in writing to do so. With **bulk shipments**, the employer must apply the supplier labels provided. If the supplier sends labelling information instead of labels, the employer must develop and apply, at a minimum, a workplace label (see page 19).

If a supplier label is missing when the product is received, or if the employer believes the label contains inaccurate information, the employer must temporarily store that product while he or she is actively seeking the information from the supplier or the manufacturer. The temporarily stored product cannot be handled or used until a proper label has been obtained.

If a supplier label later becomes illegible or is accidentally removed, the employer must replace the label with either a supplier label or a workplace label (see page 19).



*Multi-container shipment with supplier label.*

# Workplace labels

Workplace labels are required on containers for each controlled product produced and used on-site, on secondary containers after a product has been transferred from the original container, and on containers where the supplier label is missing or not readable. Workplace labels provide three types of information:

- Product identifier
- Specific safe handling information and personal protective clothing and equipment required
- Reference to the MSDS, if an MSDS has been produced by the supplier

The format for workplace labels is fairly flexible. For example:

- The information can be written directly onto the container using a permanent marker.
- The language(s) used can be chosen to fit the specific workplace.
- Hazard symbols and hatched borders are optional.



*An example of a workplace label.*

## Other means of identification

In some circumstances where workplace labels are impractical, employers may use other means of identification such as warning signs, symbols, placards, and coding systems (for example, using colours, numbers, or letters). These can be used as long as the identification system is communicated effectively and understood by workers. These other means of identification can be used when the product is:

- Used in a laboratory (for example, in transfer containers such as beakers and flasks)
- Transferred by a worker into a container for use during the same shift if that worker maintains control of the new container and finishes use in that shift
- Contained in a transfer or reaction system such as a pipe, reaction vessel, tank car, or conveyor belt
- Identified as a hazardous waste produced in the workplace

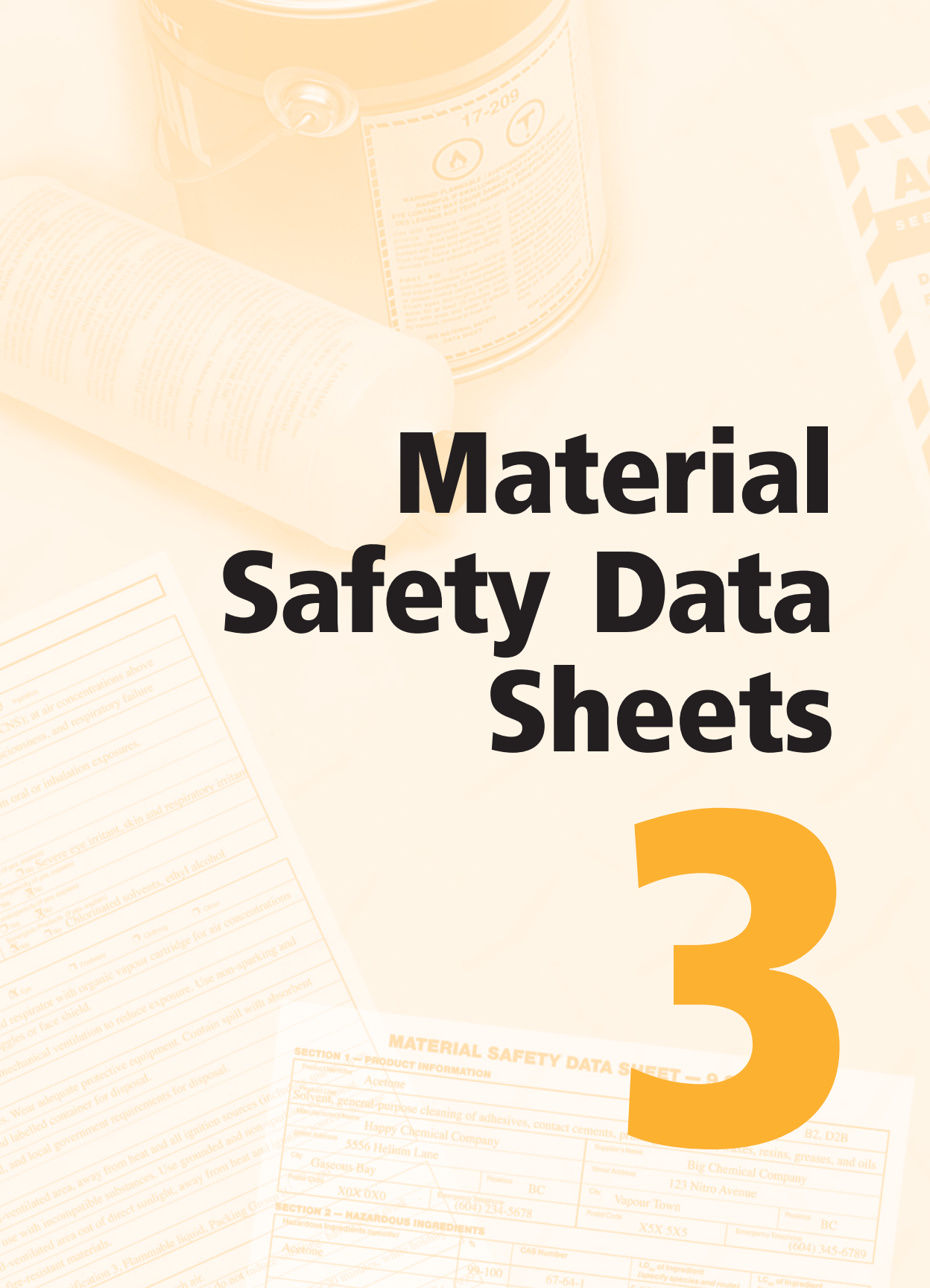


*Controlled products in pipes identified by colour and letters.*



# Material Safety Data Sheets

# 3



...at air concentrations above  
...and respiratory failure  
...oral or inhalation exposures.  
...Severe eye irritant, skin and respiratory irritant  
...Chlorinated solvents, ethyl alcohol  
...respirator with organic vapour cartridge for air concentrations  
...mechanical ventilation to reduce exposure. Use non-sparking and  
...Wear adequate protective equipment. Contain spill with absorbent  
...and labelled container for disposal.  
...and local government requirements for disposal.  
...away from heat and all ignition sources (including  
...Use with incompatible substances. Use grounded and non-sparking  
...away from heat and  
...Flammable liquid. Packing Group  
...do not inhale

**MATERIAL SAFETY DATA SHEET - 9**

**SECTION 1 - PRODUCT INFORMATION**

Product Name: Acetone  
Product Use: Solvent, general-purpose cleaning of adhesives, contact cements, resins, greases, and oils  
Manufacturer Name: Happy Chemical Company  
Street Address: 5556 Helium Lane  
City: Gaseous Bay  
Postal Code: X0X 0X0  
Province: BC  
Emergency Telephone: (604) 234-5678

Supplier's Name: Big Chemical Company  
Street Address: 123 Nitro Avenue  
City: Vapour Town  
Postal Code: X5X 5X5  
Province: BC  
Emergency Telephone: (604) 345-6789

**SECTION 2 - HAZARDOUS INGREDIENTS**

Hazardous Ingredients (specify)	%	CAS Number	LD <sub>50</sub> of Ingredient (specify species and route)	LC <sub>50</sub> of Ingredient
Acetone	99-100	67-64-1		

## Information included on an MSDS

A Material Safety Data Sheet is a technical bulletin that provides specific hazard information, safe handling information, and emergency procedures for a controlled product. Since the MSDS contains detailed health and safety information specific to each controlled product, it should be used as a key source of information for developing training programs and safe work procedures. It is also a valuable reference source of health and safety information for workers, health and safety committees, and emergency service personnel.

WHMIS legislation lists general guidelines and the minimum content requirements for an MSDS. WHMIS requires 54 items of information in nine sections. If information for any of the 54 items is either *not available* or *not applicable*, then the MSDS must clearly indicate that fact. No section of the MSDS can be left blank. See pages 39–43 for a list of the 54 items and an explanation of each one.

The following are the nine recommended section headings and the types of information to be provided in each section.

### 1. PRODUCT INFORMATION

This section identifies the product, the manufacturer, and the supplier, and it describes the intended product use. It also provides information about where to contact the manufacturer and supplier for information and/or in case of emergency.

### 2. HAZARDOUS INGREDIENTS

This section lists the specific chemical names, percentages, and acute toxicity data for the individual components.

### 3. PHYSICAL DATA

This section contains general information on physical and chemical properties such as the specific gravity, boiling point, and evaporation rate.

#### **4. FIRE AND EXPLOSION HAZARD**

This section lists the conditions under which the product may catch fire or explode, as well as information for developing strategies and procedures to deal with fire and explosion hazards.

#### **5. REACTIVITY DATA**

This section lists conditions and other substances that should be avoided to prevent dangerous reactions.

#### **6. TOXICOLOGICAL PROPERTIES**

This section identifies how the substance enters the body and the possible health effects from single or repeated exposures. It also identifies if the product has known long-term health effects such as liver or kidney damage, sensitization, cancer, or reproductive effects.

#### **7. PREVENTIVE MEASURES**

This section includes information on required protective equipment, as well as on how to safely clean up spills and how to safely use, handle, store, dispose of, and transport the product.

#### **8. FIRST AID MEASURES**

This section lists specific instructions for the immediate treatment of a worker who has inhaled or swallowed the product or who has had skin or eye contact with the product.

#### **9. PREPARATION INFORMATION**

This section lists the date the MSDS was prepared and who prepared it.

MSDSs are complex and technical. Many workers may find some of the information on an MSDS difficult to understand. The employer must be able to explain the content of the MSDS to the workers in order for them to work safely with or near controlled products.

The following sample MSDS shows information items for acetone.

# MATERIAL SAFETY DATA SHEET – 9 Sections

## SECTION 1 – PRODUCT INFORMATION

Product Identifier <b>Acetone</b>		WHMIS Classification (optional) <b>B2, D2B</b>	
Product Use <b>Solvent, general-purpose cleaning of adhesives, contact cements, printing inks, gums, waxes, resins, greases, and oils</b>			
Manufacturer's Name <b>Happy Chemical Company</b>		Supplier's Name <b>Big Chemical Company</b>	
Street Address <b>5556 Helium Lane</b>		Street Address <b>123 Nitro Avenue</b>	
City <b>Gaseous Bay</b>	Province <b>BC</b>	City <b>Vapour Town</b>	Province <b>BC</b>
Postal Code <b>X0X 0X0</b>	Emergency Telephone <b>(604) 234-5678</b>	Postal Code <b>X5X 5X5</b>	Emergency Telephone <b>(604) 345-6789</b>

## SECTION 2 – HAZARDOUS INGREDIENTS

Hazardous Ingredients (specific)	%	CAS Number	LD <sub>50</sub> of Ingredient (specify species and route)	LC <sub>50</sub> of Ingredient (specify species)
Acetone	99-100	67-64-1	5,800 mg/kg (oral, rat)	30,000 ppm (inhal., 4 hrs.)

## SECTION 3 – PHYSICAL DATA

Physical State <b>Liquid</b>	Odour and Appearance <b>Clear, colourless liquid with mildly pungent, sweet and fruity odour</b>		Odour Threshold (ppm) <b>62 (average)</b>
Specific Gravity <b>0.791 at 20° C</b>	Vapour Density (air = 1) <b>2.0</b>	Vapour Pressure (mmHg) <b>24-24.7 1 kPa</b>	Evaporation Rate <b>5.6 (n-butyl acetate=1)</b>
Boiling Point (°C) <b>56.2</b>	Freezing Point (°C) <b>-94.6</b>	pH <b>n/ap</b>	Coefficient of Water/Oil Distribution <b>0.58</b>

## SECTION 4 – FIRE AND EXPLOSION DATA

Flammability <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, under which conditions? <b>Flammable liquid</b>		
Means of Extinction <b>Carbon dioxide, dry chemical powder, "alcohol" foam, polymer foam. Water may be ineffective because it will not cool acetone below its flashpoint.</b>			
Flashpoint (°C) and Method <b>-18°C (cc)</b>	Upper Flammable Limit (% by volume) <b>12.8% at 25°C</b>	Lower Flammable Limit (% by volume) <b>2.5% at 25°C</b>	
Autoignition Temperature (°C) <b>465°C</b>	Explosion Data – Sensitivity to Impact <b>No</b>	Explosion Data – Sensitivity to Static Discharge <b>Yes</b>	
Hazardous Combustion Products <b>Carbon monoxide and carbon dioxide</b>			

## SECTION 5 – REACTIVITY DATA

Chemical Stability <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If no, under which conditions?
Incompatibility with Other Substances <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, which ones? <b>Acids (for example, nitric acid); Strong oxidizing agents (for example, hydrogen peroxide); Bases (for example, sodium hydroxide)</b>
Reactivity, and under what conditions? <b>Attacks many forms of plastics and rubber, including rayon</b>	
Hazardous Decomposition Products <b>Carbon monoxide from prolonged exposure to sunlight</b>	

<b>Product Identifier</b> Acetone
-----------------------------------

**SECTION 6 – TOXICOLOGICAL PROPERTIES**

Route of Entry	<input checked="" type="checkbox"/> Skin Contact	<input type="checkbox"/> Skin Absorption	<input checked="" type="checkbox"/> Eye Contact	<input checked="" type="checkbox"/> Inhalation	<input checked="" type="checkbox"/> Ingestion
Effects of Acute Exposure to Product	Irritation; possible effects on central nervous system (CNS); at air concentrations above 8,000 ppm may cause drowsiness, incoordination, loss of reflexes, unconsciousness, and respiratory failure				
Effects of Chronic Exposure to Product	Dermatitis. No significant harmful effects from oral or inhalation exposures.				
Exposure Limits (value, source, date)	250 ppm, 8-hour exposure limit (WCB)		Irritancy (if yes, explain) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Severe eye irritant, skin and respiratory irritant		
Sensitization (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Carcinogenicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Reproductive Toxicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Teratogenicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Mutagenicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Synergistic Products (if yes, explain) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Chlorinated solvents, ethyl alcohol		

**SECTION 7 – PREVENTIVE MEASURES**

Personal Protective Equipment	<input checked="" type="checkbox"/> Gloves	<input checked="" type="checkbox"/> Respirator	<input checked="" type="checkbox"/> Eye	<input type="checkbox"/> Footwear	<input type="checkbox"/> Clothing	<input type="checkbox"/> Other
If checked, specify type	Butyl rubber gloves. NIOSH-approved respirator with organic vapour cartridge for air concentrations up to 2,500 ppm. Splash-proof chemical safety goggles or face shield.					
Engineering Controls (specify, such as ventilation, enclosed process)	Use mechanical ventilation to reduce exposure. Use non-sparking and grounded ventilation system.					
Leak and Spill Procedure	Eliminate all ignition sources. Wear adequate protective equipment. Contain spill with absorbent material and place in a suitable covered and labelled container for disposal.					
Waste Disposal	Check with federal, provincial, and local government requirements for disposal.					
Handling Procedures and Equipment	Use in a well-ventilated area, away from heat and all ignition sources (including sparks, open flames, and hot surfaces). Do not use with incompatible substances. Use grounded and non-sparking equipment.					
Storage Requirements	Store in cool, well-ventilated area out of direct sunlight, away from heat and ignition sources. Storage facilities should be made from fire-resistant materials.					
Special Shipping Information	TDG shipping name: Acetone, Classification 3, Flammable liquid, Packing Group II					PIN 1090

**SECTION 8 – FIRST AID MEASURES**

Inhalation	Remove source of contamination or move victim to fresh air.
Ingestion	If conscious, have victim rinse mouth thoroughly with water; do not induce vomiting; have victim drink 240-300 mL of water. Obtain medical attention immediately.
Skin Contact	Flush with water for 15 minutes.
Eye Contact	Immediately flush contaminated eye(s) with lukewarm, gently flowing water for 20 minutes, while holding eyelids(s) open. Obtain medical attention immediately.

**SECTION 9 – PREPARATION INFORMATION**

Prepared by (Group, Department, etc.)	Sally Safemeister	Telephone Number	(604) 123-2222	Preparation Date	January 4, 2005
---------------------------------------	-------------------	------------------	----------------	------------------	-----------------

WHMIS legislation does not require a standard format for the layout of MSDSs. MSDSs may look very different and information items may be located in different sections.

## Alternative MSDSs

In certain circumstances, the employer may need to obtain an MSDS from a source other than the manufacturer or supplier.

### MSDS databases

Employers can use an up-to-date MSDS from a database if the MSDS was prepared by the supplier or manufacturer of the product they have purchased.

If an employer chooses to use an MSDS prepared by someone other than the supplier or manufacturer of the purchased product, then the employer becomes responsible for all of the information on that MSDS. This includes ensuring that the information is accurate, complete, and current and is reviewed at least every 3 years.

### Generic MSDSs

One generic MSDS can be used for a group of controlled products when those products have similar chemical compositions — for example, different coloured paints from the same product line. In some cases, additional information that is specific to a particular product in the group may need to be included on the MSDS. See the WorkSafeBC manual *WHMIS Core Material* for more information.

### Blank MSDSs

If employers need to create an MSDS or revise\* an existing MSDS, they may use any format to present the nine section headings and 54 information items. There is no standard format for an MSDS. However, blank MSDS forms are available on WorkSafeBC.com under “Forms.” Please note that these forms may not provide enough space for some of the information items. For example, “Effects of Acute Exposure to Product,” “Effects of Chronic Exposure to Product,” and “Leak and Spill Procedure” often require several lines of information.

*\*Be aware that if an employer changes or adds information to an MSDS provided by the supplier of a product, the employer becomes legally responsible for all the information on the revised MSDS.*

# Supplier responsibilities

Suppliers of controlled products must do the following:

- Provide an accurate and complete MSDS for each controlled product they import or sell in Canada.
- Provide an MSDS in either or both the official languages (English and French) at the purchaser's request.
- Provide an MSDS that is current (not more than three years old) to purchasers on or before the day of purchase.
- Use language and words easy for workers and employers to read and understand.
- Ensure that information is not ambiguous and does not conflict with information on the supplier label or in other parts of the MSDS. If abbreviations are used, they must be explained in the text.
- Provide an updated MSDS as soon as significant new information becomes available or every three years, whichever comes first.

## Employer responsibilities

Employers who use controlled products are responsible for the following:

- Ensure that current MSDSs are received and maintained for all controlled products in the workplace before allowing workers to handle these products. If a current MSDS is not available, the employer must temporarily store that product while he or she is actively seeking a proper MSDS from the supplier or the manufacturer.
- Educate and train workers to ensure they understand the information on MSDSs and are able to use the information to work safely with and near controlled products.
- Ensure MSDSs are “readily available” at the worksite in a file, binder, or computer database that is accessible at all times by all workers. (It is not acceptable for an MSDS to be read to a worker over a telephone or radio.)
- Ensure that no MSDS is more than three years old. Chemicals are constantly being studied and new information can affect the health and safety information on an MSDS. Even if the ingredients of a product have not changed, other important information may have changed.
- Obtain or prepare accurate and complete MSDSs for any controlled products imported for use in the workplace.
- Prepare or provide MSDSs for any controlled products mixed or made for use at the workplace (these MSDSs can be in the language or languages used at the workplace).



## Confidential business information ("trade secrets")

Confidential business information (CBI) refers to specific product information that suppliers or employers who are manufacturers are permitted to withhold from an MSDS or label for a period of three years. In the United States, CBI may be called trade secrets or proprietary information. Under WHMIS, a supplier can make a request to the Hazardous Materials Information Review Commission (HMIRC) to protect certain information that gives a company an economic advantage over competitors. Crucial information such as health hazards may *never* be withheld. Types of information that may be granted this exemption are:

- Chemical identity
- Concentration of ingredients
- Information that can be used to identify an ingredient, such as a toxicological study
- Information that can be used to identify the controlled product
- Information that can be used to identify the supplier of the controlled product

If the term "trade secret" or "proprietary information" appears on an MSDS, it must have a registration number and date. The following are examples of valid statements you may see:

- While a CBI claim is being processed:  
*HMIRC #1938, filed on April 20, 2005*
- After a CBI claim has been granted:  
*CBI claim #1938, granted on May 5, 2005*

When information is needed for emergency or first aid treatment, a supplier or employer must immediately disclose — in confidence — to a treating physician or nurse, the specific chemical identity and other necessary information about a hazardous material protected by a trade secret claim. In addition, an officer of the HMIRC may disclose — in confidence — withheld information to agencies responsible for occupational health and safety.

For more information on trade secrets and WHMIS, consult the WorkSafeBC manual *WHMIS Core Material* or the Hazardous Materials Information Review Regulations, or contact the HMIRC. Full reference information is listed on pages 48–51.

### American and European MSDSs

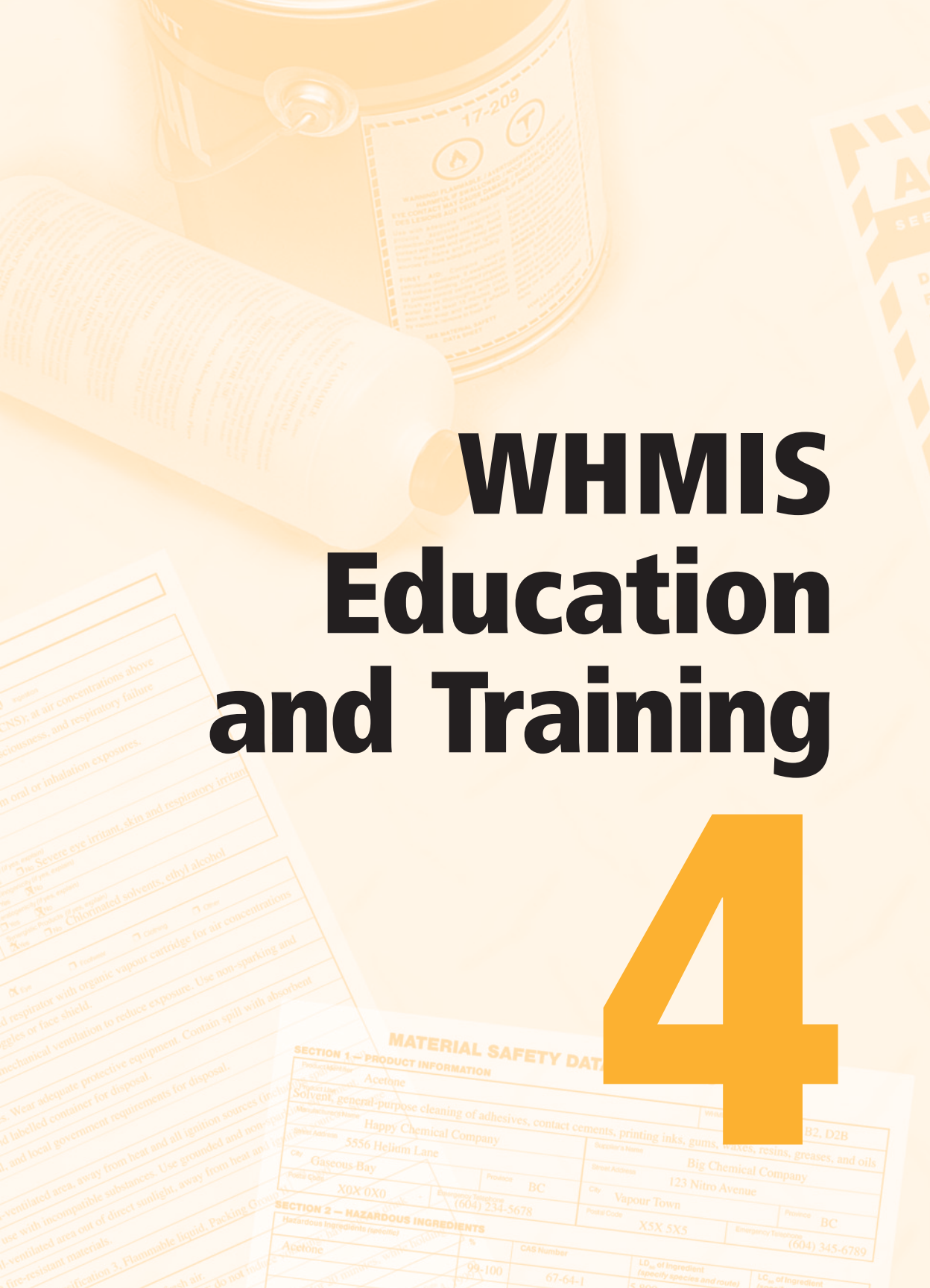
American and European MSDSs that have 16 sections instead of 9 are acceptable under WHMIS as long as they include all 54 information items. The 16 section headings must be similar to the headings recommended by ANSI (American) and European standards.

Some WHMIS information items are not required in OSHA legislation or the ANSI standard. As a result, an American or European MSDS may not be acceptable in Canada.

- Irritants may not be listed as hazardous ingredients. Some other examples of information items that are commonly missing on an American or European MSDS are odour threshold, evaporation rate, and freezing point.
- An MSDS in Canada requires the hazardous *combustion* products and hazardous *decomposition* products to be listed separately. On an American or European MSDS, they may be combined.
- American and European MSDSs usually do not have a separate section heading for First Aid Measures. This information is often combined with Health Hazards.
- American and European MSDSs usually do not have a section for Preparation Information. This information is often missing.
- American and European MSDSs may not have separate subsections for WHMIS information items (for example, carcinogenicity, teratogenicity, reproductive toxicity, mutagenicity, allergic sensitization, and synergistic effects).
- The name and telephone number of the person or group who prepared the MSDS may be omitted.
- As American and European legislation does not require MSDSs to be updated every three years, the preparation or last revision date may be missing or more than three years old.

# WHMIS Education and Training

# 4



## SECTION 1 - PRODUCT INFORMATION

Product Name	Acetone	UN Number	1113	UN Subclass	B2, D2B
Product Use	Solvent, general-purpose cleaning of adhesives, contact cements, printing inks, gums, waxes, resins, greases, and oils	Manufacturer's Name	Happy Chemical Company	Distributor's Name	Big Chemical Company
Manufacturer's Phone	(604) 234-5678	Street Address	5556 Helium Lane	Street Address	123 Nitro Avenue
Street Address	5556 Helium Lane	City	Gaseous Bay	City	Vapour Town
Postal Code	X0X 0X0	Province	BC	Postal Code	X5X 5X5
Emergency Telephone	(604) 234-5678	Province	BC	Emergency Telephone	(604) 345-6789

## SECTION 2 - HAZARDOUS INGREDIENTS

Hazardous Ingredients (if any)	%	CAS Number	LD <sub>50</sub> of Ingredient (Specify species and route)	LC <sub>50</sub> of Ingredient (Specify species and route)
Acetone	99-100	67-64-1		

# WHMIS education and training for workers

Employers must establish an education program for their workers to ensure that workers understand WHMIS and the hazards of the controlled products they work with or near. Education programs about WHMIS must be followed up with job-specific training in safe work procedures for handling, storing, and disposing of these controlled products. Workers must also be trained in emergency procedures in the event of an accident or spill.

## What's the difference between education and training?

WHMIS education explains how WHMIS works, what an MSDS is, what information is on a WHMIS label, and other information about WHMIS. Workers can be educated through classroom instruction or using videos or computer programs. WHMIS training refers to hands-on, job-specific training. Training shows individuals how to work safely with the controlled products in a particular workplace.

Workers need to be educated and trained if they:

- Store, handle, use, or dispose of a controlled product
- Supervise or manage workers who store, handle, use, or dispose of a controlled product
- Serve as emergency personnel
- Work near the controlled product, where their health and safety could be at risk during normal storage, handling, use, or disposal of the product; during maintenance operations; or in emergencies (for example, even a receptionist at a dental office may be exposed to mercury if it is spilled)

The WHMIS education and training program must be reviewed at least *once a year* to determine if it is still effective or if it needs to be revised. The program may need to be revised and workers may need to be retrained when:

- Conditions at the workplace change
- New products are being used
- Reformulated products pose different hazards
- New hazard information becomes available

Workers who are successfully educated and trained in WHMIS should be able to answer these four key questions:

1. **What are the hazards of the product you are using?**
2. **How do you protect yourself?**
3. **What should you do in case of an emergency or spill?**
4. **Where do you get more information on this product?**

When the education and training program is reviewed, it is important to find out if workers still understand the hazards of controlled products and follow safe work procedures. These four key questions can also be used to evaluate whether workers need to be retrained because they have forgotten some information.

Worker representatives or the health and safety committee must be consulted in developing, implementing, and reviewing education and training programs.

### **Does WorkSafeBC validate education or training programs?**

WorkSafeBC does not validate education or training programs. Private WHMIS consultants can help you with education or training. WorkSafeBC prevention officers will conduct performance-based audits as part of their workplace inspections — for example, they may evaluate workers' knowledge of health and safety information specific to the products they work with or near.

Some industries, such as construction, offer WHMIS “cards” or “certificates” to participants who complete their WHMIS education program. Such cards and certificates are useful for workers who move regularly from site to site, enabling them to prove to new employers that they have attended WHMIS sessions. **However, job-specific training at each worksite is still required for all workers who work with or near controlled products.**

## Implementing WHMIS in your workplace

To implement the WHMIS program, employers should make use of supplier labels and MSDSs, as well as their own knowledge of the hazards of products and their use in the workplace. Their workplace knowledge should take into account factors such as quantity, work processes, control measures, and work location. For example, the hazards of spray painting with a controlled product inside a confined space are far different from the hazards of hand brushing the same product outdoors.

Based on all this information, employers must develop written safe work procedures that ensure the health and safety of workers. They must also educate their workers about the hazards and train them in safe work procedures.

How employers implement WHMIS in their own workplaces will vary, but the major elements of their programs will be similar. The WHMIS Implementation Plan Checklist on pages 44–45 can be used to verify that a workplace WHMIS implementation plan meets WorkSafeBC guidelines. In developing a program to instruct workers, an employer might use the WHMIS Education and Training Checklist on page 46.

## What are safe work procedures?

Employers must develop effective procedures to prevent exposing their workers to excessive levels of hazardous materials. These include safe work procedures for handling, using, storing, and disposing of controlled products. As well, safe work procedures must be established for emergency situations and spill clean-ups.

Safe work procedures should be written and they should address the specific hazards of the controlled product and how it is used in the workplace. They must contain enough detail to provide direction to workers. Workers must be trained by the employer and must follow these procedures at the worksite.

### Sample safe work procedure

The following is an example of a written safe work procedure to be used by authorized workers for clean-up of small spills of acetone (about one litre) for a particular worksite:

1. Extinguish and control all ignition sources including electrical services, open flames, and electrostatic discharge.
2. Evacuate workers to the designated safe location.
3. Report the spill to your supervisor.
4. Get the waste containers and spill cart.
5. Put on the respirator, butyl rubber gloves, and safety goggles.
6. Clean up the acetone using chemical absorbent pillows from the spill cart according to the manufacturer's instructions.
7. Do not flush or rinse the spilled acetone into the sewer system.
8. Place used absorbent pillows (containing acetone) in designated waste containers.
9. Dispose of used chemical absorbent pillows according to local waste disposal procedures.



# Tables and Checklists

# 5

...ignition  
 CNS); at air concentrations above  
 consciousness, and respiratory failure  
 ...oral or inhalation exposures.  
 ...Severe eye irritant, skin and respiratory irritant  
 ...Chlorinated solvents, ethyl alcohol  
 ...  
 ...respirator with organic vapour cartridge for air concentrations  
 ...  
 ...mechanical ventilation to reduce exposure. Use non-sparking and  
 ...  
 ...Wear adequate protective equipment. Contain spill with absorbent  
 ...  
 ...and local government requirements for disposal.  
 ...away from heat and all ignition sources (including  
 ...use with incompatible substances. Use grounded and non-grounded  
 ...away from heat and ignition sources.  
 ...Flammable liquid. Packing Group  
 ...do not inhale

**SECTION 1 — PRODUCT INFORMATION**

Product Name: Acetone  
 Hazardous Use: Solvent, general-purpose cleaning of adhesives, contact cements, ...  
 Manufacturer Name: Happy Chemical Company  
 Street Address: 5556 Helium Lane  
 City: Gaseous Bay  
 Postal Code: X0X 0X0  
 Province: BC  
 Telephone: (604) 234-5678  
 Director's Name: ...  
 Street Address: 123 Nitro Avenue  
 City: Vapour Town  
 Postal Code: X5X 5X5  
 Province: BC  
 Emergency Telephone: (604) 345-6789  
 B2, D2B  
 ...resins, greases, and oils

**SECTION 2 — HAZARDOUS INGREDIENTS**

Hazardous Ingredients (if any)	%	CAS Number	LD <sub>50</sub> of Ingredient (Specify species and route)	LC <sub>50</sub> of Ingredient (Specify species and route)
Acetone	99-100	67-64-1		



## Information items on a supplier label

Information item		Description
1	Product identifier	Often the chemical name of a product or the trade name, common name, code name, or code number.
2	Hazard symbol(s)	One or more of the eight WHMIS symbols indicating the hazard class(es) of the controlled product.
3	Risk phrases	Phrases that alert workers to the specific hazard(s) of the product. There should be at least one risk phrase for each hazard symbol.
4	Precautionary statements	Statements that describe essential precautions workers should take when handling (using, storing, and disposing of) the product.
5	First aid measures	Statements that describe immediate first aid measures required.
6	Supplier identification	The name of the supplier (preferably with the address and telephone number).
7	Reference to MSDS	A statement indicating that an MSDS is available.

# Information items on an MSDS

Information item	Description	
<b>Section 1: Product Information</b>		
1	Product identifier	The name of the product as it appears on the label. This is often the chemical name of a product but can also be the trade name, common name, code name, or code number.
2	Product use	The product use(s) intended by the manufacturer or supplier.
3	Manufacturer's name, address, and emergency phone number	The manufacturer of the product. Emergency phone number must be listed if one is available.
4	Supplier's name, address, and emergency phone number	The seller or distributor (which may be the same as the manufacturer).
<b>Section 2: Hazardous Ingredients</b>		
5	Hazardous ingredients	Each hazardous ingredient must be listed by its specific chemical name (not its generic name).
6	Percentages	The percentages, or range of percentages, for each hazardous ingredient.
7	CAS Registry Number	The unique number assigned to each hazardous ingredient by the Chemical Abstract Service Registry.
8	Current LD <sub>50</sub> for each hazardous ingredient	A measure of the short-term poisoning potential of a hazardous ingredient. LD <sub>50</sub> is the lethal single dose at which 50% of a specified test population dies. Note: LD <sub>50</sub> can be determined for many routes of entry, but oral (given by mouth) and dermal (applied to skin) LD <sub>50</sub> s are used for WHMIS classification.
9	Current LC <sub>50</sub> for each hazardous ingredient	A measure of the short-term poisoning potential of a hazardous ingredient. LC <sub>50</sub> is the lethal concentration (by inhalation) at which 50% of a specified test population dies. Note: 4-hour exposures are used for WHMIS classification.
<b>Section 3: Physical Data</b>		
10	Physical state	The physical state of the product (gas, liquid, solid, paste, powder, or gel) at room temperature.
11	Odour and appearance	Odour describes the quality of the odour of the product (for example, fruity, sharp, almond-like). Appearance describes colour and texture for most products and includes particle size for solids.

Information item		Description
12	Odour threshold	The lowest airborne concentration that can be detected by the human sense of smell.
13	Specific gravity	The ratio of the weight of a substance compared with water.
14	Vapour density	A ratio of the molecular weight of a gas or vapour compared with the equivalent weight of air.
15	Vapour pressure	One measure of the ability of a substance to form vapours. The higher the vapour pressure, the more quickly a substance evaporates.
16	Evaporation rate	The ratio of how fast a substance evaporates relative to a known reference standard (usually n-butyl acetate = 1).
17	Boiling point	The temperature at which a liquid changes to a gas (at normal room pressure).
18	Freezing point (melting point)	The temperature at which a liquid changes to a solid or a solid to a liquid (at normal room pressure).
19	pH	A value that indicates the acidity or alkalinity of a product (usually liquid)—pH values between 0 and 7 are considered acidic and pH values between 7 and 14 are considered alkaline (7 is neutral).
20	Coefficient of water/oil distribution	A number that indicates how easily a product may be absorbed into the body. A value greater than 1 means a substance may enter the body through the mucous membranes of the eyes, nose, and lungs. A value less than 1 means that the substance may be absorbed by the fatty tissue below the skin.

#### Section 4: Fire and Explosion Hazard

21	Flammability	Whether a product is classified as flammable or combustible under WHMIS.
22	Means of extinction	Fire extinguishers or the extinguishing material suitable for use on the burning product or fire.
23	Flash point and test method used	The lowest temperature at which the product will catch fire (or explode) when there is a nearby source of ignition such as a spark or open flame. A flash point is determined either by a "cc" (closed cup) or "oc" (open cup) method.
24	Upper flammable limit	The highest and lowest concentration of a gas or vapour in air (expressed as a percentage) at which the product will catch fire or explode if near an ignition source such as a spark or open flame. These are also referred to as explosive limits. These concentrations, and all concentrations in between, form the flammable range.
25	Lower flammable limit	

Information item		Description
26	Autoignition temperature	The temperature above which the substance (usually the vapour) may self-ignite <u>without</u> an external flame or spark. Autoignition temperatures are available only for flammable liquids and gases.
27	Hazardous combustion products	The hazardous products produced when the substance burns or is exposed to extreme heat.
28	Sensitivity to mechanical impact	Whether the product may explode due to physical impact (for example, being dropped, bumped, or knocked over).
29	Sensitivity to static discharge	Whether the product may explode or catch fire if there is a nearby spark from static electricity.
<b>Section 5: Reactivity Data</b>		
30	Chemical stability	Whether the product is chemically stable when exposed to normal intended use or when placed in extended storage.
31	Incompatible substances	Other chemicals or chemical groups (for example, acids and caustics) that will cause violent reactions when the two products contact each other.
32	Conditions of reactivity	When hazardous reactions (for example, vigorous polymerization) may occur.
33	Hazardous decomposition products	Hazardous substances produced or released due to aging or reaction with air or moisture. These do not include thermal decomposition products from burning or excess heating.
<b>Section 6: Toxicological Properties</b>		
34	Routes of entry	How the product enters the body during normal use: skin contact, skin absorption, eye contact, inhalation, and/or ingestion.
35	Effects of acute exposure	Adverse health effects resulting from short-term exposure to the substance, either as a single exposure or as multiple exposures occurring within a short time, usually 24 hours or less.
36	Effects of chronic exposure	Adverse health effects resulting from repeated exposure over a relatively long period of time, anywhere from several days to years.
37	Exposure limits	The exposure limit for the product, usually the 8-hour time-weighted-average, and the name of the regulatory agency. The legal exposure limits (for example, in B.C. the exposure limits accepted by WorkSafeBC) may be different from the ones listed on the MSDS.

Information item		Description
38	Irritancy of product	Whether the product may irritate the skin, eyes, nose, throat, or any other part of the body that it contacts to produce tearing, reddening, swelling, itching, and/or pain. Irritancy is often described as mild, moderate, or severe.
39	Sensitization	Whether the product may cause sensitization. A sensitizer may cause severe allergic reactions with repeated exposure.
40	Carcinogenicity	Whether the product is classified as a human carcinogen by the International Agency for Research on Cancer (IARC) or by the American Conference of Governmental Industrial Hygienists (ACGIH).
41	Reproductive toxicity	Whether the product may cause reproductive problems.
42	Teratogenicity	Whether the product may cause birth defects in the fetus at exposures that do not cause damage or injury to the mother.
43	Mutagenicity	Whether the product may cause changes to the genetic material (DNA) of living cells.
44	Synergistic products	Other products that, when combined with exposure to the controlled product, may cause a toxic effect greater than the sum of the effects of the individual materials. For example, product A increases the chance for getting cancer by 2 times and product B increases the chance for cancer by 2 times, but when product A and B are used together, the chance for cancer is increased by 50 times.
<b>Section 7: Preventive Measures</b>		
45	Personal protective equipment	Specific personal protective equipment, and specific type of equipment, required to prevent exposure to the product.
46	Specific engineering controls	Recommended engineering controls, such as ventilation and process equipment design, to be used with the product.
47	Leak and spill procedures	Safe procedures to clean up spills, leaks, and other accidental releases of the product.
48	Waste disposal	Information such as proper waste container design, safe procedures for handling waste, and agencies to contact regarding disposal requirements.
49	Handling procedures and equipment	Particular procedures and equipment required to handle the product safely.
50	Storage requirements	Specific safe storage information such as separation from other incompatibles, shelf life, testing for peroxide formation, and sensitivity to light, temperature, or moisture.

Information item		Description
51	Special shipping information	<p>Safe shipping information such as:</p> <ul style="list-style-type: none"> <li>• Sensitivity to shock and temperature</li> <li>• Product identification number (PIN) or United Nations number (UN number)</li> </ul> <p>Transportation of Dangerous Goods (TDG) information (for example, classification, proper shipping name, and packaging group) may also be included.</p>
<b>Section 8: First Aid Measures</b>		
52	Specific first aid measures	<p>Specific first aid measures in the event of:</p> <ul style="list-style-type: none"> <li>• Inhalation</li> <li>• Ingestion</li> <li>• Skin contact</li> <li>• Eye contact</li> </ul>
<b>Section 9: Preparation Information</b>		
53	Date of original preparation and date of last review	Gives the date that the MSDS was first prepared and when it was last reviewed (which should be within three years of the current date). Providing the date that the MSDS was printed is not acceptable.
54	Name and phone number of preparer	Gives the name and phone number of the person or group who prepared the MSDS.

# WHMIS implementation plan checklist

Activity	Time needed	Assigned to	Date completed
<b>Assign responsibility for WHMIS implementation</b>			
1.			
2.			
3.			
<b>Establish an inventory of controlled products</b>			
Determine which products used or produced are classified as controlled products under WHMIS.			
<b>WHMIS labels and MSDSs</b>			
Obtain MSDSs for controlled products already in the workplace.			
Develop a process for requesting and receiving MSDSs for new purchases.			
Develop methods to store MSDSs so that they are readily available to workers.			
Develop a process to ensure that supplier labels are on or available for all new controlled products received.			
Develop a process to create and provide workplace labels and other means of identification.			
<b>Determine hazards</b>			
Identify and evaluate the hazards of controlled products in the workplace (for example, consider the quantities to be used and stored, and the work processes where these products are used).			

Activity	Time needed	Assigned to	Date completed
<b>Workplace controls</b>			
<p>Based on the hazard evaluation, determine where the following workplace controls may need to be established or upgraded:</p> <ul style="list-style-type: none"> <li>• Substitution of a less hazardous product</li> <li>• Engineering controls such as local exhaust ventilation and process modification</li> <li>• Administrative controls such as work procedures and work scheduling</li> <li>• Personal protective equipment and clothing</li> </ul>			
<p>Integrate these controls into the overall health and safety program.</p>			
<b>Emergency procedures</b>			
<p>Review first aid procedures and upgrade them if required.</p>			
<p>Review spill control procedures and upgrade them if required.</p>			
<p>Review firefighting procedures and upgrade them if required.</p>			
<p>Notify the local fire department of the location, types, and quantities of controlled products used and stored.</p>			
<b>Worker education and training</b>			
<p>Complete "WHMIS Education and Training Checklist" (page 46).</p>			
<b>Evaluate WHMIS program</b>			
<p>Establish periodic review process for the following:</p> <ul style="list-style-type: none"> <li>• Check to ensure that no MSDS is more than three years old.</li> <li>• Check that all items on the MSDS have been completed.</li> <li>• Check the condition and presence of labels for all controlled products.</li> <li>• Monitor workplace controls to ensure they are effective.</li> <li>• Review the WHMIS education and training program.</li> </ul>			

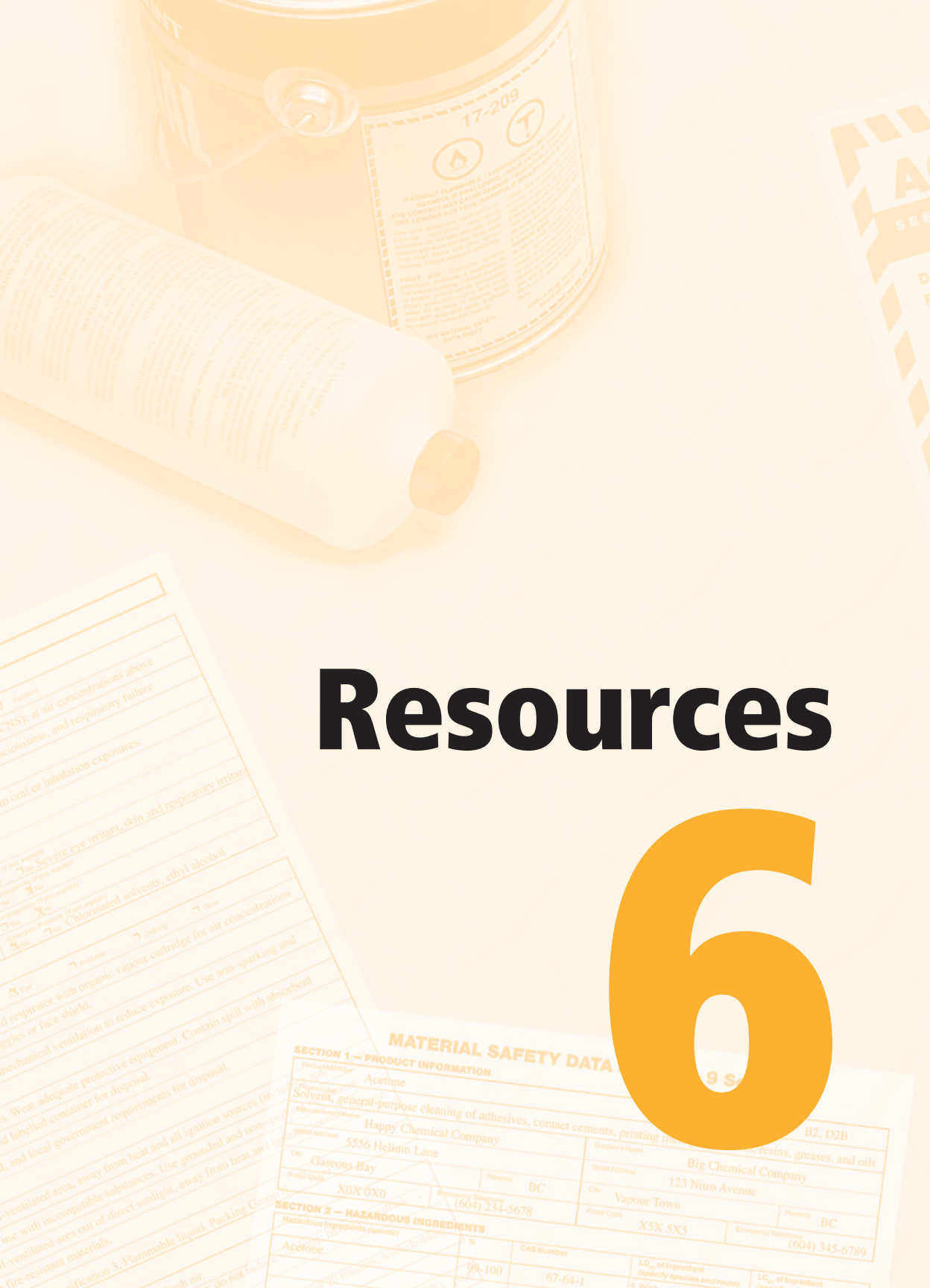


# WHMIS education and training checklist

Activity	Assigned to	Date completed
<b>Development</b>		
Consult the occupational health and safety committee or worker representative on the development, implementation, and review of the program.		
Identify all controlled products used in the workplace.		
Evaluate the hazards of each controlled product.		
Identify WHMIS instructors, from either internal or external sources.		
Train instructors (if internal), or evaluate their qualifications (if external).		
Identify employees to be instructed—those who work with or near controlled products.		
Establish a process to identify new employees and contractors who require instruction.		
Evaluate labels and MSDSs to be used in the education program (check for clarity, accuracy, and completeness).		
Evaluate safe work and emergency procedures to be used in the WHMIS education and training program.		
<b>Instruction</b>		
Provide a general introduction to WHMIS (for example, discuss responsibilities, labels, and MSDSs).		
Provide instruction on how to identify controlled products.		
Provide instruction on control measures and safe work procedures.		
Provide instruction on emergency procedures.		
Provide instruction on accessing information on controlled products.		
Evaluate the need for additional or specialized instruction to workers (for example, to those with language or learning difficulties) and provide this instruction where required.		
Provide instruction to workers whenever new products are received or new hazard information becomes available.		
<b>Follow-up activities</b>		
Evaluate workers' understanding of WHMIS, and provide further education and training as required.		
Review the effectiveness of the education and training program at least once a year. (Reviews must be done in consultation with the occupational health and safety committee or worker representative.)		

# Resources

# 6



...at air concentrations above  
...and respiratory failure  
...oral or inhalation exposures.  
...Severe eye irritant, skin and respiratory irritant  
...Chlorinated solvents, ethyl alcohol  
...Wear adequate protective equipment. Contain spill with absorbent  
...and labelled container for disposal.  
...and all ignition sources (including  
...away from heat and non-sparking  
...away from heat and  
...Flammable liquid. Packing Group  
...do not inhale

**SECTION 1 — PRODUCT INFORMATION**

Product Name: Acetone  
Hazardous Use: Solvent, general-purpose cleaning of adhesives, contact cements, printing inks, resins, greases, and oils  
Manufacturer Name: Happy Chemical Company  
Street Address: 5556 Helium Lane  
City: Gaseous Bay  
Postal Code: X0X 0X0  
Province: BC  
Emergency Telephone: (604) 234-5678

Distributor Name: Big Chemical Company  
Street Address: 123 Nitro Avenue  
City: Vapour Town  
Postal Code: X5X 5X5  
Province: BC  
Emergency Telephone: (604) 345-6789

**SECTION 2 — HAZARDOUS INGREDIENTS**

Hazardous Ingredients (if any)	%	CAS Number	LD <sub>50</sub> of Ingredient (Specify species and route)	LC <sub>50</sub> of Ingredient (Specify species and route)
Acetone	99-100	67-64-1		

## WorkSafeBC materials

To help you implement a complete WHMIS program at your workplace, you can obtain the following items produced by WorkSafeBC:

Phone: 604 232-9704  
Toll-free phone: 1 866 319-9704  
Fax: 604 232-9703  
Toll-free fax: 1 888 232-9714  
Online ordering: WorkSafeBC.com and click on  
Publications; follow the links for ordering

Web site: WorkSafeBC.com for online publications

Video loans from the WorkSafeBC library:

Phone: 604 231-8450  
Toll free: 1 888 621-7233, ext. 8450  
E-mail: library@worksafebc.com

### *WHMIS Core Material: A Resource Manual for the Application and Implementation of WHMIS (RR20)*

A comprehensive resource manual that provides information on the history and legislation of WHMIS and on topics such as regulations for classification, WHMIS labels, the MSDS, worker education and training, and confidential business information.

### *Suppliers' Guide to WHMIS (RR22)*

A self-study guide for suppliers and employers to learn how to classify controlled products and review/prepare supplier labels and MSDSs to meet all applicable WHMIS legislation.

### *Making WHMIS Work (Video 39)*

A video to educate workers in the agricultural industry about WHMIS. Other videos on WHMIS are also available from the WorkSafeBC library.

### *Occupational Health and Safety Regulation*

Available online at WorkSafeBC.com.

### *WorkSafeBC Web Site*

For more WHMIS information, visit  
<<http://whmis.healthandsafetycentre.org/s/Home.asp>>.

## **WorkSafeBC Prevention Information Line**

Information on industrial chemicals and other safety topics is available through the WorkSafeBC Prevention Information Line. Phone 604 276-3100 in the Lower Mainland or toll-free within British Columbia 1 888 621-7233 (621-SAFE).

## Other sources of information

Contact the following organizations for publications mentioned in this booklet or for other relevant WHMIS publications:

### **The Canadian Centre for Occupational Health and Safety**

135 Hunter Street East  
Hamilton ON L8N 1M5  
Phone: 1 800 668-4284  
Web site: <http://www.ccohs.ca>

The CCOHS provides a wide range of health and safety information for both workers and employers.

### **WHMIS Division, Product Safety Programme, Health Canada**

MacDonald Building  
4th floor, 123 Slater Street  
Postal Locator 3504D  
Ottawa ON K1A 0K9  
Phone: 613 957-2342  
Fax: 613 948-2626  
Web site: <http://www.hc-sc.gc.ca/hecs-sesc/whmis/>

This federal government department can provide reference information on hazardous products legislation.

### **Commission de la Santé et de la Sécurité du Travail du Québec**

Service du répertoire toxicologique  
1199, rue de Bleury, 4<sup>e</sup> étage  
CP 6056, SUCC Centre-Ville  
Montréal QC H3C 4E1  
Phone: 514 906-3080  
Web site: <http://www.reptox.csst.qc.ca>

The CSST provides information on the classification of chemicals.

### **Hazardous Materials Information Review Commission**

427 Laurier Avenue West, 7th Floor

Ottawa ON K1A 1M3

Phone: 613 993-4331

Fax: 613 993-4686

E-mail: [hmirc-ccrmd@hc-sc.gc.ca](mailto:hmirc-ccrmd@hc-sc.gc.ca)

Web site: <http://www.hmirc-ccrmd.gc.ca>

Contact the HMIRC for more information on confidential business information exemptions or to obtain a copy of the *Hazardous Materials Information Review Act* and Regulations.

### **Canadian Government Publishing Centre**

Phone: 613 957-4222

Fax: 613 954-0811

E-mail: [webadmin@justice.gc.ca](mailto:webadmin@justice.gc.ca)

Web site: <http://laws.justice.gc.ca/en>

Contact the centre to obtain government legislation such as the Controlled Products Regulations, the *Hazardous Products Act*, or the *Transportation of Dangerous Goods Act*.

A variety of organizations may be able to help you establish your WHMIS program. These include:

- Your suppliers or manufacturers
- Trade and industry associations
- Labour organizations
- Protective equipment and clothing firms
- WHMIS consulting firms
- Occupational safety and health media organizations
- Libraries, trade schools, and colleges

# WorkSafeBC Offices

Visit our web site at <[www.worksafebc.com](http://www.worksafebc.com)>.

## Abbotsford

2774 Trethewey Street V2T 3R1  
Phone 604 276-3100  
1 800 292-2219  
Fax 604 556-2077

## Burnaby

450 – 6450 Roberts Street V5G 4E1  
Phone 604 276-3100  
1 888 621-7233  
Fax 604 232-5950

## Coquitlam

104 – 3020 Lincoln Avenue V3B 6B4  
Phone 604 276-3100  
1 888 967-5377  
Fax 604 232-1946

## Courtenay

801 30th Street V9N 8G6  
Phone 250 334-8765  
1 800 663-7921  
Fax 250 334-8757

## Kamloops

321 Battle Street V2C 6P1  
Phone 250 371-6003  
1 800 663-3935  
Fax 250 371-6031

## Kelowna

110 – 2045 Enterprise Way V1Y 9T5  
Phone 250 717-4313  
1 888 922-4466  
Fax 250 717-4380

## Nanaimo

4980 Wills Road V9T 6C6  
Phone 250 751-8040  
1 800 663-7382  
Fax 250 751-8046

## Nelson

524 Kootenay Street V1L 6B4  
Phone 250 352-2824  
1 800 663-4962  
Fax 250 352-1816

## North Vancouver

400 – 224 Esplanade Ave. W. V7M 1A4  
Phone 604 276-3100  
1 888 875-6999  
Fax 604 232-1558

## Prince George

1066 Vancouver Street V2L 5M4  
Phone 250 561-3700  
1 800 663-6623  
Fax 250 561-3710

## Surrey

100 – 5500 152 Street V3S 5J9  
Phone 604 276-3100  
1 888 621-7233  
Fax 604 232-7077

## Terrace

4450 Lakelse Avenue V8G 1P2  
Phone 250 615-6605  
1 800 663-3871  
Fax 250 615-6633

## Victoria

4514 Chatterton Way V8X 5H2  
Phone 250 881-3418  
1 800 663-7593  
Fax 250 881-3482

## Head Office / Richmond

*Prevention Information Line:*  
Phone 604 276-3100  
1 888 621-7233 (621-SAFE)

### *Administration:*

6951 Westminster Highway  
Phone 604 273-2266

### *Mailing Address:*

PO Box 5350 Stn Terminal  
Vancouver BC V6B 5L5

## After Hours Health & Safety Emergency

604 273-7711  
1 866 922-4357 (WCB-HELP)



**Product Identifier** Acetone

**SECTION 6 - TOXICOLOGICAL PROPERTIES**

Route of Entry  Skin Contact  Skin Absorption  Inhalation  Ingestion

Effects of Acute Exposure to Product: Irritation; possible effects on central nervous system (CNS); at air concentrations above 8,000 ppm may cause drowsiness, incoordination, loss of reflexes, unconsciousness, and respiratory failure

Effects of Chronic Exposure to Product: Dermatitis. No significant harmful effects from oral or inhalation exposures.

Exposure Limits (air, 8-hour exposure limit (WCB))

250 ppm	Severe eye irritant, skin and respiratory irritant
Intensity (if yes, explain)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Chronicity (if yes, explain)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Toxicology (if yes, explain)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Specificity (if yes, explain)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Chlorinated solvents, ethyl alcohol	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

**SECTION 7 - PREVENTIVE MEASURES**

Personal Protection Equipment:  Goggles  Respirator  Eye  Earplugs  Earbuds  Earmuffs  Hearing aids  Ear protectors  Ear covers  Ear muffs  Ear caps  Ear bands  Ear pads  Ear cushions  Ear inserts  Ear sleeves  Ear covers  Ear muffs  Ear caps  Ear bands  Ear pads  Ear cushions  Ear inserts  Ear sleeves

Checklist: specify type of Butyl rubber gloves, NIOSH-approved respirator with organic vapour cartridge for air concentrations up to 2,500 ppm. Splash-proof chemical safety goggles or face shield.

Engineering Controls (specify such as ventilation, enclosed process): Use mechanical ventilation to reduce exposure. Use non-sparking and grounded ventilation system.

Administrative Controls: Eliminate all ignition sources. Wear adequate protective equipment. Contain spill with absorbent material. Work in a suitable covered and labelled container for disposal.

Waste Disposal: Check with provincial, and local government requirements for disposal.

Spill Prevention: Use in a well-ventilated area, away from heat and all ignition sources (including open flames, sparks, and hot surfaces). Do not use with incompatible substances. Use grounded and non-sparking materials. Flammable liquid, Packaged in a well-ventilated area out of direct sunlight, away from heat and all ignition sources.

**SECTION 2 -**

Product Name: Solvent, ge

Manufacturer's Name: Manufacture

Address: Gascon

City: Gascon

Postal Code: X

**SECTION 2 -**

Hazardous Ingre

Acetone