

Chemicals and Materials

Hazardous Waste Management

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What is hazardous waste?

Waste is any material for which the owner has no further use for the material and intends to discard this material. When materials pose potential risks to human health and the environment, they are considered to be hazardous waste or hazardous recyclable material.

The federal legislation, as well as British Columbia, Prince Edward Island and New Brunswick legislation, defines "hazardous waste" as:

hazardous waste means a hazardous product that is acquired or generated for recycling or recovery or is intended for disposal [Canada Occupational Health and Safety Regulations, Section 10.29]

Other jurisdictions use similar wording from either their occupational health and safety or environmental protection legislation.

Examples of hazardous wastes and hazardous recyclable materials are any solid, liquid, gas, sludge, or paste substance that also exhibits certain hazardous characteristics such as being toxic, corrosive or flammable. Due to the dangerous properties of these materials, special recycling and disposal operations must be undertaken at authorized facilities to the materials are managed in a way to continue to protect both the environment and human health.

How is waste regulated at workplaces to protect the worker's health and safety?

Which legislation applies depends on what is being done with the waste. Legislation may apply when the hazardous waste is being collected, processed, treated, handled, or stored at the employer's premises.

Depending on the jurisdiction and the exact nature of the activity, the employer may need to comply with their jurisdiction's:

- occupational health and safety legislation
- environmental or waste legislation
- substance specific regulations (e.g., asbestos), and/or
- fire code.

If the employer will be shipping their hazardous waste they must also comply with the Transport of Dangerous Goods (TDG) Regulation.

NOTE: Where (and if) the Hazardous Product Act (HPA) applies, this Act does NOT require suppliers to comply with the federal WHMIS supplier legislation when the "hazardous waste" is sold for recycling or recover, or is intended for disposal. This exemption means that in most cases, the employer is not required to formally place a WHMIS supplier label on a hazardous waste container, create a safety data sheet, etc.

HOWEVER, employers are still required to maintain a safe workplace, and as such, may opt to use WHMIS labels and may still prepare an SDS as methods to communicate these hazards to the workers. British Columbia (BC) is one example of a province that requires SDSs for hazardous wastes. BC also accepts hazardous waste profile sheets as long as they contain the same information as an SDS. Other methods of hazard communication may be acceptable, such as placing notices or labels on the wastes, preparing safe operating procedure (SOP) or instructions on the safe handling and storage of their hazardous wastes, and education and training of workers.

What are the employer's responsibilities for managing hazardous waste?

The management of hazardous waste can be very complicated. The handling, recovery, and disposal of hazardous wastes, even on a small scale, involve potential hazards to health, the environment, and property. Generally, the employer should have qualified and competent personnel who have in-depth knowledge of chemistry to manage the hazardous waste program. If qualified personnel from within the organization are not available, a commercial waste expert or disposal firm should be contacted.

The employer must prepare a hazardous waste program. Elements of the program may include:

- Determining when a waste is hazardous.
- Knowing which legislation applies to their hazardous waste and when (e.g., stays at the worksite or is shipped).
- Understanding any exemptions that may apply.
- Knowing when to register the organization as a hazardous waste generator.

- Determining the hazards of each waste, developing an SDS or equivalent, and labelling the hazardous waste.
- Developing and implementing waste handling SOPs for different designated categories of wastes such as explosives, gases, flammable liquids, substances requiring special handling, etc.
- Developing and implementing SOPs for waste treatment, recovery, and disposal methods for wastes that remain on site.
- Creating a chemical and hazardous waste [inventory](#) for each worksite or facility. The inventory must be kept current.
- Determining which hazardous wastes should never be mixed (e.g., halogenated waste).
- Determining container selection and packaging requirements.
- Developing and implementing storage requirements and instructions. Designate locations where the containers are both allowed and not allowed to be stored.
- Determine how to reduce or minimize the amount of hazardous waste that is generated. Consideration should be given to:
 - eliminating materials that are hazardous or difficult to dispose of,
 - finding alternative less hazardous materials, or
 - ordering and using the minimum required quantity of hazardous material so that there will be little left over for disposal.
- Developing instructions for the handling of empty containers
- Ensuring workers are educated and trained, and are [competent](#) to safely handle the hazardous wastes.
- Providing education, training, or instructions about which hazardous wastes can be:
 - Reused
 - Recycled
 - Treated, or
 - Disposed.
- Recording and reporting requirements
- Determining disposal options
- Determining emergency procedures – spills, fire, etc.
- Tracking of products and waste used in the facility
- Preparing hazardous wastes containers for transport, waste manifest, and TDG shipping documents (if applicable)
- Determining transportation carrier requirements, such as approved licenced waste haulers (if used)
- Maintaining a list of contracts with commercial waste management companies (if used)
- Determining the program evaluation frequency
- Monitoring of applicable legislation

What type of information should be included in a safe operating procedure?

The safe operating procedure (SOP) should be prepared by a competent person or team with chemical background, and who are knowledgeable about the jurisdiction's occupational and environmental legislation.

The SOP for hazardous waste should include information on:

- the facility's waste identification system: how to identify the type of hazardous waste and type of ingredients that are present in the waste
- the waste's hazardous characteristics (e.g., toxicity, fire, explosion, or reactivity),
- how hazardous wastes are:
 - collected,
 - sorted, and
 - which wastes can be mixed together in the same containment method
- how to store the waste safely (e.g., separation of incompatible waste containers, placing containers in a secondary containment)
- how to handle the hazardous waste safely (e.g., type of personal protective equipment (PPE) to use, special handling practices such as bonding and grounding for ignitable or flammable wastes)
- how to contain and clean up spills
- which wastes will be treated on site (if any) and the treatment method
- which wastes will be sent out to a commercial waste management facility
- firefighting information
- emergency response
- first aid measures

The information in the SOP should be sufficient so that workers are able to identify the hazardous waste, understand the information in the SOP or other safety related documentation, and can apply the knowledge on the job to protect themselves (i.e., what personal protective equipment to wear) and others.

What are the workers' responsibilities for handling hazardous waste?

Before workers handle hazardous wastes, employers must make sure they are trained in:

- the safe operating procedures (SOPs) that are related to the worker's tasks and responsibilities.
- any required personal protective equipment (PPE) needed, and its use and maintenance
- emergency procedures
- spill procedures
- WHMIS, environmental regulations and TDG, if they are part of the worker's responsibilities.

When handling wastes, remember the following:

- Before you handle hazardous wastes, your employer is required to provide instruction, education, and training in the identification system, hazards, safe handling, and storage. This information should be in the SOP for the particular waste that is being handled. If you have not received the necessary training, talk to your supervisor or employer.
- Always get and read a copy of the SOP, especially if you are unsure of the procedures to follow. Ask your supervisor for help.
- When instructed to use PPE, you must use it. Before you use any PPE, you must be trained on how to use it properly.
- Only use containers that are specified in the SOP for the particular hazardous waste.
- Before adding hazardous waste in a new container, always make sure the container is compatible and appropriate according to the SOP. You may be asked to label the container to identify the contents. The label may follow WHMIS or TDG requirements, if transportation is planned. Note, you must be trained in the [TDG Regulations](#) before you ship any TDG Regulated hazardous waste.
- Only mix hazardous wastes that are approved by the SOP. If you are not sure, ask your supervisor or a competent person such as a chemist.
- Containers of hazardous waste must only be opened in the designated locations that are specified in the SOP. Unless in active use, always seal or close hazardous waste containers.
- Store containers according to the SOP.
- Separate containers with incompatible hazardous wastes according to the SOP.
- NEVER add any hazardous waste to a container whose contents are unknown and not labelled. Containers without labels and unknown content must be reported to your supervisor as soon as possible.
- NEVER pour wastes down a sink or floor drain, or place into any regular solid refuse container, especially not any of the following types of hazardous wastes:
 - a solution with a pH less than 6.0 or greater than 11.5
 - a solution consisting of two or more separate liquid layers
 - any liquid with a temperature greater than 60 degrees Celsius
 - acute hazardous waste chemicals
 - flammable or combustible liquids (i.e., those having a flash point under 93.3 Celsius)
 - biomedical waste
 - fuels
 - ignitable wastes
 - hazardous waste chemicals
 - pathological waste
 - pesticides
 - reactive waste
 - severely toxic waste
 - waste radioactive substances

How does the employer find information about the hazardous waste's properties?

Waste characterization is the term used to describe the assessment of the physical, chemical, and toxicological characteristics (i.e., properties). The generator of the hazardous waste must characterize the hazardous waste in order to develop the SOPs. They should have knowledge about:

- the composition,
- properties, and
- origin or history of the waste

The three primary reasons for characterization include to assess:

- the occupational health and safety hazards and control measures needed for worker safety
- the dangers relating to transportation on public roads,
- the environmental consequences of the waste

This information may be gathered from:

- the properties of the original products, as described on the SDS or through the TDG classification
- the employer's or chemist's knowledge about the process which generated the hazardous waste
- tests conducted to determine the waste's properties

The jurisdiction's environmental or waste legislation may specify the test methods that must be used for the waste's characterization.

Testing can be done by the generator's (i.e., employer's) own laboratory staff. If there is no laboratory at the facility, a test sample should be sent to an accredited external laboratory. It is highly recommended that periodic testing be conducted of all wastes to confirm their characterization. Knowledge gained during the application of standard analytical techniques in the identification of unknown substances may be used to reduce the number of additional tests required or parameters analyzed.

A list of accredited external laboratories is available at:

- [Standards Council of Canada \(SCC\)](#).
- [Canadian Association for Laboratory Accreditation Inc. \(CALA\)](#).

What is the difference between characterization and classification?

Before the waste can be classified as per regulatory requirements (such as for shipping under TDG), the waste must be characterized.

Once the waste is characterized, the results are used to classify the waste based on the criteria that are specified in the regulatory requirements.

Do all jurisdictions use the same criteria for classifying hazardous wastes?

No. Classification criteria and test methods vary by jurisdiction. For example, some jurisdictions such as Alberta and British Columbia use the same criteria as that in the TDG Regulations while other jurisdictions such as Ontario may use only some of the TDG classification criteria.

To properly classify wastes, the waste generator must consult applicable regulations and guidance documents. Guidance documents, such as Alberta's User Guide for Waste Managers, and the British Columbia Hazardous Waste Legislation Guide include a classification procedure.

Why don't SDSs for WHMIS provide instructions on how to treat or dispose of hazardous wastes?

The requirement for the content in supplier SDSs is specified in the federal Hazardous Product Regulation (HPR). The content for Sections 12 to 15 is not mandatory according to the HPR, which includes "Disposal consideration" (i.e., waste handling) as it is assigned to Section 13.

In addition, the requirements for treatment and disposal vary for different Canadian jurisdictions which will result in an overwhelming amount of information. However, some suppliers may have separate documents in which they provide guidance to their customers for the handling of the hazardous materials wastes.

How should hazardous wastes be collected?

The employer should specify how hazardous waste is collected in their SOP. Some jurisdictions (e.g., BC and Alberta) require waste profile sheets. The SOP will need to include a system for:

- Characterizing wastes to match the relevant legislation for that jurisdiction
- Which wastes are compatible and can be combined
- Which wastes are compatible but cannot be combined because they are environmentally hazardous and require special handling or will increase the cost of disposal when combined
- Which wastes require specific treatments to reduce their hazards. They should not be mixed with other wastes which can be recovered (e.g., distillation) or treated.

It may be helpful to develop a chart that outlines incompatible. See below for links to compatibility charts. **NOTE** that the potential consequences of reactions of incompatible wastes shown in the charts below are based on combination of two pure chemicals, rather than complex wastes. Thus, considerable caution must be used when using such charts as a guide for mixing hazardous wastes.

- [Ontario Appendix C: Chemical Compatibility Chart](#) (click on the download button)
- [US Environmental Protection Agency \(EPA\)'s Publication "A Method for Determining the Compatibility of Hazardous Wastes"](#)
- [US EPA Chemical Compatibility Chart](#)

(*We have mentioned these organizations as a means of providing a potentially useful referral. You should contact the organization(s) directly for more information about their services. Please note that mention of these organizations does not represent a recommendation or endorsement by CCOHS of these organizations over others of which you may be aware.)

Is there a summary of health and safety requirements for hazardous waste?

An example of the requirements for hazardous wastes in the health and safety legislation by jurisdiction are provided in the table below.

NOTE that other requirements may be needed that are not discussed in this document. Always consult the legislation that applies in your situation, and check with your jurisdiction ([occupational health and safety](#) or [environment](#)) for complete information.

Table 1:

Jurisdiction	Identification Program	Hazards Information	Safe Handling	Safe Storage	Label, Placard, or SDS - Direct Requirement in the Regulation	Education, Training, or Instructions for Employees
Canada - Federal	YES – generic name acceptable	YES	YES	YES	EITHER Must contain: <ul style="list-style-type: none"> • Identification • hazards 	Education and training
Alberta	YES	Not specified	YES	YES	Not specified	Instructions required
British Columbia	YES – not directly specified, but required in the workplace label which is specified in the regulation	NO	YES	YES	- Workplace label (minimum requirement) - Supplier label (optional) - Placards with same information as in a workplace label for waste that is not in containers -SDS or hazardous waste profile sheet that contains the equivalent information in an SDS	Training
Manitoba	YES	NO	YES	YES	NO	Training
New Brunswick	YES	NO	YES	YES	NO	Education, instruction, and training
Newfoundland and Labrador	YES	NO	YES	YES	NO	Training
Northwest Territories	YES	YES	YES	YES	NO	Training
Nova Scotia	YES	NO	YES	YES	NO	Education

Nunavut	YES	YES	YES	YES	NO	Training
Ontario	YES	NO	YES	YES	NO	Education
Prince Edward Island	YES	NO	YES	YES	NO	Education and training
Quebec	YES – not directly specified, but required in the workplace label which is specified in the regulation	NO	YES	YES	Workplace label on container or posted sign with same information as the workplace label	Training on precautions
Saskatchewan	YES	YES	YES	YES	NO	Education and training
Yukon	NO – not directly specified	NO	YES	YES	NO	Training

How do I know which containers to use to store hazardous waste?

How hazardous waste is stored depends on the waste's hazards and on how the hazardous waste will be managed at the worksite. If the hazardous waste is:

- radioactive - containers or packages must be selected according to the *Packaging and Transport of Nuclear Substances Regulations (PTNSR)*
- **not** radioactive - containers or packages are selected according to:
 - fire code
 - environmental or waste legislative requirements, or
 - Part 5 in the TDG Regulations.

Note, generally both the fire code and the environmental/waste legislation accept containers or packages that are compliant with Part 5 of the TDG Regulations. See CCOHS's OSH Answer titled "TDG Means of Containment (MOC) for Road Shipments" for container safety standards.

What are the storage requirements for hazardous wastes at workplaces?

Once a waste is characterized (e.g., ignitable/flammable, corrosive, toxic, etc.), the storage must meet the requirements of their jurisdiction for:

- health and safety legislation

- environmental legislation
- fire codes, and
- industry safe practices such as those of National Fire Protection Agency (NFPA)

Know which regulations apply and what the requirements are for the type of hazardous wastes that are being handled at the facility.

Specific storage requirements for hazardous wastes include:

- Explosives – Natural Resources Canada R.S.C., 1985, c. E-17, *Explosives Act* and regulations
- Radioactive - Canadian Nuclear Safety Commission CNSC SOR/2000-209, *Nuclear Safety and Control Act* (S.C. 1997, c.9)

General storage practices include:

- Storage containers should be manufactured to a standard (e.g., United Nations (UN) Standardized containers), in good condition, and must not be leaking.
- Only use storage containers that are compatible with the materials to be stored in them.
- Containers should be closed except when adding or removing material.
- Secondary containment must be provided when storing liquid hazardous material. There must be no openings in the secondary containment system that provide a direct connection to the area surrounding the system, such as sewers or the ground underneath the site. A variety of approaches can be taken to provide secondary containment; from simply placing hazardous waste containers into an over-pack drum along with absorbent materials, to the construction of an impervious concrete pad with continuous curbing for tank farms. The secondary containment system for tank farms should provide containment for 110 percent of the volume of the largest tank plus 10 percent of the aggregate capacity of all other tanks. For small quantity drum or container storage facilities, spill trays or containment devices having a minimum wall height of 15 centimetres should be used for secondary containment.
- Containers of hazardous materials must be stored in a structure designed and maintained so that precipitation and surface run-off water cannot enter the secondary containment system. For example, the structure should have appropriate sidewalls and roof to protect the containers from weather and prevent the entry of rain and snow that could reduce the capacity of the secondary containment system.
- Each storage container and tank must be clearly labelled to identify the hazardous waste or recyclable being stored, and the containers must be stored in a manner that allows access and visibility of the labelling during inspection.
- Wastes or recyclables in storage should be inspected weekly. Inspections should focus on the condition and security of containers. For example, inspect for deterioration or damage of containers from corrosion or other factors. Hazardous materials should be removed from a deteriorating or damaged container, or the container transferred to an over-pack container. Inspection activities, including observations and actions taken at the storage facility should be recorded in a logbook.
- Incompatible materials must be segregated within the storage system to prevent contact between materials, even in the event of a release. Incompatible materials should not be stored in the same or adjacent containers unless a dike, berm, wall, or other barrier separates them.

- The storage facility must be secure from entry from unauthorized persons. The storage facility should be enclosed by a fence and locked.

What are the requirements when transporting hazardous waste?

Only employees who have been trained in the Transportation of Dangerous Goods (TDG) or are under supervision of another employee who has been TDG trained can handle the hazardous waste dangerous goods. Every person who handles, offers for transport, or transports wastes, including waste classified as dangerous goods, must be trained in the aspects applicable to their assigned duties. This training is important in managing the shipments of these waste materials, because without adequate training, workers may not be able to select the proper packaging, labels, or shipping documents.

Hazardous wastes must be classified as per Part 2 in the TDG Regulations. Please see the OSH Answers document on [TDG Classification](#). Once the classification has been determined, then the means of containment is selected according to Part 5 Means of Containment of the TDG Regulations. Once the waste is packaged properly, check the following items are loaded in the vehicle:

- Containers inside the package should be cushioned with compatible packing material to prevent breakage or leakage
- Containers with incompatible wastes or residue in an unwashed container must not be placed in the same package
- The lids or bungs on the containers should be tightly and securely closed
- Containers and packages must be labelled as per the requirements in Part 4 Dangerous Goods Safety Marks of the TDG Regulations. Please see the OSH Answers document on TDG – Safety Marks.
- The waste manifest is properly filled in. Note, a waste manifest is acceptable as a shipping document by the TDG Regulations when it contains all of the required information for a TDG shipping document. Please see the OSH Answers document on TDG – Shipping Documents

Is waste oil TDG regulated?

[Transport Canada](#) has provided the following guidance on waste oil:

“While dangerous to the environment, Transport Canada does not usually consider used oil or waste oil a dangerous goods unless it is contaminated by other products. This contamination could make the used oil either toxic (PCB), flammable (gasoline) or corrosive (acids).

Section 2.2 of the TDG Regulations states that the shipper / manufacturer is responsible to determine the classification of the dangerous goods. In this case, the shipper/manufacturer must determine if the used oil is classified as a dangerous goods or not. One thing you can do to avoid oil from becoming a dangerous goods is to ensure that you only put used oil in the means of containment and nothing else— no gasoline, no solvent, etc. This can prevent contamination of your used oil and as a result, can be transported as non-regulated under the TDG Regulations.

If you want to ensure that your oil is not regulated, you must test a sample of the waste oil. You may ship small samples under Section 1.19.1 of the TDG Regulations.

Finally, shipments of used motor oil may be subject to Environment and Climate Change Canada regulations and provincial regulations. "

NOTE: Some waste oil may be a dangerous good under the TDG Regulations, such as in class 3 if it has a flashpoint less than 60.5 °C or in class 9 if it contains environmentally hazardous substances above specified levels.

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