

College of Biological Science - Standard Operating Procedure			
Transportation of Dangerous Goods			
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Purpose:

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

Application:

This SOP applies to all individuals who will be offering for transport, transporting, or receiving dangerous goods (as defined in the Transportation of Dangerous Goods Regulations). The Transportation of Dangerous Goods Regulations (also called TDGR) 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 of dangerous goods exempted from TDGR.

Notes:

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 ship, carry or receive dangerous goods. For further information on available training courses, go to <http://www.uoguelph.ca/ehs> or contact Jennifer Wesley at x56401.

Safety Precautions:

- ⚠ Valid Certification in Transportation of Dangerous Goods is a requirement for anyone shipping, carrying or receiving a regulated package. Under certain conditions, the exemptions in the regulations permit transport of dangerous goods by non-certified personnel.
- ⚠ 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. The shipper is required to place the dangerous good 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.
- ⚠ Note that most automobile insurance policies exclude the carrying of dangerous goods. For more information regarding insurance requirements, contact the Insurance Manager (x 58752).

Procedure:

SHIPPING - GENERAL INSTRUCTIONS

- The basic requirements for shipments under TDG consist of
 - Classification
 - Packaging
 - Labeling
 - Shipping Documentation

Step 1 – Notify Mail Services, Classify the Material

Contact Kevin Ecott, Dangerous Goods Coordinator, Mail Services (x52264) prior to shipping any dangerous good. Kevin will assist with classification and provide a recommendation on the type of packaging that should be used. He will also 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 certification, you can not send, carry, or receive a shipment of a regulated dangerous good. Kevin Ecott is available to coordinate shipments for those who do not have the required training.

Step 2 – Package the Material

The exact nature of the packaging will depend on the goods being shipped. Mail services will provide a recommendation on the specific type of packaging for your shipment. The packaging must protect the material from damage during shipping. For ground shipping, the packaging must conform to UN requirements (and **must** have the UN safety mark on the outside). For air transport, the packaging must meet the criteria of the International Civil Aviation Organization (ICAO).

In most circumstances, we use combination packaging – basically a leak-proof container inside a box. The dangerous good(s) are sealed inside a sealed container, which is then placed in an outer package that protects it from damage. Here is an example:

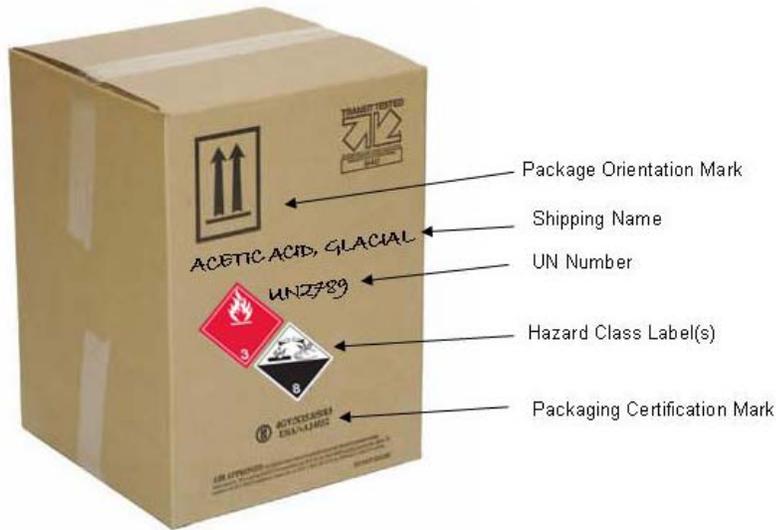


Step 3 – Apply Labels

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

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, applies the hazard class label stickers.



Step 4 –Shipping Documents

Mail services will provide shipping document that is appropriate for your shipment.

For ground shipments the form must include:

- Date prepared
- 24-hour phone number for emergency response (in Canada, use CANUTEC)
- Shipping description for each dangerous good in the shipment, in the following order:
 - o 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 above, the chemical is classified by TDGR as both corrosive (primary hazard) and flammable (subsidiary hazard), so the name on the shipping document we would write:

Shipping Name	Primary Class	Subsidiary Class	UN Number	Packing Group	Qty.
ACETIC ACID, GLACIAL	8	3	UN2789	II	2L

Step 5 – Contact Courier Service

Once the material has been classified, packaged and labelled, and you have the shipping documents completed, you are ready to ship. Contact a carrier to arrange the pick up, and be sure to let them know the details of what you are shipping.

UPS	1-800-742-5877
Federal Express	1-800-463-3339
TNT Express	1-800-461-8454
Purolator Courier	1-888-744-7123
Tughan Express	1-800-268-4678
Manitoulin Transport	1-519-653-0321

RECEIVING - GENERAL INSTRUCTIONS

Step 1 – Examine Package

Each package containing dangerous goods must be visually inspected to ensure that the packaging is intact and undamaged, and that no leaks or spills have occurred during transport. University of Guelph Policy requires receivers to refuse damaged packages – let the driver know that you can't accept the part of the shipment that has been damaged.

In addition to being free from damage and leaks, packages should have the appropriate safety marks and labels. During the visual inspection of the packages, quickly check the exterior of the packages to confirm that labeling is in place. Let the carrier know if you note any deficiencies.

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

Step 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 final destination or used. Ensure that incompatible chemicals (e.g., flammables and oxidizers; acids and bases) are well separated.

Step 3 - Document Retention

The receiver must retain shipping documents for at least two years.

EXAMPLE - Shipping an Infectious Substance This is an example to demonstrate how a microorganism is classified, and the process to determine the packaging, labeling and documentation requirements. In this example scenario, we have a culture of *E. coli* which we wish to send to a colleague elsewhere in Canada.

1. *Does it qualify as an 'Infectious Substance'?*

Risk Group 1 microorganisms are exempt from TDG regulations and can be shipped by road without documentation or training. Anything in Risk Group 2 qualifies as an Infectious Substance. In the example of *E. coli*, it is an 'infectious substance' because *E. coli* is a Risk Group 2 organism.

Note that any material identified as an 'infectious substance' (either Category A or B) must be shipped by someone with valid TDG certification, using a carrier also certified in TDG.

2. *Is it 'Category A' or 'Category B'?*

To determine whether an organism is Category A or B, we have to consult Appendix 3 of the TDGR (<http://legislation.ccohs.ca/legislation/documents/canada/caetod/cartd1.htm>). *E. coli* is listed under Category B (see item 41 in the table).

Category A materials are those that could cause permanent disability or life-threatening disease in animals or humans. All infectious substances that don't meet the Category A (high risk) criteria are captured under Category B.

3. What is the correct shipping name – UN3373, UN2814, or UN2900

Anything in Category B is shipped under the name UN3373, Biological Substance, Category B. This would be the correct shipping name for our example shipment of an *E. coli* culture.

Category A materials are assigned to either UN2814, or UN2900, depending on the ability of the organism to cause disease in humans or animals.

4. What type of packaging is needed?

There are two types of packaging; the highest level, Type 1A, is packaging you can buy commercially that has undergone various tests to verify it is durable – it is only required for Category A infectious substances (although it can be used for lower risk, Category B shipments).

For the majority of biological shipments, Type 1B packaging is adequate. In 2008, the requirements for Type 1B packaging became more stringent. Therefore it is strongly recommended that Type 1B packaging be purchased from a commercial supplier. The marking ‘TC-125-1B’ indicates a packaging system meets the requirements for Type 1B.

In our example, *E. coli* is Category B, so Type 1B packaging is required.

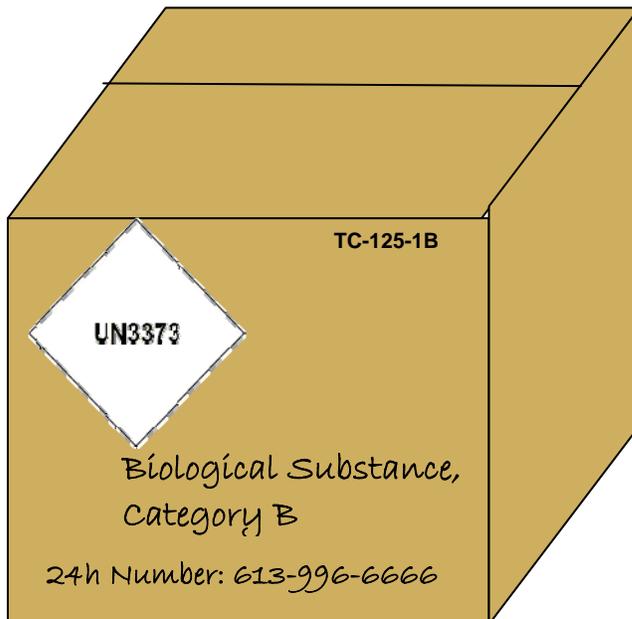
5. What labels are required?

The labeling requirements are dictated by the classification of the contents. Shipments of Category B Infectious Substances must have diamond hazard label shown below on the outer container.



They must also have the shipping name, written at least 6mm high: Biological Substance, Category B. In the case of Category B materials, a 24h emergency response number must also be written, for example: ‘24h Number: CANUTEC 613-996-6666’

Here is what our package of *E. coli* culture should look like:



6. What documentation is needed by the carrier?

Shipments of Category B, Biological Substance are exempt from documentation requirements, providing the outer package is at least 10 cm x 10 cm and meets the packaging certification and labeling requirements described above.

7. Are placards required on the outside of the vehicle?

Placards would not typically be required for a shipment of a culture of *E. coli* – in fact in general, for the size of shipments we would routinely send out, placards are not necessary.

EXEMPTIONS

The advantage of exemptions are:

- no shipping documentation may not be required
- TDG certification is not required
- exemption from TDG eliminates obstacles relating to automobile insurance coverage
- The exemptions most applicable to CBS are:
 - o Test samples
 - o Limited Quantities
 - o Liquid Nitrogen Dry Shippers
 - o Fuel
- o *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 above), radioactive materials, or explosives (TDG Class 1).
 - The packaging of test samples must be adequate to protect the contents during normal transport and handling, and the package must be securely stowed in the vehicle. The total quantity of samples must not exceed 10 kg, and on the exterior of the package the words ‘Test Samples’ must be written.
- o *Small shipments (‘Limited Quantities’)*
 - The limited quantity amount is listed in Schedule 1 of the TDGR – the value indicated is to be interpreted as volume in liters 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 can not 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 (e.g., a box) with enough cushioning to protect the items during transport.
 - The words ‘Limited Quantity’ or abbreviation ‘Ltd Qty.’ must be written clearly on the outside of the completed package.
- o *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 (UN 1977) 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 the insurance issues that arise when carrying dangerous goods in University of Guelph vehicles. Note that 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*
 - When dry ice (UN 1845) is shipped on it's own, it is considered a dangerous good, in Class 9 – Miscellaneous Products Substances or Organisms. Quantities less than 5kg are exempted as a limited quantity (see above); amounts >5kg are fully regulated TDG shipments. However, when it is used as a refrigerant in a 'small means of containment' (i.e., packages <450L), it is exempt from TDGR – all that is required is packaging that permits release of carbon dioxide gas, and the words 'Dry Ice as Refrigerant' on the shipping document or waybill that accompanies the 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 'jerry can' or portable fuel tank. The limited quantity exemption for both gas and diesel fuel is 30L, so for most 'jerry cans' training, labeling, placards and shipping documentation do not apply.
 - For a fuel tank that is attached to a piece of equipment, and required for the mechanical operation of that equipment (like 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 be visible from outside of the vehicle. As well, the tank, drum or container must be secured to the vehicle.

CONTINGENCY PLANS

Spills

- Take any reasonable measure available to protect the public (e.g., evacuating the area around a spill).
- Determine if the spill is a ‘reportable quantity’ (see Section 8.1). Reporting of ‘accidental releases’ (spills) or ‘imminent accidental releases’ (damage that may lead to a spill) is the responsibility of the party in control of the shipment at the time. The list of who must be notified varies from province to province is provided below.
- If it is a reportable spill, the person in charge of the goods at the time the incident must notify:
 - i) the appropriate authority (see below);
 - ii) the University of Guelph (as the employer);
 - iii) the shipper (if applicable);
 - iv) the owner of the road vehicle
 - v) for Class 6.2 Infectious Substances – CANUTEC at 613-996-6666
 - vi) for a cylinder that has suffered catastrophic failure – CANUTEC 613-996-6666

Province/Region	Authority
Alberta	Local police and provincial authorities at 1-800-272-9600 or 780-422-9600
British Columbia	Local police and provincial authorities at 1-800-663-3456
Manitoba	Local police or fire brigade and Department of Conservation at 204-945-4888
New Brunswick	Local police or 1-800-565-1633 or 902-426-6030
Newfoundland	Local police and Canadian Coast Guard at 709-772-2083
Northwest Territories	Appropriate authorities at 867-920-8130
Nova Scotia	Local police or 1-800-565-1633 or 902-426-6030
Nunavut	Local police and the Nunavut Emergency Services at 1-800-693-1666 or 867-979-6262
Ontario	Local police
Prince Edward Island	Local police or 1-800-565-1633 or 902-426-6030
Quebec	Local police
Saskatchewan	Local police or 1-800-667-7525
Yukon	Appropriate authorities at 867-667-7244
United States	National Response Centre at 1-800-424-8802 for chemical spills. See www.nrc.uscg.mil for more information

Motor Vehicle Accident

- Attend to any injuries and call for emergency medical assistance as required. If there is a release of dangerous goods, follow the steps above for spills.
- Report the accident to the nearest municipal or provincial police (as required by the Highway Traffic Act).
- It is appropriate to exchange ownership, insurance and driver’s license information with those involved in the accident.
- Ensure that any injuries are reported using the EHS Incident Report Form. Also, for university owned-vehicles, report the accident to Transportation Services using the University of Guelph Automobile Accident Report Form (which can be obtained from Transportation Services).

APPLICABLE POLICIES & REGULATIONS:

- University of Guelph Safety Policy 851.08.10
- University of Guelph Physical Resources Policy PR 3.0