

# REFERENCES AND RESOURCES



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## AGENCIES AND ORGANIZATIONS

This section provides the addresses and telephone numbers for three groups of agencies and organizations:

- Those involved as representatives in the development of WHMIS legislation
- Those referenced in WHMIS legislation
- Other general information and policy organizations

### Regulatory Agencies Associated with WHMIS

#### Federal Government

Hazardous Materials Information Review Commission  
427 Laurier Avenue West, 7th Floor  
Ottawa, ON K1A 1M3  
Tel: (613) 993-5015  
Fax: (613) 993-4686  
Website: [www.hmircccrmd.gc.ca](http://www.hmircccrmd.gc.ca)

Health Canada, WHMIS Division  
123 Slater Street, 4th Floor  
Postal Locator 3504D  
Ottawa, ON K1A 0K9  
Tel: (613) 957-2342  
Fax: (613) 948-2626  
Website: <http://www.hc-sc.gc.ca/hecs-sesc/whmis/>

Human Resources Development Canada  
Labour Program  
Phase 11, 10th Floor, Place du Portage  
Hull, QC K1A 0J2  
Tel: (819) 953-0215  
Fax: (819) 953-4830  
Website: <http://labour.hrdc-drhc.gc.ca/>

#### Provinces and Territories

##### Alberta

WHMIS Coordinator  
Legislation, Policy and Technical Support Services  
Workplace Health, Safety and Strategic Services  
Human Resources and Employment  
9<sup>th</sup> Floor, 10808 - 99 Avenue  
Edmonton, AB T5K 0G5  
Tel: (780) 415-0600  
Fax: (780) 422-0014  
Website: [www.gov.ab.ca/LAB/index.html](http://www.gov.ab.ca/LAB/index.html)

## **British Columbia**

Field Operations Prevention Division  
Workers' Compensation Board  
PO Box 5350, Station Terminal  
Vancouver, BC V6B 5L5  
Tel: (604) 276-3100  
Fax: (604) 232-5848  
Website: [www.WorkSafebc.com](http://www.WorkSafebc.com)

## **Manitoba**

Workplace Safety and Health Division  
Department of Labour  
200 - 401 York Avenue  
Winnipeg, MB R3C 0P8  
Tel: (204) 945-3450  
Fax: (204) 945-4556  
Website: [www.gov.mb.ca/labour/safety/index.html](http://www.gov.mb.ca/labour/safety/index.html)

## **New Brunswick**

Workplace Health, Safety and Compensation Commission  
4<sup>th</sup> Floor, 500 Beaverbrook Court  
Fredericton, NB E3B 5X4  
Tel: (506) 738-4322  
Fax: (506) 453-7982  
Website: [www.whscc.nb.ca](http://www.whscc.nb.ca)

## **Newfoundland**

Provincial Industrial Hygienist  
Occupational Health and Safety Inspection Services  
PO Box 8700  
St. John's, NF A1B 4J6  
Tel: (709) 729-0052  
Fax: (709) 729-6639  
Website: <http://www.whscc.nf.ca/>

## **Northwest Territories and Nunavut**

Workers' Compensation Board N. W. T. and Nunavut  
PO Box 8888  
Yellowknife, NT X1A 2R3  
Tel: (867) 920-3888  
Fax: (867) 873-0262  
Website: [www.gov.nt.ca](http://www.gov.nt.ca)

## Nova Scotia

Occupational Health and Safety Division  
Department of Labour  
5151 Terminal Road  
PO Box 697  
Halifax, NS B3J 2T8  
Tel: (902) 424-8477  
Fax: (902) 424-3239  
Website: <http://www.gov.ns.ca/enla/ohs/>

## Ontario

Ontario Ministry of Labour  
Occupational Health and Safety Branch  
655 Bay Street, 14th Floor  
Toronto, ON M7A 1T7  
Website: [www.gov.on.ca/LAB/main.htm](http://www.gov.on.ca/LAB/main.htm)

## Prince Edward Island

P. E. I. Workers' Compensation Board  
Occupational Health and Safety Branch  
PO Box 757  
Charlottetown, PE C1A 7L7  
Tel: (902) 368-5680  
Fax: (902) 368-5697

## Quebec

Commission de la santé et de la sécurité du travail  
Service du répertoire toxicologique  
1199 rue de Bleury 4 étage  
Montreal, QC H3C 3J1  
Tél: (514) 906-3080  
Télécopieur: (514) 906-3081  
Website: [www.csst.qc.ca](http://www.csst.qc.ca)

## Saskatchewan

Occupational Health and Safety  
Saskatchewan Labour  
6<sup>th</sup> Floor, 1870 Albert Street  
Regina, SK S4P 3V7  
Tel: (306) 787-4539  
Fax: (306) 787-2208  
Website: <http://www.labour.gov.sk.ca/>

## Yukon

Occupational Health and Safety  
Workers' Compensation Health and Safety Board  
401 Strickland Street  
Whitehorse, YT Y1A 5N8  
Tel: (867) 667-3726  
Fax: (867) 393-6279  
Website: [www.wcb.yk.ca](http://www.wcb.yk.ca)

### **Agencies and Organizations Referenced in WHMIS Legislation**

American Conference of Governmental Industrial Hygienists (ACGIH)  
1330 Kemper Meadow Drive, Suite 600  
Cincinnati, OH 45240  
U.S.A.  
Tel: (513) 742-2020  
E-mail: [pubs@acgih.org](mailto:pubs@acgih.org)  
Website: [www.acgih.org](http://www.acgih.org)

American Society for Testing and Materials (ASTM)  
100 Barr Harbor Drive  
West Conshohocken, PA 19428-2959  
U.S.A.  
Tel: (610) 832-9585  
Website: [www.astm.org](http://www.astm.org)

National Association of Corrosion Engineers (NACE) International  
1440 South Creek Drive  
Houston, TX 77054-4906  
U.S.A.  
Tel: (281)228-6200  
Website: [www.nace.org](http://www.nace.org)

Organization for Economic Cooperation and Development (OECD)  
2, rue Andre-Pascal  
75775 Paris, Cedex 16  
France  
Website: [www.oecd.org](http://www.oecd.org)

OECD Test Guidelines are also available from:

- Renouf Publishing Company  
5369 Canotek Road, Unit 1  
Ottawa, ON K1J 9J3  
Tel: (613) 745-2665  
Website: [www.renoufbooks.com](http://www.renoufbooks.com)

U. S. Government Standards  
Superintendent of Documents  
US Government Printing Office  
Washington, DC 20402  
U.S.A.  
Tel: (202) 512-1800  
Website: [www.access.gpo.gov](http://www.access.gpo.gov)

World Health Organization Headquarters  
Avenue Appia 20  
1211, Geneva 27  
Switzerland  
Tel: +41 22 791 2111  
Website: [www.who.org](http://www.who.org)

- WHO International Agency for Research on Cancer (IARC)  
150 cours Albert Thomas  
F - 69372  
Lyon, cedex 08  
France  
Website: [www.iarc.fr](http://www.iarc.fr)
- Canadian Public Health Association  
1565 Carling Avenue, Suite 400  
Ottawa, ON K1Z 8R1  
Tel: (613) 725-3769  
Website: [www.cpha.ca](http://www.cpha.ca)
- WHO Publications Centre (U.S.A.)  
49 Sheridan Avenue  
Albany, NY 12210  
U.S.A.  
Tel: (518) 436-9686  
Website: [www.who.int/dsa/](http://www.who.int/dsa/)

#### **Other Information and Policy Organizations**

Alliance of Manufacturers and Exporters Canada (Canadian Manufacturers' Association)  
5995 Avebury Road, Suite 900  
Mississauga, ON L5R 3P9  
Tel: (905) 568-8300  
Website: [www.the-alliance.org](http://www.the-alliance.org)

American National Standards Institute (ANSI)  
11 West 42<sup>nd</sup> Street  
New York, NY 10036  
U.S.A.  
Tel: (212) 642-4900  
Website: [www.ansi.org](http://www.ansi.org)

Canadian Centre for Occupational Health and Safety (CCOHS)  
250 Main Street East  
Hamilton, ON L8N 1H6  
Tel: 1-800-263-8466  
Website: <http://www.ccohs.ca>

Canadian Chemical Producers' Association  
350 Sparks Street, Suite 805  
Ottawa, ON K1R 7S8  
Tel: (613) 237-6215  
Website: [www.ccpa.ca](http://www.ccpa.ca)

Canadian Government Publishing Centre  
284 Wellington Street  
Ottawa, ON K1A 0H8  
Tel: (613) 957-4222  
Website: [www.canada.justice.gc.ca](http://www.canada.justice.gc.ca)

Canadian Labour Congress  
2841 Riverside Drive  
Ottawa, ON K1V 8X7  
Tel: (613) 521-3400  
Website: [www.clc-ctc.ca](http://www.clc-ctc.ca)

CSA International (Canadian Standards Association)  
178 Rexdale Boulevard  
Rexdale, ON M9W 1R3  
Tel: 1-800-463-6727 or (416) 747-4000  
Website: [www.csa-international.org](http://www.csa-international.org)

CANUTEC (Canadian Transport Emergency Centre)  
Transport of Dangerous Goods Branch  
Transport Canada  
330 Sparks Street, Suite 1401  
Ottawa, ON K1A 0N5  
Tel: (613) 992-4624  
Emergency Telephone: (613) 996-6666  
Website: [www.canutec.gc.ca](http://www.canutec.gc.ca)

European Union Delegation for the European Commission  
2300 M Street, NW  
Washington, DC 20037  
U.S.A.  
Tel: (202) 862-9500  
Fax: (202) 429-1766  
Website: [www.eurunion.org/legislat/chemical.htm](http://www.eurunion.org/legislat/chemical.htm)

Medical Research Council of Canada  
5<sup>th</sup> Floor, Tower B, Holland Cross  
1600 Scott Street  
Ottawa, ON K1A 0W9  
Tel: (613) 941-2672  
Website: [www.mrc.gc.ca](http://www.mrc.gc.ca)

National Fire Protection Association  
PO Box 9101  
1 Batterymarch Park  
Quincy, MA 02269-9101  
U.S.A.  
Tel: (617) 770-3000  
Fax: (617) 770-0700

Website: <http://roproc.nfpa.org>

National Institute for Occupational Safety and Health (NIOSH)

Robert A. Taft Laboratories

4676 Columbia Parkway

Cincinnati, OH 45226

U.S.A.

Tel: (513) 684-8236

Website: <http://www.cdc.gov/niosh/homepage.html>

## WHMIS-RELATED INTERNET SITES

Contact	Internet Site	Description
3M	<a href="http://www.3M.com/intl/CA/ohes.html">www.3M.com/intl/CA/ohes.html</a>	Information on the selection of respirators
Agency for Toxic Substances and Disease Registry (ATSDR)	<a href="http://www.atsdr.cdc.gov/toxpro2.html">www.atsdr.cdc.gov/toxpro2.html</a>	Information on Toxicological profiles developed by ATSDR
American Conference of Governmental Industrial Hygienists (ACGIH)	<a href="http://www.acgih.org">www.acgih.org</a>	TLVs and BEIs for chemical substances
American Industrial Hygiene Association	<a href="http://www.aiha.org">www.aiha.org</a>	Information on AIHA and discussions on industrial hygiene
Ansell-Edmont	<a href="http://www.ansell-edmont.com/">www.ansell-edmont.com/</a>	Information on glove selection
American National Standards Association	<a href="http://www.ansi.org">www.ansi.org</a>	Information on ANSI and links to national and international standards
American Society for Testing and Materials	<a href="http://www.astm.org">www.astm.org</a>	Information on ASTM. Online store for ASTM test methods
Canada Justice	<a href="http://www.canada.justice.gc.ca">www.canada.justice.gc.ca</a>	Canadian federal regulations and acts
Canadian Auto Workers Association	<a href="http://www.caw.ca/whatwedo/health&amp;safety/factsheet/index.asp">www.caw.ca/whatwedo/health&amp;safety/factsheet/index.asp</a>	Health and safety fact sheets
Canadian Center for Occupational Health and Safety (CCOHS)	<a href="http://www.ccohs.ca">www.ccohs.ca</a>	Information on CCOHS, occupational health and safety issues. Links to subscription databases and related sites
CanOSH Websites	<a href="http://www.canoshweb.org/oshmainpage.html">www.canoshweb.org/oshmainpage.html</a>	Links to Canadian OSH websites
Canadian Standards Association	<a href="http://www.csa-international.org">www.csa-international.org</a>	CSA news releases, directory information and products
Canutec	<a href="http://www.canutec.gc.ca">www.canutec.gc.ca</a>	Emergency response information for Transport Canada
CAS Databases	<a href="http://www.cas.org/casdb.html">www.cas.org/casdb.html</a>	Chemical Abstract Services databases with abstracts from journal articles; comprehensive chemistry coverage
Centers for Disease Control and Prevention (CDC)	<a href="http://www.cdc.gov">www.cdc.gov</a>	CDC publications, data, statistics, etc.
Chemical Finder	<a href="http://www.chemfinder.com">www.chemfinder.com</a>	Chemical information database
Environmental Protection Agency (EPA)	<a href="http://www.epa.gov">www.epa.gov</a>	Information on environmental issues and links to related information
Environmental Protection Agency (EPA)	<a href="http://www.epa.gov/opptintr/chemfact/#pdfversions">www.epa.gov/opptintr/chemfact/#pdfversions</a>	Information on chemical spills; fact sheets
Fisher Scientific	<a href="http://www.fishersci.com">www.fishersci.com</a>	Link to MSDSs
Genium Publishing Corporation	<a href="http://www.genium.com/">www.genium.com/</a>	Material safety data sheets for a fee from an MSDS database
Health Canada — Product Safety Bureau	<a href="http://www.hc-sc.gc.ca/hecs-sesc/whmis/">www.hc-sc.gc.ca/hecs-sesc/whmis/</a>	WHMIS information
Health Canada — Biosafety	<a href="http://www.hc-sc.gc.ca/hpb/lcdc/index.html">www.hc-sc.gc.ca/hpb/lcdc/index.html</a>	Links to news, updates, LCDC programs, MSDSs for biohazards.
Hazardous Materials Information Review Commission	<a href="http://www.hmirc-ccrmd.gc.ca">www.hmirc-ccrmd.gc.ca</a>	HMIRC information
Human Resources Development Canada (Labour Program)	<a href="http://www.hrsdc.gc.ca/en/gateways/topics/oxs-lal.shtml">www.hrsdc.gc.ca/en/gateways/topics/oxs-lal.shtml</a>	Links to Canada Labour Code, Part II on Occupational Health and Safety

Contact	Internet Site	Description
International Agency for Cancer Research (IARC)	<a href="http://www.iarc.fr/">www.iarc.fr/</a>	Information on IARC, links to WHO, and Lists of IARC evaluations
IPCS-INCHEM	<a href="http://www.inchem.org/search.html">www.inchem.org/search.html</a>	Searchable collection of information on hazardous chemicals compiled by international bodies
Medscape	<a href="http://www.medscape.com">www.medscape.com</a>	Free, full-text, peer-reviewed and medical news
MSDS on Internet	<a href="http://www.ilpi.com/msds/index.html">www.ilpi.com/msds/index.html</a>	Link to MSDS sites, government agencies, chemical manufacturers and suppliers and safety publications
MSDS search	<a href="http://www.msdssearch.com">www.msdssearch.com</a>	Links to MSDSs
National Association of Corrosion Engineers (NACE)	<a href="http://www.nace.org">www.nace.org</a>	NACE news and order form for NACE Standard test methods
National Fire Protection Association (NFPA)	<a href="http://www.nfpa.org/index.asp">www.nfpa.org/index.asp</a>	Codes and standards for purchase; some documents free online
National Institute of Environmental Health of Sciences (NIES)	<a href="http://www.niehs.nih.gov">www.niehs.nih.gov</a>	National Toxicology Program (NTP); text Environmental Perspectives Journal; environmental health issues
National Institute of Occupational Safety & Health	<a href="http://www.cdc.gov/niosh/ipcs/icstart.html">www.cdc.gov/niosh/ipcs/icstart.html</a>	International chemical safety cards
National Institute of Occupational Safety & Health	<a href="http://www.cdc.gov/nasd/docs/d001001-d001100/d001051/d001051.html">www.cdc.gov/nasd/docs/d001001-d001100/d001051/d001051.html</a>	Advice on chemical glove selection
National Institute of Occupational Safety & Health	<a href="http://www.cdc.gov/niosh/mcpc.html">www.cdc.gov/niosh/mcpc.html</a>	Advice on selecting protective clothing
National Library of Medicine (NLM)	<a href="http://www.nlm.nih.gov">www.nlm.nih.gov</a>	Free access to MEDLINE; Links to Internet Grateful Med & PubMed; health and medical information; toxicology and environmental health information (ie. HSDB, Toxline, RTECS)
OECD Chemical Test Guidelines	<a href="http://www.oecd.org/department/0,2688,en_2649_34377_1_1_1_1_1,00.html">www.oecd.org/department/0,2688,en_2649_34377_1_1_1_1_1,00.html</a>	Information on OECD guidelines for testing chemicals. Monograph series on testing and assessment
Physical and Theoretical Chemistry Laboratory Oxford University	<a href="http://physchem.ox.ac.uk/MSDS/">http://physchem.ox.ac.uk/MSDS/</a>	Chemical safety information
Planning Design & Construction at Cornell University	<a href="http://msds.pdc.cornell.edu/msdssrch.asp">http://msds.pdc.cornell.edu/msdssrch.asp</a>	Material safety data sheets
Transport Canada	<a href="http://www.tc.gc.ca/tdg/menu.htm">www.tc.gc.ca/tdg/menu.htm</a>	TDG information and legislation
U.S. Occupational Safety and Health Administration (OSHA)	<a href="http://www.osha.gov/">www.osha.gov/</a>	OSHA standards and technical information on health and safety
Vermont SIRI (Safety Information Resources on the Internet) Website	<a href="http://www.siri.org/">www.siri.org/</a> or <a href="http://www.hazard.com">http://www.hazard.com</a>	Occupational and environmental health and safety information, MSDSs, safety issue sheets, OH&S resources
World Health Organization (WHO)	<a href="http://www.who.int/en/">www.who.int/en/</a>	WHO directory and program information, links to WHO library and publications

## SOURCES FOR PRODUCT CLASSIFICATION

This table identifies sources of technical information that may be helpful for WHMIS product classification. See Technical Information Contacts, on page 213, for contact details.

**Note:** CSST and CCOHS have classified pure substances.

<b>Classification</b>		ACGIH	Bretherick	CCOHS (CHEMINFO)	CCOHS (RTECS)	CRC	CSST	Grant	Health Canada's Lab Guide	IARC	Journal Articles	Kirk-Othmer	Merck	Patty's (Clayton & Clayton)	Physical Laboratory Testing	TDG Regulations, Part III	Sax	Shepherd	Sittig	Toxicological Testing	Vessel Pressure Gauge
<b>Class A — Compressed Gas</b>																					
<i>Where to find the information</i>																					
<b>Required information</b>																					
Whether product belongs to Class A							<input checked="" type="checkbox"/>														
Critical Temperature	For Pure Substances					<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>									
	For Mixtures														<input checked="" type="checkbox"/>						
Absolute vapour pressure: • At 50° C, for the gaseous state of the product • At 37.8° C, for the liquid state of the product	For Pure Substances					<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>						
	For Mixtures														<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>
Absolute pressure in the cylinder or pressure vessel																					<input checked="" type="checkbox"/>
<b>Class B — Flammable and Combustible Material</b>																					
<i>Where to find the information</i>																					
<b>Required information</b>																					
Whether product belongs to Class B							<input checked="" type="checkbox"/>														
Lower Explosive Limit (LEL) or Lower Flammable Limit (LFL)	For Pure Substances			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>				
	For Mixtures														<input checked="" type="checkbox"/>						
Upper Explosive Limit (UEL) or Upper Flammable Limit (UFL)	For Pure Substances			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>				
	For Mixtures														<input checked="" type="checkbox"/>						









Vessel Pressure Gauge																			
Toxicological Testing		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			
Sittig																			
Shepherd																			
Sax	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				
TDG Regulations, Part III																			
Physical Laboratory Testing																			
Patty's (Clayton & Clayton)	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>							
Merck																			
Kirk-Othmer																			
Journal Articles	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				
IARC	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>												
Health Canada's Lab Guide																<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Grant								<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>									
CSST	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				
CRC																			
CCOHS (RTECS)	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>										
CCOHS (CHEMINFO)	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>					
Bretherick																			
ACGIH	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				
<b>Classification</b>	<b>Class D continued</b>	For Ingredients	For Tested Mixtures	For Ingredients	For Tested Mixtures	For Ingredients	For Tested Mixtures	For Ingredients	For Tested Mixtures	For Ingredients	For Tested Mixtures	For Ingredients	For Tested Mixtures	Risk Groups 2, 3, or 4 as defined by MRCC/WHO	Risk Groups 2, 3, or 4 as defined by MRCC/WHO				
		If, in <i>in vivo</i> testing on mammalian cells, evidence of gene mutation in somatic cells exists	If, in <i>in vivo</i> testing on mammalian cells, evidence of chromosomal aberration in somatic cells exists	If product causes specified levels of erythema or edema in animal tests	If product causes specified levels of corneal or iris damage, or conjunctival swelling or redness, in animal tests	If product causes irritation of skin, eyes, or respiratory tract in exposed persons	If product causes specified levels of skin sensitization in animal tests	If product causes specified levels of skin sensitization in persons exposed at workplaces	If product is an organism known or reasonably believed to cause disease in humans or animals	If product is the toxin of an organism known or reasonably believed to cause disease in humans or animals									



Vessel Pressure Gauge								
Toxicological Testing								
Sittig	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Shepherd								
Sax	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
TDG Regulations, Part III								
Physical Laboratory Testing		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Patty's (Clayton & Clayton)								
Merck								
Kirk-Othmer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Journal Articles								
IARC								
Health Canada's Lab Guide								
Grant								
CSST								
CRC								
CCOHS (RTECS)								
CCOHS (CHEMINFO)	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Bretherick	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
ACGIH								
<p style="text-align: center;"><b>Classification</b></p> <p><i>Class F continued</i></p> <p>If product becomes self-reactive under conditions of shock</p> <p>If product becomes self-reactive under conditions of increased pressure</p> <p>If product becomes self-reactive under conditions of increased temperature</p> <p>If product reacts vigorously with water to release a gas with LC<sub>50</sub> &gt; 2,500 ppm (4 hours)</p>	For Pure Chemicals		For Pure Chemicals		For Pure Chemicals		For Pure Chemicals	
	For Mixtures		For Mixtures		For Mixtures		For Mixtures	

*Adapted from WHMIS Information for Suppliers, Alberta Labour (April 1994)*

## SOURCES FOR MSDS INFORMATION ITEMS

This table identifies sources of technical information where suppliers can find information to fill in missing items or verify information for an MSDS. See Technical Information Contacts on page 213 for contact details.

This table lists information sources for pure substances only. Check these sources for information on individual ingredients (pure substances) in a mixture if the manufacturer or supplier cannot provide the required information.

For example, if the manufacturer cannot provide a required information item for the product Best Brake Cleaner 123, try looking up information on its ingredients: n-hexane, ethanol, and methanol.

CPR Items	Where to find the information																							
	3M Respirator Guide	ACGIH	By Observation	CANUTEC	CAS Registry	CCOHS (CHEMINFO)	CCOHS (RTECS)	CRC	CSST	Doull	Harper	IARC	Manufacturer	Merck	NIOSH	Patty's (Clayton & Clayton)	Physical Laboratory Testing	Professional Judgment	Provincial OSH Requirements	Sax	Sittig	Supplier	TDG Regulations	
1. Product identifier (name must match the identifier on supplier label exactly)													<input checked="" type="checkbox"/>									<input checked="" type="checkbox"/>		
				<input checked="" type="checkbox"/>									<input checked="" type="checkbox"/>										<input checked="" type="checkbox"/>	
2. Product use												<input checked="" type="checkbox"/>										<input checked="" type="checkbox"/>		
3. Manufacturer's identity (name/address/telephone number)												<input checked="" type="checkbox"/>										<input checked="" type="checkbox"/>		
4. Supplier's identity (name/address/telephone number)												<input checked="" type="checkbox"/>										<input checked="" type="checkbox"/>		
<b>Hazardous Ingredients</b>																								
5. Hazardous Ingredients (specific chemical names)		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>							<input checked="" type="checkbox"/>									<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
6. Percentages (exact concentrations or range of concentrations)												<input checked="" type="checkbox"/>										<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
7. CAS number		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>							<input checked="" type="checkbox"/>										<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>



CPR Items	Where to find the information													
	Physical Data continued	For pure substances												
	20. Coefficient of Water/Oil Distribution													
<b>Fire and Explosion Data</b>														
	21. Conditions of flammability	For mixtures												
		For pure substances												
	22. Means of extinction	For mixtures												
		For pure substances												
	23. Flashpoint and method of determination	For pure substances												
	24. Upper flammable (explosive) limit	For pure substances												
	25. Lower flammable (explosive) limit	For pure substances												
	26. Auto-ignition temperature	For pure substances												
	27. Hazardous combustion products	For pure substances												
	28. Explosion data — sensitivity to mechanical impact	For pure substances												
	29. Explosion data — sensitivity to static discharge	For pure substances												





<b>CPR Items</b>	TDG Regulations					
	Supplier				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Sittig					
	Sax					
	Provincial OSH Requirements					
	Professional Judgment					
	Physical Laboratory Testing					
	Patty's (Clayton & Clayton)					
	NIOSH		<input checked="" type="checkbox"/>			
	Merck					
	Manufacturer		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	IARC					
	Harper					
	Doull					
	CSST					
	CRC					
	CCOHS (RTECS)					
	CCOHS (CHEMINFO)		<input checked="" type="checkbox"/>			
	CAS Registry					
	CANUTEC					
By Observation						
ACGIH						
3M Respirator Guide						
	<i>Where to find the information</i>					
	<b>CPR items</b>					
	<b>First Aid Measures</b>					
	52. Specific first aid measures for acute exposure (inhalation, ingestion, skin contact, eye contact)					
	<b>Preparation Information</b>					
	53. Date of preparation or revision					
	54. Name and phone number of preparer					

# WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM INFORMATION BULLETIN

Issue No. 8

September 20, 1991

The attached document provides guidance on the use of professional judgment in the classification of controlled products under WHMIS. It is an amplification and clarification of the requirements found in section 33 of the *Controlled Products Regulations* entitled “Manner of Establishing Classification.”

This document has been developed by a tripartite technical subcommittee and endorsed by the WHMIS Current Issues Committee, a committee made up of representatives of industry, organized labour, and federal, provincial, and territorial governments.

Consumer and Corporate Affairs Canada	Consommation et Corporations Canada
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10534 B 91-10

## Use of Professional Judgment in the Classification of Controlled Products Under WHMIS

A supplier who intends to sell or import a product for use in a workplace in Canada must classify his product to decide if it is a WHMIS-controlled product and therefore subject to WHMIS requirements. In classifying a product the supplier must consider all of the criteria listed in Part IV of the *Controlled Products Regulations (CPR)*. Prior to classifying a product, the supplier may want to consider if the product is exempt from WHMIS requirements under section 12 of the *Hazardous Products Act*.

The extent to which professional judgment is used by the supplier will depend on the specific criteria being considered. Because of this, the discussion of professional judgment will be focused under the different kinds of criteria.

### I. Non-toxicological Criteria that Define the Limits for a Measurable Product Property when Subjected to a Specific Test Method

Includes *CPR* sections: 34(d), 37, 38, 39(c), 40, 65(a).

A hierarchical approach to the consideration of test results should be used. The approach is described below and shown in flow chart format in Figure 1.

- (1) Use test results on the product carried out in accordance with the specified test methods (either by conducting the test or using available test

results). Professional judgment may be required to interpret results where, for example, there are varying test results for a product that has been subjected to the same specified test method.

- (2) In the absence of test results referred to in (1), use test results on the product from relevant but non-specified test methods. Professional judgment must be used with these results to classify the product.
- (3) In the absence of test results referred to in (1) or (2), where appropriate, extrapolate test results on a product with similar properties to classify the product. Professional judgment must be used to carry out such an extrapolation.
- (4) In the absence of being able to classify a product by steps (1), (2) or (3) above, a supplier must recognize that if the supplier sells the product and has classified it as not meeting the criterion and the product does in fact meet the criterion, the supplier will be in violation of the law

### II. Toxicological Criteria that Define the Limits for a Measurable Product Property when Subjected to a Specific Test Method

Includes *CPR* sections: 46, 49, 52, 53, 55(b), 57(1)(b), 59, 60, 61(a), 62, 65(b), 66(c).

A supplier must use a hierarchical approach to the consideration of test results as shown in steps (1) to (4) below **or** the approach shown in (5) below. Both of these approaches are summarized in flow chart format in Figure 2.

- (1) Use test results on the product carried out in accordance with the specified test methods (either by conducting the test or using available test results). Professional judgment may be required to interpret results where, for example, there are varying test results for a product that has been subjected to the same specified test method.
- (2) In the absence of test results referred to in (1), use test results on the product from relevant but non-specified test methods. Professional judgment must be used with these results to classify the product. Examples of relevant test methods are given in *CPR* paragraph 33(3)(b).
- (3) In the absence of test results referred to in (1) or (2), where appropriate, extrapolate test results on a product with similar properties to classify the product. Professional judgment must be used to carry out such an extrapolation. (Although suppliers are not obliged, they are encouraged to make use of available quantitative structure-activity relationship (QSAR) systems to estimate the toxic effects of chemicals. Professional judgment is required to assess the value of such estimates.)
- (4) For Class D criteria, if it is not possible to classify a product by steps (1), (2) or (3), a supplier is not required to undertake toxicological testing. The product can be considered as not meeting a Class D criterion, if the supplier has no “information of which the supplier is aware or ought reasonably to be aware.” Every supplier “ought reasonably to be aware” of appropriate published literature. The Canadian Centre for Occupational Health and Safety (CCOHS) is one organization capable of conducting a comprehensive literature search. When additional information is made available to the supplier by the appropriate regulatory agencies, by industry or trade association(s), and by labour organization(s), the supplier is expected to evaluate that information.

OR

- (5) For Class D criteria, a supplier may use an alternate strategy **in place of** steps (1) to (4) above. A supplier may undertake a search of information he “ought reasonably be aware of” (as in (4) above). If the supplier finds “sufficient” human data to show that the product meets or does not meet a criterion, the supplier may use this information to classify the

product. Professional judgment must be used in making an assessment of what is “sufficient” in each case and taking into account animal test results.

### III. Criteria that Define the Limits for a Measurable Property or Qualitative Characteristic of a Product without Specifying a Test Method

Includes *CPR* sections: 34(a)(b)(c), 36, 39(a)(b), 41, 42, 66(a)(b)(c).

None of these *CPR* criteria relate to Class D and therefore the supplier is obliged to use the direction provided in *CPR* subsection 33(1)(b).

For the above criteria other than sections 39(b) and 66(a)(c), the use of professional judgment in classification is addressed in I.(2) and (3) above.

For sections 39(b) and 66(a)(c), it is clear the professional judgment must be used to decide if the qualitative criteria properly describe the properties of the product.

### IV. Criteria which State that “There is Evidence” of a Physiological Effect, without Specifying a Test Method

Includes *CPR* sections: 55(a), 56, 57(1)(a), 61(b),64, 65(e).

The supplier must use professional judgment to decide if test results or studies on the product signify “evidence” of an effect. This would include giving consideration to the particulars of the test method or study and the relevance of the results or conclusions in the occupational situation. There is nothing in the *CPR* to prevent a supplier from over-classifying a product.

Where the supplier finds “evidence” that the product meets a criterion and also finds “evidence” to the contrary, the supplier must consider the product as meeting the criterion for the purpose of classification. The supplier may make reference to the contrary evidence on the MSDS, but such disclosure must be done in accordance with the qualifications referred to in section 13 of the *CPR*.

Where a supplier cannot find test results, conclusions from a study or other evidence on the product for one of these criteria, the supplier is not required to test the product but may assume, for the purposes of classification, that the product does not meet that criterion.

## V. Criteria for Carcinogenicity — *CPR* section 54

There is no opportunity to use professional judgment in the classification of carcinogens when the substance or tested mixture is included in the referenced lists. The WHMIS criteria for carcinogens apply only to products or substances, not to processes listed by IARC or ACGIH, such as “antimony trioxide production” or “manufacture of magenta.”

Where a substance or tested mixture does not appear on the referenced lists and the supplier has information to show that the product may be a carcinogen, the supplier should use professional judgment to decide if the product should be classified as carcinogenic. While it is required that such information be disclosed on the MSDS of a product, a classification of the product as carcinogenic would not be required by WHMIS legislation.

## VI. Criteria that Refer to *Transportation of Dangerous Goods (TDG) Regulations* Criteria

Includes *CPR* sections: 39(d), 47, 50, 65(c)(d).

The referenced TDG criteria are of the type referred to in III. above or, in the case of section 65, of the type referred to in IV. above. The same appropriate rules for the use of professional judgment apply to these criteria.

In addition to containing scientific criteria, the *TDG Regulations* contains a list of specified dangerous goods in Schedule II with designated primary classifications. If a product is listed in Schedule II to the *TDG Regulations* as meeting one of the referenced TDG criterion, the supplier cannot use professional judgment to decide that the product does not meet that criterion.

Suppliers should be cautious when reading the TDG classification in Schedule II. TDG prioritizes the hazards and only lists the most severe hazard in Schedule II. Thus, when assessing a product against a particular TDG criterion, a supplier should first refer to the Schedule II list and, where the product is not listed as meeting the criterion, also refer to the TDG criterion in the *TDG Regulations* before concluding the product does not meet the criterion.

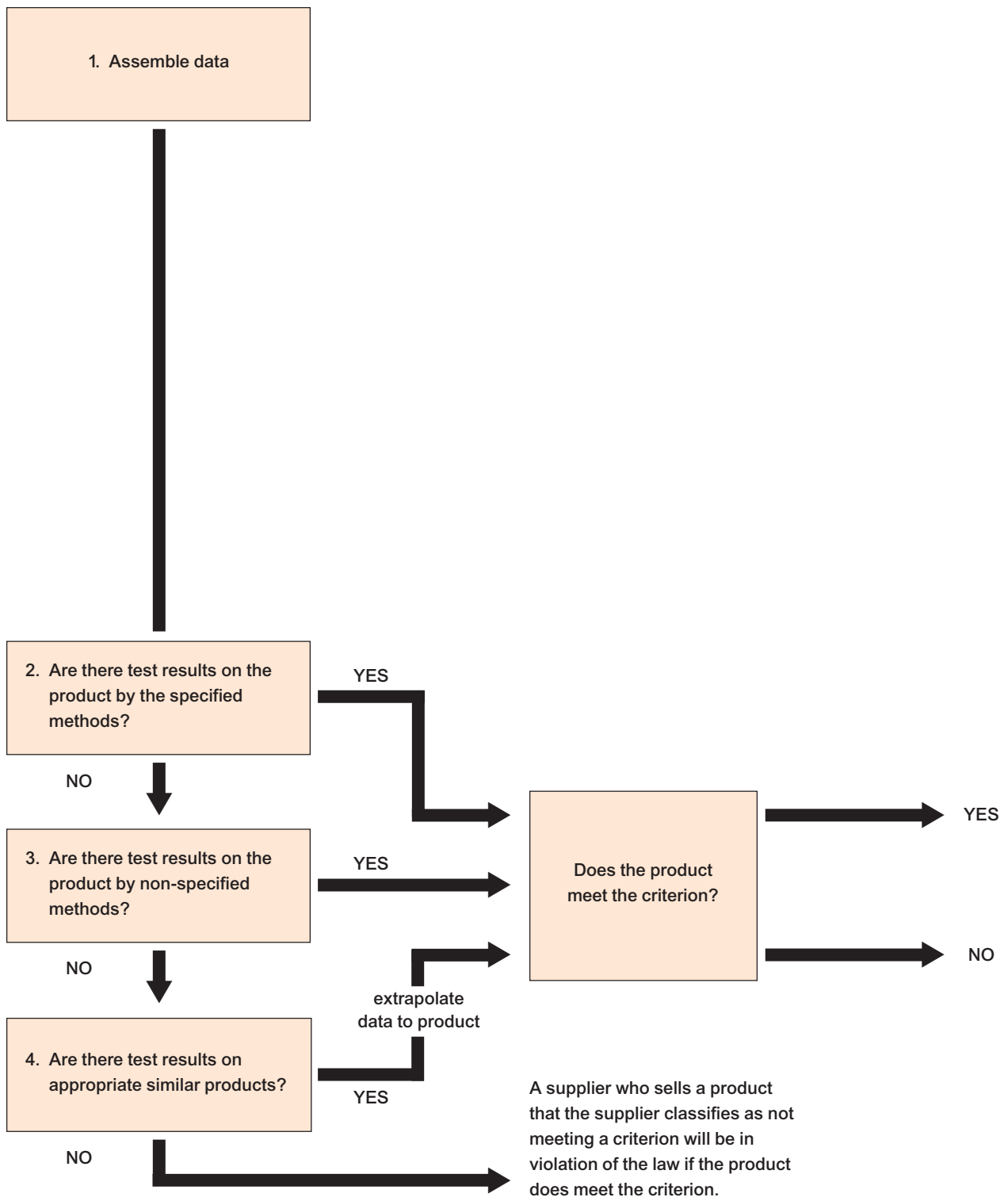
## VII. Criteria for Ingredients in a Product that is an Untested Mixture

Including *CPR* sections: 48, 51, 58, 63, 65(f).

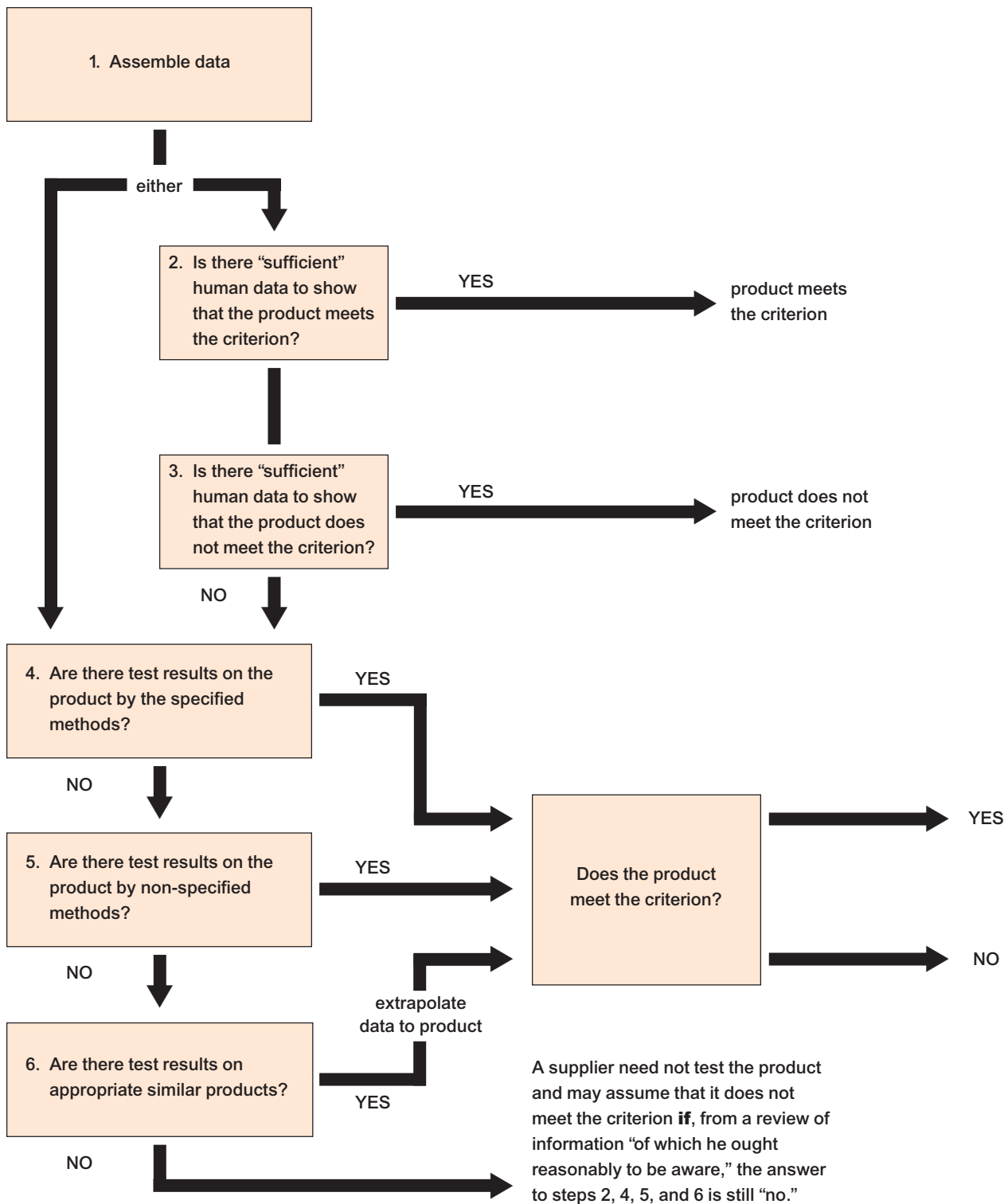
The same rules for use of professional judgment that applied when deciding if a tested product meets a criterion will apply when deciding if an ingredient is a controlled product.

**Note:** The WHMIS legislation does not prohibit a supplier from including a product in any WHMIS class, division, or subdivision even though it does not strictly meet the hazard criteria in the *CPR*. However, suppliers should avoid including products that are clearly beyond the scope of the hazard criteria that define a class. Otherwise, the overall effectiveness of WHMIS in accurately warning workers of the hazards inherent in workplace products will be diminished.

If a supplier's produce falls just outside the criteria which define any class, a supplier may use professional judgment to decide that the product should nonetheless be included in the class.



**Figure 1.** Steps in the WHMIS classification of products against criteria, other than Class D, in the *Controlled Products Regulations*



**Figure 2.** Steps in the WHMIS classification of products against Class D criteria in the *Controlled Products Regulations*

From Health Canada (1991). Adapted with permission of the Minister of Public Works and Government Services Canada, 2000.

## WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM INFORMATION BULLETIN

Issue No. 12

June 1997

### Guidelines for the Disclosure of Toxicological Information on a Material Safety Data Sheet

This guideline is targeted primarily to those tasked with the preparation of material safety data sheets (MSDSs). Employers, suppliers, workers, and regulators may also wish to make use of this document. The purpose of the guideline is to clarify the *Hazardous Products Act (HPA)* and the *Controlled Products Regulations (CPR)* requirements for the MSDS disclosure of toxicological information for a WHMIS “controlled product.”

A product, material or substance is a controlled product if it meets any of the hazard criteria specified in Part IV of the *CPR*. A controlled product may be a “pure” substance, a tested mixture or an untested mixture. Section 33 of the *CPR* sets out the procedures for a supplier to establish whether or not a substance is a controlled product and does not apply to the determination of the information that must be disclosed on the MSDS.

**Note:** Although the classification criteria specified in sections 34–66 of the *CPR* may provide a useful guideline for certain MSDS information, it is section 12 and Schedule I to the *CPR* which set out what information must be disclosed on a MSDS; paragraph 13(a) of the *HPA* sets out what ingredients are subject to disclosure on the MSDS; section 4 of the *CPR* specifies the concentration above which those ingredients must be disclosed.

All relevant toxicological information available to the supplier and applicable to the controlled product must be disclosed on the MSDS. The results of animal testing which yield positive results and on which classification is based must be disclosed. The specific categories of information which must be addressed are listed under the heading “Toxicological Properties” (see item 7, Schedule I to the *CPR*). These categories require the disclosure of information on: the routes of entry including skin contact, skin absorption, eye contact, inhalation, and ingestion; the effects of acute exposure; the effects of chronic exposure, i.e., irritancy, sensitization, carcinogenicity, reproductive toxicity, embryotoxicity, teratogenicity, fetotoxicity, mutagenicity; and any

toxicologically synergistic interactions. In addition, subsection 12(11) of the *CPR* requires the disclosure of “any other hazard information with respect to the controlled product [which includes information relating to its toxicological properties] of which the supplier is aware or ought reasonably to be aware.”

Professional judgment will generally be required to determine the extent and nature of hazard disclosure, particularly where the data are extensive, conflicting or contradictory. In order to be understandable by the intended user, the preparer of the MSDS should summarize the hazard and should make an effort to minimize the disclosure of extraneous scientific or technical jargon.

**Mixtures:** Most products are mixtures as opposed to being “pure” substances. Any toxicological information resulting from tests on a mixture must be disclosed if available and applicable to the mixture. In the absence of scientific evidence to the contrary, it should be assumed that, taking into account possible synergistic interactions, the toxicological properties to be disclosed for an untested mixture are the same as those of the mixture’s ingredients which are subject to disclosure. Information relating to ingredients subject to disclosure must be disclosed if this information is applicable to the mixture. The information disclosed on the MSDS should correlate the toxicological information to the ingredient with which the adverse effect is associated.

**Example:** Where an untested mixture contains 5% of ingredient “X” and this ingredient has been shown to be neurotoxic, the mixture will also fall within the same classification as the pure ingredient by virtue of paragraph 58(b) of the *CPR*. In the absence of evidence demonstrating that this adverse effect is not applicable to the mixture, the MSDS must disclose that an ingredient in the product has been shown to be neurotoxic and should specify which ingredient is associated with this adverse effect.

**“Applicable” information:** As suppliers cannot anticipate all possible uses of their products, thorough information on toxicological properties should be provided without limiting such information to the hazards based on presumed use.

Results of any studies conducted according to the WHMIS classification criteria (sections 33, 46 to 62 of the *CPR*) and other studies conducted according to established scientific principles, which report statistically significant adverse effects, must be disclosed on the

MSDS if this information is available to the supplier and applicable to the controlled product. Where more than one study has similar results, the information may be summarized. If available, the MSDS must disclose significant human health effects reported in epidemiological studies, and case reports in the literature, relevant to occupational exposure.

Since evidence of health effects to humans is typically not available, it is reasonable to disclose information, considered statistically significant, based on “relevant” animal testing. Relevant testing relates to the normal routes of occupational exposure such as inhalation, ingestion, skin and eye contact, and skin absorption as opposed to routes such as intraperitoneal, intramuscular, subcutaneous etc. Negative information may also be disclosed if it aids significantly in assessing the potential health risks of downstream use of the product. Where it is appropriate to extrapolate data from a similar product to an untested mixture for classification purposes, the supplier should disclose the relevant test data, indicate that the data relate to a similar substance and identify the substance.

Section 13 of the *CPR* requires that, where contradictory or ambiguous toxicological information is disclosed, sufficient information be disclosed so that a proper judgment as to the nature or extent of the hazards posed by the controlled product can be made.

**Information sources:** Preparers of MSDSs must exercise professional judgment when determining the source and extent of information to be reviewed and disclosed. For example, often only article abstracts are obtained through literature searches; i.e., literature searches may not provide all of the information subject to disclosure on the MSDS. Information sources which should be considered include:

- Company information on toxicity tests or illness experience
- Supplier MSDSs for ingredients used in untested mixtures
- The latest edition of the sources listed in the appendix to this guideline
- Information made available by regulatory agencies, trade associations and labour organizations

\* \* \* \* \*

### **Specific guidelines for MSDS disclosure in respect of subitems 1(3), 1(4), and 7(1) to 7(11) of Schedule I to the *Controlled Products Regulations*:**

**Subitems 1(3) and 1(4) – LD<sub>50</sub> (species and route) and LC<sub>50</sub> (species and duration of exposure):** Sections 46, 48, 49, and 51 of the *CPR* specify the classification criteria for acute lethality. Formulae for determining “equivalent” LD<sub>50</sub> and LC<sub>50</sub> are described in sections 44 and 45 of the *CPR*.

- i. For LD<sub>50</sub> data, the supplier must disclose the species of the animal used in the test [e.g., rat, mouse]; the unit of measurement [e.g., milligrams of test substance per kilogram of body weight of the test animal (mg/kg)]; and route of exposure [e.g., oral, dermal]; for example: LD<sub>50</sub> (rat, oral): 100 mg/kg.

For LC<sub>50</sub> data, the supplier must disclose the species of the animal used in the test [e.g., rat, mouse]; the unit of measurement [e.g., the concentration of the test substance in air (i.e., ppm or mg/m<sup>3</sup> for gases and vapours, and mg/m<sup>3</sup> or mg/L for dusts, mists, and fumes)]; and the duration of the exposure [e.g., 4 hours]; for example: LC<sub>50</sub> (rat, 4 hours): 600 ppm.

- ii. For untested mixtures, relevant and available LD<sub>50</sub> and LC<sub>50</sub> values must be disclosed for each ingredient subject to disclosure.
- iii. For tested mixtures, as per subsection 12(10) of the *CPR*, “where the LD<sub>50</sub> or LC<sub>50</sub> of a controlled product that is a mixture is determined by testing the mixture,” the supplier need not disclose the LD<sub>50</sub> or LC<sub>50</sub> of the ingredients of the mixture (regardless of whether the LD<sub>50</sub> or LC<sub>50</sub> determined through testing the product is a range or a “greater than” value as opposed to a “single (i.e., specific) dose” in the case of an LD<sub>50</sub> or a specific concentration in the case of an LC<sub>50</sub>).

If the LD<sub>50</sub> and LC<sub>50</sub> values are known for each ingredient present at a concentration of at least 1% in the mixture, the supplier may disclose the LD<sub>50</sub> and/or LC<sub>50</sub> value calculated in accordance with subsection 45(1) of the *CPR*. Each value used in the formula must be related to the same route of exposure, animal species, and sex.

- iv. When more than one LD<sub>50</sub> and/or LC<sub>50</sub> value for a tested mixture or an ingredient is available, it is recommended that the supplier disclose:

- a) The value established in accordance with the referenced Organization for Economic Cooperation and Development (OECD) Guideline or, if this is not available, values established using other protocols carried out in accordance with generally accepted standards of good scientific practice
- b) The rat value where values are available for more than one species, and other mammalian species values if different hazard classifications are indicated
- c) Where more than one LD<sub>50</sub> or LC<sub>50</sub> value is available for the same species and using the same protocol, the supplier should disclose the lowest appropriate value reported or a range that encompasses the values

**Example:** A controlled product which is an untested mixture is composed of five hazardous ingredients, all five of which are subject to disclosure. The following acute toxicity data is available:

**Ingredient 1:**

LD<sub>50</sub> (oral, rat) ..... 565 mg/kg  
 LD<sub>50</sub> (oral, mouse) ..... 372 mg/kg  
 LC<sub>50</sub> (inhl., mouse, 4 hr, aerosol) ..... 2.2 mg/L

**Ingredient 2:**

LD<sub>50</sub> (oral, dog) ..... 1, 720 mg/kg  
 LD<sub>50</sub> (oral, rat) ..... 835 mg/kg  
 LD<sub>50</sub> (oral, guinea pig) ..... 665 mg/kg

**Ingredient 3:**

LD<sub>50</sub> (dermal, rabbit) ..... 720 mg/kg  
 LD<sub>50</sub> (oral, rat) ..... 120 mg/kg  
 LD<sub>50</sub> (oral, mouse) ..... 45 mg/kg

**Ingredient 4:**

No acute toxicity data available

**Ingredient 5:**

LD<sub>50</sub> (oral, rat) ..... 1, 678 mg/kg  
 LD<sub>50</sub> (oral, mouse) ..... 1, 150 mg/kg

Using guidelines (a) to (c) above, the MSDS should disclose the following data for LD<sub>50</sub>/LC<sub>50</sub> of the hazardous ingredients:

**Ingredient 1:**

LD<sub>50</sub> (oral, rat) ..... 565 mg/kg  
 LD<sub>50</sub> (oral, mouse) ..... 372 mg/kg  
 LC<sub>50</sub> (inhl., mouse, 4 hr, aerosol) ..... 2.2 mg/L

**Ingredient 2:**

LD<sub>50</sub> (oral, rat) ..... 835 mg/kg

**Ingredient 3:**

LD<sub>50</sub> (dermal, rabbit) ..... 720 mg/kg  
 LD<sub>50</sub> (oral, rat) ..... 120 mg/kg  
 LD<sub>50</sub> (oral, mouse) ..... 45 mg/kg

**Ingredient 4:**

Not available<sup>1</sup>

**Ingredient 5:**

LD<sub>50</sub> (oral, rat) ..... 1, 678 mg/kg

*(Footnote 1: The CPR will be amended to more explicitly state that all subheadings which appear on an MSDS be addressed by disclosing the relevant information or by declaring that the information in “not available” or “not applicable.”)*

**Note:** Where the results of the new Fixed Dose Method (OECD Test Guideline 420) are used to determine the classification of the product, the MSDS should disclose the mortality and evident toxicity data (under subitem 7(2) of Schedule I to the CPR) used to make that determination.

**Subitem 7(1) – Routes of entry, including skin contact, skin absorption, eye contact, inhalation, and ingestion:**

Of these five potential routes of entry, those routes which can present health risks to workers during reasonable foreseeable use must be specified. These routes of entry will relate to the nature and properties of the substance under consideration as well as its uses; for example:

Substance	Route of Entry
silica	inhalation
n-hexane	inhalation, skin absorption
acetone	inhalation, skin absorption, eye contact
phosphoric acid	skin and eye contact
sodium fluoride	ingestion, inhalation

**Subitem 7(2) – Effects of acute exposure to product:**

Acute toxicity relates to toxic effects provided by a single or multiple exposure to a substance by any route for a short period of time. The MSDS must disclose both immediate and delayed effects resulting from short-term exposure; for example, skin corrosion (immediate) or pulmonary edema (delayed) from exposure to nitric acid. The information that must be disclosed on the MSDS is not limited to the results of tests for acute lethality specified in the classification section of the *CPR*.

**Subitem 7(3) – Effects of chronic exposure to product:**

Chronic toxic effects include any target organ effects from prolonged, repeated, or seasonal exposures. The MSDS must disclose significant human health effects reported in epidemiological studies and case reports in the literature. Since human evidence of health effects is typically not available, it is reasonable to disclose information based on mammalian animal testing which is judged to report significant information on toxicological properties. It is important to include the route of exposure when disclosing the effects of chronic exposure.

For chronic toxicity animal studies, the exposure time is considered to be approximately 80 percent of the lifespan; for subchronic toxicity, the exposure time is approximately 10 percent of the lifespan. In the absence of data on chronic or subchronic exposure, the results of studies of shorter duration (i.e., “subacute” studies) should be evaluated.

**Subitem 7(4) – Exposure Limits:** Exposure limits are recommended by bodies such as the American Conference of Governmental Industrial Hygienists (ACGIH) and the National Institute for Occupational Safety and Health (NIOSH) or are legislated by federal, provincial, and territorial agencies responsible for occupational safety and health. Various types of exposure limits, short-term and long-term, may be applicable depending on the working conditions. The MSDS must disclose appropriate values for the controlled product. The MSDS should also disclose values for ingredients of a mixture if this information is applicable to the mixture. The MSDS must specify which type of exposure limit is being disclosed; for example, time weighted average (TWA), short-term exposure limit (STEL), or ceiling (C).

If exposure limits are not available from the ACGIH or other jurisdictional authorities but are recommended by the supplier, the appropriate bodies recommending those limits should be disclosed on the MSDS. Up to the present time, no source, North American or other, has

been identified as publishing unacceptable exposure limits. The *CPR* will be amended to require that whatever exposure limit is used, the limit is to be qualified by indicating the source of the exposure limit and that a statement to the effect “consult local authorities for acceptable exposure limits” appears on the MSDS.

Disclosure of the term: “TLV (TWA) 10 ppm” would suffice as all “TLVs” are issued by the ACGIH, and consequently the ACGIH is the source of all TLVs. (The term “TLV” is a registered trade mark of the ACGIH). In the case of other exposure limits, the MSDS should disclose the source.

Where it is known that the use of the product could give rise to potentially lethal conditions, such as high airborne concentrations of solvent vapours from use of degreasers or furniture strippers, the supplier should disclose an IDLH limit if available. IDLH is the acronym for Immediately Dangerous to Life and Health. The IDLH is the concentration at which, in the event of respirator failure, a worker could evacuate within 30 minutes without experiencing any escape-impairing or irreversible health effects.

**Subitem 7(5) – Irritancy of product:** Sections 33(3) and 60 of the *CPR* specify the criteria to be used when determining whether a substance falls within the WHMIS criteria for skin or eye irritation. The information disclosed on the MSDS must indicate the severity of the irritant effect, i.e., whether the effect is slight/mild, moderate, or severe. A product will fall within the classification criteria for eye or skin irritation if the irritant effect is greater than “slight.” The effect relates only to chemical reaction, not to the effect of mechanical abrasion.

Numerical irritation scores, such as those obtained through testing in accordance with OECD Test Guidelines 404 (Acute Dermal Irritation/Corrosion) and 405 (Acute Eye Irritation/Corrosion) or the Draize test, may be disclosed but this information is not generally comprehensible to the majority of MSDS users.

**Subitem 7(6) – Sensitization [Respiratory or Skin] to product:**

A statement summarizing the results from the tests specified in sections 56 and 61 of the *CPR* (or from other relevant animal tests) must be disclosed on the MSDS if available. Positive human experience data must also be disclosed on the MSDS. It is important that the disclosed information identify the sensitizing agent. Non-occupational situations may be included if considered relevant.

**Subitem 7(7) – Carcinogenicity:** Section 54 of the *CPR* describes the classification criteria for carcinogens under WHMIS:

1. Group 1 or 2 in the International Agency for Research on Cancer (IARC) “Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans” published by the World Health Organization; or
2. Section A1, A2, or A3<sup>2</sup> of Appendix A of the Threshold Limit Values or Chemical Substances and Physical Agents in the Work Environment published by the ACGIH, as amended from time to time.

(Footnote 2: As agreed to through the WHMIS Current Issues Committee Policy Issue Sheet No 72(b).)

Information to be disclosed on the MSDS is not limited to the above classification criteria. Other sources which are considered applicable include:

- Lists of carcinogens from other countries
- The US National Toxicology Program list and related studies
- Academic studies
- Unpublished studies

Information from these other sources must be disclosed on the MSDS if it is available to the supplier and applicable to the controlled product.

**Subitem 7(8) – Reproductive Toxicity and Subitem 7(9) – Teratogenicity:** The classification criteria for developmental and reproductive toxins described in sections 33, 53, and 55 of the *CPR* may serve as a starting point for the evaluation of relevant hazard information to be disclosed on the MSDS. In contrast to the classification criteria, the information that must be disclosed on the MSDS is not limited to the results of tests which demonstrate that there was “no adverse effect on the pregnant female.”

Reproductive toxicity relates to effects on the parents such as sterility or other impairment of reproductive capability in either males or females. Developmental toxicity relates to toxicity and abnormalities in offspring, e.g., teratogenicity (malformations), embryotoxicity, and fetotoxicity.

In animal bioassays, adverse effects on fetal development or parental reproductive functions may occur at doses above or below those producing signs of toxicity in the parent animals. The handling, storage, or use of controlled products may occasionally produce exposures resulting in mild parental toxicity thereby resulting in potential developmental or reproductive toxicity hazards. For the purpose of MSDS disclosure, any indication of an adverse effect on fetal development or reproductive parameters must be disclosed on the MSDS irrespective of whether or not there is an adverse effect on the pregnant female. Any relevant epidemiological evidence must also be disclosed.

**Subitem 7(10) – Mutagenicity:** The classification criteria for mutagenicity are described in sections 33, 57, and 62 of the *CPR*. These criteria are limited to:

- i. Epidemiology results for human populations, or
- ii. *In vivo* tests carried out on living mammals

Positive results from studies that meet the above criteria must be disclosed. Results of tests on bacteria (e.g., Ames Salmonella Mutation Test), insects (e.g., *Drosophila*) or cells studied in cultures outside the living animals, must also be disclosed on the MSDS if this information is available to the supplier and applicable to the controlled product.

**Subitem 7(11) – Name of toxicologically synergistic products:** A synergistic effect occurs when the combined toxicological effect of two chemicals is greater than the sum of the effect caused by each agent alone. For example, both carbon tetrachloride and ethanol are hepatotoxic compounds. Together they produce much more liver injury than the sum of their individual effects on the liver would suggest. Available relevant information regarding toxicological interactions between the product, including its ingredients, and other chemicals must be disclosed if applicable to the controlled product. Exposure to two or more chemical agents may result in various types of toxicological interaction other than synergism, including additivity, antagonism, and potentiation:

**Additivity:** An additive effect occurs when the combined toxicological effect of two chemicals is equal to the sum of the effect caused by each agent alone. For example, when two organic phosphate insecticides are given together, the cholinesterase inhibition is usually additive.

**Antagonism (or Inhibition):** Antagonism occurs when two chemicals interfere with each other's actions or when one chemical interferes with the action of the other chemical, the net effect being a reduction in toxicity. For example, the prevention of absorption of a toxicant by ipecac or charcoal.

**Potentiation:** A potentiator is a substance which produces no toxic effects itself but when administered in conjunction with another substance which does cause toxic effects, it makes the latter much more toxic. For example, isopropanol is not hepatotoxic but when isopropanol is administered in addition to carbon tetrachloride, the hepatotoxicity of carbon tetrachloride is much greater than when administered in isolation.

<http://www.hc-sc.gc.ca/ehp/ehd/catalogue/psb-pubs/whmis12.htm>

From Health Canada (1997). Adapted with permission of the Minister of Public Works and Government Services Canada, 2000.

## OECD GUIDELINES FOR TESTING A PURE SUBSTANCE OR MIXTURE

The supplier shall use either:

1. Results from testing carried out on the product, material, or substance in accordance with sections 34–66 of the *CPR*.
2. Evaluation and scientific judgment based on test results on (a) the product, material, or substance; or (b) where appropriate, a product, material, or substance with similar properties. For more information on OECD Guidelines for the Testing of Chemicals, see the web site: [www.oecd.org/](http://www.oecd.org/).

WHMIS Class	Description	Criteria	OECD Test No.	Guideline Title	Other Tests/Studies*
D1A	<p><b>Poisonous and Infectious Material</b></p> <p>A pure substance or tested mixture falls into this class if an animal assay for acute lethality meets the criteria listed.</p>	a) $LD_{50} \leq 50$ mg/kg of animal body weight	401 revoked	Acute Oral Toxicity (May 12, 1981)	Class 6.1, Packing Group I or II of the <i>TDG Reg.</i>
			420	Acute Oral Toxicity — Fixed Dose Method (Jul 17, 1992)	Class 2.3 of the <i>TDG Reg.</i>
			423	Acute Oral Toxicity — Acute Toxic Class Method (Mar 22, 1996)	
			425	Acute Oral Toxicity — Up and Down Procedure (Sep 21, 1998)	
			402	Acute Dermal Toxicity (May 12, 1981) Updated Feb 24, 1987	
			403	Acute Inhalation Toxicity (May 12, 1981)	
			403	Acute Inhalation Toxicity (May 12, 1981)	
		b) $LD_{50} \leq 200$ mg/kg of animal body weight			
		c) $LC_{50} \leq 2500$ ppm by volume of gas when tested for 4 hours			
		d) $LC_{50} \leq 1500$ ppm by volume of vapour when tested for 4 hours, and a saturated vapour concentration at normal atmospheric pressure > 2 times the value of that $LC_{50}$			
		e) $LC_{50} \leq 0.5$ mg/L or 500 mg/m <sup>3</sup> of dust, mist, or fume when tested for 4 hours	403	Acute Inhalation Toxicity (May 12, 1981)	

<b>WHMIS Class</b>	<b>Description</b>	<b>Criteria</b>	<b>OECD Test No.</b>	<b>Guideline Title</b>	<b>Other Tests/Studies*</b>
<b>D1B</b>	<p><b>Poisonous and Infectious Material</b></p> <p>A pure substance or tested mixture falls into this class if an animal assay for acute lethality meets the criteria listed.</p>	<p>a) LD<sub>50</sub> of &gt; 50–500 mg/kg of animal body weight</p> <p>b) LD<sub>50</sub> of &gt; 200–1000 mg/kg of body weight of the animal</p> <p>c) LC<sub>50</sub> of &gt; 1500–2500 ppm by volume of vapour when tested for 4 hours, and a saturated vapour concentration at normal atmospheric pressure of &gt; 0.4 times the value of that LC<sub>50</sub></p> <p>d) LC<sub>50</sub> of &gt; 0.5–2.5 mg/L or gm/m<sup>3</sup> of dust, mist, or fume when tested for 4 hours</p>	<p>401 revoked</p> <p>420</p> <p>423</p> <p>425</p> <p>402</p> <p>403</p> <p>403</p>	<p>Acute Oral Toxicity (May 12, 1981)</p> <p>Acute Oral Toxicity — Fixed Dose Method (Jul 17, 1992)</p> <p>Acute Oral Toxicity — Acute Toxic Class Method (Mar 22, 1996)</p> <p>Acute Oral Toxicity — Up and Down Procedure (Sep 21, 1998)</p> <p>Acute Dermal Toxicity (May 12, 1981) Updated Feb 24, 1987</p> <p>Acute Inhalation Toxicity (May 12, 1981)</p> <p>Acute Inhalation Toxicity (May 12, 1981)</p>	<p>Class 6.1, Packing Group III of the TDG Reg.</p>

WHMIS Class	Description	Criteria	OECD Test No.	Guideline Title	Other Tests/Studies*
D2A	<p><b>Poisonous and Infectious Material</b></p> <p>A pure substance or tested mixture falls into this class if, in an animal assay for chronic toxic effects, it elicits a response of sufficient severity to threaten life or cause serious permanent impairment in a statistically significant proportion of the test population (as listed).</p>	<p>a) Dose <math>\leq</math> 10 mg/kg of body weight of animal per day</p> <p>b) Dose <math>\leq</math> 20 mg/kg of animal body weight per day</p> <p>c) Concentration <math>\leq</math> 25 ppm by volume of gas or vapour, or <math>\leq</math> 10 ug/L or 10 mg/m<sup>3</sup> of dust, mist, or fume</p>	<p>408</p> <p>409</p> <p>452</p> <p>411</p> <p>452</p> <p>413</p> <p>452</p>	<p>Subchronic Oral Toxicity — Rodent: 90-day (May 12, 1981) Updated Sep 21, 1998</p> <p>Subchronic Oral Toxicity — Non-Rodent: 90-day (May 12, 1981) Updated Sep 21, 1998</p> <p>Chronic Toxicity Studies based on oral route test (May 12, 1981)</p> <p>Subchronic Dermal Toxicity: 90-day (May 12, 1981)</p> <p>Chronic Toxicity Studies (May 12, 1981) based on the dermal route test</p> <p>Subchronic Inhalation Toxicity: 90-day (May 12, 1981)</p> <p>Chronic Toxicity Studies (May 12, 1981) based on inhalation route test</p>	

WHMIS Class	Description	Criteria	OECD Test No.	Guideline Title	Other Tests/Studies*
<p><b>D2A continued</b></p> <p>Teratogenicity and Embryotoxicity</p>	<p>A pure substance or tested mixture falls into this class if, in an animal assay for teratogenicity and embryotoxicity, it is shown to cause injury to the embryo or fetus in a statistically significant proportion of the test population at a concentration that has no adverse effect on the pregnant female when tested according to OECD test guidelines.</p>		414	Teratogenicity (May 12, 1981)	<p>If no tests carried out in accordance with the applicable OECD Test Guidelines, refer to the method described in <i>Principles for the Testing of Drugs for Teratogenicity</i>, Technical Report Series #364, published by WHO, 1967.</p>
<p>Carcinogenicity</p>	<p>A pure substance or tested mixture falls into this class if listed in IARC and ACGIH.</p>		415 416	<p>One-Generation Reproduction Toxicity (May 26, 1983)</p> <p>Two-Generation Reproduction Toxicity (May 26, 1983)</p>	<p>IARC – Group 1 – Group 2 ACGIH (revised) – A1 – A2 – A3</p>
<p>Reproductive Toxicity</p>	<p>A pure substance or tested mixture falls into this class if the listed criteria are met.</p>	<p>a) Evidence of sterility or an adverse effect on reproductive capability in persons following exposure in the workplace</p> <p>b) Sterility or an adverse effect on reproductive capability as shown in animal assay for reproductive toxicity</p>	415 416	<p>One-Generation Reproduction Toxicity (May 26, 1983)</p> <p>Two-Generation Reproduction Toxicity (May 26, 1983)</p>	

WHMIS Class	Description	Criteria	OECD Test No.	Guideline Title	Other Tests/Studies*
D2A continued	Respiratory Tract Sensitization	A pure substance or tested mixture falls into this class if evidence shows that it causes respiratory tract sensitization in persons following exposure in the workplace.			
Mutagenicity	A pure substance or tested mixture falls into this class if the listed criteria are met.	<p>a) Epidemiological evidence shows a causal connection between exposure of persons to the substance or mixture and heritable genetic effects</p> <p>b) Evidence of mutagenicity in mammalian germ cells is shown by <i>in vivo</i> tests, i.e.:</p> <ul style="list-style-type: none"> <li>i) Positive results in a study that measures mutations transmitted to offspring</li> <li>ii) Positive results in an <i>in vivo</i> study showing chemical interaction with the genetic materials of mammalian germ cells and positive results in an <i>in vivo</i> study assessing either gene mutation or chromosomal aberration in somatic cells</li> </ul>		Genetic Toxicology Testing and Guidance on the Selection and Application of Assays (Mar 1, 1987)	<p><i>Guidelines on the Use of Mutagenicity Tests in the Toxicological Evaluation of Chemicals</i>, published under the authority of Health Canada</p> <p>If no tests are carried out in accordance to OECD Test Guidelines, refer to test/method described by the US Environmental Protection Agency (EPA) in "Proposed Guidelines for Registering Pesticides in the US; Hazard Evaluation: Human and Domestic Animals," published in vol. 43 of the <i>Federal Register</i> (#163 dated 1978)</p>

<b>WHMIS Class</b>	<b>Description</b>	<b>Criteria</b>	<b>OECD Test No.</b>	<b>Guideline Title</b>	<b>Other Tests/Studies*</b>
<b>D2B</b>	<p><b>Poisonous and Infectious Material</b></p> <p>A pure substance or tested mixture falls into this class if, in an animal assay for chronic toxic effects, it elicits a response of sufficient severity to threaten life or cause serious permanent impairment in a statistically significant proportion of the test population.</p>	<p>a) Dose &gt; 10–100 mg/kg of animal body weight per day</p> <p>b) Dose &gt; 20–200 mg/kg of animal body weight per day</p> <p>c) Concentration &gt; 25–250 ppm by volume of gas or vapour, or &gt; 10–100 ug/L or &gt; 10–100 mg/m<sup>3</sup> of dust, mist, or fume</p>	<p>408</p> <p>409</p> <p>452</p> <p>411</p> <p>452</p> <p>413</p> <p>452</p>	<p>Subchronic Oral Toxicity — Rodent: 90-day (May 12, 1981) Updated Sep 21, 1998</p> <p>Subchronic Oral Toxicity — Non-Rodent: 90-day (May 12, 1981) Updated Sep 21, 1998</p> <p>Chronic Toxicity Studies — Oral route test (May 12, 1981)</p> <p>Subchronic Dermal Toxicity: 90-day (May 12, 1981)</p> <p>Chronic Toxicity Studies — Dermal route (May 12, 1981)</p> <p>Subchronic Inhalation Toxicity: 90-day (May 12, 1981)</p> <p>Chronic Toxicity Studies — Inhalation route test (May 12, 1981)</p>	<p>If no tests carried out in accordance with the applicable OECD test guidelines, refer to the test/method described in US Food and Drug Administration (FDA) guidelines or US Environmental Protection Agency (EPA) guidelines</p>

<b>WHMIS Class</b>	<b>Description</b>	<b>Criteria</b>	<b>OECD Test No.</b>	<b>Guideline Title</b>	<b>Other Tests/Studies*</b>
<p><b>D2B continued</b></p> <p>Skin Irritation</p>	<p>A pure substance or tested mixture falls into this class if the listed criteria are met.</p>	<p>a) An effect graded at a mean of:            – 2 or more for erythema formation or 2 or more for edema formation</p> <p>b) An effect graded at a mean of:            – 2 or more for corneal damage            – 1 or more for iris damage            – 2.5 or more for conjunctival swelling or redness</p> <p>a) A response in            i) 30% or more of the test animals when using one of the techniques incorporating the use of an adjuvant            ii) 15% or more of the test animals when using one of the techniques not incorporating the use of an adjuvant or</p> <p>b) Evidence showing that product causes skin sensitization in persons following exposure in a workplace</p>	<p>404</p> <p>405</p> <p>406</p>	<p>Acute Dermal Irritation/Corrosion (May 12, 1981), measured at any of the times specified in the test Updated Jul 17, 1992</p> <p>Acute Eye Irritation/Corrosion (May 12, 1981), measured at any of the times specified in the test Updated Feb 24, 1987</p> <p>Skin Sensitization (May 12, 1981) Updated Jul 17, 1992</p>	<p>If no tests carried out in accordance with OECD test guidelines, refer to Draize Test. <i>Journal of Pharmacology and Experimental Therapeutics</i>, 82: 377–390, 1944.</p>

WHMIS Class	Description	Criteria	OECD Test No.	Guideline Title	Other Tests/Studies*
<p><b>D2B continued</b></p> <p>Mutagenicity</p>	<p>A pure substance or tested mixture falls into this class if evidence of mutagenicity in mammalian somatic cells is obtained in an <i>in vivo</i> test assessing either gene mutation or chromosomal aberration.</p>			<p>"Genetic Toxicology Testing and Guidance on the Selection and Application of Assays." In <i>Third Addendum to the OECD Guidelines for Testing of Chemicals</i> (March 1, 1987)</p>	<p><i>Guidelines on the Use of Mutagenicity Tests in the Toxicological Evaluation of Chemicals</i>, published under the authority of Health Canada (1986)</p>
<p><b>D3</b></p>	<p><b>Biohazardous Material</b></p> <p>A pure substance or tested mixture falls into this class if it is an organism that has been shown to cause disease or is reasonably believed to cause disease in persons or animals and the toxins of such an organism.</p>				<p>Organisms classified into Risk Groups 2, 3, or 4 as determined by the World Health Organization (WHO) or the Medical Research Council of Canada (MRCC)</p>
<p><b>E</b></p>	<p><b>Corrosive Material</b></p> <p>A pure substance or tested mixture falls into this class if the listed criteria are met.</p>	<p>a) Corrosion of SAE 1020 steel or 7075-T6 non-clad aluminum surfaces at a rate exceeding 6.25 mm per year</p>			<p>Test Method, Laboratory Corrosion Testing of Metals for the Process Industries, NACE Standard TM-01-95</p>

<b>WHMIS Class</b>	<b>Description</b>	<b>Criteria</b>	<b>OECD Test No.</b>	<b>Guideline Title</b>	<b>Other Tests/Studies*</b>
E continued	Corrosive Material	<ul style="list-style-type: none"> <li>b) Corrosive effect on skin</li> <li>c) Inclusion in <i>TDG Reg.</i></li> <li>d) Inclusion in <i>TDG Reg.</i> as Corrosive Gas</li> <li>e) Evidence that product causes necrosis of human skin tissue</li> <li>f) Untested mixture containing a substance present at a concentration of at least 1% and meeting criteria b) to e)</li> </ul>	404	Acute Dermal Irritation/Corrosion (May 12, 1981) Updated 17 Jul 1992	Class 8, Part III of the <i>TDG Reg.</i>
F	<b>Dangerously Reactive Material</b> A pure substance or tested mixture falls into this class if the listed criteria are met.	<ul style="list-style-type: none"> <li>a) Product that undergoes vigorous polymerization, decomposition, or condensation</li> <li>b) Product that becomes self-reactive under conditions of shock or increase in pressure or temperature</li> <li>c) Product that reacts vigorously with water to release a gas with an <math>LC_{50} \leq 2500</math> ppm by volume of gas, when tested for 4 hours</li> </ul>	403	Acute Inhalation Toxicity (May 12, 1981)	Division 4, Class 2 in Part III of the <i>TDG Reg.</i>

\* Any other test or method shall be carried out in accordance with generally accepted standards of good scientific practice.

## **TOXICOLOGY TESTING COMPANIES**

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## REGULATORY QUICK REFERENCES

### Controlled Products Regulations (CPR) and Hazardous Products Act (HPA)

All references are to the *CPR*, unless otherwise indicated.

Subject	Reference
<b>Material Safety Data Sheets</b>	
MSDS	HPA13a (sale) HPA14a (import)
Nine categories and headings on MSDS	12 (1)
Information placed under proper headings on MSDS	12 (2) (3)
Other information of which supplier is aware or ought to be “reasonably aware”	12 (11)
Undisclosed information marked either <i>not available</i> or <i>not applicable</i>	12 (6)
Misleading or contradictory toxicology information on MSDS	13 (1) (2)
Ingredient % expressed as a proper ratio	11 (1) (5)
Ingredient % expressed as range	11 (2) (3) (4)
LD <sub>50</sub> or LC <sub>50</sub> of a mixture	44, 45
Generic MSDS	7 (2) (a) or (b)
English and French MSDS requirement	24 (1) (2)
Revision of MSDS when new information becomes available	29 (1)
Revision of MSDS every three years	29 (2)
“Trade Secret” registration number and date given as per <i>HMIRA</i>	12 (5) 26 (1) (2) 27
<b>Label</b>	
Label	HPA13b (sale) HPA14b (import)
Information required on supplier label	19 (1) a–e 19 (2)–19 (5)
Labels on small containers < 100 mL	19 (1) a–d
Labels on lab chemicals	17
Labels on inner vs. outer containers	14
Labels on laboratory samples	16
Design and colour of border	20 (a) (i–ii)
Label attached to “visible” area of container	20 (b)
Legible and contrasting print on label	21 (1)

Subject	Reference
Durability of label	21 (2)
Coloured hazard symbols	22 (a) (b)
English and French label requirements	24 (3)
Revision of label when new information becomes available, or when review of information requires that label be changed	29 (1), 29 (2)
Identical product identifiers on label and MSDS	28
Bulk shipments	15
Contradictory information or disclaimers on MSDS or label	25
<i>HMIRA</i> Information	27
<b>Classes of Controlled Products</b>	
Manner of Establishing Classification: A supplier can (1) test the product (2) make judgments based on decisions on the test results available on products with similar properties (3) use information that a supplier is aware of or ought to be reasonably aware of (4) derive information from the OCED test (or equivalent) guidelines	33 (1)–(3)
Class A — Compressed Gas	34 (a)–(d)
Class B — Flammable and Combustible Material: Schedule II of <i>HPA</i>	35 (1)–(2)
Class B1 — Flammable Gas	36 (a)–(b)
Class B2 — Flammable Liquids	37
Class B3 — Combustible Liquids	38
Class B4 — Flammable Solids	39 (a)–(d)
Class B5 — Flammable Aerosols	40
Class B6 — Reactive Flammable Materials	41 (a)–(b)
Class C — Oxidizing Material	42 (a)–(b)
Class D1A — Materials Causing Immediate and Serious Toxic Effects Subdivision A: Very Toxic Material: Pure Substances and Tested Mixtures a) Acute Lethality: Pure Substances and Tested mixtures	46 (a)–(e), 47
b) Untested Mixtures	48
Class D1B: Toxic Material a) Acute Lethality: Pure Substances and Tested Mixtures	49 (a)–(d), 50
b) Untested Mixtures	51
Class D2: Materials Causing Other Toxic Effects	
Class D2A: Very Toxic Material A) Pure Substances and Tested Mixtures Chronic toxic effects	52 (a)–(c) 52 (a)–(c)
Teratogenicity and Embryotoxicity	53 (1)–(2)
Carcinogenicity	54 (a)–(b)

Subject	Reference
Reproductive Toxicity	55 (a)–(b)
Respiratory Tract Sensitization	56
Mutagenicity	57 (1)–(2)
Untested Mixtures	58 (a)–(b)
Class D2B: Toxic Material Pure Substances and Tested Mixtures <ul style="list-style-type: none"> <li>Chronic Toxic Effects</li> <li>Skin or Eye Irritation</li> <li>Skin Sensitization</li> <li>Mutagenicity</li> </ul>	59 (a)–(c) 60 (a)–(b) 61 (a)–(b) 62 (a)–(b)
Untested Mixtures	63
Class D3: Biohazardous Infectious Material	64
Class E: Corrosive Material	65 (a)–(b)
Class F: Dangerously Reactive Material	66 (a)–(c)

## CONVERSIONS AND FORMULAS

### Formulas

Measure	Conversion
° Rankine	° Fahrenheit + 460
° Kelvin	° Celsius + 273
Celsius to Fahrenheit	$(1.8 \times ^\circ\text{C}) + 32$
Fahrenheit to Celsius	$(^\circ\text{F} - 32) \times 0.556$
ppm	$\frac{24.45 \times \text{mg}/\text{m}^3}{\text{gram molecular weight of substance}}$
mg/m <sup>3</sup>	$\frac{\text{ppm} \times \text{gram molecular weight of substance}}{24.45}$

### Volume, Mass, and Length Conversions and Other Units

To Convert	Into	Multiply By
atmospheres	feet of water	33.90
atmospheres	inches Hg	29.92
atmospheres	kiloPascal	101.3
atmospheres	lb/sq inch (psi)	14.70
atmospheres	mmHg	760
centimetres	Inches	0.3937
cubic feet	cubic meters	0.02832
cubic feet	gallons	7.48052
cubic feet	litres	28.32
cubic inches	cubic centimetre	16.39
cubic meters	litres	1000
gallons (imperial)	litres	4.546
gallons (US)	litres	3.785
inches	centimetres	2.540
kilograms	pounds	2.205
litres	cubic yards	1.308 E-3
litres	cubic feet	0.03531
litres	ounces (fluid)	33.814
microns	metres	1 E6
miles/hour	feet/minute	88
milligrams	micrograms	1000
pints	millilitres	473.2

To Convert	Into	Multiply By
pounds	grams	453.6
pounds of water	cubic feet water	0.01602
pounds/cubic feet	kg/cubic metre	16.02
quarts	litres	0.9464
tons (metric)	kilograms	1000
tons (short)	pounds	2000
tons (short)	tons (metric)	0.9072

### Units: Volume/Weight/Measurements

Unit	
<p><b>Volume</b></p> <p>cu cm = 0.0610 cu in</p> <p>cu in = 16.39 cu cm</p> <p>cu m = 35.31 cu ft</p> <p>cu ft = 0.0283 cu m</p>	<p><b>Weight</b></p> <p>gram = 0.0353 oz</p> <p>oz = 28.3 g</p> <p>kg = 2.204 lb</p> <p>lb = 454 g</p>
<p><b>Capacity</b></p> <p>litre = 2.205 lb of pure water at 4°C</p> <p>litre = 0.0353 cu ft</p> <p>litre = 0.2642 gal (US)</p> <p>cu in = 0.0164 litre</p> <p>cu ft = 28.32 litre</p> <p>gal = 3.785 litre</p>	<p><b>Length</b></p> <p>cm = 0.3937 in</p> <p>in = 2.540 cm</p> <p>meter = 3.281 ft</p> <p>ft = 0.3048 m</p> <p>km = 0.6214 mile</p> <p>mile = 1.610 km</p>

Metric System Multiples	
<p><b>Prefix</b></p> <p>tera</p> <p>giga</p> <p>mega</p> <p>kilo</p> <p>milli</p> <p>micro</p> <p>nano</p> <p>pico</p> <p>femto</p> <p>atto</p>	<p><b>Factor</b></p> <p><math>10^{12}</math></p> <p><math>10^9</math></p> <p><math>10^6</math></p> <p><math>10^3</math></p> <p><math>10^{-3}</math></p> <p><math>10^{-6}</math></p> <p><math>10^{-9}</math></p> <p><math>10^{-12}</math></p> <p><math>10^{-15}</math></p> <p><math>10^{-18}</math></p>