Legislation

WHMIS 1988 - Material Safety Data Sheets (MSDSs): Creating

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How do I write an MSDS?

This section will aid writers in identifying the specific types of information required in MSDSs used in Canada, the US and the European Union. This document is not intended to be a comprehensive guide on how to write MSDSs but it will provide information that will be useful to MSDS writers.

Many countries have legislation that requires chemical producers or suppliers to prepare MSDSs. In Canada this legislation is generally called WHMIS (Workplace Hazardous Materials Information System). The Controlled Products Regulations (CPR) define technical criteria for determining if a material is hazardous (a controlled product) and what information must be contained on labels and MSDSs. These regulations are commonly referred to as the "WHMIS regulations".

The WHMIS regulations specify requirements for a 9-section MSDS. However, since the WHMIS regulations were passed, several agencies have made recommendations or approved standards for the format and content of 16-section MSDSs. These agencies include the International Labour Organization (ILO), the European Union (EU, formerly the European Communities, EC), the American National Standards Institute (ANSI), and the International Organization for Standardization (ISO). The 16-headings for MSDSs, described in more detail below, have been approved for use in WHMIS-compliant MSDSs if two conditions are met. First, all the information required in the Controlled Products Regulations must be in the MSDS. Second, a statement like "This product has been classified according to the hazard criteria of the CPR and the MSDS contains all the information required by the CPR." appears under heading "Section 15 - Regulatory Information".

How do I make hazard identification and classifications?

The first step in preparing an MSDS is to collect information about the material and its components including physical, chemical and environmental characteristics, and toxicity information. The collected information is then evaluated and assessed to determine the potential physical (fire and reactivity), health and environmental hazards associated with the material. Then, using professional judgement, the product is classified according to the hazard criteria specified in legislation of the country where the product will be used. The corresponding Canadian legislation is the Controlled Products Regulations (CPR), made under the Hazardous Products Act. This legislation defines the criteria for categorizing controlled products into various classes. Several classes have subclasses to provide more specific information about particular kinds of hazards. The CPR should be consulted to find out what the criteria are that are used to classify chemical products as flammable versus combustible or toxic versus very toxic, and so on.

The Controlled Products Regulations (WHMIS) regulations also prescribe what elements of information must be on labels and MSDSs for WHMIS-controlled products. The supplier must use professional, scientific judgement when evaluating the test results of the product or, where appropriate, a product with similar properties. The supplier also has the duty to report any hazard information of which he or she is "aware or ought reasonably to be aware" [see subsections 12(11) and 33(2) of the CPR]. The toxicology information must be presented in such a way "so as not to mislead a person as to the nature or extent of the hazard posed by the controlled product" [subsection 13.1].

More information on identification and classification can be found on the Health Canada WHMIS website.

- WHMIS Reference Manual
- WHMIS 1988 - Classification of Controlled Products

What information is to be disclosed on a MSDS?

In Canada the Controlled Products Regulations (see Schedule I below) specify what information must be disclosed in an MSDS. In the US, the OSHA Hazard Communication Rule (29 CFR1900.1200) prescribes what information is to be provided by MSDS. Those who prepare MSDSs for chemical products used in workplaces in other countries should consult the legislation in those jurisdictions to find out their requirements for product classification, labelling and information to be disclosed in MSDSs.

SCHEDULE I of the Controlled Products Regulations (Section 12) INFORMATION TO BE DISCLOSED ON A MATERIAL SAFETY DATA SHEET			
Item	**Column I Category**	**Column II Suggested Headings**	**Column III Information in respect of controlled products**
1	Hazardous Ingredients	Hazardous Ingredients	1. Information required by subparagraphs 13(a)(I) to (iv) of the Act. 2. CAS registry number and product identification number. 3. LC_{50} (species and route). 4. LD_{50} (species and route).
2	Preparation Information	Preparation Information	1. Name and phone of the group, department or party responsible for the preparation for the material safety data sheet. 2. Date of preparation of the material safety data sheet.
3	Production Information	Production Information	1. Manufacturer's name, street address, city, province, postal code and emergency telephone number. 2. Supplier identifier, the supplier's street address, city, province, postal code and emergency telephone number. 3. Product identifier. 4. Product use.
4	Physical Data	Physical Data	1. Physical state (i.e. gas, liquid or solid) 2. Odour and appearance 3. Odour threshold 4. Specific gravity 5. Vapour pressure 6. Vapour density 7. Evaporation rate 8. Boiling point 9. Freezing point 10. pH 11. Coefficient of water/oil distribution
5	Fire or Explosion Hazard	Fire or Explosion	1. Conditions of flammability 2. Means of extinction 3. Flash point and method of determination 4. Upper flammable limit

			5. Lower flammable limit 6. Auto-ignition temperature 7. Hazardous combustion products 8. Explosion data - sensitivity to mechanical impact 9. Explosion data - sensitivity to static discharge
6	Reactivity Data	Reactivity Data	1. Conditions under which the product is chemically unstable 2. Name of any substance or class of substance with which the product is incompatible 3. Conditions of reactivity 4. Hazardous decomposition products
7	Toxicological Properties	Toxicological Properties	1. Route of entry, including skin contact, skin absorption, eye contact, inhalation and ingestion 2. Effects of acute exposure to product 3. Effects or chronic exposure to product 4. Exposure limits 5. Irritancy of product 6. Sensitization to product 7. Carcinogenicity 8. Reproductive toxicity 9. Teratogenicity 10. Mutagenicity 11. Name of toxicologically synergistic products
8	Preventive Measures	Preventive Measures	1. Personal protective equipment to be used 2. Specific engineering controls to be used 3. Procedures to be followed in case of leak or spill 4. Waste disposal 5. Handling procedure and equipment 6. Storage requirements 7. Special shipping information
9	First Aid Measures	First Aid Measures	1. Specific first aid measures

What are international standards and guidelines for preparing MSDSs?

When WHMIS came into effect in 1988, there were no national or international standards for MSDS formats. Since then several guidelines and standards have been prepared. One such standard is the American National Standard for Hazardous Industrial Chemicals - Material Safety Data Sheets - Preparation (ANSI Z400.1-2004). This standard specifies:

- the general layout of MSDSs
- 16 headings with standardized wording
- the numbering and order of these headings
- the information items required to complete an MSDS

The objective of this standard is to "create consistency in providing information on safety, health and environmental matters for chemical products". The 16-section MSDS headings in the standard are the same as those proposed for adoption by the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). The GHS addresses the classification of chemicals by types of hazard (health, fire, reactivity, environmental) and proposes harmonized hazard communication elements (labels and safety data sheets). It is intended that the GHS will be adopted worldwide.

Please see the OSH Answers Globally Harmonized System (GHS) for general information on GHS.

Canadian regulatory authorities have said that they will accept the 16-heading format if all the information required by the CPR is included. They also require a statement such as "This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR" be entered in the "Regulatory Information" section.

Table 2 itemizes the WHMIS MSDS headings suggested in Schedule I of the CPR along with the headings specified in standards for the 16-heading format.

What does a Canadian MSDS require in comparison to other standards (ANSI, GHS)?

Comparison of MSDS headings in WHMIS legislation and other standards (ANSI, GHS)			
WHMIS		**ANSI / GHS**	
Item	**Heading suggested in CPR schedule**	**Section**	**Heading**
1	Hazardous Ingredients	1	Product and Company Identification
2	Preparation Information	2	Hazards Identification
3	Product Information	3	Composition/Information on Ingredients
4	Physical Data	4	First Aid Measures
5	Fire or Explosion Hazard	5	Fire Fighting Measures
6	Reactivity Data	6	Accidental Release Measures
7	Toxicological Properties	7	Handling and Storage
8	Preventive Measures	8	Exposure Controls/Personal Protection
9	First Aid Measures	9	Physical and Chemical Properties
		10	Stability and Reactivity
		11	Toxicological Information
		12	Ecological Information
		13	Disposal Considerations
		14	Transport Information
		15	Regulatory Information
		16	Other Information

What is the ANSI standard for preparing MSDSs?

The ANSI "Standard for Hazardous Industrial Chemicals - Material Safety Data Sheets - Preparation" (ANSI Z400.1-2004) is a consensus standard. It was prepared by a committee with user input from numerous labour representatives, government officials, professional associations, industry associations and academic groups.

Even though the ANSI standard was prepared in the US, the standard is useful to MSDS preparers around the world. The ANSI standard describes the format for MSDSs and discusses the various steps involved in preparing MSDSs such as how to:

- collect information
- determine hazards of materials
- complete each section of an MSDS
- organize and present the information in the MSDSs

The standard has information about the appearance and readability of MSDSs. It explains where technical and non-technical language should be used to optimize MSDS usefulness to different groups of readers. For example, medical information can be provided under the subheading "Notes to the Physician" in the section "First Aid Measures". Non-technical language should be used in sections intended for use by the employee (e.g., under the subheading "First Aid Procedures"). It also provides advice about font types and sizes, page layouts and so on that make MSDSs easier to read.

The standard also provides a list of commonly used phrases and the extensive glossary to help suppliers write MSDSs clearly without an extensive use of technical terms or jargon. For example, the phrase " . . . may cause partial to complete unconsciousness" will be clearer to many readers than " . . . causes narcosis". To prevent skin contact, "wear chemical resistant clothing such as gloves, apron, boots or whole body suits made from Neoprene, as appropriate" is more precise and helpful than "wear chemical resistant clothing". It also provides some sample MSDSs and a brief checklist for evaluating the completed MSDSs.

What are the main differences between the 1998 ANSI Standard compared to the 2004 standard?

The 2004 revision states that the new standard includes the following significant changes:

- Improving hazard communication and aligning the Standard with the recommendations for safety data sheets in the Globally Harmonized System for Hazard Classification, Communication and Labelling (GHS) adopted by the United Nations in 2002;
- Improving readability and consistency and minimizing redundancy;
- Reordering the MSDS sections so Hazards Identification appears before Composition Information;
- Including a requirement that flammable properties appear in the physical and chemical properties section with an option to repeat them in the fire fighting measures section;
- Increasing consistency between the sections for Toxicological Information and Ecological Information, and including more complete and accurate lists of data types;
- Adding transportation elements that may be needed for transporting a chemical by various modes, to meet international regulations and for improved emergency response.

Is there standardized wording or ordering of MSDS headings?

According to the ANSI standard and GHS, an MSDS should always have 16 sections, each with a fixed heading name. In addition, the sections should always follow the same order. The purpose of this standardized format it to make it easier for specific groups of people to find the information they need. For example, emergency responders will know that the information they need first will always be in Section 2, "Hazards Identification". MSDS writers have some flexibility in the way that they present information since the proposed format does not prescribe a standardized form with fill-in blanks. It will also make it easier for companies to modify their current MSDSs to harmonize with the ANSI standard and GHS.

The ANSI/GHS MSDS standard format is organized in an order that answers the following five basic questions:

- what is the material
- what information needs to be known immediately
- what should be done in cases of emergency situations
- how can hazardous situations be prevented from occurring
- what other useful information is there on this material

As the global market continues to expand, international standardization of MSDSs will become more important. It will benefit companies who supply chemicals to international markets in helping them meet the regulatory requirements in each customer's country.

The task of training employees to read and understand MSDSs will also be made easier when MSDSs have the same format and are written to the same standard. All users - from employees to occupational hygiene and safety professionals to employers - will benefit by being able to find and understand information more readily as more of the "standardized" MSDSs become available.

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