

The MSDS: A Basic Guide for Users – International Version –



Canadian Centre for Occupational Health and Safety

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A Material Safety Data Sheet (MSDS) provides basic information on a material or chemical product. It contains information on the properties and potential hazards of the material, how to use it safely, and what to do if there is an emergency.

This document is intended primarily as a guide for non-technical users of Material Safety Data Sheets, in particular, those who use MSDSs presented in the 16-heading international format and prepared in accordance with Canadian requirements.

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1. Introduction

A Material Safety Data Sheet (MSDS) provides basic information on a material or chemical product. It contains information on the properties and potential hazards of the material, how to use it safely, and what to do if there is an emergency.

Although the term "material safety data sheet" or "safety data sheet" is used internationally, different countries have different content requirements for these documents. For example, an MSDS prepared in accordance with the Canadian Controlled Products Regulations (WHMIS), is not necessarily acceptable in other jurisdictions.

An internationally-harmonized 16-heading MSDS format has been developed and is documented in ANSI Standard Z400.1-2004. In Canada, regulatory authorities have agreed to allow the use of this 16-heading format, provided that all of the MSDS information required under the Controlled Products Regulations is included and that a statement on the MSDS indicates that (1) the product was classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations and (2) that the MSDS contains all the information required by those regulations. As a result of this broad acceptance, users of MSDSs are finding that, more and more, suppliers are providing data sheets that are organized using the international format.

This document is intended primarily as a guide for non-technical users of material safety data sheets, particularly those who use MSDSs presented in the 16-heading international format and prepared according to Canadian requirements. It explains the types of information found on these MSDSs and how that information can be used to gain an understanding of the hazards and precautions necessary for the safe use of chemical products.

MSDSs are written for several audiences other than supervisors and workers using the material - firefighters, doctors, occupational hygienists, safety supervisors, engineers and environmental specialists,

among others. The information used by one group may not be needed by another. Thus, there may be information on an MSDS which you do not need.

The MSDS is an essential starting point for the development of a complete health and safety program for the material. However, MSDSs are not complete sources of information on their own. They tend to be general in nature, since they provide summarized information which tries to address all reasonably anticipated uses of the material. As well, there are local laws which must be followed. These laws are not generally described on the MSDS.

When you read an MSDS, you should keep in mind that there are three main types of hazards which can be related to the use of a chemical product:

- Health Hazards. For example, skin contact with strong acids will cause burns.
- Fire Hazards. For example, propane burns very easily and may explode.
- Reactivity Hazards. For example, mixing ammonia and household bleach will result in the release of a harmful gas.

In addition, international format MSDSs include information on environmental hazards (hazards to the natural environment).

Specialized or technical terms are frequently used on MSDSs. The meaning of many of these terms is explained in the CCOHS publication "[The Material Safety Data Sheet: An Explanation of Common Terms.](#)"

When reading an international format MSDS, it is important to recognize that certain technical terms can be defined differently from one jurisdiction to another. For example, the term reproductive toxin is defined differently in Canada compared to the U.S. In such cases, the international MSDS should indicate which jurisdiction's definition has been used.

A good quality MSDS will provide information that is specific and practical (easy to apply). A review of the most important questions to answer when reading an MSDS is found at the end of this document.

Additional information and advice about chemical products is available from a number of sources, including your supervisor, your health and safety committee, your company or union health and safety professional, the manufacturer, the supplier, the government body responsible for occupational health and safety in your jurisdiction, and the Canadian Centre for Occupational Health and Safety (CCOHS).

MATERIAL SAFETY DATA SHEET

Note: Information items required by the Controlled Products Regulations (WHMIS) are marked with *.

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

- * Product identifier:
 - * Name of manufacturer, address and emergency telephone number:
 - * Name of supplier, supplier's address and emergency telephone number:
 - * Product use:
-

SECTION 2: HAZARDS IDENTIFICATION

2.1 Emergency Overview

2.2 Regulatory Status

2.3 Potential Health Effects:

- * Route of Entry
- * Effects of Acute Exposure to Product
- * Effects of Chronic Exposure to Product
- * Irritancy of the Product
- * Sensitization to the Product
- * Carcinogenicity
- * Reproductive Toxicity
- * Teratogenicity
- * Mutagenicity
- * Name of Toxicologically Synergistic Products

2.4 Potential Environmental Effects

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

* Chemical identity and CAS registry no. of hazardous ingredients:

- WHMIS Controlled Products present at 1.0%, or 0.1% as appropriate, by weight
- Ingredients present which are on the WHMIS Ingredient Disclosure List at, or above, the minimum concentration specified on the List
- Ingredients with unknown toxicological properties
- Ingredients the supplier believes may be harmful

Generic chemical identity, registry number, and date of claim for trade secret ingredients registered under the Hazardous Materials Information Review Commission:

Ingredient concentration in units of wt./wt., vol./vol. or wt./vol. expressed as:

- i) actual concentration, or
- ii) a range as specified in the Controlled Products Regulations.

SECTION 4: FIRST AID MEASURES

4.1 First Aid Procedures

- * Specific First Aid Measures

4.2 Note to Physicians:

SECTION 5: FIRE FIGHTING MEASURES

5.1 Flammable Properties

- * Conditions of Flammability
- * Flash Point and Method of Determination
- * Upper Flammable Limit
- * Lower Flammable Limit
- * Auto-ignition Temperature
- * Explosion Data - Sensitivity to Mechanical Impact
- * Explosion Data - Sensitivity to Static Discharge

Note: ANSI Z400.2-2004 indicates that these information items are basic physical properties and belong in Section 9: Physical and Chemical Properties. This section may direct the reader to Section 9 and may repeat the flammable properties here if they are considered useful in fire fighting.

5.2 Extinguishing Media

5.2.1 Suitable Extinguishing Media

- * Means of extinction

5.2.2 Unsuitable Extinguishing Media

5.3 Protection of Firefighters

5.3.1 Specific Hazards Arising from the Chemical

- * Hazardous Combustion Products

5.3.2 Protective Equipment and Precautions for Firefighters

SECTION 6: ACCIDENTAL RELEASE MEASURES

- * Procedures to be followed in case of a leak or spill

6.1 Personal Precautions

6.2 Environmental Precautions

6.3 Methods for Containment

6.4 Methods for Clean-up

6.5 Other Information

SECTION 7: HANDLING AND STORAGE

7.1 Handling

- * Handling procedures and equipment

7.2 Storage

- * Storage requirements

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Exposure Guidelines

- * Exposure limits

8.2 Engineering Controls

- * Specific engineering controls to be used

8.3 Personal Protective Equipment (PPE)

- * Personal protective equipment to be used

8.3.1 Eye/Face Protection

8.3.2 Skin Protection

8.3.3 Respiratory Protection

8.3.4 General Hygiene Considerations

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

- * Physical State (i.e. gas, liquid or solid)
- * Odour and Appearance
- * Odour Threshold
- * Specific Gravity
- * Vapour Pressure
- * Vapour Density
- * Evaporation Rate
- * Boiling Point
- * Freezing Point/Melting Point
- * pH
- * Coefficient of water/oil distribution

Note: Flammable properties from Section 5 may be listed here.

SECTION 10: STABILITY AND REACTIVITY

10.1 Chemical Stability

10.2 Conditions to Avoid

- * Conditions under which the product is chemically unstable

10.3 Incompatible Materials

- * Name of any substance or class of substance with which the product is incompatible

10.4 Hazardous Decomposition Products

- * Hazardous decomposition products

10.5 Possibility of Hazardous Reactions

- * Conditions of reactivity

SECTION 11: TOXICOLOGICAL INFORMATION

- * LD50 (species and route)
- * LC50 (species and route)
- * Effects of acute exposure to product
- * Effects of chronic exposure to product
- * Irritancy of product
- * Sensitization to product
- * Carcinogenicity
- * Reproductive toxicity
- * Teratogenicity
- * Mutagenicity
- * Name of toxicologically synergistic products

SECTION 12: ECOLOGICAL INFORMATION

SECTION 13: DISPOSAL CONSIDERATIONS

- * Waste Disposal

SECTION 14: TRANSPORT INFORMATION

14.1 Basic shipping information

- * Special shipping information

14.2 Additional information

SECTION 15: REGULATORY INFORMATION

WHMIS classification for product:

A statement that the MSDS has been prepared to meet the requirements of the Canadian Controlled Products Regulation.

SECTION 16: OTHER INFORMATION

- * Date of MSDS preparation:

- * Name and telephone number of party responsible for MSDS preparation:

1. Product and Company Identification

-
- * Product identifier:
 - * Name of manufacturer, address and emergency telephone number:
 - * Name of supplier, supplier's address and emergency telephone number:
 - * Product use:
-

The product identifier (normally the product name) appears on both the MSDS and on the container label (the Canadian WHMIS label). To locate the correct MSDS, always use the product identifier, not a shortened name that may be used in your workplace. Check that the name of the manufacturer and/or supplier matches the label as well. In addition, the MSDS and label may display other identification, such as a product code or catalog number, which you could use to confirm that you have the correct MSDS.

Information on how the product is used (product use) may also be provided in this section. Some manufacturers write their MSDSs with the anticipation that the product will be used in certain specific applications. This can be valuable information, because it can indicate whether your particular way of using the material was anticipated. If it wasn't, you may have to get additional safe handling information from the manufacturer.

Materials may come into the workplace in containers from the original manufacturer, or they may be packaged by a supplier or distributor. The supplier or distributor is the company which provides the material directly to your company. In these cases, both the supplier's information (name, address, phone number) and the manufacturer's information will be included on the MSDS.

The manufacturer and/or supplier telephone number provided in this section can be used to obtain more safe handling information if you need it. You can also contact the group, department or party responsible for preparing the MSDS.

2. Hazards Identification

2.1 Emergency Overview

2.2 Regulatory Status

2.3 Potential Health Effects:

- * Route of Entry
- * Effects of Acute Exposure to Product
- * Effects of Chronic Exposure to Product
- * Irritancy of the Product
- * Sensitization to the Product
- * Carcinogenicity
- * Reproductive Toxicity
- * Teratogenicity
- * Mutagenicity
- * Name of Toxicologically Synergistic Products

2.4 Potential Environmental Effects

2.1 Emergency Overview

ANSI has recommended that an emergency overview be included as the first part of the Hazards Identification section. So, you may see this type of information on international format MSDSs. The purpose of this overview is to describe the material's appearance and its most significant immediate hazards (health, physical and environmental) for emergency response personnel.

2.2 Regulatory Status

There is no specific requirement for this subsection on a Canadian MSDS. This section may communicate if the material meets any of the criteria that would make it a Controlled Product or if there are any other federal, provincial or territorial regulations that apply to the material or specific ingredients.

2.3 Potential Health Effects

The Hazards Identification section describes the ways you may be exposed to the material and the harmful health effects it can have on people. It may include effects that have been observed in experimental animals, but only if they are judged to be relevant to people. Animal information is used to assess possible health effects when there is a lack of human information. Information supporting the conclusions about potential health effects is found in Section 11 - Toxicological Information.

Route of Entry

The information under the Route of Entry heading describes how you can be exposed to the material. In designing ways to minimize exposure, each Route of Entry needs to be considered. Chemicals can cause harm either at the point of contact, by absorption into the body, or both. Chemicals absorbed into the body can affect body systems and organs far away from the point of entry. For example, phenol absorbed through the skin can cause kidney failure.

The possible routes of entry are the skin, the eyes, the respiratory system (by inhalation), and the digestive (gastrointestinal) system (by swallowing). How important each route of entry is for a particular material depends on many factors, such as the physical properties of the material and how it is used in the workplace.

Effects of Acute Exposure to Product

An acute (short-term) exposure is one that takes place over a short period of time (minutes, hours or days).

The health effects caused by an acute exposure are usually seen at the time of exposure. However, sometimes they may not appear for several hours or even days afterward.

You need information on the typical effects of a short-term exposure (signs and symptoms) because they can alert you that you are being accidentally

exposed. For example, workplace control measures may have failed. Any symptoms you experience which may be associated with use of a material should be reported so that your workplace can be investigated to find out the cause. Possible reasons for the symptoms can vary widely. For example, perhaps the material has passed through your gloves, or the ventilation system is not working effectively. Sometimes the symptoms may not be related to an exposure at work – they may be caused by a cold, for example.

Usually, the effects of exposure to a low concentration of the material are described first. The MSDS may then go on to tell you the possible effects of a moderate or severe exposure. You need to know the nature of these symptoms so that you can recognize the potential seriousness of an exposure.

Effects of Chronic Exposure to Product

A chronic exposure is a long-term exposure. Long-term means over months or years. This type of exposure may also be described as prolonged, meaning very long, or repeated, meaning many exposures.

Any illness related to a chronic exposure may develop very slowly or may not appear until many years after the exposure has stopped. You should be aware that at the time of the exposure you may experience no warning symptoms but an illness possibly related to the exposure may appear months or years later. For example, if you are exposed to asbestos you may not experience any respiratory symptoms at the time but may develop lung cancer many years later. Therefore, it is especially important that you follow all safe handling procedures for jobs involving materials with these types of effects.

Irritancy of Product

Some products can cause irritation (reversible reddening, swelling and pain) if they come into direct contact with the skin, eyes or respiratory tract (nose, breathing airways and lungs). If there is

information available about irritancy of the product, for example from tests on experimental animals, it will be indicated in this section.

Sensitization to Product

Sensitization is the development, over time, of an allergic reaction to a chemical. Chemicals which are "sensitizers" may cause a mild response on the first few exposures but, as the allergy develops, the response becomes worse with subsequent exposures. Eventually, even short exposures to low concentrations can cause a very severe reaction.

There are two different types of occupational sensitization: skin and respiratory. Typical symptoms of skin sensitivity are swelling, redness, itching, pain, and blistering. Sensitization of the respiratory system may result in symptoms similar to a severe asthmatic attack. These symptoms include wheezing, difficulty in breathing, chest tightness, coughing and shortness of breath.

It is very important that you reduce your exposure to sensitizing materials as much as possible by following safe handling procedures.

Carcinogenicity

A carcinogen is a substance that can cause cancer. Carcinogenic means able to cause cancer. Carcinogenicity is the ability of a substance to cause cancer.

Under Canadian WHMIS, materials are identified as carcinogens if they are recognized as carcinogens by the American Conference of Governmental Industrial Hygienists (ACGIH), or the International Agency for Research on Cancer (IARC). The lists of carcinogens published by these organizations include known human carcinogens and some materials which cause cancer in animal experiments. Certain chemicals may be listed as suspected or possible carcinogens if the evidence is limited or so variable that a definite conclusion cannot be made.

If the product you are using contains materials that are identified as known carcinogens, probable carcinogens, suspected carcinogens, or possible

carcinogens, you should be particularly careful that you follow safe handling procedures and reduce your exposure to the product as much as possible.

Reproductive Toxicity

Reproductive toxicity is defined under WHMIS as effects on the reproductive process in adult males and/or females, which may be caused by a substance. Possible reproductive effects include reduced fertility in the male or female and menstrual changes.

If you are working with a chemical that is identified as having the potential to cause reproductive effects, you should be careful to reduce your exposure as much as possible by following safe handling procedures.

Teratogenicity and Embryotoxicity

A teratogen is a substance that can cause birth defects. An embryotoxin is a substance that can cause a toxic effect on the developing embryo. Teratogenic means able to cause birth defects. Embryotoxic means able to cause toxic effects on the developing embryo. Both teratogenicity and embryotoxicity result from a harmful effect on the embryo or the fetus during pregnancy.

Most chemicals can cause teratogenic/embryotoxic effects if there is an extremely high exposure. In these cases, the exposed person will experience other noticeable signs and symptoms caused by the exposure. On the other hand, chemicals which cause reproductive effects in the absence of other significant harmful effects are regarded as true reproductive hazards. Very few workplace chemicals are known to fit these criteria.

Pregnant women need to be particularly careful to reduce their exposure to these types of materials as much as possible.

Mutagenicity

A mutagen is a substance that can cause changes in the DNA of cells (mutations). Mutagenic means able to cause mutations. Mutagenicity is the ability of a substance to cause mutations.

DNA determines the characteristics that children inherit from their parents. DNA also determines how cells in the body divide or reproduce.

A number of laboratory tests are used to screen chemicals for possible mutagenic effects. Also, there is some evidence that mutations may increase the risk of cancer and reproductive problems such as infertility or birth defects. However, mutagenicity test results are not very reliable predictors of these effects. One reason for this is that the human body can repair many mutations while the bacteria used for many of the mutagenicity tests cannot.

Mutagenicity is included on the MSDS because it is an early indicator of potential hazard and often there is very little other evidence available on possible genetic, carcinogenic or reproductive effects.

Toxicologically Synergistic Products

Synergism means that exposure to more than one chemical over the same period of time can result in health effects greater than expected when the effects of exposure to each chemical are added together. Very simply, it is like saying $1 + 1 = 3$. When chemicals are synergistic, the potential hazards of the chemicals should be re-evaluated, taking their synergistic properties into consideration.

It is important to know whether you are using chemicals which are synergistic, since they may cause health effects which are more severe than might be anticipated by considering the effects of each chemical separately.

The health effects information in the Hazards Identification section of the MSDS should be considered general since a particular material will not affect everyone the same way. In addition, the way in which a material is used or handled in a particular workplace will influence the degree of the health hazard. The writer of the MSDS normally tries to anticipate all reasonable uses or abuses of the material, including emergency situations. However, as you read MSDSs from different suppliers, you will see that they are not all written

in the same way. Some MSDSs provide "worst case" toxicity information, describing any known health effect which may possibly occur at any dose, by any route of exposure. Other MSDSs provide information on health effects which would reasonably be anticipated under conditions of normal use, spills or emergencies. This type of information is generally more useful to the user of the product. Because of these differences in approach, one must be cautious in assuming that a product is or is not a health hazard on the basis of information given in this section.

It is important that you understand the potential health effects of materials you are working with because they underline the importance of following safe work practices and wearing appropriate protective equipment. Many of the terms that are used in this section of the MSDS are defined in the CCOHS publication "[The Material Safety Data Sheet: An Explanation of Common Terms](#)". Sometimes medical terms are used to describe the possible health effects. If there are words you don't understand, ask for assistance from someone familiar with the use of medical terms to find out what they mean; for example, a nurse or a doctor. Even a medical dictionary will not always provide a complete or understandable definition.

You also should give the health effects information to your family doctor. This will help your doctor follow your work history and to monitor your health and relate any symptoms you have to a possible workplace exposure.

2.4 Potential Environmental Effects

There is no specific requirement for this subsection on a Canadian MSDS.

3. Composition/ Information On Ingredients

* Chemical identity and CAS registry no. of hazardous ingredients:

- WHMIS Controlled Products present at 1.0%, or 0.1% as appropriate, by weight
- Ingredients present which are on the WHMIS Ingredient Disclosure List at, or above, the minimum concentration specified on the List
- Ingredients with unknown toxicological properties
- Ingredients the supplier believes may be harmful

* Generic chemical identity, registry number, and date of claim for trade secret ingredients registered under the Hazardous Materials Information Review Commission

Ingredient concentration in units of wt./wt., vol./vol. or wt./vol. expressed as:

- i) actual concentration, or
- ii) a range as specified in the Controlled Products Regulations.

All potentially hazardous ingredients of the material must be listed on the MSDS. The approximate amount (percentage or percentage range) of each ingredient of the material will also be provided.

In some cases, the identity of one or more ingredients is considered by the manufacturer to be confidential business information ("trade secret"). To meet Canadian requirements, the manufacturer applies for an exemption under the Canadian Hazardous Materials Information Review Act (administered by the Hazardous Materials Information Review Commission). If this has been done, the MSDS

will indicate the generic chemical identity of the ingredient, the date the claim for exemption was filed and the registry number assigned to the claim. Once the claim has been accepted, there will be a statement on the MSDS indicating that an exemption has been granted, along with the date of the legal decision.

It is important to emphasize that regardless of whether or not an ingredient is considered "confidential business information" in Canada, the potential hazards associated with that ingredient must be included on the MSDS. For example, if a claim for exemption has been filed for an ingredient that is a skin sensitizer, the supplier must describe skin sensitization as a hazard in the appropriate section of the MSDS.

Canadian requirements specify that the CAS registry numbers for the ingredients be included as well. The CAS number is a unique identifier that is assigned to a specific chemical by the Chemical Abstracts Service (CAS) of the American Chemical Society. This number can be very useful since one chemical often has many different names. This means that if you are trying to look up additional information on the chemical, you need to try all the alternative chemical names to be sure that you have done a thorough search. On the other hand, if you use the CAS number, searching is much simpler.

4. First Aid Measures

4.1 First Aid Procedures

- * Specific First Aid Measures

4.2 Note to Physicians

The First Aid Measures section describes actions to be taken immediately in case you are exposed to the material. The purpose of first aid is to minimize injury and future disability. In serious cases, first aid may be necessary to keep the victim alive.

You need to know first aid information before you start working with the material. There is no time to find and read the MSDS during an emergency. First aid procedures should be periodically reviewed by everyone working in areas where the material is handled. Everyone should know the location of the facilities and equipment for providing first aid; for example, the eyewash fountains, safety showers and first aid kits.

Knowing the first aid procedures for materials used in a work area is also necessary so that people will have the appropriate first aid skills. In most cases, only basic first aid training is needed. Sometimes, you may need advanced training; for example, for the administration of cardiopulmonary resuscitation (CPR) or oxygen.

Sometimes, the first aid procedures on an MSDS are given for a "worst case" exposure. The first-aider should evaluate how severe the exposure is before using the full first aid procedure. Formal first aid training will help you make this decision. If you are not sure, follow the instructions given on the MSDS.

When medical treatment is necessary, send the MSDS, if it is readily available, to the emergency facility with the victim. If the MSDS is not available,

you should send the material's label or a labelled container of the material, if it is small enough. The medical personnel need to know what the material is and what first aid measures have been recommended and used. Occasionally, the MSDS has additional instructions (or a NOTE TO PHYSICIANS) which may be useful to the emergency doctor; for example, it may say, "Monitor kidney function for 24 hours."

5. Fire Fighting Measures

5.1 Flammable Properties

- * Conditions of Flammability
- * Flash Point and Method of Determination
- * Upper Flammable Limit
- * Lower Flammable Limit
- * Auto-ignition Temperature
- * Explosion Data - Sensitivity to Mechanical Impact
- * Explosion Data - Sensitivity to Static Discharge

Note: ANSI Z400.2-2004 indicates that these information items are basic physical properties and belong in Section 9: Physical and Chemical Properties. This section may direct the reader to Section 9 and may repeat the flammable properties here if they are considered useful in fire fighting.

5.2 Extinguishing Media

5.2.1 Suitable Extinguishing Media

- * Means of extinction

5.2.2 Unsuitable Extinguishing Media

5.3 Protection of Firefighters

5.3.1 Specific Hazards Arising from the Chemical

- * Hazardous Combustion Products

5.3.2 Protective Equipment and Precautions for Firefighters

The purpose of the Fire Fighting Measures section is to describe any fire hazards associated with the material. This information, combined with information from the Handling and Storage and the Stability and Reactivity Data sections, can be used in determining where a certain material should be stored (e.g. flammable liquids should be stored in

specially designed facilities away from incompatible chemicals).

Information in this section can also be used to plan the appropriate type and placement of fire extinguishers as well as to plan the best response to a fire for a particular work site. Much of the information is intended for firefighters and emergency response personnel.

If the material is a potential fire hazard, you should know the special handling precautions or other control measures required to prevent a fire.

You should also know the emergency procedures to follow in case of a fire at your particular work site.

6. Accidental Release Measures

- * Procedures to be followed in case of a leak or spill

6.1 Personal Precautions

6.2 Environmental Precautions

6.3 Methods for Containment

6.4 Methods for Clean-up

6.5 Other Information

General instructions for responding to an accidental release or cleaning up a spill are provided in this section. Specific information, such as recommended absorbent materials for spill cleanup, may be included. The information is intended to be used mainly by emergency responders and environmental professionals. Usually, special training is required to respond to a spill or leak safely. You should know your own work site emergency response plan.

7. Handling and Storage

7.1 Handling

- * Handling procedures and equipment

7.2 Storage

- * Storage requirements
-

In this section, you will find general precautions necessary for the safe handling of the material, including any equipment that may be required. All of the possible hazards (fire, reactivity and health) need to be considered when developing safe handling procedures. For example, for dispensing a flammable liquid, the MSDS may suggest electrical grounding and bonding of containers.

Information provided under this heading also gives advice about storing the material safely. For example, "store in a cool, dry, well-ventilated area away from heat and ignition sources" is commonly used to describe storage conditions for materials which can burn. These storage recommendations are a good starting point for deciding where and how materials should be stored. Refer also to the Fire Fighting Measures and the Stability and Reactivity sections of the MSDS. In order to design safe storage areas for chemicals, the applicable fire codes, building codes and national standards also need to be consulted.

Much of the information in this section is intended for occupational health and safety professionals or those responsible for designing safe storage/handling facilities. The instructions given may or may not apply to your work, depending on how you are using the material and the hazard control measures already in place. An assessment of your work by a competent person will determine the best handling precautions for your particular situation.

8. Exposure Controls/Personal Protection

8.1 Exposure Guidelines

- * Exposure limits

8.2 Engineering Controls

- * Specific engineering controls to be used

8.3 Personal Protective Equipment (PPE)

- * Personal protective equipment to be used

8.3.1 Eye/Face Protection

8.3.2 Skin Protection

8.3.3 Respiratory Protection

8.3.4 General Hygiene Considerations

This section provides information which is used to develop procedures and practices for working safely with the material. It should be noted that most Material Safety Data Sheets are written to address all reasonably anticipated uses of the material. Because they must address such a wide range of uses, the information will not always be entirely applicable to your particular situation.

The services of a health and safety professional may be valuable when you are trying to interpret the information and assess its relevance to your job. You may also be able to get more specific information by contacting the manufacturer using the phone numbers given in the Product and Company Identification section.

8.1 Exposure Guidelines

MSDSs usually give common occupational exposure limits such as TLVs (Threshold Limit Values) which are published by the American Conference of Governmental Industrial Hygienists (ACGIH) or the Permissible Exposure Limits (PELs) published by the

U.S. Occupational Safety and Health Administration (OSHA). Legal (regulated) exposure limits in your jurisdiction (country, province, territory) may be different from those listed on the MSDS. Legally, your company must comply with the applicable regulated limits.

Health and safety professionals use exposure limits as standards when air sampling is conducted. The airborne concentrations measured in the workplace are compared with the exposure limits, so that compliance with standards can be assessed. If measured levels are too high, ways to reduce employee exposures will be implemented.

8.2 Engineering Controls

Engineering control systems reduce potential hazards either by isolating the person from the hazard or by removing the hazard from the work environment. They include mechanical ventilation and process enclosure. Engineering control systems are important because they are built into the work process to reduce the hazards automatically.

It should be noted that substitution of a less hazardous material or industrial process is always the best way to reduce a hazard and should be considered first. Engineering control systems are the next best option and are preferred over other control measures such as the use of personal protective equipment. This is because engineering controls either control the potential hazard at its source (local exhaust ventilation), remove the potential hazard from the general area (general ventilation) or put up a permanent barrier between the worker and the potential hazard (isolation or enclosure).

The MSDS does not usually provide the specific details of the engineering controls (for example, ventilation rates, fan size and so on). This is because the controls must be designed to suit the individual work site.

You need to make sure that engineering control systems recommended for your job are properly checked and maintained and that they are operating when you are working with the material. If there are changes in the process or materials, the controls may have to be changed as well.

8.3 Personal Protective Equipment

General guidance on the need for and selection of personal protective equipment such as protective clothing, eye protection and respiratory protection is provided under this heading.

8.3.1 Eye/Face Protection

Under this heading, the MSDS describes the type of eye/face protection you may need when handling the material. The most common types of eye/face protection recommended are safety glasses, chemical safety goggles and face shields.

8.3.2 Skin Protection

Skin Protection includes items such as gloves, aprons, full body suits, and boots. The MSDS should tell you the types of rubbers or other materials that provide the best protection against the chemicals you are using. No one material acts as a barrier to all chemicals. It is also important to consider the temperature conditions and the need for materials that will not be cut or torn easily. Sometimes, the MSDS may only say to use impervious (resistant) materials. In this case, you have to get information about the specific material of which the clothing should be made. You may be able to obtain this information from the product supplier or manufacturer or from a protective clothing supplier or manufacturer.

Whenever possible, you should wear protective clothing which is resistant to all the potentially hazardous chemicals to which you may be exposed while performing a particular task. Also, it is important to maintain your protective equipment properly (for example, protective gloves usually need to be washed and rinsed between uses).

8.3.3 Respiratory Protection

There are many different types of respirators. The correct type of respiratory protection can change as the amount of the material in the air changes. Also, one type of respirator may be effective against some kinds of chemicals but may provide little or no protection against others.

Complete respiratory protection guidelines usually

cannot be given on the MSDS because there is not enough room or because specific information about the job is required. The selection of the best respirator for you can be quite complicated and usually requires a worksite assessment. This assessment would normally involve air sampling and should be conducted by a qualified person.

If respirators are required at your work site, a complete respiratory protection program including respirator selection, fit testing, training and maintenance is necessary. The relevant regulatory and consensus standards should be consulted. For example, the CSA standard "Selection, Use and Care of Respirators" or the ANSI standard "American National Standard Practices for Respiratory Protection" provide valuable guidance.

Depending on the job, you may have to use personal protective equipment all the time, part of the time, or only in an emergency. You should know which protective equipment is necessary for your work. You also need to know where, when and how to use, maintain and store your protective equipment and how to recognize problems with it.

Sometimes, there may be no information about personal protective equipment on the MSDS. If a potentially hazardous exposure is possible in your job, you should check the routes of entry in the Hazards Identification section. If a certain type of exposure is possible and the route of entry is indicated, you should get advice about the need for you to wear protective equipment. For example, if you may have direct hand contact with a material which can damage or be absorbed through the skin, you need to wear protective gloves.

8.3.4 General Hygiene Considerations

This subsection is not specifically required on a Canadian MSDS.

9. Physical and Chemical Properties

- * Physical State (i.e. gas, liquid or solid)
- * Odour and Appearance
- * Odour Threshold
- * Specific Gravity
- * Vapour Pressure
- * Vapour Density
- * Evaporation Rate
- * Boiling Point
- * Freezing Point/Melting Point
- * pH
- * Coefficient of water/oil distribution

Note: Flammable properties from Section 5 may be listed here.

You should check that the description of the material (the physical state and appearance) is the same as the material you have. If it is not, you may not have the correct MSDS. Alternatively, the material may be old or may have decomposed during shipping or storage. In either case, the information on the MSDS may not apply and you should obtain additional advice.

The rest of the information in this section is used to help determine the conditions under which the material may be hazardous. Technical specialists use this information to develop specific work site procedures for exposure control, storage, handling, spill clean-up and so on.

The different physical properties commonly given on a MSDS (odour threshold, specific gravity, vapour pressure, vapour density, evaporation rate, boiling point, freezing point, pH and coefficient of water/oil distribution) are explained in the CCOHS publication "[The Material Safety Data Sheet: An Explanation of Common Terms](#)".

10. Stability and Reactivity

10.1 Chemical Stability

10.2 Conditions to Avoid

- * Conditions under which the product is chemically unstable

10.3 Incompatible Materials

- * Name of any substance or class of substance with which the product is incompatible

10.4 Hazardous Decomposition Products

- * Hazardous decomposition products

10.5 Possibility of Hazardous Reactions

- * Conditions of reactivity
-

This section of the MSDS indicates how stable the material is and describes any conditions under which it is unstable or can react dangerously. Unstable materials may break down (decompose) and cause fires or explosions or cause the formation of new chemicals which have different hazards. For example, these new chemicals (decomposition products) may be more toxic or flammable than the original material. Conditions such as heat, sunlight, and aging of the chemical can cause unstable chemicals to break down. Therefore, these materials require special storage and handling precautions.

Some chemicals can create a hazard because they have a tendency to undergo a particular type of chemical reaction called "polymerization". This reaction may generate a lot of heat, may generate enough pressure to burst a container or may be explosive. Chemicals that tend to react in this way often contain additives called inhibitors, which reduce or eliminate the possibility of an uncontrolled polymerization.

Some materials may create a hazard if they come in contact with water (water-reactive chemicals). Others may be pyrophoric, meaning they can ignite spontaneously when exposed to air.

Incompatible materials are materials that may react violently or explosively if they are mixed or brought together. These materials should be stored separately and should not be mixed unless special procedures are followed.

You need to be aware of the information in this section so you can store and handle the material safely and avoid mixing incompatible materials.

11. Toxicological Information

- * LD50 (species and route)
 - * LC50 (species and route)
 - * Effects of acute exposure to product
 - * Effects of chronic exposure to product
 - * Irritancy of product
 - * Sensitization to product
 - * Carcinogenicity
 - * Reproductive toxicity
 - * Teratogenicity
 - * Mutagenicity
 - * Name of toxicologically synergistic products
-

This section of the MSDS contains toxicity information, either for the ingredients of the product or the product as a whole. This information can be quite technical and difficult to interpret and is intended mainly for medical professionals, occupational health and safety professionals and toxicologists. The information in this section is used to support the conclusions that are drawn in Section 2.3 - Potential Health Effects. If you are uncertain whether the information is relevant to your workplace and your job, you should ask a knowledgeable health and safety professional.

When reading about the effects of the material on animals, it is important to remember that the effects are not necessarily the same for people. With careful interpretation, animal data can add to our understanding of how the material can affect people.

The information items listed above are required under the Canadian Controlled Products Regulations, and would normally appear in this section.

12. Ecological Information

Ecological information is not specifically required under Canadian WHMIS. You will normally find data that is useful in evaluating the environmental impact of the material if it is released to the environment (e.g. toxicity to fish, birds, plants and microorganisms). This information is intended mainly for environmental professionals and other company staff evaluating use, disposal or spill control.

13. Disposal Considerations

* Waste Disposal

This section of the MSDS is intended mainly for environmental professionals.

MSDSs prepared for Canadian workplaces will normally include general waste disposal information.

The MSDS does not usually contain all the steps and precautions necessary for adequate hazardous waste disposal. As well, the MSDS often does not give the federal, provincial, or local regulations which must be followed. The appropriate authorities for your area should be contacted for this information.

14. Transport Information

14.1 Basic shipping information

- * Special shipping information

14.2 Additional information

This section of the MSDS is intended for those responsible for shipping the material. If there are special precautions necessary during shipment, they will be provided. For example, some products may be sensitive to shock or sensitive to high temperatures. The TDG (Canadian Transportation of Dangerous Goods) PIN number (product identification number) or U.S. DOT (Department of Transportation) identification number may be provided if the product meets the TDG or DOT criteria. The supplier may include the Canadian TDG and/or U.S. DOT classification for the product.

15. Regulatory Information

WHMIS classification for product:

A statement that the MSDS has been prepared to meet the requirements of the Canadian Controlled Products Regulation.

Information in this section is aimed primarily at regulatory compliance professionals.

Useful references to applicable health, safety and environmental laws and regulations may be provided, along with information on the regulatory status of the product. If the MSDS has been prepared according to Canadian regulations, there should be a statement indicating that:

- (1) the product was classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations and
- (2) the MSDS contains all of the information required by those regulations. The WHMIS classification for the product may also be given.

16. Other Information

- * Date of MSDS preparation:

 - * Name and telephone number of party responsible for MSDS preparation:
-

The other information section is used to provide supplementary information which the writer of the data sheet considers important for the safe use of the material. Reference sources used in preparing the data sheet are sometimes listed. You can use this reference list to obtain additional information on the material.

The date the MSDS was prepared also appears in this section. If the MSDS has been revised or reviewed, the date shown will be the last time this was done. The MSDS is updated when new information becomes available. To meet Canadian requirements, the MSDS must be routinely reviewed at least once every 3 years. Therefore, if your workplace is in Canada, you should check that the MSDS you are using is less than 3 years old. If it isn't, you should notify the person responsible for MSDSs in your company so that an updated data sheet can be requested from the supplier or manufacturer.

Conclusion

It is important to remember that a MSDS is not a complete source of health and safety information on its own. This is because MSDSs are usually written for many different work sites and, therefore, cannot be specific in the advice they offer. They are an essential starting point for developing a complete health and safety program for a material.

The questions on the next page will help you identify the specific information you need to work safely with a material.

Important Questions to Answer When Reading A MSDS

Identification

- _____ Do you have the right MSDS for the material with which you are working or will be working?
- _____ Do you have an up-to-date MSDS (in Canada, less than 3 years old)?
- _____ Does the MSDS description of the material match the material you have?

Potential Hazards

- _____ Can this material burn or explode?
- _____ Is this material unstable? If so, under what conditions?
- _____ Can this material react with other chemicals? If so, which ones?
- _____ Can this material harm your health?
- _____ Do you know the symptoms which may warn you of exposure?
- _____ Have you discussed the health effects information with your doctor?
- _____ Can this material cause harm to the environment?

Preventive Measures

- _____ Does your work site need engineering controls?
- _____ Does this material require special handling precautions?
- _____ Do you need protective equipment?
- _____ Do you need to be careful when mixing this material with any other chemicals?
- _____ Does this material require special storage conditions?

Emergency Measures

- _____ Do you know what to do in case of a fire or explosion?
- _____ Do you know the first aid measures needed in case of an exposure?
- _____ Do you know what to do in case of a spill or leak?
- _____ Do you know where the emergency response equipment is and how to use it?