

CHAPTER 1

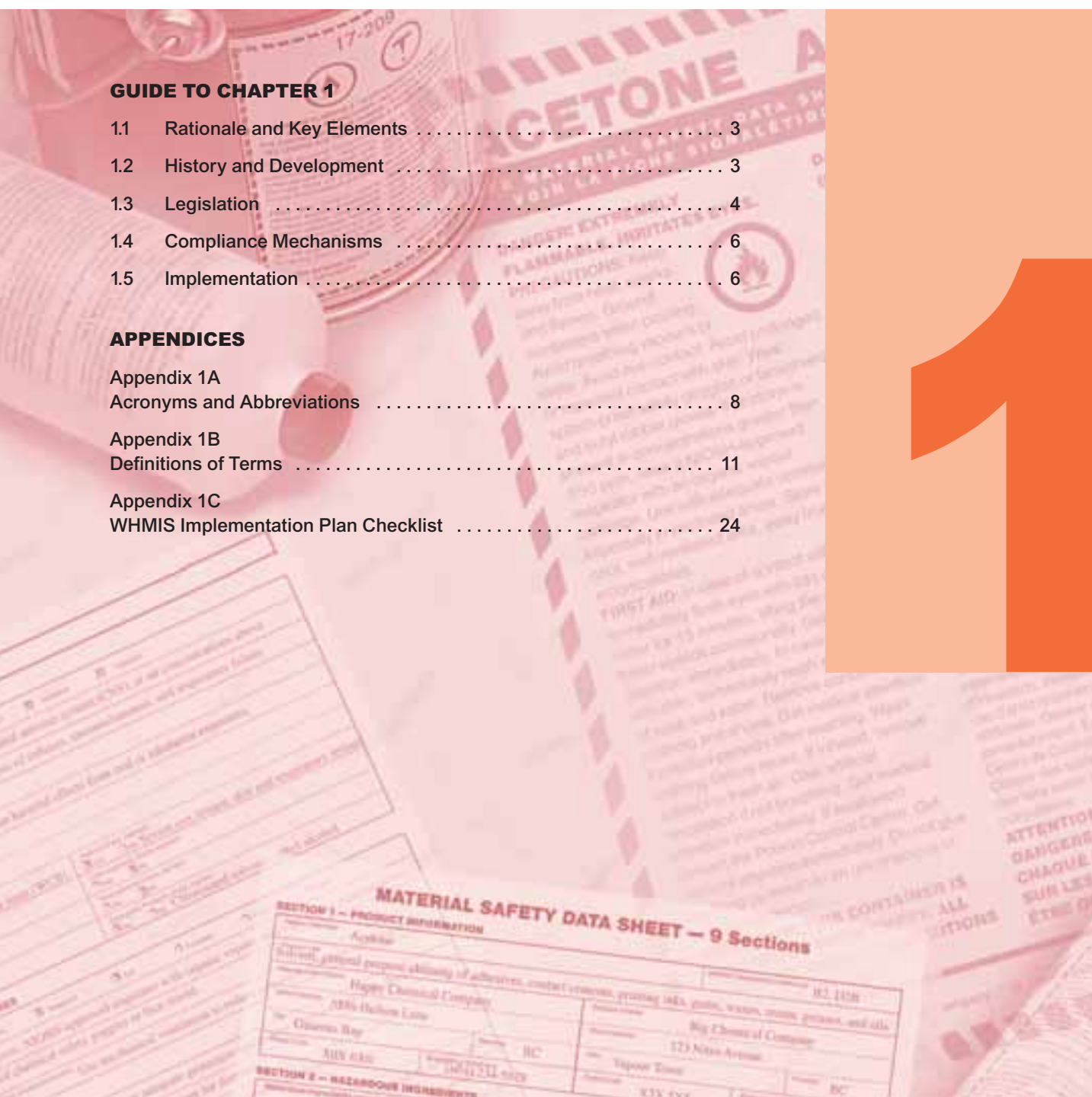
Introduction to WHMIS

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1.1 Rationale and Key Elements

Purpose The Workplace Hazardous Materials Information System (WHMIS) is a nationwide system providing information on hazardous materials used in the workplace. WHMIS recognizes the interests of workers, employers, suppliers, and regulators—balancing the worker’s right to know about hazards with industry’s right to protect confidential business information.

Exposure to hazardous materials can cause or contribute to a variety of health effects such as irritation, burns, sensitization, heart ailments, kidney and lung damage, and cancer. Some materials may also be safety hazards that can contribute to fires, explosions, and other accidents if improperly stored or handled.

The seriousness of these problems and the lack of information available to employers and employees prompted the federal, provincial, and territorial governments to implement WHMIS in 1988 to reduce the incidence of illness and injury caused by hazardous materials in the workplace.

WHMIS is a system of information delivery with three key elements:

Key elements

- Labels on hazardous materials and their containers. Labels immediately alert employers and workers to the dangers of products and provide basic safety precautions.
- Material Safety Data Sheets (MSDSs). These technical bulletins provide detailed information on the hazards of the product as well as precautionary measures and first aid procedures for immediate response.
- Worker Education and Training. With these programs, workers receive the instruction on hazards and training in safe work procedures that they need to work safely around or near hazardous materials.

WHMIS also includes mechanisms for ruling on claims by suppliers and employers to withhold certain information from labels and MSDSs as confidential business information (CBI or trade secrets), and for appeals to these rulings.

1.2 History and Development

WHMIS was developed over a period of almost a decade, through consultation and the collective effort of industry, labour, and federal-provincial-territorial governments.

Chronology of Events

January 1979	Working group of the Occupational Safety and Health Committee of the Canadian Association of Administrators of Labour Legislation (CAALLOSH) was formed to review current legislation in Canada for labelling hazardous substances.
May 1981	Federal-Provincial-Territorial Task Force chaired by Consumer and Corporate Affairs Canada (CCAC), the Federal Government department responsible for the HPA at that time, was formed to study the feasibility of labelling hazardous substances.
April 1982	CAALLOSH Committee submitted a final report on labelling to the CAALL Executive. Members agreed to extend the concept to a material information delivery system for hazardous materials. Labour Canada was asked to establish a tripartite consultative process to develop a proposal for the system.
February 1983	First meeting of the tripartite WHMIS Steering Committee was held. Working groups were established with participation by industry, labour, and government representatives.
April 1985	The Steering Committee published: <i>Workplace Hazardous Materials Information System - Report of the Project Steering Committee</i> .
May 1986	Deputy Ministers of Labour and heads of OSH agencies agreed to the formation of an intergovernmental Implementation Coordinating Committee (ICC).

January 1987	Consultative process began, involving federal, provincial, and territorial governments, industry, and labour on drafting of federal WHMIS legislation under the <i>Hazardous Products Act (HPA)</i> and complementary Model OSH Regulations, to be used as a basis by all OSH agencies.
June 1987	Federal legislation under Bill C-70 to amend the <i>HPA</i> , the <i>Canada Labour Code (Part II)</i> , and other related federal legislation, as well as to introduce the <i>Hazardous Materials Information Review Act (HMIRA)</i> , received Royal Assent, enabling implementation of WHMIS on a national basis by October 31, 1988.
January 1988	The <i>Controlled Products Regulations (CPR)</i> and Ingredient Disclosure List (IDL) under the <i>HPA</i> ; confidentiality criteria regulations under the <i>HMIRA</i> ; and amendments to the <i>Canada Occupational Safety and Health Regulations</i> under the <i>Canada Labour Code (II)</i> were published in final approved form in Part II of the <i>Canada Gazette</i> .
Spring 1988	Consultative process involving industry, labour, and government continued; Model Occupational Safety and Health Regulations for WHMIS workplace requirements and policy for the implementation of the information system were developed.
October 1988	WHMIS legislation went into effect.
October 1990	Report to Parliamentary Sub-committee on the tripartite review (by industry, labour, and government) of exclusions (WHMIS II) was completed.
April 1992	Parliamentary Sub-committee reported favourably to the Government on the exclusions review proposals.
May 1993	Federal Government announced agreement to implement the proposals from the exclusions review process.
May 1993 to Present	Relapse of WHMIS II proposals. Multi-stakeholder WHMIS task force formed to provide input into the proposed Globally Harmonized System (GHS) for hazardous classification, MSDSs, and labelling of chemicals that will bring into accord existing systems around the world. Currently, Canada actively participates in international GHS discussions, for which no exemptions are being considered.

1.3 Legislation

WHMIS is enforced by a combination of federal and provincial legislation, as shown in Figure 1.1.

Federal legislation

The federal *Hazardous Products Act* as amended by Bill C-70 (Chapter 30 [1987] of the Statutes of Canada) requires suppliers/importers of hazardous materials (called controlled products) to provide adequate labels and MSDSs as a condition of sale and importation.

The *Controlled Products Regulations*, issued under the authority of the *HPA*, specify the criteria defining a controlled product, the form and content of supplier labels, the information required on MSDSs, and the conditions of exemption from certain requirements.

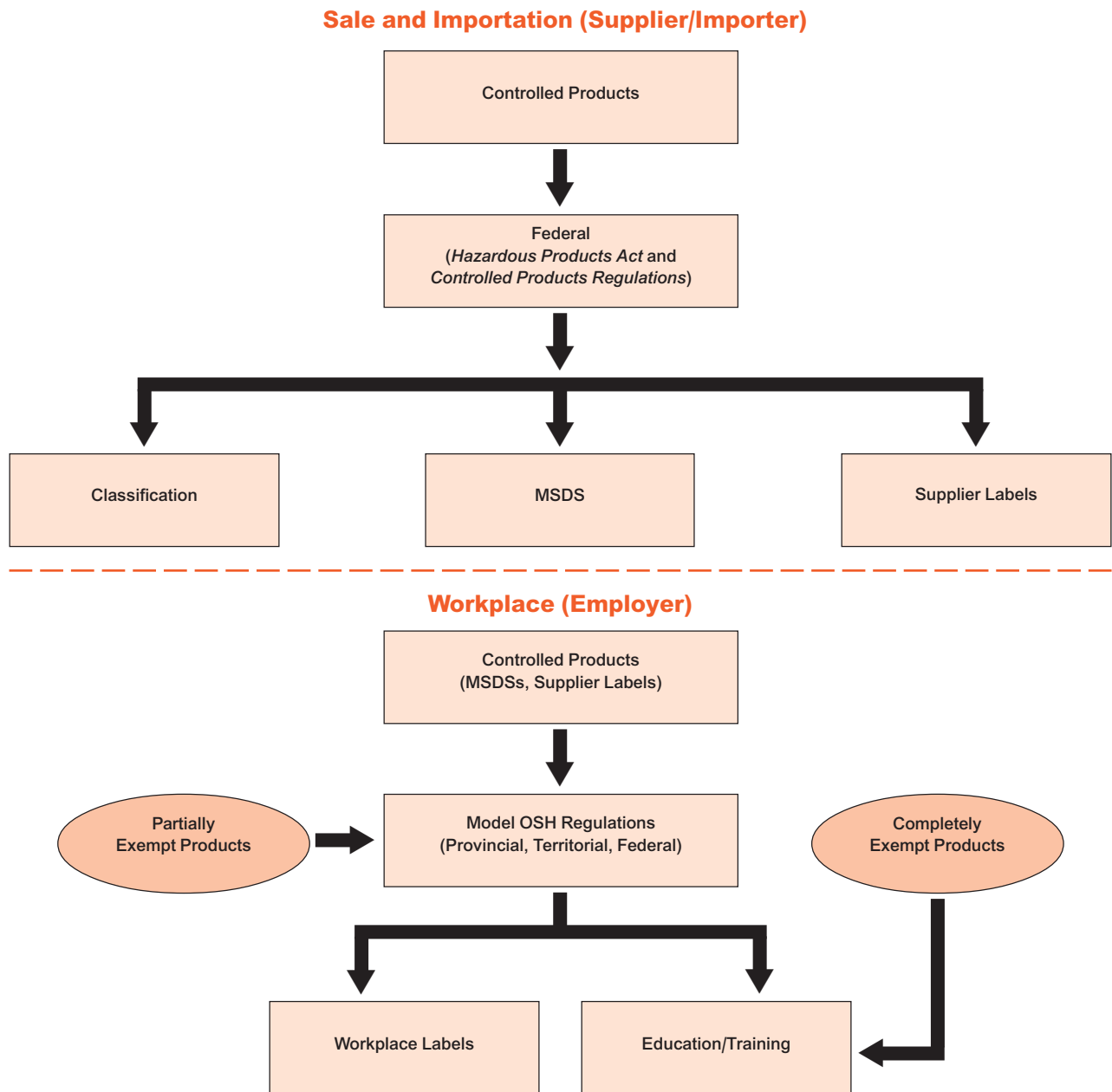
The Ingredient Disclosure List, also established under the *HPA* lists 1736 chemicals whose identities must be disclosed on a MSDS if present above specified concentrations in a controlled product. Substances on the IDL are not the only ingredients that must be disclosed on the MSDS. *WHMIS controlled products are classified by the criteria set out in the CPR.*

OSH legislation

Federal, provincial, and territorial Occupational Safety and Health (OSH) legislation require employers to provide labels, MSDSs, and worker education programs in the workplace. The model for this legislation is provided by the Workplace Hazardous Materials Information System Regulations (Model OSH Regulations).

- HMIRA The *Hazardous Materials Information Review Act* establishes a Commission to rule on claims and appeals related to exemptions from disclosure of confidential business information. The *Hazardous Materials Information Review Regulations* provide criteria for determining the validity of a claim for exemption.
- HMIRC The Hazardous Materials Information Review Commission (HMIRC) uses current literature, legislation, and policy decisions to approve confidential business information exemptions.

Figure 1.1
WHMIS Legislation



1.4 Compliance Mechanisms

The responsibility for ensuring compliance of suppliers with the *Hazardous Products Act* and the *Controlled Products Regulations* is delegated to federal, provincial, and territorial regulatory agencies, which carry out inspection programs. Health Canada, in cooperation with Customs and Excise Canada, exercises control on imports at point of entry.

Penalties:
federal

The penalties under the HPA are:

- On summary conviction, a maximum fine of \$100, 000, imprisonment for a maximum of six months, or both
- On proceedings by way of indictment, a maximum fine of \$1 million, imprisonment for a maximum of two years, or both

The Hazardous Materials Information Review Commission is responsible for ensuring compliance with the *Hazardous Materials Information Review Act*. Penalties under the *HMIRA* are the same as those under the *HPA*.

Penalties:
workplace

Human Resources Development Canada (Labour Program) and provincial and territorial occupational safety and health regulatory agencies carry out inspection programs under the legislation adopted by each agency for applying WHMIS to employers and the workplace. The penalties under such workplace legislation are established by the statutes that apply to each jurisdiction.

1.5 Implementation

To implement a WHMIS program, employers must make use of supplier labels and MSDSs, as well as their own knowledge of the hazards of products and their use in the workplace. This knowledge should take into account factors such as quantity, work processes, control measures, and work location.

General OSH regulations require employers to develop from this information written safe work procedures that ensure the health and safety of workers. They must also educate their workers about the hazards and train them in safe work procedures.

How employers implement WHMIS in their own workplaces will vary. Local occupational health and safety authorities can provide advice on requirements within each jurisdiction. The major elements of any WHMIS program, however, should contain the elements below (also see sample WHMIS Implementation Plan Checklist in Appendix 1C, “WHMIS Implementation Plan Checklist”):


1. Assign responsibility for program implementation.
2. Establish an inventory of controlled products. Determine if products in the workplace are controlled products by consulting both suppliers of products and published sources (also see Chapter 2, “Classification” and Chapter 8, “Resources”).
3. Develop a system to ensure WHMIS Labels and MSDSs are in compliance:
 - **Labels.** Use compliant supplier labels on existing and newly received controlled products. Develop workplace labels or other appropriate identification for other products. (See Chapter 4, “The Label.”)
 - **MSDSs.** Obtain and store current, compliant MSDSs for existing and newly received controlled products. Prepare compliant MSDSs for products produced or prepared in the workplace. (See Chapter 5, “The MSDS.”)
4. Determine the hazards of controlled products in the workplace. Review possible hazards encountered in the storage, handling, use, and disposal of controlled products, in the circumstances specific to the particular work setting.

5. Establish workplace controls. Based on the hazard evaluation, establish or upgrade workplace controls:
 - Substitution of a less hazardous chemical (as first choice of control, when possible)
 - Engineering controls such as general or local ventilation, process modification, or isolation
 - Administrative controls such as work procedures or scheduling
 - Personal Protective Equipment (PPE) such as respirators and gloves (if other controls are not practicable)
6. Establish emergency procedures. Develop, review, or upgrade both general and product-specific procedures for:
 - First aid
 - Evacuation
 - Spill control and accidental release
 - Firefighting and other emergency response
7. Provide worker education and training (see Chapter 6 “Worker Education and Training”). A WHMIS education and training program includes both an explanation of facts—for example, the hazards of controlled products, the WHMIS system, the significance of product labels and MSDS—and practical training in safe, specific procedures developed from WHMIS information.
8. Review each aspect of the WHMIS program regularly for compliance and effectiveness.

Appendix 1A Acronyms and Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
AEC	Atomic Energy Control (Agency)
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
BEI	Biological Exposure Indices
BSI	British Standards Institute
CAALL	Canadian Association of Administrators of Labour Legislation
CANUTEC	Canadian Transport Emergency Centre
CAS	Chemical Abstracts Service
CBI	Confidential Business Information
CCAC	Consumer and Corporate Affairs Canada
CCCR	Consumer Chemicals and Containers Regulations
CCOHS	Canadian Centre for Occupational Health and Safety
CEPA	Canadian Environmental Protection Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations (U.S.)
CHEMTREC	Chemical Transportation Emergency Center
CIHR	Canadian Institutes of Health Research
CPR	Controlled Products Regulations
CSST	Commission de la santé et de la sécurité du travail
CSA	Canadian Standards Association
DOT	Department of Transport (U.S.)
EPA	Environmental Protection Agency (U.S.)
EU	European Communities
FDA	Food and Drug Administration (U.S.)
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
HBV	Hepatitis B Virus
HC	Health Canada
HCV	Hepatitis C Virus
HEPA	High-Efficiency Particulate Air (filter)
HIV	Human Immunodeficiency Virus
HPA	Hazardous Products Act

HMIRA	Hazardous Materials Information Review Act
HMIRC	Hazardous Materials Information Review Commission
HMIS	Hazardous Materials Identification System
HRDC	Human Resources Development Canada
IARC	International Agency for Research on Cancer
ICAO	International Civil Aviation Organization
IDL	Ingredient Disclosure List
IDLH	Immediately Dangerous to Life and Health
ILO	International Labour Organization (based in Geneva)
IMO	International Maritime Organization
ISO	International Organization for Standardization
IUPAC	International Union of Pure and Applied Chemistry
LC	Lethal Concentration
LCDC	Laboratory Centre for Disease Control
LD	Lethal Dose
LEL	Lower Explosive Limit
LFL	Lower Flammable Limit
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration (U.S.)
NACE	National Association of Corrosion Engineers (U.S.)
NFPA	National Fire Protection Association (U.S.)
NIOSH	National Institute for Occupational Safety and Health (U.S.)
NSC	Nuclear Safety and Control Act
NTP	National Toxicology Program (U.S.)
OECD	Organization for Economic Cooperation and Development
OSHA	Occupational Safety and Health Administration (U.S.)
ORM	Other Regulated Material
PAPR	Powered Air-Purifying Respirator
PHAC	Public Health Agency of Canada
PIN	Product Identification Number
PIS	Policy Issue Sheet
PMCC	Pensky-Martens Closed Cup
RCRA	Resource Conservation and Recovery Act



RTECS	Registry of Toxic Effects of Chemical Substances
RTK	Right-to-Know
SARA	Superfund Amendment and Re-authorization Act (U.S.)
SETA	Setaflash Closed Cup
TDG	Transportation of Dangerous Goods (Act and pursuant Regulations)
TLV	Threshold Limit Value
TSCA	Toxic Substances Control Act
UEL	Upper Explosive Limit
UFL	Upper Flammable Limit
UNCETDG	United Nations Committee of Experts on Transport of Dangerous Goods
WHMIS	Workplace Hazardous Materials Information System
WHO	World Health Organization

Appendix 1B Definitions of Terms

About to be	A phrase which, when used where a product is “about to be appropriately labelled”, generally means within one work shift.
Absolute pressure	<p>Pressure measured with respect to zero pressure, contrasted with gauge pressure, which is measured with respect to atmospheric pressure.</p> <p>Absolute pressure = atmospheric pressure + gauge pressure. Absolute vapour pressure and absolute pressure in a cylinder refer to vapour and cylinder pressures measured with respect to zero instead of gauge.</p> <p>Pressure conversions: 1 atmosphere = 101.3 kPa = 760 mmHg = 760 torr = 14.7 lb/in²</p>
Acid	A chemical with a pH value less than 7.
Active ingredient (a.i.)	In a chemical formulation, the ingredient that produces the intended effect.
Acute exposure	A single exposure to a substance or multiple exposures occurring within a short time, usually 24 hours or less. See also <i>Chronic exposure</i> and <i>Subchronic exposure</i> .
Acute lethality	The death of animals immediately or within 14 days after a single dose of or exposure to a toxic substance.
Acute toxic effect	An adverse effect in a human or animal, with severe symptoms developing rapidly and advancing quickly to a crisis.
Acute toxicity	The degree to which a substance can cause adverse (acute) effects resulting from a single dose of or exposure to a substance. Ordinarily used to denote effects in experimental animals.
Aerosol	A dispersion of solid or liquid particles suspended in air.
Aerosol container	A disposable container designed to release pressurized contents through a manually operated valve that is an integral part of the container.
Affected party	If a controlled product is the subject of a claim for confidential business information, an affected party is one who is not a competitor of the claimant, and who is involved with the use or supply of a controlled product at a workplace. An affected party may be a supplier of the controlled product (or authorized representative); an employee (or legally authorized representative) or employer at the workplace; or a health and safety professional, representative, or committee member for the workplace.
Antidote	A remedy used to counteract the effects of a poison.
Aplastic anemia	A condition in which the bone marrow fails to produce an adequate number of red blood cells.
Applicable information	On MSDSs, information on a product that can help workers to properly and safely store, handle, use, or dispose of the product.
Applied	Where a label is “applied” to a controlled product or its container, the label is attached, imprinted, stencilled, or embossed on the controlled product or container or, in a bulk shipment of a controlled product, is included with or accompanies the bulk shipment in the manner prescribed.

Aqueous	Indicates the presence of water in a solution.
Aromatic solvents	Derivatives of benzene. They penetrate the skin and may be toxic if inhaled.
Asbestosis	A form of bilateral, diffuse, interstitial fibrosis of the lungs resulting from inhalation of airborne asbestos fibres.
Asphyxiant	A vapour or gas that can cause unconsciousness or death by suffocation. Two types are: <ul style="list-style-type: none"> • Simple asphyxiants are physiologically inert gases that in excess may displace or dilute oxygen in air to dangerously low levels. • Chemical asphyxiants are chemical substances that prevent normal delivery of oxygen to body tissues by interfering with either the uptake of oxygen by blood or the ability of cells to use oxygen
At a later time	A phrase which, when used where a controlled product will be labelled “at a later time”, generally means a period of time longer than one work shift, an interim during which a placard must be posted.
Atopic	A constitutional or hereditary tendency to develop chronic hypersensitive states such as hay fever or asthma, especially to antigens that provoke no adverse reactions in nonatopic subjects.
Autoignition temperature	The temperature at which the vapour from a liquid will ignite without a source of ignition such as a spark or flame.
Biological Exposure Indices (BEI)	Numerical reference values representing the amount of a material the human body absorbs when a healthy worker is exposed to a chemical at its threshold limit value. Determined by measuring the material or its metabolic products in tissue, fluid, or exhaled air.
Boiling point	The temperature at which the vapour pressure of a liquid is equal to the external pressure (usually standard atmospheric, or sea level, pressure of 760 mm Hg).
Bonding	In the transfer of a liquid from one container to another, refers to making an electrically conductive connection between the discharge container and the receiving container to eliminate the possibility of an electrical spark due to static discharge.
Buffer	A pH stabilizer. A substance counteracting the change in hydrogen ion concentration (pH) otherwise produced when acids or bases are added to a solution.
Bulk shipment	A shipment of a controlled product that is contained, without intermediate containment or packaging, in any of the following: <ul style="list-style-type: none"> • A vessel with a water capacity of more than 454 litres • A freight container, a road vehicle, a portable tank; a freight container carried on a road vehicle, railway vehicle, ship, or aircraft; or a portable tank carried on a road vehicle, railway vehicle, ship, or aircraft • The hold of a ship • A pipeline
Canister	A container filled with adsorbent materials, and designed, as part of a respirator, to remove gases and vapours from the air before they are inhaled by a worker.
Carcinogen	A substance or agent capable of producing cancer in mammals.
Carrier	A material mixed with active ingredients to make a formulation, for example, finely ground clay, diatomaceous earth, water, gas propellant.

Cartridge	In an air-purifying respirator, the small, detachable part of an air-purifying respirator that is designed to adsorb gases and vapours from the air.
CAS registry number	The identification number assigned to a chemical substance by the Chemical Abstracts Service Division of the American Chemical Society.
Caustic	A chemical with a pH value greater than 7. (May also be called <i>Base</i> or <i>Alkali</i>).
cc	Cubic centimetre; a volume measurement in the metric system, equal in capacity to one millilitre (mL).
Chemical cartridge respirator	A non-emergency, air-purifying respirator equipped with one or more cartridges specific to various gases or vapours.
Chemical family	A group of single elements or compounds with similar chemical characteristics or structure. For example, acetone, methyl ethyl ketone (MEK), and methyl isobutyl ketone (MIBK) are in the <i>ketone</i> family.
Chemical formula	A combination of chemical symbols defining a chemical. It represents the proportions of the elements that make it up. For example, H ₂ O is the formula for water, made up of two molecules hydrogen and one molecule oxygen.
Chemical identity	A specific chemical name. Complex chemicals may have more than one name, depending on the naming system used.
Chief Appeals Officer	The Chief Appeals Officer appointed pursuant to Section 38 of the <i>HMIRA</i> .
Chief Screening Officer	The Chief Screening Officer appointed pursuant to Section 38 of the <i>HMIRA</i> .
Chronic exposure	Repeated exposure to a substance over a relatively long period of time (typically more than 10% of lifetime in laboratory studies). See also <i>Acute exposure</i> and <i>Subchronic exposure</i> .
Chronic toxic effect	An adverse effect to the health of a person or test animal that develops: <ul style="list-style-type: none"> • Over time, following a single exposure to a toxic substance • From prolonged or repeated exposure to a toxic substance under conditions that do not produce that effect from a single exposure.
Coefficient of water/oil distribution	The ratio of the solubility of a product in water to its solubility in n-octanol.
Combustible liquid	A liquid with a flashpoint of 100° F (37.8° C) or more but less than 93.3° C (200° F) when tested according to the applicable method in Schedule IV of the <i>CPR</i> .
Combustion	Rapid oxidation with the production of heat and light, as in the burning of a fuel.
Commission	The Hazardous Materials Information Review Commission established by Subsection 28(1) of the <i>HMIRA</i> .
Common chemical name	The simple chemical name of a chemical as opposed to its trade name or its technically precise IUPAC name. For example, the pesticide with the common chemical name <i>carbaryl</i> has the trade name <i>Sevin</i> and the full scientific name of <i>1-naphthyl-n-methyl carbamate</i> .
Complex mixture	A mixture that is a combination of many chemicals, has a commonly known generic name, and is any of the following: <ul style="list-style-type: none"> • A naturally occurring mixture • A fraction of a naturally occurring mixture that results from a separation process • A modification of either a naturally occurring mixture or a fraction of a naturally occurring mixture that results from a chemical modification process

Concentration	The relative amount of a substance combined with other substances. Examples: 2 ppm hydrogen sulfide in air, or a 50% caustic solution.
Confidential business information (CBI)	Product information withheld from labels or MSDSs for a specified period of time in a valid claim for exemption from WHMIS disclosure requirements, and granted on the basis of criteria in the <i>Hazardous Materials Information Review Regulations</i> .
Consultation	Regarding WHMIS instruction, means a meeting in which an employer seeks information or advice from the joint occupational safety and health committee (or representative).
Container	Under the <i>HPA</i> and the <i>CPR</i> , a container sold by a supplier includes a bag, barrel, bottle, box, can, cylinder, drum, or similar package or receptacle. Under Model OSH Regulations governing employers, the term includes bulk storage tanks. See also <i>Outer container</i> .
Controlled product	Any product, material, or substance that falls within the hazard criteria set out in Part IV of the Controlled Products Regulations.
Corrosive	Refers to a material that causes visible destruction or irreversible alterations in human skin tissue at the site of contact or that has a significant corrosion rate on steel or aluminum.
Cosmetic	As defined in the <i>Food and Drugs Act</i> , means any substance or mixture of substances manufactured, sold, or represented for use in cleansing, improving, or altering the complexion, skin, hair, or teeth. This definition includes deodorants, perfumes, soaps, tattoo inks, and products used to groom animals.
Critical temperature (T _c)	The temperature above which a substance can exist only as a gas and cannot be converted to a liquid by pressure.
Cylinder pressure	The pressure to which a cylinder is filled.
Decomposition	Breakdown of a substance by heat, chemical reaction, biological, aging, or other processes into parts or elements or simpler compounds.
Dermal	Used on or applied to the skin.
Dermal toxicity	Adverse effects resulting from skin exposure to a substance. Ordinarily used to denote effects in experimental animals.
Dermatitis	Inflammation of the skin caused by an irritant substance.
Detoxify	To make harmless; to neutralize a poison or remove a poisonous effect.
Distributor	A person or company that distributes controlled products, made by manufacturers, to users or other suppliers. See also <i>importer, supplier</i> .
Drug	As defined in the <i>Food and Drugs Act</i> , includes any substance or mixture manufactured, sold, or represented for any of the following: <ul style="list-style-type: none"> • The diagnosis, treatment, mitigation, or prevention of a disease, disorder, abnormal physical state, or the physical symptoms thereof, in man or animal • Restoring, correcting, or modifying organic functions in man or animal • Disinfection in premises in which food is manufactured, prepared, or kept
Dust	Solid airborne particles that are mechanically generated.
Education	All those activities, including instruction, that provide both knowledge and practical skills to workers so that they may work safely with, or in proximity to, controlled products in the workplace. See also <i>Instruction</i> and <i>Training</i> .

Embryotoxicity	Material that is toxic to the fetus at concentrations or exposures that are not toxic to the mother.
Employer	Specific meaning is established by the appropriate occupational regulatory authority. In general, refers to that person who has in service under a contract of hiring or apprenticeship—written or oral, express or implied—a person engaged in work in or about a workplace.
Emulsion	A mixture of two or more immiscible liquids, such as oil and water, where one is suspended or dispersed in the other in the form of minute droplets and remains suspended or dispersed for a period of time. An emulsifier may be used to assist the dispersion.
Epidemiology	The science dealing with the study of disease in a general population, in particular the incidence (rate of occurrence) and distribution (for example, by age, sex, or occupation) of the disease.
Evaporation	The transformation of a liquid into a vapour.
Evaporation rate	The rate at which a particular material will vaporize (evaporate) relative to butyl acetate, ether, or other specified solvent.
Explosive	As defined in the <i>Explosives Act</i> , means any substance that is made, manufactured or used to produce an explosion, or detonation, or a pyrotechnic effect and includes gunpowder, propellant powders, blasting agents, dynamite, detonating cord, lead azide, detonators, ammunition, rockets, fireworks, safety flares, or other signals.
Exposure	A condition of contact between a person and a hazardous substance. Contact may be oral, dermal, or respiratory.
Exposure limit	A maximum permitted level of exposure to an air contaminant. Three types of limits commonly used by the ACGIH are: <ul style="list-style-type: none"> • <i>Threshold Limit Value – Time-Weighted Average (TLV-TWA)</i>. The time-weighted average concentration for a normal 8-hour work day or 40-hour work week to which almost all workers can be repeatedly exposed without adverse effect. • <i>Threshold Limit Value – Short-Term Exposure Limit (TLV-STEL)</i>. The maximum concentration to which workers can be periodically exposed for up to 15 minutes without suffering irritation, chronic or irreversible tissue change, or sufficient narcosis to increase accident proneness, impair ability for self-rescue, or greatly reduce work efficiency. • <i>Threshold Limit Value – Ceiling (TLV-C)</i>. The concentration that must not be exceeded at any time. This limit applies to substances that are irritant or fast-acting (the TLV-TWA is inappropriate for such substances).
Flame projection	The ignited discharge of the pressurized contents of an aerosol container. See also <i>Flashback</i> .
Flammable limits	The upper and lower concentrations of a gas or vapour in air between which an explosion or propagation of flame will occur when an ignition source is present. See also <i>LEL (LFL)</i> and <i>UEL (UFL)</i> .
Flammable liquid	A liquid with a flashpoint below 100° F (37.8° C) when tested according to the appropriate method in Schedule IV of the <i>CPR</i> . See also <i>Combustible liquid</i> .

Flammable range	The concentration range in which a gas or vapour is flammable in air between the upper and lower flammable limits.
Flammable solid	A solid that meets any of four criteria in <i>CPR</i> , Section 39.
Flashback	The part of a flame projection that extends from its point of ignition back to the aerosol container. See also <i>Flame projection</i> .
Flashpoint	The minimum temperature at which a liquid gives off enough vapour to ignite in the presence of a source of ignition under specified test conditions. Flashpoints will vary for the same material depending on the test method used. Appropriate test methods are provided in Schedule IV of the <i>CPR</i> .
Fugitive emission	A gas, liquid, solid, vapour, fume, mist, fog, or dust that escapes from process equipment, emission control equipment, or a product.
Fume	Solid particles in air condensed from the vapour of a solid material. Fumes are produced in, for example, welding operations, and often accompanied by a chemical reaction, such as oxidation.
g	Gram; a metric unit of weight. One pound is about 454 grams.
Gas	A substance that is in the gaseous state at ordinary temperature and pressure (that is, an absolute pressure of 101.325 kPa at 20° C).
General exhaust ventilation	A system for exhausting air containing contaminants from a general work area. Also see <i>Local exhaust</i> .
Generic instruction	Instruction of workers in WHMIS hazard information without reference to specific products or worksites.
Generic material safety data sheet	A single MSDS that applies to a number of similar products.
Half life	The period of time for a chemical or radioactive substance to lose half its concentration or activity due to metabolic uptake, decay, or other chemical change.
Hazard information	Information on the proper and safe storage, and handling, use, and disposal of a controlled product; includes information relating to its toxicological properties.
Hazard symbol	Includes any design, mark, pictogram, sign, letter, word, number, abbreviation, or any combination thereof that must be displayed on a controlled product or its container to show the nature of the hazard of the controlled product.
Hazardous product	Any prohibited product, restricted product, or controlled product.
Hazardous waste	A controlled product that is intended for disposal or is sold for recycling or recovery.
High-efficiency particulate air (HEPA) filter	A filter that has been tested to assure an efficacy equal to or exceeding 99.97% for removal of particles having a mean aerodynamic diameter of 0.3 microns.
Ignition source	A condition such as flame, static discharge, or heat capable of contributing to ignition of flammable or combustible materials.
Immediately Dangerous to Life and Health (IDLH)	An atmosphere in which the concentration of oxygen or flammable or toxic air contaminants would cause fatal injury or irreversible and incapacitating health effects to a person without respiratory protection.

Immediate use	With reference to the use of the contents of a portable container, means to be used at once, without delay.
Importer	A supplier, that is, a person or company, who imports controlled products for sale, distribution, or immediate use in Canada. The importer can arrange the transaction without necessarily handling the product physically.
In proximity to	With reference to “working in proximity to a controlled product,” means the area in which worker health and safety could be at risk during the storage, handling, use, or disposal of the product, or in emergencies such as accidental release or spill.
In vitro	Refers to laboratory studies performed outside living organisms, for example, in glass (<i>vitro</i>) test tubes, or Petri dishes.
In vivo	Refers to laboratory studies performed inside living organisms.
Incompatible	Materials that could cause dangerous reactions from direct contact with one another are described as incompatible.
Ingestion	Intake of a substance through the mouth.
Ingredient Disclosure List (IDL)	The IDL is a list of substances which, if present in a WHMIS controlled product must be disclosed on the MSDS if present at or above the specified cut-off concentration (1.0% or 0.1%). Ingredient disclosure is not limited to materials that appear on the IDL. The criteria for ingredient disclosure is set out in 13(a)(i) to (iv) of the <i>HPA</i> .
Inhalation	The breathing in of a substance.
Inhibitor	A chemical that is added to another substance to prevent an unwanted chemical change from occurring.
Inorganic chemicals	Generally, chemicals that do not contain carbon bonded to hydrogen.
Instruction	The methodical teaching of information. See also <i>Education, Training</i> .
Irritant	A substance that, with sufficient contact, will cause reversible inflammation of the eye, skin, or respiratory system. The contact may be single or multiple. <i>Primary irritants</i> cause irritation at the site of contact. See also <i>Dermatitis</i> .
kg	Kilogram; a metric unit of weight, about 2.2 pounds. Also see g and mg.
kPa	Kilopascal; a unit of pressure (1 atmosphere equals 101.3 kPa).
L	Litre; a metric unit of volume, equal to 1,000 cc or mL.
Label	Includes any mark, sign, device, stamp, seal, sticker, ticket, tag, or wrapper.
Laboratory	A place devoted to experimental study in any branch of natural science or to the application of scientific principles in testing and analysis. A laboratory includes non-traditional settings such as field testing locations (open or enclosed) and production line testing stations.
Laboratory sample	A sample, taken from a controlled product, that is intended solely to be tested in a laboratory but does not include a controlled product that is to be used: <ul style="list-style-type: none"> • by the laboratory for testing other products, materials or substances • for educational or demonstration purposes • for marketing

Lethal concentration ₅₀ (LC ₅₀)	As defined by the <i>CPR</i> , means the concentration of a substance in air that, when administered by inhalation over a specified length of time in an animal assay, is expected to cause the death of 50% of a defined animal population. LC ₅₀ criteria in the <i>CPR</i> are based on 4-hour exposures. The LC ₅₀ is expressed by volume as parts of substance per million parts of air (ppm) for gases and vapours; or by weight as milligrams of material per litre or cubic metre of air (mg/L or mg/m ³) for dusts, mists, and fumes.
Lethal dose ₅₀ (LD ₅₀)	As defined by the <i>CPR</i> , is a single dose of a substance that, when administered by a defined route in an animal assay, is expected to cause the death of 50% of a defined animal population. The LD ₅₀ dose is usually expressed as milligrams or grams of material per kilogram of animal body weight (mg/kg or g/kg).
Lower explosive limit (LEL)	See <i>Lower flammable limit (LFL)</i> .
Leukemia	A blood disease characterized by over-production of white blood cells.
Lipophilic properties	Affinity of a product for fatty tissue.
Local exhaust ventilation	A system for capturing and exhausting contaminants from the air at the point where the contaminants are produced (for example, during welding, grinding, or similar operations). Also see <i>General exhaust ventilation</i> .
Lower flammable limit (LFL)	For a vapour or gas, the lowest concentration of the substance in air that will produce a flame or explosion when an ignition source is present. At concentrations lower than the LFL, the mixture is too “lean” to burn. Also termed the <i>lower explosive limit (LEL)</i> .
m ³	Cubic metre; a metric measure of volume equal to 1,000 litres.
mL	One millilitre or cubic centimetre, one one-thousandth part of a litre.
Manufactured article	Any article that is formed to a specific shape or design during manufacture, the intended use of which is dependent in whole or in part on its shape or design, and that, under normal conditions of use, will not release or otherwise cause a person to be exposed to a controlled product.
Material safety data sheet (MSDS)	A document disclosing the information referred to in subparagraphs 13(a)(i) to (v) of the <i>Hazardous Products Act</i> . A technical document that provides detailed hazard and precautionary information on a controlled product.
Mechanical exhaust ventilation	A powered device such as a fan or venturi tube for exhausting contaminants from a workplace.
Medical professional	A person who is either of the following: <ul style="list-style-type: none"> • Entitled to practice medicine • Registered as a registered nurse under the laws of the province in which the person is practising
Mist	Liquid droplets suspended in air that are produced by dispersion of a liquid or by condensation of a vapourized liquid.
Mixture	A combination of two or more products, materials, or substances that does not undergo a chemical change as a result of interaction among products, materials, or substances.
Mutagenicity	The capability of a substance to cause mutations in living cells. Mutations may occur in either germ (reproductive) cells or somatic (body) cells.

NBUAC or n-BuAc	Normal butyl acetate; an organic compound assigned the evaporation rate of 1 (n-BuAc = 1). See <i>Evaporation rate</i> .
Normal atmospheric pressure	An absolute pressure of 101.325 kPa (1.00 atmosphere) at 20° C (68° F).
Nuclear substance	As defined in the <i>Nuclear Safety and Control Act</i> (which will replace the <i>Atomic Energy Control Act</i>), means: <ul style="list-style-type: none"> • Deuterium, thorium, uranium, or an element with an atomic number greater than 92 • Derivatives or compounds of deuterium, thorium, uranium, or elements with atomic numbers greater than 92 • A radioactive nuclide • A substance prescribed by the Canadian Nuclear Safety Commission as capable of releasing nuclear energy, or required for the production or use of nuclear energy • A radioactive byproduct of the development, production, or use of nuclear energy • A radioactive substance or thing used for the development or production of, or connected with the use of, nuclear energy.
Nurse	A registered nurse registered or licensed under the laws of a province. See also <i>Medical professional</i> .
Odour threshold	The lowest airborne concentration of a chemical that can be perceived by the sense of smell.
Oncogenic	Capable of creating tumours in tissue.
Oral	Taken into the body through the mouth.
Oral toxicity	Adverse effects resulting from taking a substance into the body via the mouth. Ordinarily used to denote effects in experimental animals.
Organic chemicals	Generally, chemical compounds containing carbon.
Outer container	The most outward container of a controlled product that is visible under normal conditions of storage and handling. See also <i>Container</i> .
Oxidation	A reaction in which a substance combines with oxygen provided by an oxidizer or oxidizing agent.
Oxidizer	A substance that readily yields oxygen or equivalent to stimulate the combustion of organic matter. Oxidizers are incompatible with any flammable or combustible material.
Package liner	A special case of an inner container that would normally be kept in the outer container during product storage and use.
Packing Groups	As defined under the <i>Transportation of Dangerous Goods Regulations</i> , Packing Groups are categories of hazard to which products in Classes 3, 6, and 8 are assigned.
Percent volatile	The percentage (usually by volume) of a volatile component that will evaporate at a temperature of 21° C (70° F) (unless some other temperature is stated).
Personal protective equipment	Devices worn by workers to protect against hazards in the environment, for example, respirators, gloves, and face shields.

Pest control product	As defined in the <i>Pest Control Products Act</i> , any product, device, organism, substance, or thing that is manufactured, represented, sold, or used as a means for directly or indirectly controlling, preventing, destroying, mitigating, attracting, or repelling any pest, and includes: <ul style="list-style-type: none"> • Any compound or substance that enhances or modifies or is intended to enhance or modify the physical or chemical characteristics of a control product to which it is added • Any active ingredient used for the manufacture of a control product
pH	An expression on a scale from 0 to 14 of the extent of acidity or alkalinity of a substance. Materials with pH 7 are neutral. Those below pH 7 are acidic and those above are basic.
Pictogram	The stylized graphical material that appears within a hazard symbol, for example, a skull and crossbones, stylized “T,” or flame.
Pensky-Martens Closed Cup (PMCC)	A flashpoint test method.
Polymerization	A chemical reaction in which one or more small molecules combine to form larger molecules. A <i>hazardous polymerization</i> is one that takes place at a rate that releases large amounts of energy.
Powered air-purifying respirator (PAPR)	An air-filtering respirator that uses an electrically powered pump to deliver air to a face piece or head covering, and that meets minimum air flow requirements set by NIOSH.
ppb	Parts per billion; a unit for measuring the concentration of a gas or vapour in air, expressed as parts (by volume) of the gas or vapour in a billion parts of air.
ppm	Parts per million; a unit often used for measuring the concentration of a gas or vapour in air, expressed as parts (by volume) of the gas or vapour in a million parts of air.
Product Identification Number (PIN)	Four-digit number used for shipping. The PIN may be of UN (United Nations) or NA (North American) origin. Numbers can be found in Schedule II of the <i>Transportation of Dangerous Goods Regulations</i> .
Product identifier	In respect of a controlled product, the brand name, code name, or code number specified by a supplier or the chemical name, common name, generic name, or trade name.
Prohibited product	Any product, material, or substance included in Part I of Schedule I of the <i>HPA</i> .
Radioactive precibred substance	See <i>Nuclear substance</i> .
Reaction	A chemical transformation or change; the interaction of two or more substances to form new substances.
Reactivity	A description of the tendency of a substance to undergo chemical reaction with the release of energy. Undesirable effects—such as pressure buildup, temperature increase, formation of toxic, or corrosive by-products—may occur because of the reactivity of a substance to heating, burning, direct contact with other materials, or other conditions in use or in storage.
Readily available	Means, when referring to a material safety data sheet, accessible to all workers, who have the right to read the MSDS before using a controlled product.
Reducing agent	In a reduction reaction, the reducing agent is the substance that combines with oxygen or donates electrons to the reaction. See <i>Oxidation</i> .

Reproductive toxicity	The effect of a product on the capability of persons or test animals to produce offspring.
Research and development	Systematic investigation or search carried out in a field of science or technology by experiments or analyses, other than investigation or search for market research, sales promotion, quality control, or routine testing of controlled products. This investigation includes : <ul style="list-style-type: none"> • Applied research, namely, work undertaken to advance scientific knowledge with a specific practical application in view • Development, namely, use of the results of applied research to create new or improve existing processes or controlled products
Respirator	A personal protection device designed to protect the wearer from inhalation of a hazardous atmosphere.
Respiratory tract sensitization	The development in a person who is not atopic (allergic) of severe asthma-like symptoms on exposure to a substance to which the person has previously been exposed. See also <i>Sensitizer</i> and <i>Skin sensitization</i> .
Restricted product	Any product, material, or substance included in Part II of Schedule I of the <i>HPA</i> .
Risk phrase	A statement identifying a hazard that may arise from the nature of the controlled product or the class, division, or subdivision of controlled products.
Saturated vapour concentration	The vapour concentration of a material above which no further volatilization can take place.
Sell	As defined in the <i>HPA</i> , includes offer for sale, expose for sale, and distribute. The interpretation of “sell” includes the rental or lease of a controlled product as well as the distribution of sales samples of the product.
Sensitizer	A substance that on first exposure causes little or no reaction in humans or test animals, but which on repeated exposure may cause a marked response not necessarily limited to the contact site. Skin sensitization is the most common form in industry although respiratory sensitization also occurs. See also <i>Respiratory tract sensitization</i> and <i>Skin sensitization</i> .
Setaflash Closed Tester (SETA)	A flashpoint test method.
Silicosis	A degenerative disease of the lungs caused by the inhalation of substances that contain crystalline silica (free silica).
Skin sensitization	An immunologically-mediated cutaneous reaction in a person or test animal that is not atopic (allergic) on exposure to a substance to which the person or animal has previously been exposed. See also <i>Respiratory tract sensitization</i> and <i>Sensitizer</i> .
Smoke	Aerosols, gases, and vapours resulting from incomplete combustion.
Solubility in water	A term expressing the percentage of a material (by weight) that will dissolve in water at ambient temperature. <i>The Occupational Environment: Its Evaluation and Control</i> (see Chapter 8, “Resources”) uses these terms used to express solubility: <ul style="list-style-type: none"> • Negligible (less than 0.1%) • Slight (0.1% to 10%) • Moderate (1% to 10%) • Appreciable (more than 10%) • Complete (soluble in all proportions)

Solvent	A liquid that will dissolve another substance.
Specific gravity	The weight of a material compared to the weight of an equal volume of water. Example: If a volume of a material weighs 8 grams, and an equal volume of water weighs 10 grams, the material is said to have a specific gravity of 0.8. Insoluble materials with specific gravity of less than 1.0 will float in water; insoluble materials with specific gravity greater than 1.0 will sink
Statistically significant	Shown by statistical procedures to have a high probability of being due to something other than chance.
Subchronic exposure	In laboratory tests, usually refers to toxic effects associated with repeated exposure of a test animal to a substance, the exposure not exceeding 10% of the animal's average lifetime. See also <i>Chronic exposure</i> .
Supplier	A person who is a manufacturer, processor, or packager of a controlled product or a person who, in the course of business, imports or sells controlled products.
Supplier identifier	The name of a supplier of a controlled product.
Supplier label	A label provided by a supplier disclosing the information and displaying the hazard symbols referred to in paragraph 13(b) of the <i>HPA</i> .
Supplier material safety data sheet	An MSDS provided by a supplier disclosing the information referred to in subparagraphs 13(a)(i) to (v) of the <i>HPA</i> .
Tagliabue (TAG) Closed Cup (TCC) and Open Cup (TOC)	Flashpoint test methods.
Teratogenicity	The capability of a material to cause birth defects in a fetus resulting from exposure of the pregnant female at a concentration that has no adverse effect on the mother.
Threshold Limit Value (TLV)	A term used by ACGIH to express the airborne concentration of a material to which <i>nearly</i> all persons can be exposed day after day, without adverse effects. See also <i>Exposure limit</i> .
Toxicity	The adverse effects, in animal test subjects or humans, resulting from exposure to certain materials, generally by way of the mouth, skin, or respiratory tract.
Trade name	The trademark name or commercial trade name for a material.
Trade secret	See <i>Confidential business information</i> .
Training	One type of instruction in which workers are taught specific work procedures. See also <i>Instruction</i> and <i>Education</i> .
Transmit	To pass along by any physical, electronic, optical, or other means.
Upper explosive limit (UEL)	See <i>Upper flammable limit (UFL)</i> .
Unstable	Tending toward decomposition or other unwanted chemical change during normal handling or storage.
Upper flammable limit (UFL)	The upper flammable limit of a vapour or gas; the highest concentration of the substance in air that will produce a flash of fire when an ignition source (heat, arc, or flame) is present. At higher concentrations, the mixture is too "rich" to burn. Also termed the <i>upper explosive limit (UEL)</i> .
Vapour	The gaseous form of a substance that is found in a solid or liquid state at normal atmospheric pressure (that is, an absolute pressure of 101.325 kPa at 20°C).

Vapour density	The weight of a vapour or gas compared to the weight of an equal volume of air.
Vapour pressure	The pressure exerted by the saturated vapour of a substance in equilibrium with its liquid or solid form in a closed container. The vapour pressure of a substance increases with temperature until its critical temperature is reached. Vapour pressures are reported in millimetres of mercury (mmHg) at 20° C (68° F), unless stated otherwise.
Ventilation	See <i>General exhaust</i> , <i>Local exhaust</i> , and <i>Mechanical ventilation</i> .
Viscosity	The ability of a liquid to resist flow. Viscosity can be measured in various ways. Dynamic viscosity is the ratio of a fluid's viscosity to its density, and is reported in units such as square millimetres per second and Saybolt Universal Seconds (1 mm ² /s = 7.76 SUS).
Volatile	A volatile material is one that changes to vapour easily (and quickly) at a relatively low temperature.
Volatility	Refers to the ease with which a material evaporates.
Warning properties	The capability of chemicals to be noticed by human senses at levels in the air below those that may cause ill health effects.
Waste Profile Sheet	An information sheet that identifies ingredients in hazardous waste and provides information on potential hazards and preventative measures. (See Appendix 3A, "Sample Hazardous Waste Profile Sheet".)
Workplace	A place where a person works for remuneration.
Workplace label	A label that discloses all of: <ul style="list-style-type: none"> • A product identifier identical to that found on the MSDS of the corresponding controlled product • Information for the safe handling of the controlled product • A statement indicating that an MSDS for the product, if supplied or produced, is available

Appendix 1C WHMIS Implementation Plan Checklist

Activity	Time needed	Assigned to	Date completed
Assign responsibility for WHMIS implementation			
1.			
2.			
3.			
Establish an inventory of controlled products			
Determine which products used or produced are classified as controlled products under WHMIS.			
WHMIS labels and MSDSs			
Obtain MSDSs for controlled products already in the workplace.			
Develop a process for requesting and receiving MSDSs for new purchases.			
Develop methods to store MSDSs so that they are readily available to workers.			
Develop a process to ensure that supplier labels are on or available for all new controlled products received.			
Develop a process to create and provide workplace labels and other means of identification.			
Determine hazards			
Identify and evaluate the hazards of controlled products in the workplace (for example, consider the quantities to be used and stored, and the work processes where these products are used).			
Workplace controls			
Based on the hazard evaluation, determine where the following workplace controls may need to be established or upgraded:			
<ul style="list-style-type: none"> • Substitution of a less hazardous product • Engineering controls such as local exhaust ventilation and process modification • Administrative controls such as work procedures and work scheduling • Personal protective equipment and clothing 			
Integrate these controls into the overall health and safety program.			
Emergency procedures			
Review first aid procedures and upgrade them if required.			
Review spill control procedures and upgrade them if required.			
Review firefighting procedures and upgrade them if required.			
Notify the local fire department of the location, types, and quantities of controlled products used and stored.			
Worker education and training			
Complete "WHMIS Education and Training Checklist."			
Evaluate WHMIS program			
Establish periodic review process for the following:			
<ul style="list-style-type: none"> • Check to ensure that no MSDS is more than 3 years old. • Check that all items on the MSDS have been completed. • Check the condition and presence of labels for all controlled products. • Monitor workplace controls to ensure they are effective. • Review the WHMIS education and training program. 			