



WHMIS 2015

Learning Manual

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Table of Contents - WHMIS 2015

Module 1 - Overview of WHMIS 2015	2
What is WHMIS?.....	2
What are the main elements in WHMIS?	2
What is GHS?	3
What are the main elements in GHS?.....	3
What are some key terms in the GHS Vocabulary?	3
Module 2 - WHMIS 2015 - Hazard Groups and Classes.....	4
Physical Hazard Class	4
Health Hazard Class	6
WHMIS 2015 – Pictograms	7
Module 3 - WHMIS 2015 – Labels	10
Are there different types of labels?	10
What information is required on a supplier label?	10
What is a signal word?.....	11
What is a hazard statement?.....	11
What is a precautionary statement?	11
What will a supplier label look like?	12
When will a supplier label have to be updated?.....	13
What information will be required on a workplace label?	13
Module 4 – Safety Data Sheets SDS	14
What is a SDS?	14
What information is on the SDS?.....	14
When is the SDS updated?.....	17
As an employer, do I have responsibilities for SDSs?	17
As a worker, when would I use a SDS?.....	17
Sample Safety Data Sheet.....	18
Module 5 – Education & Training.....	27
Is there a difference between education and training?.....	27
Who should receive this education and training?.....	27
What topics should be covered?.....	27
What are the employer duties?	28
What are the worker duties?	28
Briefly, what does successful education and training look like?	28
Who should provide the education and training?	28

Module 1 - Overview of WHMIS 2015

What is WHMIS?

What are the main elements in WHMIS?

What is GHS?

What are the main elements in GHS?

Key Terms in GHS Vocabulary

What is WHMIS?

The Workplace Hazardous Materials Information System, or WHMIS as it is called, is a national system designed to ensure that all employers obtain the information that they need to inform and train their employees properly about hazardous materials used in the workplace. WHMIS was developed jointly by labour, industry and federal, provincial and territorial governments. WHMIS came into force all across Canada on October 31, 1988 by a combination of federal and provincial legislation.

On February 11, 2015, the Government of Canada published the Hazardous Products Regulations (HPR), which, in addition to the amendments made to the Hazardous Products Act, modified WHMIS to incorporate the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) for workplace chemicals. This modified WHMIS is referred to as WHMIS 2015.

In December 2022, the WHMIS legislation (Hazardous Products Regulations) was amended to align with certain provisions of the 8th revised edition of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

What are the main elements in WHMIS?

While WHMIS 2015 includes new harmonized criteria for hazard classification and requirements for labels and safety data sheets (SDS), the roles and responsibilities for suppliers, employers and workers have not changed.

Suppliers, defined as persons who, in the course of business, sell or import a hazardous product, will continue to:

- ❖ identify whether their products are hazardous products; and,
- ❖ prepare labels and SDSs and provide these to purchasers of hazardous products intended for use in a workplace.

Employers will continue to:

- ❖ educate and train workers on the hazards and safe use of hazardous products in the workplace;
- ❖ ensure that hazardous products are properly labelled;
- ❖ prepare workplace labels and SDSs (as necessary); and,
- ❖ ensure appropriate control measures are in place to protect the health and safety of workers.

Workers will continue to:

- ❖ participate in WHMIS and chemical safety training programs;
- ❖ take necessary steps to protect themselves and their co-workers; and,
- ❖ participate in identifying and controlling hazards.

What is GHS?

The Globally Harmonized System of Classification and Labelling of Chemicals (GHS) is an internationally consistent approach to classifying chemicals and communicating hazard information through labels and safety data sheets.

The key objectives of the GHS are:

- ❖ To increase worker protections through the adoption of an improved, globally recognized standard for communicating the hazards associated with workplace hazardous chemicals.
- ❖ To facilitate trade through common labelling and other hazard communication requirements; and
- ❖ To lower costs for businesses and consumers by reducing the need for retesting and reclassifying workplace hazardous chemicals from, or for, different markets.

What are the main elements in GHS?

The two major elements of GHS are:

1. Classification of the hazards of chemicals
2. Communication of the hazards and precautionary information

What are some key terms in the WHMIS / GHS Vocabulary?

- ❖ **SDS** - Safety Data Sheet is the term used by GHS for Material Safety Data Sheet (MSDS)
- ❖ **Hazard group** - GHS divides hazards into three major groups - health, physical and environmental.
- ❖ **Class** - the term used to describe the different types of hazards
- ❖ **Category** - the name used to describe the sub-sections of classes. Categories are assigned numbers (or letters) with category 1 (or A) being the most hazardous.
- ❖ **Hazard Statement** - For each category, a standardized statement is used to describe the hazard. This hazard statement would appear both on the label and on the SDS.
- ❖ **Precautionary Statement** - Standardized phrases that describe the recommended steps to be taken to minimize or prevent adverse effects from exposure to or resulting from improper handling or storage of a hazardous product.
- ❖ **Signal word** - There are two signal words in the GHS system - Danger and Warning. These signal words are used to communicate the level of hazard on both the label and the SDS.
- ❖ **Pictogram** - Pictogram refers to the GHS symbol on the label and SDS. Not all categories have a symbol associated with them.

Module 2 - WHMIS 2015 - Hazard Groups and Classes

What are the main concerns for each Physical hazard class?

What are the main concerns for each Health hazard class?

WHMIS 2015 - Pictograms

WHMIS 2015 applies to two major groups of hazards: physical, and health. Each hazard group includes hazard classes that have specific hazardous properties.

«Physical hazards group» is based on the physical or chemical properties of the product - such as flammability, reactivity, or corrosivity to metals.

«Health hazards group» is based on the ability of the product to cause a health effect - such as: eye irritation, respiratory sensitization, or carcinogenicity.

GHS also defines an «Environmental hazards group». This group (and its classes) was not adopted in WHMIS 2015. However, you may see the environmental classes listed on labels and Safety Data Sheets. Including information about environmental hazards is allowed by WHMIS 2015.

Hazard classes are a way of grouping together products that have similar properties. Most of the hazard classes are common to GHS and will be used worldwide by all countries that have adopted GHS. Some hazard classes are specific to WHMIS 2015.

Physical Hazard Class

General Description

Flammable gases Flammable liquids Flammable solids Aerosols	These four classes cover products that have the ability to ignite (catch fire) easily and the main hazards are fire or explosion. Note: the Aerosol class also includes a category for non-flammable aerosols
Oxidizing gases Oxidizing liquids Oxidizing solids	These three classes cover oxidizers, which may cause or intensify a fire or cause a fire or explosion.
Gases under pressure	This class includes compressed gases, liquefied gases, dissolved gases and refrigerated liquefied gases.
Self-reactive substances and mixtures	These products may react on their own to cause a fire or explosion, or may cause a fire or explosion if heated.
Pyrophoric liquids Pyrophoric solids	These products can catch fire very quickly (spontaneously) if exposed to air.
Self-heating substances and mixtures	These products may catch fire if exposed to air.

Substances and mixtures which, in contact with water, emit flammable gases	As the class name suggests, these products react with water to release flammable gases.
Organic peroxides	These products may cause a fire or explosion if heated.
Corrosive to metals	These products may be corrosive (chemically damage or destroy) to metals
Combustible dust	This class is used to warn of products that are finely divided solid particles. If dispersed in air, the particles may catch fire or explode if ignited.
Simple asphyxiants	These products may displace oxygen in air and cause rapid suffocation.
Physical hazards not otherwise classified	This class is meant to cover any hazards that are not covered in any other physical hazard class. These hazards must have the characteristic of occurring by chemical reaction and result in the serious injury or death of a person at the time the reaction occurs. If a product is classified in this class, the hazard statement on the label and SDS will describe the nature of the hazard.
Chemicals under pressure	This class includes liquids and solids that are packaged in a receptacle – other than an aerosol dispenser – and that are pressurized with a gas at a gauge pressure of 200 kPa or more at 20°C but excludes any gas under pressure

Health Hazard Class General Description

Acute toxicity	These products are fatal, toxic or harmful if inhaled, following skin contact, or if swallowed.
Skin corrosion/irritation	This class covers products that cause severe skin burns (i.e., corrosion) and products that cause skin irritation.
Serious eye damage/eye irritation	This class covers products that cause serious eye damage (i.e., corrosion) and products that eye irritation.
Respiratory or skin sensitization	A respiratory sensitizer is a product that may cause allergy or asthma symptoms or breathing difficulties if inhaled. Skin sensitizer is a product that may cause an allergic skin reaction.
Germ cell mutagenicity	This hazard class includes products that may cause or are suspected of causing genetic defects (permanent changes (mutations) to body cells that can be passed on to future generations).
Carcinogenicity	This hazard class includes products that cause or are suspected of causing cancer.
Reproductive toxicity	This hazard class includes products that may damage or are suspected of damaging fertility or the unborn child.
Specific target organ toxicity – single exposure	This hazard class covers products that cause or may cause damage to organs (e.g., liver, kidneys, or blood) following a single exposure.
Specific target organ toxicity – repeated exposure	This hazard class covers products that cause or may cause damage to organs (e.g., liver, kidneys, or blood) following prolonged or repeated exposure.
Aspiration hazard	This hazard class is for products that may be fatal if they are swallowed and enter the airways.
Biohazardous infectious materials	These materials are microorganisms, nucleic acids or proteins that cause or is a probably cause of infection, with or without toxicity, in humans or animals.
Health hazards not otherwise classified	This class covers products that are not included in any other health hazard class and have the characteristic of occurring following acute or repeated exposure and resulting in the death of a person exposed to the product, or have an adverse effect on that person's health - including injury. If a product is classified in this class, the hazard statement will describe the nature of the hazard.



WHMIS 2015 – Pictograms





Pictograms are graphic images that immediately show the user what type of hazard is present. With a quick glance, you can see, for example, that the product is flammable, or... if it might be a health hazard.

Most pictograms have a distinctive red square "set on, one of its points" border. Inside this border is a symbol that represents the potential hazard (e.g., fire, health hazard, corrosive, etc.). Together, the symbol and the border are referred to as a pictogram. Pictograms are assigned to specific hazard classes or categories.

In the case of the pictogram for "Biohazardous Infectious Materials", it must have a black symbol on a white background with a black border in the shape of a circle.

WHMIS 2015 Pictograms

Pictogram	General Description
	Gases under pressure (Compressed gas, Liquefied gas, Refrigerated liquefied gas, and Dissolved gas), Chemicals under pressure
	Flammables (gases, aerosols, liquids, solids), Pyrophoric (liquids, solids, gases), Self-reactive substances and mixtures, Self-heating substances and mixtures, Substances and mixtures which, in contact with water, emit flammable gases, Organic peroxides, Chemicals under pressure

	<p>Oxidizing (liquids, solids, gases)</p>
	<p>Organic peroxides, Self-reactive substances and mixtures</p>
	<p>Acute toxicity (fatal and toxic via oral, skin, inhalation)</p>
	<p>Carcinogenicity; Germ cell mutagenicity; Respiratory sensitization; Reproductive toxicity; Specific target organ toxicity - single exposure, Specific target organ toxicity - repeated exposure; Aspiration hazard</p>



Acute toxicity (harmful via oral, skin, inhalation); Skin irritation; Eye irritation; Skin sensitization; Specific target organ toxicity - single exposure



Corrosive to metals; Skin corrosion; Serious eye damage



Biohazardous infectious materials

Module 3 - WHMIS 2015 – Labels

Are there different types of labels?

What information is required on a supplier label?

What is a signal word, a hazard statement and a precautionary statement?

Supplier labels

What information will be required on a workplace label?

Are there different types of labels?

There are two main types of WHMIS labels: supplier labels, and workplace labels.

A supplier label is provided or affixed (attached) by the supplier and will appear on all hazardous products received at a workplace in Canada. If the hazardous product is always used in the container with the supplier label, no other label is required.

A workplace label is required when:

- ❖ a hazardous product is produced (made) at the workplace and used in that workplace,
- ❖ a hazardous product is decanted (e.g., transferred or poured) into another container, or
- ❖ a supplier label becomes lost or illegible (unreadable).

There are two situations when a workplace label is not necessary. When a hazardous product is:

- ❖ poured into a container and it is going to be used immediately, or
- ❖ "under the control of the person who decanted it". For example, when the person who poured the product into another container will be the only person who will use it, and the product will be used during one shift, a full workplace label may not be required. However, the container must still be identified with the product identifier (name).

What information is required on a supplier label?

Supplier labels must be written in English and French. They may be bilingual (as one label), or available as two labels (one each in English and French).

The supplier label must include the following information:

- ❖ Product identifier - the brand name, chemical name, common name, generic name or trade name of the hazardous product.
- ❖ Initial supplier identifier – the name, address and telephone number of either the Canadian manufacturer or the Canadian importer.
- ❖ Pictogram(s) – hazard symbol within a red "square set on one of its points".
- ❖ Signal word – a word used to alert the reader to a potential hazard and to indicate the severity of the hazard.
- ❖ Hazard statement(s) - standardized phrases which describe the nature of the hazard posed by a hazardous product.

- ❖ Precautionary statement(s) – standardized phrases that describe measures to be taken to minimize or prevent adverse effects resulting from exposure to a hazardous product or resulting from improper handling or storage of a hazardous product.

What is a signal word?

A signal word is a prompt that alerts you about the degree or level of hazard of the product. There are only two signal words used: "Danger" or "Warning". "Danger" is used for high risk hazards, while "Warning" is used for less severe hazards.

Some hazard classes or categories do not have a signal word assigned to them.

What is a hazard statement?

Each hazard class and category has an assigned "hazard statement". Hazard statements are brief, standardized sentences that tell you more about the exact hazard of the product. The statements are short but they describe the most significant hazards of the product.

Examples of hazard statements are:

- ❖ Extremely flammable gas.
- ❖ Contains gas under pressure; may explode if heated.
- ❖ Fatal if inhaled.
- ❖ Causes eye irritation.
- ❖ May cause cancer.

What is a precautionary statement?

Precautionary statements provide advice on how to minimize or prevent adverse effects resulting from exposure to a hazardous product or resulting from improper storage or handling of a hazardous product. These statements can include instructions about storage, handling, first aid, personal protective equipment and emergency measures.

There are five types of precautionary statements:

- ❖ General.
- ❖ Prevention.
- ❖ Response (including first aid).
- ❖ Storage.
- ❖ Disposal.

Examples of precautionary statements are:

Keep container tightly closed.

- ❖ Wear protective gloves/protective clothing/eye protection/face protection.
- ❖ If exposed or concerned: Get medical advice/attention.
- ❖ Fight fire remotely due to the risk of explosion.
- ❖ Protect from sunlight.
- ❖ Precautionary statements will be consistent with the degree of the hazard associated with the product.


What will a supplier label look like?

There is no set format for a supplier label. As mentioned, labels must be in English and French. They may be bilingual (as one label), or be presented as two labels (one each in English and one in French).

Labels will require the following:

- ❖ the pictogram, signal word, and hazard statement are to be grouped together,
- ❖ to be clearly and prominently displayed on the container,
- ❖ to be easy to read (e.g., you can see it easily without using any item except corrective glasses), and
- ❖ to be in contrast with other information on the product or container.

1 Product ABC / Produit ABC



<p>3 Danger 4 Fatal if swallowed. 4 Causes skin irritation.</p> <p>Precautions: Wear protective gloves. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product.</p> <p>Store locked up. Dispose of contents/containers in accordance with local regulations.</p> <p>IF ON SKIN: Wash with plenty of water. If skin irritation occurs: Get medical advice or attention. Take off contaminated clothing and wash it before reuse. IF SWALLOWED: Immediately call a POISON CENTRE or doctor. Rinse mouth.</p>	<p>3 Danger 4 Mortel en cas d'ingestion. 4 Provoque une irritation cutanée.</p> <p>Conseils : Porter des gants de protection. Se laver les mains soigneusement après manipulation. Ne pas manger, boire ou fumer en manipulant ce produit.</p> <p>5 Garder sous clef. Éliminer le contenu/récipient conformément aux règlements locaux en vigueur.</p> <p>EN CAS DE CONTACT AVEC LA PEAU : laver abondamment à l'eau. En cas d'irritation cutanée : Demander un avis médical/consulter un médecin. Enlever les vêtements contaminés et les laver avant réutilisation. EN CAS D'INGESTION : Appeler immédiatement un CENTRE ANTIPOISON ou un médecin. Rincer la bouche.</p>
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1. Product Identifier
Identificateur de produit
2. Hazard Pictogram
Pictogrammes de danger
3. Signal Words (NEW)
Mentions d'avertissement (NOUVEAU)
4. Hazard Statements
Mentions de danger
5. Precautionary Statements
Conseils de prudence
6. Supplier Identifier
Identificateur de fournisseur

When will a supplier label have to be updated?

A label will be required to be updated when the supplier becomes aware of any "significant new data". Labels will be required to be updated within 180 days of the supplier being aware of the new information.

What information will be required on a workplace label?

- ❖ Product name (matching the SDS product name).
- ❖ Safe handling precautions may include pictograms or other supplier label information.
- ❖ A reference to the SDS (if available).

Module 4 – Safety Data Sheets SDS

What is a SDS?

What information is on the SDS?

When is the SDS updated?

As an employer, do I have responsibilities for SDSs?

As a worker, when would I use a SDS?

What is a SDS?

Safety Data Sheets (SDSs) are summary documents that provide information about the hazards of a product and advice about safety precautions. SDSs provide more detailed hazard information about the product than the label.

What information is on the SDS?

The *Hazardous Products Regulations* specifies the sections and content for the SDS, as follows:

SDS Section and Heading

Specific Information Elements

SDS Section and Heading	Specific Information Elements
1 Identification	<ul style="list-style-type: none">❖ Product identifier (e.g. Product name)❖ Canadian supplier identifier<ul style="list-style-type: none">○ Name, full address and phone number(s)
2 Hazard identification	<ul style="list-style-type: none">❖ 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:<ul style="list-style-type: none">○ Symbol (image) or the name of the symbol (e.g., flame, skull and crossbones)○ Signal word○ Hazard statement(s)○ Precautionary statement(s)
3 Composition/Information on ingredients	<ul style="list-style-type: none">❖ When a hazardous product is a material or substance:<ul style="list-style-type: none">○ 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

4	First-aid measures	<ul style="list-style-type: none"> ❖ First-aid measures by route of exposure: <ul style="list-style-type: none"> ○ Inhalation ○ Skin contact ○ Eye contact ○ Ingestion ❖ Most important symptoms and effects (acute or delayed) ❖ Immediate medical attention and special treatment, if necessary
5	Fire-fighting measures	<ul style="list-style-type: none"> ❖ Suitable extinguishing media ❖ Unsuitable extinguishing media ❖ Specific hazards arising from the hazardous product (e.g., hazardous combustion products) ❖ Special protective equipment and precautions for fire-fighters
6	Accidental release measures	<ul style="list-style-type: none"> ❖ Personal precautions, protective equipment and emergency procedures ❖ Methods and materials for containment and cleaning up
7	Handling and storage	<ul style="list-style-type: none"> ❖ Precautions for safe handling ❖ Conditions for safe storage (including incompatible materials)
8	Exposure controls/ Personal protection	<ul style="list-style-type: none"> ❖ Control parameters, including occupational exposure guidelines or biological exposure limits and the source of those values ❖ Appropriate engineering controls ❖ Individual protection measures (e.g. personal protective equipment)
9	Physical and chemical properties	<ul style="list-style-type: none"> ❖ Appearance (physical state, colour, etc.) ❖ Odour ❖ Odour threshold ❖ pH ❖ Melting point/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	<ul style="list-style-type: none"> ❖ Reactivity ❖ Chemical stability ❖ Possibility of hazardous reactions ❖ Conditions to avoid (e.g., static discharge, shock, or vibration) ❖ Incompatible materials ❖ Hazardous decomposition products
11	Toxicological information	<p>Concise but complete description of the various toxic health effects and the data used to identify those effects, including:</p> <ul style="list-style-type: none"> ❖ Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact) ❖ Symptoms related to the physical, chemical and toxicological characteristics ❖ Delayed and immediate effects, and chronic effects from short-term and long-term exposure ❖ Numerical measures of toxicity
12	Ecological information*	<ul style="list-style-type: none"> ❖ 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*	<ul style="list-style-type: none"> ❖ 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

*Sections 12 to 15 require the headings to be present, but under Canadian regulations, the supplier has the option to not provide information in these sections.

When is the SDS updated?

A SDS will be required to be updated when the supplier becomes aware of any "significant new data". SDSs will be required to be updated within 90 days of the supplier being aware of the new information.

Note that there is no requirement for the supplier to provide an updated SDS to past purchasers of a hazardous product. However, it continues to be good practice to provide this information to purchasers who may still be using the product.

As an employer, do I have responsibilities for SDSs?

Employers will be required to make sure that all hazardous products have an up-to-date SDS when it enters the workplace. The SDSs must be readily available to the workers who are exposed to the hazardous product, and to the health and safety committee or representative.

Employers may computerize the SDS information as long as:

- ❖ all employees have access to and are trained on how to use the computer or device,
- ❖ the computers/devices are kept in working order, and
- ❖ the employer makes a hard copy of the SDS available to the employee or health and safety committee/representative upon request.

As a worker, when would I use a SDS?

Always be familiar with the hazards of a product before you start using it. You should look at the SDS, match the name of the product on the container to the one on the SDS, know the hazards, understand safe handling and storage instructions, as well as understand what to do in an emergency.

You can think of the SDS as having four main purposes. It provides information on:

- a. **Identification:** for the product and supplier.
- b. **Hazards:** physical and health.
- c. **Prevention:** steps you can take to work safely, reduce or prevent exposure, or what to do in the event of an emergency.
- d. **Response:** appropriate responses in various situations (e.g., first-aid, fire, accidental release).

Sample Safety Data Sheet

Product Name: VARSOL SOLVENT

Page 1 of 9

SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: VARSOL SOLVENT
Product Description: Petroleum Hydrocarbons
MSDS Number: 012345
Intended Use: Solvent

COMPANY IDENTIFICATION

Supplier: Imperial Oil Chemicals Division
240 4th Avenue S.W.
Calgary, ALBERTA. T2P 3M9 Canada
24 Hour Environmental / Health Emergency Telephone: 516-325-4225
Transportation Emergency Phone Number: 516-325-4226
Product Technical Information: 1-888-613-4159

SECTION 2 COMPOSITION INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*	Acute Toxicit
Stoddard solvent	8052-41-3	100%	Dermal Lethality: LD50 > 2.0 g/kg (Rabbit); Oral Lethality: LD50 > 5.0 g/kg (Rat)

Hazardous Constituent(s) Contained in Complex Substance(s)

Name	CAS#	Concentration*	Acute Toxicit
ETHYL BENZENE	100-4-14	< 0.2%	Dermal Lethality: LD50 15 g/kg (Rabbit); Inhalation Lethality: LC50 4000 ppm (Rat); Oral Lethality: LD50 3.5 g/kg (Rat)
Naphthalene	19-20-3	< 0.2%	Dermal Lethality: LD50 > 20 g/kg (Rabbit); Oral Lethality: LD50 0.49 g/kg (Rat)
Nonane	111-8-42	1 - 5%	None
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	< 4.0%	Inhalation Lethality: LC50 3662 ppm (Rat); Oral Lethality: LD50 5.0 g/kg (Rat)
XYLENES	3130-20-7	< 0.9%	Dermal Lethality: LD50 4.5 g/kg (Rabbit); Inhalation Lethality: LC50 5000 ppm (Rat); Oral Lethality: LD50 4.3 g/kg (Rat)

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 3 HAZARDS IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines (see SDS Section 15).

PHYSICAL/CHEMICAL EFFECTS

SAMPLE SAFETY DATA SHEET

Product Name: VARSOL SOLVENT

Page 2 of 9

Combustible. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited. Material can accumulate static charges which may cause an incendiary electrical discharge.

HEALTH EFFECTS

Irritating to skin. May cause cancer. Danger of serious damage to health by prolonged exposure. May cause harm to the unborn child. If swallowed, may be aspirated and cause lung damage. May be irritating to the eyes, nose, throat, and lungs.

Target Organs: Reproductive system | Skin |

NFPA Hazard ID:	Health: 1	Flammability: 2	Reactivity: 0
HMIS Hazard ID:	Health: 1*	Flammability: 2	Reactivity: 0

Note: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent run-off from fire control or dilution from entering

SAMPLE SAFETY DATA SHEET

Product Name: VARSOL SOLVENT

Page 3 of 9

streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Vapour is flammable and heavier than air. Vapour may travel across the ground and reach remote ignition sources, causing a flashback fire danger. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Oxides of carbon, Incomplete combustion products, Smoke, Fume

FLAMMABILITY PROPERTIES

Flash Point [Method]: 43C (109F) [ASTM D-56]

Flammable Limits (Approximate volume % in air): LEL: 0.8 UEL: 5.6

Autoignition Temperature: 260°C (500°F)

SECTION 6

ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do so without risk. Eliminate sources of ignition. Warn other shipping. If the Flash Point exceeds the Ambient Temperature by 10 deg C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SAMPLE SAFETY DATA SHEET

Product Name: VARSOL SOLVENT

Page 4 of 9

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid contact with skin. Potentially toxic/irritating fumes/vapour may be evolved from heated or agitated material. Use only with adequate ventilation. Use proper bonding and/or earthing procedures. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source).

Loading/Unloading Temperature: [Ambient]

Transport Temperature: [Ambient]

Transport Pressure: [Ambient]

Static Accumulator: This material is a static accumulator.

STORAGE

Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Storage containers should be earthed and bonded. Drums must be earthed and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

Storage Temperature: [Ambient]

Storage Pressure: [Ambient]

Suitable Containers/Packing: Drums; Barges; Tank Cars; Tank Trucks

Suitable Materials and Coatings: Carbon steel; Polyethylene; Polypropylene; Teflon; Stainless steel; Polyester

Unsuitable Materials and Coatings: Polystyrene; Natural rubber; Butyl rubber; Ethylene-propylene-diene monomer (EPDM)

SECTION 8 EXPOSURE CONTROLS PERSONAL PROTECTION

Substance Name	Form	Limit/Standard	Note	Source
ETHYL BENZENE		STEL 125 ppm		ACGIH
ETHYL BENZENE		TWA 100 ppm		ACGIH
Naphthalene		STEL 15 ppm	Skin	ACGIH
Naphthalene		TWA 10 ppm	Skin	ACGIH
Nonane		TWA 200 ppm		ACGIH
PRODUCT	Vapour.	TWA 73 ppm	400 mg/m ³	Total Hydrocarbons Supplier
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)		TWA 25 ppm		ACGIH
Stoddard solvent		TWA 100 ppm		ACGIH
XYLENES		STEL 150 ppm		ACGIH
XYLENES		TWA 100 ppm		ACGIH

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions.

SAMPLE SAFETY DATA SHEET

Product Name: VARSOL SOLVENT

Page 5 of 9

Control measures to consider:

Adequate ventilation should be provided so that exposure limits are not exceeded. Use explosion-proof ventilation equipment.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

Half-face filter respirator

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

Chemical/oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practise good housekeeping.

ENVIRONMENTAL CONTROLS

See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION

Physical State: Liquid
Form: clear
Colour: Colourless
Odour: Petroleum/solvent
Odour Threshold: N/D

SAMPLE SAFETY DATA SHEET

Product Name: VARSOL SOLVENT

Page 6 of 9

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15.6 C): 0.788
Flash Point [Method]: 43C (109F) [ASTM D-56]
Flammable Limits (Approximate volume % in air): LEL: 0.8 UEL: 5.6
Autoignition Temperature: 260°C (500°F)
Boiling Point / Range: 159C (318F) - 195C (383F)
Vapour Density (Air = 1): 4.9 at 101 kPa
Vapour Pressure: 0.285 kPa (2.14 mm Hg) at 20°C | 0.9 kPa (6.75 mm Hg) at 38C
Evaporation Rate (N-Butyl Acetate = 1): 0.14
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Solubility in Water: Negligible
Viscosity: [N/D at 40°C] | 1.21 cSt (1.21 mm²/sec) at 25C
Oxidizing properties: See Sections 3, 15, 16.

OTHER INFORMATION

Freezing Point: -76°C (-105°F)
Melting Point: N/D
Pour Point: < -51°C (-60°F)
Molecular Weight: 140
Coefficient of Thermal Expansion: 0.00074 V/V/DEG C

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Avoid heat, sparks, open flames and other ignition sources.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

Acute Toxicity

Route of Exposure	Conclusion	Remarks
INHALATION		
Toxicity: Data available.	Minimally Toxic.	Based on test data for structurally similar materials.
Irritation: Data available.	Negligible hazard at ambient/normal handling temperatures.	Based on test data for structurally similar materials.
INGESTION		
Toxicity: LD50 > 5000 mg/kg	Minimally Toxic.	Based on test data for structurally similar materials.
Skin		
Toxicity: LD50 > 3160 mg/kg	Minimally Toxic.	Based on test data for structurally similar materials.
Irritation: Data available.	Irritating to the skin.	Based on test data for structurally similar materials.

SAMPLE SAFETY DATA SHEET

Product Name: VARSOL SOLVENT

Page 7 of 9

Eye	
Irritation: Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data fo structurall simila materials.

CHRONIC/OTHER EFFECTS

For the product itself:

Vapour/aerosol concentrations above recommended exposure levels are irritating to the eyes and respiratory tract, may cause headaches, dizziness, anaesthesia, drowsiness, unconsciousness and other central nervous system effects including death. Prolonged and/or repeated skin contact with low viscosity materials may defat the skin resulting in possible irritation and dermatitis. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

Contains:

NAPHTHALENE: Exposure to high concentrations of naphthalene may cause destruction of red blood cells, anemia, and cataracts. Naphthalene caused cancer in laboratory animal studies, but the relevance of these findings to humans is uncertain. **ETHYLBENZENE:** Caused cancer in laboratory animal studies. The relevance of these findings to humans is uncertain.

XYLENES: High exposures to xylenes in some animal studies have been reported to cause health effects on the developing embryo/fetus. These effects were often at levels toxic to the mother. The significance of these findings to humans has not been determined.

Additional information is available by request.

CMR Status:

Chemical Name	CAS Numbe	List Citations
ETHYL BENZENE	100-41-4	3, 4
Naphthalene	9 1-20-3	3, 4
Nonane	1 11-84-2	4
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	4
Stoddard solvent	8052-41-3	4
XYLENES	1 330-20-7	4

--REGULATORY LISTS SEARCHED--

1 = IARC 1
2 = IARC 2A

3 = IARC 2B
4 = ACGIH ALL

5 = ACGIH A1
6 = ACGIH A2

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

Material -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

SAMPLE SAFETY DATA SHEET

Product Name: VARSOL SOLVENT

Page 8 of 9

Biodegradation:

Material -- Expected to be inherently biodegradable

Hydrolysis:

Material -- Transformation due to hydrolysis not expected to be significant.

Photolysis:

Material -- Transformation due to photolysis not expected to be significant.

Atmospheric Oxidation:

Material -- Expected to degrade rapidly in air

OTHER ECOLOGICAL INFORMATION

VOC (EPA Method 24): 6.593 lbs/gal

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (TDG)

Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S

Hazard Class & Division: 3

UN Number: 1268

Packing Group: III

LAND (DOT)

Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S

Hazard Class & Division: COMBUSTIBLE LIQUID

ID Number: 1268

Packing Group: III

ERG Number:

128

Label(s): NONE

Transport Document Name: UN1268, PETROLEUM DISTILLATES, N.O.S., COMBUSTIBLE LIQUID, PG III

Footnote: The flash point of this material is greater than 38°C/100°F. Regulatory classification of this material varies. DOT: Flammable liquid or combustible liquid. OSHA: Combustible liquid. IATA/IMO: Flammable liquid. This material is not regulated under 49 CFR in a container of 450 litre/119 gallon capacity or less when

SAMPLE SAFETY DATA SHEET

Product Name: VARSOL SOLVENT

Page 9 of 9

transported solely by land, as long as the material is not a hazardous waste, a marine pollutant, or specifically listed as a hazardous substance.

SEA (IMDG)

Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S

Hazard Class & Division: 3

EMS Number: F-E, S-E

UN Number: 1268

Packing Group: III

Label(s): 3

Transport Document Name: UN1268, PETROLEUM DISTILLATES, N.O.S., 3, PG III, (43°C c.c.)

AIR (IATA)

Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S

Hazard Class & Division:

3 **UN Number:**

1268 **Packing**

Group: III **Label(s):**

3

Transport Document Name: UN1268, PETROLEUM DISTILLATES, N.O.S., 3, PG III

SECTION 15 REGULATORY INFORMATION

NATIONAL CHEMICAL INVENTORY LISTING: KECI, AICS, TSCA, EINECS, PICCS, IECSC, ENCS, DSL

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Numbe	List Citations
Nonane	1 11-84-2	1, 5
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	6

--REGULATORY LISTS SEARCHED--

1 = TSC 4 3 = TSC 5e 5 = TSC 12b
2 = TSC 5a2 4 = TSC 6 6 = NPRI

SECTION 16 OTHER INFORMATION

Revision Date: June 1, 2015

Module 5 – Education & Training

Difference between education and training

Education and training topics

Employer and worker duties

What does successful education and training look like?

Who should provide the education and training?

Is there a difference between education and training?

Education and training can be thought of as two separate parts.

Education refers to general or portable information such as how WHMIS works and the hazards of the products.

Training refers to the site- and job-specific information to employees that will cover your workplace's procedures for storage, handling, use, disposal, emergencies, spills, and what to do in unusual situations.

Who should receive this education and training?

In Canada, if a workplace uses hazardous products, there must be a WHMIS program in place. Workers must be educated and trained so they understand the hazards, and know how to work safely with hazardous products.

All workers who work with a hazardous product, or who may be exposed to a hazardous product as part of their work activities must learn about the hazard information for these products.

As an example, this education and training will include all workers who:

- ❖ May be exposed to a hazardous product due to their work activities (including normal use, maintenance activities, or emergencies).
- ❖ Use, store, handle or dispose of a hazardous product.
- ❖ Supervise or manage workers who may be exposed, or use, store, handle or dispose of a hazardous product.
- ❖ Are involved in emergency response.

What topics should be covered?

Examples of topics that should be covered during education and training include:

- ❖ The information on both the supplier label and workplace label, and what that information means.
- ❖ The information on the Safety Data Sheet (SDS) and what that information means.
- ❖ The procedures required for safe use, handling and disposal of a hazardous product.
- ❖ All procedures that must be followed in an emergency that involves the hazardous product.

What are the employer duties?

All Canadian jurisdictions currently require that employers develop, implement, and maintain a worker WHMIS education and training program. This education and training is required for hazardous products workers work with, or for products that workers may be exposed to at work

Employers are also expected to consult with the health and safety committee (or representative) when developing, implementing or reviewing the education and training programs.

In addition, the employer must review their overall WHMIS education and training program, at least annually or more often if there is a change in work conditions, hazard information or similar. This review should be done in consultation with the health and safety committee or representative.

Refresher education and training is generally required:

- ❖ As needed to protect the worker's health and safety.
- ❖ If conditions of the workplace have changed.
- ❖ If new products are introduced.
- ❖ If the products have changed and now have different hazards.
- ❖ When new hazard information becomes available.
- ❖ If there is new information about safe use, handling, storage or disposal.

What are the worker duties?

Workers must participate in the education and training sessions, and follow the safe work procedures established by their employer.

Briefly, what does successful education and training look like?

Workers should be able to answer these questions for every hazardous product they work with:

- What are the hazards of the product?
- How do I protect myself from those hazards?
- What do I do in case of an emergency?
- Where can I get further information?

Who should provide the education and training?

The legislation places the obligation for education and training with the employer, and it outlines the minimum requirements for education and training. This education and training may be provided by the employer, or by a qualified person or agency that the employer has chosen. Regardless of who delivers the education and training, employers remain legally responsible to ensure the protection of workers.