READY FOR WORK

Module 5. WHMIS

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An Introduction to WHMIS

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Introduction to WHMIS

Module description

An Introduction to Workplace Hazardous Materials Information System (WHMIS) is a four-hour module that provides teachers and instructors with objectives, learning activities, evaluation tools and resource lists. The approximate time it takes for each learning activity is indicated. Teachers can choose or adapt activities to fit their school's timetable.

This module is strictly an introduction to WHMIS and not a full-fledged education or training program. For online WHMIS training, visit WorkSafe Saskatchewan's website. This module reinforces and expands upon key concepts introduced in Module 3: Safety Works: Occupational Health and Safety for Young Workers. Therefore, we suggest teachers and students explore the introductory activities on workers' rights and responsibilities and identifying hazards in the workplace in that module prior to studying the *WHMIS* module.

This module is formatted into the following four sections or activities:

1. Workplace Hazardous Materials Information System

    - Provides an overview and lists the key concepts that will be covered in the module.
    - Lists foundational and specific learning objectives.
    - Discusses the background and need for this program.
    - Describes the three main parts to WHMIS and outlines the worker responsibilities.

2. Responsibilities and labels

    - Describes the responsibilities of the employer, the worker and the supplier.
    - Discusses the purpose for labels used to identify hazardous materials.
    - Provides background notes and worksheet activities for teachers and students.

3. Product classification and pictograms (symbols)

    - Describes the product classification and pictograms (symbols) for WHMIS.
    - Provides worksheet quizzes for teacher and students.
    - Provides background notes and activities for teacher and student.

4. Safety data sheets (SDSs) and control of hazardous materials

    - Describes the SDSs and why they are used.

- Describes the steps to control hazards in the workplace.
- Reinforces the three rights and the steps in a refusal to work for a worker.
- Provides background notes and activities for teachers and students.

This module can be used in a number of secondary level courses, but has specific relevance for courses with a transition-to-work dimension.

WHMIS focuses on the following key concepts:

- Workers can learn to recognize workplace hazards.
- Workers can prevent incidents and injuries by following safe work practices and using personal protective equipment (PPE).
- Workers have three basic rights: the **right to know**, the **right to participate**, and the **right to refuse**.
- The Occupational Health and Safety Branch at the Ministry of Labour Relations and Workplace Safety can assist with workplace health and safety concerns.

These concepts are essential as students enter the workforce. As new workers become supervisors and employers, knowledge of and positive attitudes towards health and safety will continue to be of value.

Occupational health and safety legislation

The Saskatchewan Employment Act and *Occupational Health and Safety Regulations, 2020* set minimum standards for workplace practices and procedures. Some regulations apply to the information and activities covered in this module:

- Personal protective equipment (PPE).
- Chemical and biological substances.
- WHMIS.
- Fire and explosion hazards.

Further information can be found in *The Saskatchewan Employment Act* and *The Occupational Health and Safety Regulations, 2020.*

Objectives

Foundational objectives

- To identify and explain health and safety hazards in the workplace so that the potential for personal injury, as well as damage to equipment and the environment are minimized.
- To introduce students to rights and responsibilities regarding healthy and safe workplace practices.
- To introduce students to the subtle nature of hazardous materials around them and the need to be proactive about the safe use of these materials.
- To develop an awareness of the responsibility and need for safe work procedures that must be followed in the workplace.
- To develop skills, knowledge and attitudes which will enable students to act on safety knowledge.

Specific learning objectives

- To identify hazardous materials and situations through WHMIS hazard recognition activities.
- To evaluate hazardous materials and situations and determine how to respond.

Resource list

Module resources

1. *The Saskatchewan Employment Act* and *The Occupational Health* and *Safety Regulations, 2020*
2. whmis.org
3. *Ready for Work* q-cards
   Download from worksafesask.ca

Additional resources

1. Online WHMIS training (available at worksafesask.ca)
2. Slides to safety: An occupational health and safety presentation for young workers (PowerPoint)

   Access this presentation and teacher's guide at worksafesask.ca or book a speaker from the Saskatchewan Federation of Labour:

   Phone: 306.525.0197
   Fax: 306.525.8960

3. Module 3: Safety Works: Occupational Health and Safety for Young Workers

Reference resources

1. Elements of an Occupational Health and Safety Program, Occupational Health and Safety Branch
   Download from: saskatchewan.ca
2. OHC Training Level 2 – Workplace Inspections Guide, WorkSafe Saskatchewan (available at worksafesask.ca)

Course outline

Time frame: Four hours

Content	Instructional techniques/strategies	Time frame
WHMIS: An introduction	Activity: Identify the three main parts of WHMIS	60 min.
Responsibilities and labels	Activity: Identify responsibilities and labels Video: The winning label Discussion questions	60 min.
Product classification and pictograms	Discussion questions Activity: Identifying hazard classes quiz	60 min.
Safety data sheets (SDS) and control of hazardous materials	Discussion questions Activity: SDS quiz	60 min.

Learning activities

Activity 1: Workplace Hazardous Materials Information System

Specific learning objectives

- To identify hazardous materials and situations through WHMIS hazard recognition activities.
- To evaluate hazardous materials and situations and determine how to respond.

Materials

- Background notes.
- Handout 1: WHMIS: An introduction quiz

Time: 60 minutes

Activity

1. Ask students if anyone has heard of the Workplace Hazardous Materials Information System or WHMIS. If students are working, have they seen or heard about WHMIS in their workplaces?

2. Use the background notes to explain that WHMIS is a system that provides information about hazardous materials or substances in the workplace. Discuss the purpose, scope and worker responsibilities with respect to WHMIS. Provide students with a copy of the background notes for future reference.

3. Distribute Handout 1: WHMIS: An Introduction Quiz and have students do the exercise. Discuss the results and provide the correct responses if necessary.

4. Ask students to be aware of chemicals used in the home, school or workplace. Note if any symbols are present on the containers or packages. Bring a list of products and their symbols to class. Refer to these examples when discussing hazard symbols in Activity 3.

Evaluation

1. Observe students' participation in activities and their responses to the discussions and the activities.

2. Do an assessment of WHMIS: An introduction quiz.

Background notes

WHMIS: An introduction [1]

> On his third day of a part-time job, a 19-year-old was pouring a drum of highly flammable chemical into small containers. Highly flammable means that the chemical can start a serious fire if not handled properly. There were no warning labels on the drums that held the chemical. A spark from static electricity made the chemical explode. This young worker suffered burns to 95 per cent of his body. He died the next day.

WHMIS (pronounced "wimis") stands for Workplace Hazardous Materials Information System. It is a globally harmonized information system set up to protect all Canadian workers and employers. A hazardous material is any substance that can cause illness, disease or death to unprotected people.

WHMIS provides vital information about any materials that pose a risk or hazard in the workplace. Students may have already been introduced to this system in secondary level science classes.

WHMIS provides employers and workers with information about the hazardous materials they work with on the job. This information is necessary to protect the health and safety of everyone in the workplace.

The WHMIS information system is based on a Canadian law that came into effect in October 1988. It states that everyone has a right to know about the hazardous substances being used in their workplace. It requires suppliers, employers and workers to use the system to identify and safely handle hazardous materials. WHMIS rules apply in every province and territory of Canada. WHMIS is standardized nationally and internationally.

People who do not follow the laws on hazardous materials can be charged with an offence and can be jailed or fined if convicted.

[1] The Ministry of Labour Relations and Workplace Safety wishes to acknowledge the Workers' Compensation Board of the Northwest Territories for its contribution of resource materials to this module.

Why is it needed?

In our daily lives, hundreds of materials and chemicals have been developed to make our work easier and allow us to make better products. This process uses or produces substances that can be dangerous to people if handled improperly. WHMIS lets us know:

- Which materials are dangerous.
- How we can protect ourselves when we handle them.

The danger of hazardous materials can come from explosion, fire, skin contact, inhalation or ingestion. The level of danger will usually depend on one or more of the following:

- the amount of pressure (gases)
- how easily the material burns or explodes
- the amount of material involved
- how toxic it is
- how it enters the body
- its concentration
- how it is used
- the frequency of use

Who developed WHMIS?

Once the need for a national information system was recognized, joint committees of employers, unions and governments developed WHMIS. More recently, the United Nations developed the Globally Harmonized System (GHS) for hazard identification. WHMIS is an element of GHS that has been adopted by Canadian and Saskatchewan legislation.

What problems does WHMIS try to solve?

- Unlabelled chemicals in workplaces.
- Lack of awareness by employers about the identity and hazard level of the chemicals they are using.
- Inadequate information provided by suppliers to employers and workers about the hazard level of the chemicals they are using.
- Differences between provinces and territories in the way hazardous materials are handled.

The three main parts of WHMIS

WHMIS has three main parts to help identify and handle hazardous materials safely:

1. **Labels with pictograms** are applied to the containers with materials inside. The labels supply vital warning information.
2. **Safety data sheets** (SDSs) are sheets of information stored separately from the material. These sheets give details for handling emergencies, clean ups and controls for the safe use of the hazardous materials. The law requires employers to have an SDS available for every hazardous material in the workplace.
3. **Worker education and training programs –** Employers must instruct each worker on how to use WHMIS, what hazardous materials are on site and how to handle them properly.

Worker responsibility

Workers have the responsibility to use the system to protect themselves from hazardous materials by:

- recognizing labels and pictograms
- checking the hazards
- following recommended procedures

Employer and supplier responsibilities will be discussed in other activities.

Exemptions from WHMIS

Some products are already covered by other legislation. These have been **partially or fully exempted** from WHMIS requirements for labels and SDSs. Employers must still follow WHMIS laws for these products by educating workers in the safe handling of the products and by using labels when the contents are transferred. These products include consumer products, cosmetics and drugs, explosives, pesticides and radioactive substances.

Some products are covered by other laws and are **completely exempted** from WHMIS. These include wood and products of wood, tobacco and products made of tobacco, hazardous wastes, and manufactured articles.

Handout 1: WHMIS: An introduction quiz

Questions

1. What should have been done on the work site to prevent the 19-year old worker from losing his life? (Refer to the case study in the background notes.)

2. a) WHMIS stands for:

   b) What is WHMIS?

   c) What does WHMIS require suppliers, employers and workers to do?

3. Do WHMIS laws differ across Canada?

4. What is a hazardous material?

5. What are the three main parts of WHMIS?

6. Hazards identified in the WHMIS system can come from:
   (Place a mark by those that are correct.)

   _____ a) fire
   _____ b) skin contact
   _____ c) reading
   _____ d) explosion
   _____ e) inhalation
   _____ f) ingestion
   _____ g) seeing

7. The level of hazard usually depends on one or more of the following:
   (Mark the answers that you think are correct.)

   _____ a) the amount of material
   _____ b) the month of the year
   _____ c) the manufacturer
   _____ d) how toxic the material is
   _____ e) how great the pressure is
   _____ f) how easily the material burns or explodes
   _____ g) how concentrated the material is
   _____ h) your elevation
   _____ i) how the material enters your body

Handout 1: WHMIS: An introduction quiz

(Teacher's copy)

Questions

1. **What should have been done on the work site to prevent the 19-year old worker from losing his life? (Refer to the case study in the background notes.)**

   Students should mention items such as the employer needed to use proper workplace labels with pictograms, provide workers training in WHMIS, have SDSs available to the worker and have competent supervisors.

2. **a) WHMIS stands for:** Workplace Hazardous Materials Information System

   b) What is WHMIS? A global information system, which provides information about any materials that pose a risk or hazard in the workplace.

   c) What does WHMIS require suppliers, employers and workers to do? It requires suppliers, employers and workers to use the system to identify and handle hazardous materials safely.

3. **Are Canada's WHMIS laws different than other countries?**

   The law does not differ. The same requirements exist in Canada and worldwide.

4. **What is a hazardous material?**

   A hazardous material is any substance that can cause illness, disease or death to unprotected people.

5. **What are the three main parts of WHMIS?**

   - labels with pictograms
   - safety data sheets (SDS)
   - worker education and training programs

6. **Hazards identified in the WHMIS system can come from"**

   All except c) reading and g) seeing.

   _____ a) fire
   _____ b) skin contact
   _____ c) reading

_____ d) explosion
_____ e) inhalation
_____ f) ingestion
_____ g) seeing

7. The level of hazard usually depends on one or more of the following:

The following should be checked: a), d), e), f), g) and i).

_____ a) the amount of material
_____ b) the month of the year
_____ c) the manufacturer
_____ d) how toxic the material is
_____ e) how great the pressure is
_____ f) how easily the material burns or explodes
_____ g) how concentrated the material is
_____ h) your elevations
_____ i) how the material enters your body

Activity 2: Responsibilities and labels

Specific learning objectives

- To identify hazardous materials and situations through WHMIS hazard recognition activities.
- To evaluate hazardous materials and situations and determine how to respond.

Materials

- background notes
- handout 2: Responsibilities and labels
- whmis.org (Resources link)

Time: 60 minutes

Activity

1. List and discuss the WHMIS responsibilities of the employer, worker and supplier. Stress the importance of asking your employer or supervisor about hazardous substances in your workplace before using any product.

2. Describe the three types of labels: supplier labels, workplace labels and other means of identification. Where possible, show examples of supplier labels for substances found at your school (that is., substances with which your students may be familiar).

   A sample supplier label is provided in the background notes. Ask if anyone knows what the symbols on the label mean. If no one knows, identify the symbols. Tell students that the next activity in the module will help them become familiar with WHMIS pictograms.

   Ask students if they can provide examples of workplace labels used in their workplaces. If few students are working, locate examples in the shop or lab areas of your school.

3. Hand out the background notes.

4. Have students complete Handout 2: Responsibilities and labels. Discuss the results and provide the correct responses if necessary.

Evaluation

1. Observe the students' participation in activities and their responses.

2. Assess quiz.

Background notes

Responsibilities and labels

Responsibilities

The responsibility for safely handling hazardous materials is shared by three parties:

- employer
- worker
- supplier

The employer must:

- Tell you what hazardous materials you may come into contact with on the site.
- Make sure that all the hazardous materials on the job site are marked or labelled properly in accordance with WHMIS rules.
- Have safe procedures for the use, handling, storage and disposal of hazardous materials used on the site. They must also have procedures for handling emergencies involving hazardous materials.
- Provide you, the worker, with training on:
  - How to use WHMIS labels with pictograms (warning symbols) and safety data sheets (SDSs). You must also be told where SDSs are kept. Workers should have easy access to SDSs through posters, computers or binders containing the sheets.
  - Procedures for the safe use, storage, handling and disposal of the hazardous materials on the work site.
  - Procedures to follow in case of an emergency involving hazardous materials.
  - The codes that are specific to that work site. Those codes may be colours, letters or numbers. As the codes may change from one work site to another, employers must make sure that you are trained for their particular work sites. Pipes, pumps, large containers or vessels that carry hazardous materials should all be marked with these codes.
- Supply and replace all safety equipment related to hazardous materials and substances.

The worker

You have responsibility for:

- Receiving information and being informed about hazardous materials on the work site before you use any hazardous products.
- Learning how to use WHMIS before you use any hazardous products. This part of the ready for work program allows you to work toward meeting this responsibility.
- Following recommended procedures to protect yourself and others.
- Informing your employer of hazards or damaged and missing labels.

The supplier

Suppliers must provide labels and the information on the safety data sheets. The information on labels and SDSs is the foundation for the safe handling of hazardous materials.

Labels

WHMIS uses labels to identify hazardous materials. The labels alert workers to the main hazards of products and provide procedures for working with them. They also direct workers to the second part of the information system, the safety data sheet.

There are three main types of WHMIS labels:

- **Supplier labels** are placed on the container by the manufacturer or distributor. The materials are then shipped to the workplace.
- **Workplace labels** are placed on hazardous materials where needed on the job site. When any hazardous material is taken out of its supplier container and put into another container, workplace labels must be applied to the new container.
- **Other means of identification** in the workplace are required when pipes, tubes, pumps or vessels are used to transport hazardous materials from one place to another. Since each work site may be different, the employer has to develop ways of warning the worker that there are hazardous materials present. Sometimes coloured flags or tape are attached or the containers are coloured. As each employer has developed his or her own system for warning workers, workers must be trained to recognize this other means of identification.

Supplier labels

When hazardous materials enter the workplace, the supplier label is the first warning sign of their presence. The label may be placed on the container of hazardous materials by the supplier before shipping or may be included with the shipment and placed on the containers by the receiver when the shipment arrives at the workplace. The label signals that hazardous materials are present.

Suppliers must provide supplier labels on containers of products sold or imported into the workplace. Supplier labels must be written in English and French. They may be bilingual (as one label) or available as two labels (one English and one French).

The supplier label must include these seven types of information:

1. **Product identifier –** the brand name, chemical name, common name, generic name or trade name of the hazardous product.
2. **Initial supplier identifier –** the name, address and telephone number of the manufacturer.
3. **Pictogram(s) –** hazard symbol within a red square set on one of its points.
4. **Signal word –** a word used to alert the reader to a potential hazard and to indicate the severity of the hazard.
5. **Hazard statement(s) –** standardized phrases which describe the nature of the hazard posed by a hazardous product.
6. **Precautionary statement(s) –** standardized phrases that describe measures to be taken to minimize or prevent adverse effects resulting from exposure or from improper handling or storage of a hazardous product.
7. **Supplemental label information –** some supplemental label information required based on the classification of the product.

   For example, the label for a mixture containing ingredients with unknown toxicity in amounts higher than or equal to one per cent must include a statement indicating the percent of the ingredient or ingredients with unknown toxicity. Labels may also include supplementary information about precautionary actions, hazards not yet included in the WHMIS, physical state or route of exposure. This information must not contradict or detract from the standardized information.

There is no specific rule for the size, shape or colour of the label, but it must contrast with the background colour of the container. In other words, a yellow label is not allowed on a yellow drum or a blue label on a blue bottle and so forth.

A problem arises when the container with the hazardous material is small. It is difficult to fit a label with all the above information on a small bottle.

When the container is less than 100 milliliters, or one third of a can of pop, only the following information is required on the supplier label:

- product identifier
- supplier identifier
- pictogram showing the dangers associated with the material
- signal word

Sample supplier label

Sample Label

Workplace labels

These labels must be placed on:

- Hazardous materials produced in the workplace.
- Hazardous material moved out of its original container into a new container.

The workplace label is supplied by the employer and contains less information than the supplier label. It is required to give **only three of the seven kinds of information**:

1. Product name (matching the SDS product name).
2. Safe handling precautions (may include pictograms or other supplier label information).
3. A reference to the SDS.

There are no specific requirements for the colour, size or shape of the workplace label.

Sample workplace label

Toluene Sulphonic Acid 70 per cent liquid
Wear protective gloves, apron, goggles and face shield. **USE IN WELL VENTILATED AREA**
Refer to safety data sheet

Handout 2: Responsibilities and labels quiz

1. Who are the three main WHMIS participants?

2. Mark the employer's responsibilities with an "E" and the worker's responsibilities with "ME."

   _____ a) Provide training on how to use WHMIS.
   _____ b) Learn how to use WHMIS.
   _____ c) Provide training on procedures for the safe use, storage and handling of the hazardous materials on site.
   _____ d) Learn and follow procedures for the safe use, storage and handling of the hazardous materials on site.
   _____ e) Recognize special colour, number or letter codes on pumps, pipes and vessels carrying hazardous materials.
   _____ f) Develop emergency procedures and supply training to follow them.
   _____ g) Clearly mark or label pumps, pipes and vessels carrying hazardous materials.

3. Write the letter of the employer's responsibility in the blank that best matches the way in which employers can meet the requirement.

	Employers' responsibilities		**Ways employers can meet the requirements**
A	Identify all hazardous materials on site.		Check materials as they arrive from suppliers.
B	Make sure materials are labelled.		Keep SDSs handy on site.
C	Provide information.		Provide step-by-step training on the use, handling, storage or disposal of hazardous materials.
D	Develop procedures.		Explain how to do things at a safety or staff meeting.
E	Train workers.		Place WHMIS posters on the job for easy reference.
			Show and practice what to do in an emergency.
			Post a list of all hazardous materials on the site.

Handout 2: Responsibilities and labels quiz

(Teacher's copy)

1. Who are the three main WHMIS participants?

Suppliers, employers and workers

2. Mark the employer's responsibilities with an "E" and the worker's responsibilities with "ME."

E a) Provide training on how to use WHMIS.
ME b) Learn how to use WHMIS.
E c) Provide training on procedures for the safe use, storage and handling of the hazardous materials on site.
ME d) Learn and follow procedures for the safe use, storage and handling of the hazardous materials on site.
ME e) Recognize special colour, number or letter codes on pumps, pipes and vessels carrying hazardous materials.
E f) Develop emergency procedures and supply training to follow them.
E g) Clearly mark or label pumps, pipes and vessels carrying hazardous materials.

3. Write the letter of the employer's responsibility in the blank that best matches the way in which employers can meet the requirement.

	Employers' responsibilities		Ways employers can meet the requirements
A	Identify all hazardous materials on site.	B	Check materials as they arrive from suppliers.
B	Make sure materials are labelled.	C	Keep SDSs handy on site.
C	Provide information.	D	Provide step-by-step training on the use, handling, storage or disposal of hazardous materials.
D	Develop procedures.	E	Explain how to do things at a safety or staff meeting.
E	Train workers.	C	Place WHMIS posters on the job for easy reference.
		C	Show and practice what to do in an emergency.
		A	Post a list of all hazardous materials on the site.

Activity 3: Product classification and pictograms (symbols)

Specific learning objectives

- To identify hazardous materials and situations through WHMIS hazard recognition activities.
- To evaluate hazardous materials and situations and determine how to respond.

Materials

- background notes
- Handout 3: WHMIS pictograms (symbols)

Time: 60 minutes

Activity

1. Introduce the product classification system and pictograms (hazard symbols). Refer to the background notes for pictures and descriptions of the symbols. An overhead can be made from the symbols in the notes.

2. Distribute the background notes for student reference. Refer students to the lists of products and symbols they collected in Activity 1 of this module. Using the background notes, have students tell what each symbol means. Remind the students WHMIS legislation does not cover all dangerous materials and substances – some products are partially exempt, and others are completely exempt.

3. Review Handout 3: WHMIS pictograms (symbols) with students.

4. In small groups, ask the students to think of a hazardous substance (or make up a product). Ask the group to create a supplier label and a workplace label for their product. The students will need to assign a pictogram to their product. Have each group present its product to the class and discuss the classification, pictogram (symbol) and labelling system created for the product.

Evaluation

1. Observe students' participation in the activities and their responses.

2. In the small group presentations, consider the accuracy and completeness of the product information presented by the students, the clarity of their description, and their ability to answer questions about the product.

Background notes

Product classification and pictograms (symbols)

The WHMIS classification system consists of hazard groups, classes and categories based on the properties of the hazardous material. Each of these levels of classification are explained below.

Hazard group

WHMIS consists of two major groups of hazards: physical and health.

- **Physical hazards group** – based on the physical or chemical properties of the product, such as flammability, reactivity, or corrosiveness to metals.
- **Health hazards group –** based on the ability of the product to cause a health effect, such as eye irritation, respiratory sensitization (may cause allergy or asthma symptoms or breathing difficulties if inhaled), or carcinogenicity (may cause cancer).

Hazard classes

Each hazard group includes hazard classes with specific hazardous properties. Hazard classes are a way of grouping together products that have similar properties. The list of hazard classes for each hazard group is as follows:

Physical hazards		Health hazards	
• flammable gases • flammable aerosols • oxidizing gases • gases under pressure • flammable liquids • flammable solids • self-reactive substances and mixtures • pyrophoric liquids • pyrophoric solids • self-heating substances and mixtures	• substances and mixtures which emit flammable gases in contact with water • oxidizing liquids • oxidizing solids • organic peroxides • corrosive to metals • combustible dusts • simple asphyxiants • pyrophoric gases • physical hazards not otherwise classified	• acute toxicity • skin corrosion/irritation • serious eye damage/eye irritation • respiratory or skin sensitization • germ cell mutagenicity • carcinogenicity	• reproductive toxicity • specific target organ toxicity – single exposure • specific target organ toxicity – repeated exposure • aspiration hazard • biohazardous infectious materials • health hazards not otherwise classified

Hazard categories

Hazard classes are further divided into hazard categories. Each hazard class may contain multiple hazard categories.

The hazard categories are assigned a number (for example, 1, 2, 3) Categories may also be called "types." Types are assigned an alphabetical letter (for example, A, B, C). In a few cases, sub-categories are also specified. Subcategories are identified with a number and a letter (for example, 1A and 1B).

Some hazard classes have only one category (for example, corrosive to metals). Others may have two categories (for example, carcinogenicity) or three categories (for example, oxidizing liquids). There are a few hazard classes with five or more categories (for example, organic peroxides).

The category tells you how hazardous the product is. That is, the severity of hazard.

Category 1 is always the greatest level of hazard (the most hazardous within that class). If category 1 is further divided, category 1A within the same hazard class is a greater hazard than category 1B.

What is a flashpoint?
When a liquid evaporates, it gives off a vapour. The vapour combines with air to form a mixture. If enough vapour is present and mixed with air, the mixture can be ignited. A flashpoint is the lowest temperature at which a liquid gives off enough vapour to form a mixture that can produce a flame.

Exemptions

Some products such as pesticides, certain consumer products and explosives do not require the distinctive WHMIS label because they are already covered by other labelling laws. WHMIS requires employers to provide training to workers. If those products are transferred to smaller containers, WHMIS requires that workplace labels be applied.

Handout 3: WHMIS pictograms (symbols)

	This pictogram is used for indicating flammable gases, aerosols, liquids and solids; pyrophoric liquids, gases and solids; self-heating substances and mixtures; substances and mixtures that produce flammable gases when in contact with water; organic peroxides; and self-reactive substances and mixtures.
	The pictogram is flame over a circle plus a distinctive red "diamond" shaped border. It is used to indicate oxidizing gases, liquids and solids.
	This pictogram is used to indicate the hazard of gases under pressure such as dissolved gas, liquefied gas, compressed gas and refrigerated liquefied gas.
	The corrosive pictogram indicates a substance that can irritate the skin and eyes, and damage metals. It is used for hazardous products that are corrosive to metals, cause skin irritation (corrosion), and cause serious eye irritation or damage.
	Used to indicate explosion or reactivity hazards, the Exploding Bomb Pictogram is placed on the labels of self-reactive substances and mixtures, and on labels of organic peroxides.
	For hazardous products that can cause death or acute toxicity after exposure to small amounts of the products, this Pictogram is used to warn users of the potential dangers. It is placed on labels of materials with acute oral, dermal and inhalation toxicity. For instance, the pictogram can be used on containers for cleaning chemicals
	This Pictogram is used to indicate a product that causes or is suspected of causing serious health effects. It forms part of labels of products that cause respiratory sensitivity, skin toxicity, germ cell mutagenicity, carcinogenicity, reproductive toxicity, aspiration hazard, specific target organ toxicity after single exposure, and specific target organ toxicity after repeated exposure.
	Used for hazardous products that cause less serious health effects, the Exclamation Mark Pictogram indicates acute toxicity (oral, dermal or inhalation), skin corrosion (irritation), eye irritation, skin sensitivity, respiratory damage, and specific target organ toxicity on single exposure.
	Indicates the presence of organisms or toxins that can cause diseases in humans and animals, The Biohazardous Infectious Materials pictogram has been retained from WHMIS 1988. The pictogram is used on labels of biohazardous infectious materials. For instance, it is used on growths of micro-organisms like E. coli or salmonella bacteria cultures.

Activity 4: Safety data sheets and control of hazardous materials

Specific learning objectives

- To identify hazardous materials and situations through WHMIS hazard recognition activities.
- To evaluate hazardous materials and situations and determine how to respond.

Materials

- Background notes.
- Handout 4: Sample safety data sheets (SDSs).
- Handout 5: Safety data sheets (SDS) quiz.
- Handout 6: Using sample safety data sheets (SDSs).
- Handout 7: Control of hazardous materials.

Time: 60 minutes

Activity

1. Using the background notes, introduce the purpose of SDSs and the 16 pieces of information they must contain. Use Handout 4: Sample safety data sheets (SDSs) to demonstrate all the information that might be included. It is not necessary to "memorize" all the information contained in an SDS.

2. Distribute Handout 5: Safety data sheets (SDSs) quiz, and have students do the exercise. Discuss the results and provide the correct responses if necessary.

3. Safety data sheets can be quite intimidating when you first look at them. They contain a lot of information with chemical names and other vocabulary that may not be familiar to students. Before doing the next activity, a review of skimming and scanning techniques may be helpful.

   Encourage your students to scan the SDS to find the heading that might contain the information they are looking for. Next, ask them to skim that section until they find the specific information they need. Remind students that it is OK if they do not know all the chemicals mentioned or all the vocabulary. It is important, however, to be able to read and understand the information that is needed to keep them safe when dealing with that product and to know who they can go to for additional information in the workplace.

4. Distribute Handout 6: Using sample safety data sheets (SDSs). This activity contains questions about three hazardous products and their SDSs.

If students need additional practice in reading and using information from SDSs, collect sample SDSs from products used in the school or from local employers. Have students answer the questions from the “Reminder” section of Handout 6. Students could present information they learned about the product to the class.

5. Distribute Handout 7: Control of hazardous materials. Have students complete the quiz. Discuss the correct responses.

Evaluation

1. Observe the students’ participation in the activities and their responses.

2. Assess the students’ responses to discussion questions and their understanding of the assignments.

Background notes

Safety data sheets and control of hazardous materials

Safety data sheets

The safety data sheet (SDS) is a very important technical document. There is an SDS for every hazardous material on site. The SDS is the second level of the **right to Know.**

Federal law requires that a supplier provide an SDS for each controlled product. Saskatchewan law requires employers to have an SDS available for every hazardous material in the workplace. The SDS must be readily accessible to all workers, worker representatives and members of the occupational health committee.

Every SDS must be current. The SDS must be revised whenever significant new information about the hazardous product becomes available. The SDS has 16 main sections containing information of which the employer should be aware.

The *Hazardous Products Regulations* specify the section content for the SDS, as follows:

SDS section and heading		Specific information elements
1.	Identification	• Product identifier (for example, product name). • Other means of identification (for example, product family, synonyms, etc.). • Recommended use. • Restrictions on use. • Supplier identifier. ○ Name, full address and phone number(s). • Emergency telephone number and any restrictions on the use of that number, if applicable.

2.	Hazard identification	• Hazard classification (class, category) of substance or mixture or a description of the identified hazard for physical or health hazards not otherwise classified.
		• Label elements:
		  ○ Symbol (image) or the name of the symbol (for example, flame, skull and crossbones).
		  ○ Signal word.
		  ○ Hazard statement(s).
		  ○ Precautionary statement(s).
		• Other hazards which do not result in classification (for example, molten metal hazard).

3.	Composition/Information on ingredients	• When a hazardous product is a material or substance:
		  ○ Chemical name.
		  ○ Common name and synonyms.
		  ○ Chemical Abstract Service (CAS) registry number and any unique identifiers.
		  ○ Chemical name of impurities, stabilizing solvents and/or additives.
		• For each material or substance in a mixture that is classified in a health hazard class:
		  ○ Chemical name.
		  ○ Common name and synonyms.
		  ○ CAS registry number and any unique identifiers
		  ○ Concentration.
		Confidential business information rules can apply.

4.	First aid measures	• First aid measures by route of exposure:
		  ○ inhalation
		  ○ skin contact
		  ○ eye contact
		  ○ ingestion
		• Most important symptoms and effects (acute or delayed).
		• Immediate medical attention and special treatment, if necessary.

5.	Firefighting measures	• Suitable extinguishing media. • Unsuitable extinguishing media. • Specific hazards arising from the hazardous product (for example, hazardous combustion products). • Special protective equipment and precautions for firefighters.
6.	Accidental release measures	• Personal precautions, protective equipment and emergency procedures. • Methods and materials for containment and cleaning.
7.	Handling and storage	• Precautions for safe handling. • Conditions for safe storage (including incompatible materials).
8.	Exposure controls/ personal protection	• Control parameters, including occupational exposure guidelines or biological exposure limits and the source of those values. • Appropriate engineering controls. • Individual protection measures (for example, personal protective equipment).
9.	Physical and chemical properties	• Appearance (physical state, colour, etc.). • Odour. • Odour threshold. • pH (acidity/alkalinity). • Melting/freezing point. • Initial boiling point/boiling range. • Flash point. • Evaporation rate. • Flammability (solid, gas).

		• Lower flammable/explosive limit. • Upper flammable/explosive limit. • Vapour pressure. • Vapour density. • Relative density. • Solubility. • Partition coefficient – n-octanol/water. • Auto-ignition temperature. • Decomposition temperature. • Viscosity.
10.	Stability and reactivity	• Reactivity. • Chemical stability. • Possibility of hazardous reactions. • Conditions to avoid (for example, static discharge, shock or vibration). • Incompatible materials. • Hazardous decomposition products.
11.	Toxicological information	Concise but complete description of the various toxic health effects and the data used to identify those effects, including: • Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact). • Symptoms related to the physical, chemical and toxicological characteristics. • Delayed, immediate, and chronic effects from short-term and long-term exposure. • Numerical measures of toxicity.
12.	Ecological information	• Ecotoxicity. • Persistence and degradability. • Bioaccumulative potential. • Mobility in soil. • Other adverse effects.
13.	Disposal considerations	Information on safe handling for disposal and methods of disposal, including any contaminated packaging.
14.	Transport information	• UN number. • UN proper shipping name. • Transport hazard class(es). • Packing group. • Environmental hazards. • Transport in bulk, if applicable. • Special precautions.
15.	Regulatory information	Safety, health and environmental regulations specific to the product.
16.	Other information	Date of the latest revision of the SDS.

Exemptions

Some companies do not want to disclose information on the SDS because they would be giving away trade secrets. Some cleaners and soaps are examples of this. Those companies submit a request to a committee that approves or turns down the company's request. Other situations arise where consumer products fall under other laws. When this occurs, suppliers need not complete all parts of the SDS.

Five categories of products are **partially exempt** from WHMIS requirements for labels and SDSs, but not WHMIS education and training requirements:

1. Consumer restricted products (those sold to the general public that are already labelled following the rules of the *Canadian Consumer Product Safety Act.).*
2. Explosives (as defined by the *Explosives Act).*
3. Cosmetics, drugs, good or devices (as defined by the *Food and Drugs Act).*
4. Pest control products (for example, pesticides as defined by the *Pest Control Products Act).*
5. A nuclear substance that is radioactive as defined by the *Nuclear Safety and Control Act.*

These acts are available to view online.

Handout 4: Sample safety data sheets

Information on this sample SDS was created by MSDSonline for information and training purposes only. This SDS is NOT for commercial use.

Acetone

SAMPLE SDS ONLY. Created by MSDSonline for informational and training purposes only. NOT FOR COMMERCIAL USE.

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date: 04/22/2013 Supersedes: 01/01/2000 Version: 1.0

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product Identifier

Product form: Substance

Substance name: Acetone

CAS No.: 67-64-1

Formula: C3H6O

Synonyms: Dimethyl ketone, Propan-2-one, Dimethyl ketone, β-Ketopropane, Propanone, 2-Propanone, Dimethyl formaldehyde, Pyroacetic spirit (archaic)

Intended Use Of The Product

Use of the substance/mixture: Solvent

Name, Address, And Telephone Of The Responsible Party

Glendale Industries, Inc.
1234 Anywhere Way
Anytown, US 12345
1.888.362.2007

Emergency telephone number

Emergency number : 1.888.362.2007
For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident, call GLENTREC– Day or Night

SECTION 2: Hazards identification

Classification of the substance or mixture

GHS-US classification

Flam. Liq. 2 H225
Eye Irrit. 2A H319
STOT SE 3 H336

Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) : H225 - Highly flammable liquid and vapour
H319 - Causes serious eye irritation
H336 - May cause drowsiness or dizziness

Precautionary statements (GHS-US) : P210 - Keep away from heat, open flames, sparks. - No smoking.
P233 - Keep container tightly closed.
P240 - Ground/bond container and receiving equipment.
P241 - Use explosion-proof electrical, lighting, ventilating equipment.
P242 - Use only non-sparking tools.
P243 - Take precautionary measures against static discharge.
P261 - Avoid breathing mist, spray, vapours.
P264 - Wash hands, forearms, and exposed areas thoroughly after handling.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear eye protection, protective clothing, protective gloves.
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 - Call a POISON CENTER or doctor if you feel unwell.
P337+P313 - If eye irritation persists: Get medical advice/attention.
P370+P378 - In case of fire: Use appropriate media for extinction.
P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
P235 - Keep cool.
P405 - Store locked up.
P501 - Dispose of contents/container according to local, regional, national, and international regulations.

Other hazards
No additional information available

Unknown acute toxicity (GHS US)
No data available

SECTION 3: Composition/information on ingredients

Substances

Name	Product Identifier	%	GHS-US classification
Acetone	(CAS No.) 67-64-1	100	Flam. Liq. 2, H225 Eye Irrit. 2A, H319 STOT SE 3, H336

Full text of H-phrases: see section 16

SECTION 4: First aid measures

Description of first aid measures
First-aid measures general: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).
First-aid measures after inhalation: When symptoms occur: go into open air and ventilate suspected area. Remove to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER/doctor/physician if you feel unwell.
First-aid measures after skin contact: Remove contaminated clothing. Drench affected area with water for at least 15 minutes.
First-aid measures after eye contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
First-aid measures after ingestion: Rinse mouth. Do NOT induce vomiting.

Most important symptoms and effects, both acute and delayed
Symptoms/injuries: Eye irritation.
Symptoms/injuries after inhalation: May cause drowsiness or dizziness.
Symptoms/injuries after eye contact: Causes serious eye irritation.
Symptoms/injuries after ingestion: Ingestion may cause nausea, vomiting and diarrhea.

Indication of any immediate medical attention and special treatment needed
If medical advice is needed, have product container or label at hand.

SECTION 5: Firefighting measures

Extinguishing media
Suitable extinguishing media: Dry chemical, alcohol foam, carbon dioxide.
Unsuitable extinguishing media: Do not use a heavy water stream. A heavy water stream may spread burning liquid.

Special hazards arising from the substance or mixture
Fire hazard: Highly flammable liquid and vapour.
Explosion hazard: May form flammable/explosive vapour-air mixture.
Reactivity: Reacts with chloroform and bromoform under basic conditions, causing fire and explosion hazard. Ignites on contact with the chloride.

Advice for firefighters
Firefighting instructions: Exercise caution when fighting any chemical fire.
Protection during firefighting: Firefighters should wear full protective gear. Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

General measures: Use special care to avoid static electric charges. Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Avoid breathing (vapor, mist). Use only outdoors or in a well-ventilated area. Handle in accordance with good industrial hygiene and safety practice.

For non-emergency personnel

Protective equipment: Use appropriate personal protection equipment (PPE).

Emergency procedures: Evacuate unnecessary personnel.

For emergency responders

Protective equipment: Equip cleanup crew with proper protection. Use appropriate personal protection equipment (PPE).

Emergency procedures: Ventilate area.

Environmental precautions

Prevent entry to sewers and public waters.

Methods and material for containment and cleaning up

For containment: Absorb and/or contain spill with inert material, then place in suitable container. Do not take up in combustible material such as: saw dust or cellulosic material.

Methods for cleaning up: Clear up spills immediately and dispose of waste safely.

Reference to other sections

See heading 8, Exposure Controls and Personal Protection.

SECTION 7: Handling and storage

Precautions for safe handling

Additional hazards when processed: Handle empty containers with care because residual vapours are flammable.

Precautions for safe handling: Use only non-sparking tools. Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Avoid breathing mist, spray, vapours. Use only outdoors or in a well-ventilated area. Wear recommended personal protective equipment.

Hygiene measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work.

Conditions for safe storage, including any incompatibilities

Technical measures: Proper grounding procedures to avoid static electricity should be followed. Ground/bond container and receiving equipment. Use explosion-proof electrical, lighting, ventilating equipment.

Storage conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use.

Incompatible products: Strong acids. Strong bases. Strong oxidizers.

Incompatible materials: Heat sources.

Storage area: Keep in fireproof place.

Special rules on packaging: Attacks many plastics.

Specific end use(s)

Solvent.

SECTION 8: Exposure controls/personal protection

Control parameters

Acetone (67-64-1)		
USA ACGIH	ACGIH TWA (ppm)	500 ppm
USA ACGIH	ACGIH STEL (ppm)	750 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m3)	590 mg/m³
USA NIOSH	NIOSH REL (TWA) (ppm)	250 ppm
USA IDLH	US IDLH (ppm)	2500 ppm (10% LEL)
USA OSHA	OSHA PEL (TWA) (mg/m3)	2400 mg/m³
USA OSHA	OSHA PEL (TWA) (ppm)	1000 ppm

Exposure controls

Appropriate engineering controls	: Ensure all national/local regulations are observed. Gas detectors should be used when flammable gases/vapours may be released. Proper grounding procedures to avoid static electricity should be followed. Use explosion-proof equipment. Ensure adequate ventilation, especially in confined areas.
Personal protective equipment	: Fireproof clothing. Insufficient ventilation: wear respiratory protection. Protective goggles. Gloves.

Hand protection	: Wear chemically resistant protective gloves.
Eye protection	: Chemical goggles or safety glasses.
Skin and body protection	: Wear fireproof clothing.
Respiratory protection	: If exposure limits are exceeded or irritation is experienced, NIOSH approved respiratory protection should be worn.
Thermal hazard protection	: Wear suitable protective clothing.
Other information	: When using, do not eat, drink or smoke.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Clear, volatile liquid.
Colour	: Colorless
Odour	: Characteristic. Sweet. Mint-like.
Odour threshold	: No data available
pH	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Melting point	: -94.7 °C (-138.46°F)
Freezing point	: No data available
Boiling point	: 56.05 °C (132.89°F) at 1013.25 hPa
Flash Point	: -20 °C (-4°F)
Auto-ignition temperature	: No data available
Decomposition Temperature	: No data available
Flammability (solid, gas)	: No data available
Vapour pressure	: 233 hPa (at 20 °C)
Relative vapour density at 20 °C	: No data available
Relative density	: No data available
Density	: 0.7845 g/cm³ (at 25 °C)
Solubility	: Miscible.
Log Pow	: No data available
Log Kow	: -0.24
Viscosity, kinematic	: No data available
Viscosity, dynamic	: 0.32 cP
Explosive properties	: No data available
Oxidising properties	: No data available
Explosive limits	: Not applicable

Other information

No additional information available

SECTION 10: Stability and reactivity

Reactivity Reacts with chloroform and bromoform under basic conditions, causing fire and explosion hazard. Ignites on contact with the chloride.

Chemical Stability Stable under recommended handling and storage conditions (see section 7). Highly flammable liquid and vapour. May form flammable/explosive vapour-air mixture.

Possibility Of Hazardous Reactions The substance can form explosive peroxides on contact with strong oxidants such as acetic acid, nitric acid, hydrogen peroxide. Acetone may form explosive mixtures with chromic anhydride, chromyl chloride,

hexachloromelamine, hydrogen peroxide, nitric acid and acetic acid, nitric acid and sulfuric acid, nitrosyl chloride, nitrosyl perchlorate, nitryl perchlorate, permonosulfuric acid, potassium tert-butoxide, thiodiglycol and hydrogen peroxide.

Conditions To Avoid Avoid ignition sources. Heat. Sparks. Open flame. Direct sunlight. Extremely high or low temperatures.

Incompatible Materials Attacks many plastics. Strong acids. Strong bases. Strong oxidizers.

Hazardous Decomposition Products Carbon oxides (CO, CO2). May release flammable gases.

SECTION 11: Toxicological information

Information on toxicological effects

Acute toxicity : Not classified

Acetone (\f)67-64-1	
LD50 oral rat	5800 mg/kg
LD50 dermal rabbit	15688 mg/kg
LC50 inhalation rat (mg/l)	76000 mg/m³

Skin corrosion/irritation: Not classified

Serious eye damage/irritation: Causes serious eye irritation.

Respiratory or skin sensitisation: Not classified

Germ cell mutagenicity: Not classified

Carcinogenicity: Not classified

Reproductive toxicity: Not classified

Specific target organ toxicity (single exposure): May cause drowsiness or dizziness.

Specific target organ toxicity (repeated exposure): Not classified

Aspiration hazard: Not classified

Symptoms/injuries after inhalation: May cause drowsiness or dizziness.

Symptoms/injuries after eye contact: Causes serious eye irritation.

Symptoms/injuries after ingestion: Ingestion may cause nausea, vomiting and diarrhea.

SECTION 12: Ecological information

Toxicity

Acetone (67-64-1)	
LC50 fishes 1	4144.846 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss)
EC50 Daphnia 1	1679.66 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
LC50 fish 2	6210 - 8120 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])
EC50 Daphnia 2	12600 - 12700 mg/l (Exposure time: 48 h - Species: Daphnia magna)

Persistence and degradability

Acetone (67-64-1)	
Persistence and degradability	Readily biodegradable in water. Not established.

Bioaccumulative potential

Acetone (67-64-1)	
BCF fish 1	0.69
Log Kow	-0.24
Bioaccumulative potential	Not established.

Mobility in soil

No additional information available

Other adverse effects

Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

Waste treatment methods

Regional legislation (waste): U.S. - RCRA (Resource Conservation & Recovery Act) - Basis for Listing - Appendix VII. U.S. - RCRA (Resource Conservation & Recovery Act) - Constituents for Detection Monitoring. U.S. - RCRA (Resource Conservation & Recovery Act) - List for Hazardous Constituents. U.S. - RCRA (Resource Conservation & Recovery Act) - Phase 4 LDR Rule - Universal Treatment Standards. U.S. - RCRA (Resource Conservation & Recovery Act) - TSD Facilities Ground Water Monitoring. U.S. - RCRA (Resource Conservation & Recovery Act) - U Series Wastes - Acutely Toxic Wastes & Other Hazardous Characteristics.

Waste disposal recommendations: To be disposed of as hazardous waste. Dispose of contents/container in accordance with local/regional/national/international regulations.
Additional information: Handle empty containers with care because residual vapours are flammable.

SECTION 14: Transport information

In accordance with ICAO/IATA/DOT/TDG

UN number

UN-No.(DOT) : 1090
DOT NA no. UN1090

UN proper shipping name

Department of Transportation (DOT) : 3 - Class 3 - Flammable and combustible liquid 49 CFR 173.120
Hazard Classes ACETONE
Hazard labels (DOT) : 3 - Flammable liquid

Packing group (DOT) : II - Medium Danger
DOT Special Provisions (49 CFR 172.102) : IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized.
T4 - 2.65 178.274(d)(2) Normal..... 178.275(d)(3)
TP1 - The maximum degree of filling must not exceed the degree of filling determined by the following: (image) Where: tr is the maximum mean bulk temperature during transport, and tf is the temperature in degrees celsius of the liquid during filling.
DOT Packaging Exceptions (49 CFR 173.xxx) : 150
DOT Packaging Non Bulk (49 CFR 173.xxx) : 202
DOT Packaging Bulk (49 CFR 173.xxx) : 242

Additional information

Emergency Response Guide (ERG) Number : 127
Other information : No supplementary information available.

Transport by sea

DOT Vessel Stowage Location : B - (i) The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) "On deck only" on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.
MFAG-No. : 127

Air transport

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 5 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 60 L

SECTION 15: Regulatory information

US Federal regulations

Acetone (67-64-1)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
EPA TSCA Regulatory Flag	T - T - indicates a substance that is the subject of a Section 4 test rule under TSCA.

US State regulations

Acetone(67-64-1)	
State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Indication of changes : 04/23/2013

Other information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

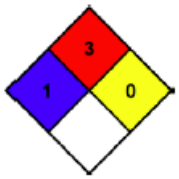
GHS Full Text Phrases:

Eye Irrit. 2A	Serious eye damage/eye irritation Category 2A
Flam. Liq. 2	Flammable liquids Category 2
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
H225	Highly flammable liquid and vapour
H319	Causes serious eye irritation
H336	May cause drowsiness or dizziness

NFPA health hazard : 1 - Exposure could cause irritation but only minor residual injury even if no treatment is given.

NFPA fire hazard : 3 - Liquids and solids that can be ignited under almost all ambient conditions.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health : 1 Slight Hazard - Irritation or minor reversible injury possible

Flammability : 3 Serious Hazard

Physical : 0 Minimal Hazard

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

SDS US (GHS HazCom) - US Only

Handout 5: Safety data sheets (SDSs) quiz

1. How many sections must be provided on an SDS?

3. What is the title of the section of the SDS that tells who to contact if you have questions about the product?

4. Which section of the SDS lists the special protective measures you can take to avoid harmful contact with the product?

5. When must an SDS be updated?

Handout 5: Safety data sheets (SDSs) quiz

(teacher's copy)

1. **How many sections must be provided on an SDS?**

   16 sections

2. **What is the title of the section of the SDS that tells who to contact if you have questions about the product?**

   Identification

3. **Which section of the SDS lists the special protective measures you can take to avoid harmful contact with the product?**

   Exposure controls/personal protection

4. **How often must an SDS be updated?**

   Whenever significant new information about the hazardous product becomes available

Handout 6: Using sample safety data sheets (SDSs)

The following pages contain questions about acetone. Refer to the SDS for each product to answer the questions.

Acetone

1. What is the telephone number of the supplier?
   Under what section of the SDS did you find this information?

2. What problems can occur if you get acetone in your eyes?
   In what section did you find this information?

3. What should you do if you get acetone in your eyes?
   What could you have done to prevent it from happening?

4. What if any engineering controls may be needed for this product?

5. Are the ingredients of this product carcinogenic (cancer causing)?

Handout 6: Using sample safety data sheets

(teacher's copy)

The following pages contain questions about acetone. Refer to the SDS for each product to answer the questions.

Acetone

1. **What is the telephone number of the supplier?**
   Under what section of the SDS did you find this information?

   1.888.362.2007
   Section 1: Identification

2. **What problems can occur if you get acetone in your eyes?**
   In what section did you find this information?

   Causes serious eye irritation
   Section 2: Hazard identification

3. **What should you do if you get acetone in your eyes?**
   What could you have done to prevent it from happening?

   Section 4: First aid measures. Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do so. Continue rinsing.

   Section 8: Wear goggles or safety glasses.

4. **What if any engineering controls may be needed for this product?**

   Section 8: Ensure all national/local regulations are observed. Gas detectors should be observed when flammable gases/vapours may be release. Follow proper grounding procedures to avoid static electricity. Use explosion-proof equipment. Ensure adequate ventilation, especially in confined spaces.

5. **Are the ingredients of this product carcinogenic (cancer causing)?**

   No

Reminder

SDSs must be readily available to all workers at all times.

Did you really understand the SDS?

Here are some questions you should be able to answer.

1. Can this product harm your health? Do you know the symptoms that may warn you of overexposure?
2. Do you know the first aid measures needed in case of an overexposure?
3. Can this product burn or explode?
4. Does your work site need any control measures such as special ventilation?
5. Does this product require special handling precautions?
6. Do you need any personal protective equipment?
7. Do you need to be careful when mixing this product with any other chemicals? Which ones?
8. Does this product require any special storage conditions?
9. Do you know what to do in case of a fire or explosion?
10. Do you know what to do in case of a spill or leak?
11. Do you know where the emergency response equipment is and how to use it?

> If you cannot answer any one of these questions, you must talk to your employer, supervisor or safety officer before using the product.

Handout 7: Control of hazardous materials

When hazardous materials are on the work site, it is necessary to control them to protect the health and safety of workers.

Toxic substances may take one of four routes to enter your body: inhalation, ingestion, injection and absorption. Hazardous materials that enter the body may have acute or chronic effects, or a combination of both.

- **Acute effects** occur immediately or shortly after exposure; immediate death sometimes results.
- **Chronic effects** may show up years later. By this time, the worker may have had many exposures. The period between the exposure to the hazardous material and the illness of the worker is referred to as the latency period.

Sometimes the body reacts strongly to defend against exposure. This is called sensitization. Examples of sensitization include rashes and asthma-like reactions such as wheezing and coughing. Sensitization is acquired over a period of exposures, but once sensitization occurs, low level exposure to the material will cause a strong reaction. Avoiding exposure to the material is the only solution to sensitization.

A hazard control measure is something used to prevent workers from injury or illness. A control measure may involve how or where something is done. If you want to open a can, you use a can opener, not a hammer. If you do not want to get paint on furniture, you cover the furniture. These are examples of control measures.

On the work site, there are many different ways in which control measures are used. If a control measure is to be of benefit, it must meet the following requirements:

- **It must adequately control the hazard.** If the hazard is lethal, there should be no contact. The level of the hazard must be reduced, so there is no danger for the worker.
- **The control measure must create no new hazards.** For example, the cover protecting the furniture from paint should be arranged so no one can trip on it. Another example could be providing latex gloves to prevent exposure, while increasing the risk of latex sensitivities.
- **You must be able to do your job without unnecessary discomfort or stress.** Protective clothing should fit properly. It should not be too big or too small. Additional protective clothing may increase the risk of heat stress when working under hot conditions in summer or other hot environments.
- **Every worker who comes into contact with the hazard must be protected by the control measure.** If a lab technician uses gloves, shouldn't the nurse (who takes the sample) do so as well?

- **The hazard must be eliminated from the surrounding community as well as the workplace**. If a substance is harmful, why remove it from the work site and release it into the community?

Types of control

There are three basic ways in which hazardous material can be controlled:

- **At the source:** The hazardous material can be eliminated or substituted with a less hazardous substance or material. For example, brake linings that do not contain asbestos can replace those that do.
- **In the pathway:** Barriers can be used to keep hazards away. For example, ventilation can be used to remove fumes or to dilute the concentration of the hazardous substance by mixing it with fresh air. Chemicals that react when mixed can be stored far away from each other.
- **At the worker level:** Personal protective equipment can be used and workers can be removed or rotated from hazard areas to keep exposure to dangerous chemicals below allowable limits.

As a worker involved in health and safety, you should always be aware of the effects of hazardous materials on you, your coworkers and the community. Your practices at work should prevent harm from coming to anyone. This involves knowing what is harmful. WHMIS is one important tool used to recognize hazards present in the workplace and to learn how to deal with them safely.

Questions

1. What are the three ways chemicals can enter your body?

2. What are the two effects that hazardous materials may have on your body? Explain what each type is.

3. What is sensitization?

4. What is a control measure?

5. What are the three methods by which a hazardous material can be controlled?

Handout 7: Control of hazardous materials

(teacher's copy)

1. What are the three ways chemicals can enter your body?

Inhalation, ingestion, and absorption

2. What are the two effects that hazardous materials may have on your body? Explain what each type is.

Acute effects occur immediately or shortly after exposure.
Immediate death can sometimes result.

Chronic effects show up years later.
By that time, the worker may have had many exposures.

3. What is sensitization?

Sensitization is when the body reacts strongly to defend against exposure.
A low level of exposure will cause a strong reaction.

4. What is a control measure?

Something that prevents workers from becoming ill or being injured.

5. What are the three methods by which a hazardous material can be controlled?

First, at the source: eliminate the hazardous material or substitute a less hazardous material.

Second, in the pathway: barriers can be used to keep a hazard away.

Third, at the worker level: workers can use personal protective equipment to keep exposure to hazardous materials below the allowable exposure limit.

Worker rights

As stated in a previous lesson, the law in Saskatchewan guarantees workers three basic rights when it comes to health and safety.

Right to know

The first right is the right to know about possible hazards in the workplace. It is the responsibility of workers to be aware of the necessary steps to protect themselves. Being knowledgeable in WHMIS is part of the **right to know**.

Right to participate

The second right is the **right to participate**. The worker has the right to participate in:

- Making recommendations to the occupational health committee or to the health and safety representative where one exists
- Reporting to the supervisor on health and safety issues where no occupational health committee or representative exists

Right to refuse

The third right of any worker is the right to refuse work that she or he believes to be unusually dangerous. With proper training in WHMIS, workers can recognize situations that involve hazardous materials that may be dangerous. The refusal to work must have reasonable grounds and involve an unsafe work condition. Employers cannot discipline or deny wages to a worker who refuses unsafe work.

The following shows the steps workers can take if they feel they are asked to do work that is unsafe.

Steps in a refusal for a worker

1. Inform your supervisor.
2. Involve the committee chairs (if the concern cannot be resolved with your supervisor).
3. Stay at the workplace. Your employer may assign you other work.
4. You can continue the refusal until an occupational health officer makes a ruling.

Labour Relations and Workplace Safety
300 - 1870 Albert Street
Regina SK S4P 4W1
Toll free: 1.800.567.SAFE(7233)

Online: saskatchewan.ca

WorkSafe Saskatchewan
Head Office
200 - 1881 Scarth Street
Regina SK S4P 4L1

Saskatoon Office
115 24th Street East
Saskatoon SK S7K 1L5

Phone: 306.787.4370
Toll free: 1.800.667.7590
Fax: 306.787.4311
Toll-free fax: 1.888.844.7773

Online: worksafesask.ca

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