

Transportation of Dangerous Goods SOP

CBS-SOP-024-18

Effective 2021.09.15

Purpose

To provide instruction on the requirements for the safe transport of hazardous materials (also referred to as dangerous goods).

Scope

This SOP applies to all individuals in the College of Biological Science who will be transporting, offering for transport or receiving dangerous goods as defined in the Transportation of Dangerous Goods Regulations (TDGR) which applies to many kinds of shipments of hazardous materials, including chemicals, radioactive and biohazardous materials.

This SOP is intended to supplement the required certification training in Transport of Dangerous Goods (TDG), and to provide information to those who may be involved in the transport and/or handling of dangerous goods exempted from TDGR.

Definitions/Acronyms

TDG – Transportation of dangerous goods

Dangerous good – a product, substance or organism defined or classified by the federal Transportation of Dangerous Goods Act and Regulations which pose significant hazards during transport.

United Nations (UN) numbers – are four-digit numbers used worldwide in the framework of international transport that identify dangerous goods during transport by sea, air, road, rail and inland waterways. To avoid confusion with other number codes the 4 numbers are preceded by the letters "UN" (for example, "UN2789"). The numbers are assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods.

Handling – means loading, unloading packing or unpacking dangerous goods in a means of containment for the purposes of, in the course of or following transportation and includes storing them in the course of transportation only.

Spill – a direct or indirect discharge of pollutant (solid, liquid or gas) made into the natural environment, which is the air, land or water of Ontario, from or out of a structure, vehicle or other container, that is abnormal in quality or quantity in light of all the circumstances of the discharge.

Requirements/Policies/Regulations

- IATA Dangerous Goods Regulations, International Air Transport Association
- Transportation of Dangerous Goods Act, 1992, S.C. 1992, c.34
- [CAN/CGSB-43.125](#) standard
- Nuclear Safety and Control Act, S.C. 1997, c. 9
- Occupational Health and Safety Act (OHSA), R.S.O. 1990
- Dangerous Goods Transportation Act, R.S.O. 1990, c D.1
- Environmental Protection Act, R.S.O. 1990
- Workplace Safety and Insurance Act, R.S.O. 1997

Training

Training and competency:

- WHMIS
- When transporting dangerous goods for university business, persons shall be TDG trained and shall use only University owned vehicles.

Certification:

- EHS will assign TDG training module and issue TDG training certification
- TDG training is offered online. <https://www.uoguelph.ca/hr/about-hr/environmental-health-safety-ehs/ehs-training/course-descriptions/transportation-dangerous>

NOTE *Reviewing this SOP does not constitute training. You must successfully complete an approved course and obtain a certification card from EHS to be certified to handle i.e. ship, carry or receive dangerous goods.*

Safety Precautions

- ⚠ The shipper is required to place the dangerous goods in the appropriate type of packaging, and carriers have the responsibility of refusing to transport any container that is damaged, leaking, or inappropriate for the goods within.
- ⚠ Carrying dangerous goods should be avoided by using certified carriers, however if a suitable alternative does not exist, always ensure the shipment is well secured and will not spill during transport, that the vehicle is in good working order, and that adequate automobile insurance coverage is in place.
- ⚠ Note that most automobile insurance policies exclude the carrying of dangerous goods. For more information regarding insurance requirements, review <https://www.uoguelph.ca/finance/departments-services/insurance-office/vehiclesdrivers>

Shipping Procedures

General Instructions

1. Classify the Material

Contact the University of Guelph Dangerous Goods Coordinator, Mail Services (x52264) prior to shipping any dangerous good. The Dangerous Goods Coordinator will assist with the shipping, classification and provide a recommendation on the type of packaging that should be used and provide the required shipping documentation and labels when you are ready to send out your package.

NOTE – *if you do not have current TDG training and certification, you cannot send, carry, or receive a shipment of a regulated dangerous good. The Dangerous Goods Coordinator is available to coordinate shipments for those who do not have the required certification.*

2. Package the Material

The exact nature of the packaging will depend on the goods being shipped. The packaging must protect the material from damage during shipping and conform to UN requirements (must have the UN safety mark on the outside) and must meet the shipping criteria of the International Civil Aviation Organization (ICAO).

In most circumstances, we use combination packaging –a leak-proof container which cushions and stabilizes the contents from shifting or movement inside a box. The dangerous good(s) are within a sealed container, which is then placed in an outer package that protects it from damage.



Figure 1 Combination Packaging Examples

3. Apply Labels

There is a set of requirements for what must appear on the outside of a package of dangerous goods which include:

- Shipping Name
- UN Identification Number

- Hazard Class Label(s)
- Packaging Certification Mark
- Ship to address

The figure below depicts the required labels on a shipment of glacial acetic acid. The manufacturer of the carton will typically print on the orientation mark and packaging certification – the shipper usually applies the shipping name, UN number, the hazard class label stickers and the shipping address.



Figure 2 TDG Label Requirements

4. Shipping Documents

The Dangerous Goods Coordinator will provide shipping documents that are appropriate for your shipment.

For most shipments the form must include:

- Date prepared
- Telephone number of a responsible person, knowledgeable about the shipment
- Shipping description for each dangerous good in the shipment in the following order:
 - Shipping Name (and technical name if required)
 - Hazard Class (and subsidiary class if required)
 - UN Identification Number
 - Packing Group

For the shipment of glacial acetic acid example above, the chemical is classified by TDGR as both corrosive (primary hazard) and flammable (subsidiary hazard), so the name on the shipping document would appear as:

Table 1 Shipping document classification example

Shipping Name	Primary Class	Subsidiary Class	UN Number	Packing Group	Quantity
Acetic Acid, Glacial	8	3	UN2789	11	2L

Figure 3 Example of Type P-650 Packaging

Procedure: RECEIVING – General Instructions

1. Examine Package

Each package containing dangerous goods must be visually inspected to ensure that the packaging is intact and undamaged, confirm that no leaks or spills have occurred during transport and that the proper labeling is in place. Receivers should refuse damaged packages and ensure the supplier is notified if dangerous goods arrive that are not in compliance. .

After a shipment has been received, TDG labeling requirements no longer apply, and hazardous materials within a workplace are subject to WHMIS labeling requirements. Once the goods have been removed from the package, deface or remove all labels on the shipping carton to avoid any future confusion.

2. Confirm Contents

After the visual inspection, review the shipping document and check the contents of the shipment against the contents listed on the shipping paperwork. Any omissions or errors must be reported to the carrier.

Store the packages in a safe and suitable location until they are delivered to their destination or used. Ensure that incompatible chemicals (e.g., flammables and oxidizers; acids and bases) are well separated.

3. Document Retention

The receiver must submit all shipping documents to cbsclerk@uoguelph.ca. The shipper must retain the shipping documents for a minimum of 2 years.

EXEMPTIONS

The advantages of exemptions are:

- TDG certification is not necessary,
- no TDG shipping documentation may be required, and
- eliminates obstacles relating to automobile insurance coverage.

The exemptions most applicable to CBS are: Test samples, Limited Quantities, Liquid Nitrogen Dry Shippers,

Dry Ice and Fuel.

Test Samples

- Test samples are not subject to TDGR. Test samples include any sample being transported to a laboratory for the purposes of classifying, testing or analysis, but excludes samples of infectious substances (e.g., Risk Group 2 or higher) (TDG Class 6.2), radioactive materials (TDG Class 7), or explosives (TDG Class 1).
- The packaging of test samples must be adequate to protect the contents during normal transport and handling,
- The exterior of the package must be labeled 'Test Samples'.
- The total quantity of test samples must not exceed 10 kg.

Limited Quantities – small shipments

The limited quantity amount is listed in Schedule 1 of the TDGR – the value indicated is to be interpreted as volume in litres for liquids and gases, and weight in kilograms for solid materials. This is the amount of material permitted in each inner package (e.g. plastic bottle). In all cases the maximum package weight cannot exceed 30kg. For example, a shipment of 6 x 1L bottles of a 37% formaldehyde solution (UN2209 - which has a limited quantity index of 5L) is not subject to TDGR, however certain conditions still apply:

- The inner package must be of good quality and placed in combination packaging with cushioning to immobilize and protect the items during transport.
- The Limited Quantities Mark must be displayed on one side of a means of containment to comply with the Limited Quantities Exemption (Section 1.17). There are 2 international safety marks to indicate limited quantity of a dangerous good.

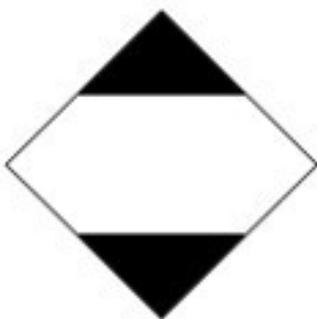


Figure 5 Limited Quantities Mark (by road)



Figure 6 ICAO Limited Quantities Mark (by air)

Liquid Nitrogen Dry Shippers

There are commercially available specimen transporters that are not subject to TDGR. These shippers are considered 'dry' because the liquid nitrogen is absorbed by a solid matrix and there is no free liquid available to spill. The limited quantity exemption for liquid nitrogen (UN1977) is only 125 mL, so the use of a dry shipper eliminates the need for shipper/carrier certification, TDG labeling and shipping documentation, as well as circumventing insurance issues that arise when carrying dangerous goods in University of Guelph vehicles. Note: the dry shipper should be carried in the back of a pick-up truck, so the nitrogen gas released as the vessel warms is free to escape to the atmosphere.

Dry Ice

Dry ice, Class 9; Miscellaneous Products Substances or Organisms is considered an explosion hazardous during transportation as it releases a large volume of carbon dioxide gas as it sublimates. Special Provision 18 allows a complete exemption for dry ice (UN1845) provided the package is properly vented i.e. if the means of containment is designed and constructed to permit the release of carbon dioxide to prevent the build-up of pressure that could rupture the means of containment that is transported by a road vehicle or a railway vehicle.

If it is shipped by air, it requires a Class 9 Hazard label and safety marks on the bill of lading.

A shipper's declaration of dangerous goods is not required unless the dry ice is used as a refrigerant for other dangerous goods. Otherwise only an air waybill is required with the following information: Dry Ice or Carbon dioxide, solid, Class 9, UN1845, number of packages and the net quantity of dry ice in each package.

Fuel

In support of field work and different activities throughout the college, there are instances where staff and students must carry fuel in a vehicle, usually in a portable fuel tank or jerrican. The limited quantity exemption for both gas and diesel fuel is 30L. The fuel must be packed in a means of containment (i.e. jerrican) which has a gross mass less than or equal to 30 kg, so for most 25 litre jerrican the need for training,

labeling, placards and shipping documentation do not apply.

The "150 kg Gross Mass Exemption" allows transport of a gross mass of up to 150 kg of gasoline. When using this exemption, the weight of each means of containment and the gasoline may not exceed 30 kg. As each 25 litre jerrican weighs less than 25 kg, you could transport 6 jerricans of gasoline.

For a fuel tank that is attached to a piece of equipment and required for the mechanical operation of that equipment (i.e. the fuel tank in a boat), Section 1.34 provides an exemption for quantities up to 200L.

For a fuel tank being carried separately, such as a refueling tank in the bed of a pickup, the relevant section of the TDGR is 1.35, which exempts the requirements for shipping documents and training certification for quantities up to 2000L. However, there is a condition that the container (i.e. fuel tank or drum) and the required diamond hazard label are visible from outside of the vehicle. As well, the tank, drum or container must be secured to the vehicle.

Contingency Plan and Reporting

The *Transportation of Dangerous Goods Act, 1992* (TDG Act) provides that any person who has the charge, management or control of a means of containment shall report any release or anticipated release (e.g. spills, accidents), loss or theft of dangerous goods that is or could be in excess of a quantity or concentration specified by regulation from the means of containment if it endangers, or could endanger, public safety. The TDG Act also provides for the development of regulations that prescribe who will receive reports, the manner of making the reports, the information to be included and the circumstances in which such reports are not required.

Loss, theft or unlawful interference of dangerous goods:

Contact EHS department for assistance ext: 53282. When reporting to EHS report the following information:

- The name, telephone number and address of the place of business of the person making the report.
- The name and address of the place of business of the consignor, the consignee and the carrier.
- Whether the dangerous goods were lost or stolen, or detailed description of the unlawful interference.

- The classification of the dangerous goods.
- The quantity of dangerous goods lost or stolen.
- A description of the type of means of containment containing the dangerous goods and a description or photograph of the certification safety marks
- The approximate date, time and geographic location of the loss or theft, or unlawful interference.

Spill Cleanup:

- Contact Campus Policy Immediately and evacuate the area around a spill, Dial X52000
- Contact your supervisor
- Contact EHS X53282, provide information as needed
- Ensure that any injuries are reported using the EHS [Incident Report Form](#)

Waste Management and Environmental Responsibility

- Once the goods have been removed from the package, deface or remove all labels on the shipping carton to avoid any future confusion.
- Dispose of dry ice in shipping containers by letting it sublimate in a well-ventilated area.
- Gel packs filled with a non-toxic salt solution can be thawed, cut open and poured down the drain with hot water to dissolve the gel. Recycle the exterior with other plastics. If you are unsure, check with the manufacturer of the thermal control packing material for their reuse guidelines and disposal instructions.
- Polystyrene packing peanuts are not recyclable thus disposed of in the garbage.
- The University does not recycle Styrofoam, shrink wrap, wrappers, bubble-wrap, or bags. These go into the garbage stream.
- Styrofoam or expanded polystyrene (EPS) shipping container can be recycled. Make sure all containers are clean, empty, and free of tape, labels, plastic film, or other contamination.
- Contact the University of Guelph Sustainability Office for further instruction <https://www.uoguelph.ca/campussustainability/>

Distribution of Copies

Document accessible on [CBS website](#)

Review Frequency:

All CBS SOP's are to be reviewed as changes in legislation or procedures as needed.