



Self-Teach Training Program

TDG Self-Teach™

**Transportation
of Dangerous Goods**



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Transportation of Dangerous Goods

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Includes Amendments up to December 2017.

Revised January 2018.

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Published by Danatec Educational Services Ltd.

ISBN 978-1-894359-19-1

Danatec provides instructors' packages, self-teach programs, online courses, handbooks, videos and posters for:

- ▶ Transportation of Dangerous Goods (TDG)
- ▶ Workplace Hazardous Materials Information System (WHMIS)
- ▶ Other workplace safety topics

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Before You Start



Name

Title or Position

Company / Location

IMPORTANT *Please read and sign below before starting the program.*

This manual is intended for use by one person only. Please keep it for your own reference.

I understand the paragraph above.

Signature

Date

This self-teach program provides an overview of the requirements for shipping and transporting dangerous goods by road. For complete details, consult an up-to-date copy of the Transportation of Dangerous Goods Regulations or ask your supervisor.

Part 6 of the TDG Regulations describes the employer's responsibility to provide training to employees.

For more information or to obtain a copy of the Regulations, contact the Danatec representative in your region (listed at www.Danatec.com) or call Danatec at 1.800.465.3366.

Table of Contents

| | |
|---------------------------------------|-----------|
| Introduction | 1 |
| Classification | 15 |
| Shipping Document | 35 |
| Safety Marks | 45 |
| Containers | 59 |
| Special Situations | 65 |
| Emergency Actions | 75 |
| Conclusion | 81 |
| Glossary | 83 |
| Answers to Questions in Manual | 84 |

HOW THIS PROGRAM WORKS

Welcome to the dangerous goods self-teach program. It is designed so you can learn on your own and master the knowledge and skills you need in order to comply with the Transportation of Dangerous Goods (TDG) Regulations.

This is your copy of the self-teach manual, so feel free to **underline** or **highlight** important points or scribble **notes** in the margin.

As you work through this manual you'll be asked short **questions**. It's important to answer the questions – to make sure you understand the main points of the program and to prepare for the **competency check** at the end.

Here's a question to get you started. Check the Glossary and write your answer here. (The Glossary is on page 83.)

Question



What does ERAP stand for?

The correct answers are on page 84, in case you need to check.

The **competency check** will not be difficult if you've answered the questions in the manual as you go. It's an "open book" test designed to give you more practice in applying what you've learned, so you'll be able to use all your course materials to answer the test questions.

Most people need **two to four hours** to complete the training program.

If you're reading this manual by yourself, try to set aside time to work with no distractions. Or you might be using it in a small group or a classroom, where you'll be able to discuss the information and ask questions.

After you finish the training program, you and your employer will sign the **training certificate**, and your employer will make a photocopy. If you're being retrained, hand in the old certificate for your employer to keep on file, and replace it with the new one.

To get the most benefit from this program:

1. Read the manual, answering the questions as you go.
2. Review any additional information provided by your employer.
3. Complete the competency check and hand it in to be marked.
4. Sign your wallet certificate and make sure you carry it with you at work.

COURSE MATERIALS

In the front pocket you'll find:

- ▶ a **class guide and checklist**, with a **placard guide** on the other side
- ▶ a dangerous goods **list**
- ▶ a **competency check**
- ▶ a **wallet certificate**
- ▶ a **wall certificate**

Check to make sure you have everything you need to complete this course.



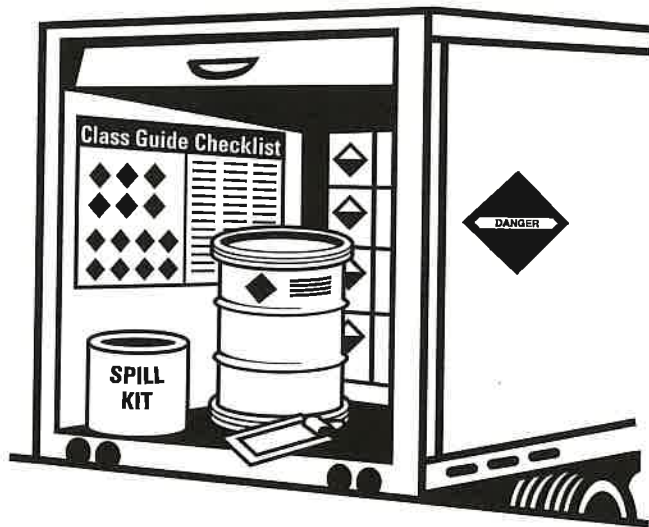
WHAT IS TDG?

Thousands of shipments of dangerous goods such as gasoline, propane and pesticides are transported every day on Canada's highways. The Transportation of Dangerous Goods (TDG) Regulations are intended to **protect the public** from the hazards of an accidental spill or leak.

The TDG system **provides information** to everyone who comes in contact with the dangerous goods – including emergency responders, if something goes wrong.

The regulations make sure that:

- ▶ a **shipping document** describes the dangerous goods
- ▶ safe **packaging** helps prevent spills and leaks
- ▶ safety marks such as **labels** and **placards** provide visual clues about the hazards of the dangerous goods
- ▶ **emergency actions** protect people and the environment in case of a spill or leak



The story on the opposite page is an example of how a placard on the tank truck helps emergency responders immediately identify the product, and then the shipping document provides them with more detailed information.

Truck Rolls Over on Highway Town of Barreville Evacuated

A tank truck carrying 54,000 litres of methanol rolled over and skidded into the yard of the Barreville gas station late last night.

Truck driver Ian Sanford was injured in the accident, which took place in icy conditions.

Jim and Eileen Donovan woke when they heard the crash just after 2:00 a.m. They phoned 911 and rushed across the highway to the gas station.

Jim Donovan said, "The driver was unconscious but we managed to pull him out of the cab and away from the truck by the time the police got there. We were afraid it was going to blow up."

Constable Marie Leclair saw liquid spreading rapidly around the accident site and called the volunteer fire department.

She told fire chief Austin Kozak the truck had red placards with the number 1230. When Kozak checked his Emergency Response Guidebook he found that 1230 refers to methanol, a flammable liquid which is also poisonous.



Firefighters cover the spilled methanol with foam to prevent a fire or explosion.

Because of the danger of fire, explosion and toxic fumes, Leclair blocked off the highway and roused the 72 residents of Barreville. They gathered at the community hall about two kilometres from the accident scene.

Kozak explained, "The placards told us what kind of hazard we were dealing with, so we covered the spill with alcohol-resistant foam instead of the kind we use for other flammable liquids.

The shipping document gave us a lot more details, such as the exact amount of methanol in the tank."

By 6:00 a.m. the residents were given permission to return to their homes and the clean-up was under way.

Sanford will be released from hospital later today. Transport officials are investigating the accident.

WHY DO I NEED THIS TRAINING PROGRAM?

The fact that you're reading this training manual means your job – in some way – brings you in contact with dangerous goods. You might work in a warehouse preparing shipping documents, or you might load and unload trucks. You could be a long-distance truck driver hauling tanker loads of gasoline or a pickup and delivery driver handling small shipments.

This training program contains the basic information needed by everyone who works with dangerous goods, and will show you how your job fits into the picture. To prepare, handle or transport dangerous goods safely and correctly, you must:

- ▶ be trained
- ▶ know your responsibilities
- ▶ have a training certificate

Emergency responders are usually highly trained people, like firefighters, police officers or special chemical response teams. However, anyone might have to deal with an emergency involving dangerous goods, including a loader, driver, ambulance attendant or member of the public.

PUTTING IT ALL TOGETHER

The roles and responsibilities of the various players are like the interlocking pieces of a jigsaw puzzle. If the shipper, handler, driver and emergency responders are trained and do their jobs properly, the public will be at less risk when there is an accident involving dangerous goods:

You are responsible for at least one piece of the puzzle.

Question



The Transportation of Dangerous Goods Regulations only apply on the highway, so the person who loads trucks does not need to be trained.

..... TRUE FALSE

HOW DO I FIT IN?

Everyone who handles dangerous goods, including the person who loads or unloads, is responsible for making sure the goods are transported safely to their final destination.

All the people involved should:

- ▶ understand the **hazards** of each class of dangerous goods
- ▶ recognize the hazards shown by **labels** and **placards**
- ▶ carry a valid training **certificate**
- ▶ **handle** dangerous goods carefully to prevent spills and leaks
- ▶ **take action** in case of a spill or leak



It is each employer's responsibility to provide specific details about the dangerous goods their employees are expected to handle, ship or transport.

Shipper (Consignor)

The person who prepares the shipment:

- ▶ finds out the **classification**
- ▶ **packages** the goods securely
- ▶ completes a **shipping document**
- ▶ **labels** and **marks** the packages
- ▶ provides **placards** if necessary



Someone who **imports** dangerous goods into Canada may also have the responsibilities of a shipper.

Driver (Carrier)

Before accepting a shipment, the driver:

- ▶ makes sure the **document** is complete
- ▶ makes sure the **labels** and **markings** on the containers match the information on the shipping document

Drivers must not accept shipments until the document, labels and markings are complete and correct. They must not accept containers that could leak or are in poor condition.



The driver also:

- ▶ attaches **placards**, if required
- ▶ makes sure the dangerous goods are **loaded** and **secured** properly
- ▶ carries the **document** with the goods

In some cases a driver may have responsibilities of both a shipper and a carrier – for example, when transporting company goods or picking up freight from an unattended location.

Receiver (Consignee)

The person who unloads the shipment is a handler of dangerous goods and has the general responsibilities listed on page 7.

Question



Stan is a handyman for a company that owns several dry cleaners and a fleet of delivery vans. In his truck he sometimes carries vehicle batteries and dry cleaning chemicals that he picks up from the company's unmanned warehouse.

Stan's responsibilities under the dangerous goods regulations include those of a shipper, handler and driver.

_____ TRUE _____ FALSE

TRAINING

Everyone who handles, prepares for transport or carries dangerous goods must be trained and certified. Your employer determines what **type and level of training** you need.

In addition to the topics covered in this manual, your dangerous goods training **might include:**

- ▶ the use of safety equipment
- ▶ safe loading and unloading procedures
- ▶ special training for explosives or radioactives
- ▶ guidelines for selecting appropriate packages and containers
- ▶ more information about how to classify dangerous goods

Although you will find examples of dangerous goods in this workbook, your employer must provide details about the specific products you deal with.

Question



Conrad is a forklift driver who loads and unloads trucks containing auto parts.

His training should include: *(Mark all that apply)*

- **recognition of dangerous goods labels**
- **safe operation of a forklift**
- **emergency procedures in case of a spill or leak**

CERTIFICATE

The dangerous goods training certificate is issued by your employer, and is valid for **three years**. It can be in any size or format, but it's not valid unless it is **signed** by both you and your employer.

Whether you use the wallet certificate included with this manual or one issued by your employer, it must contain:

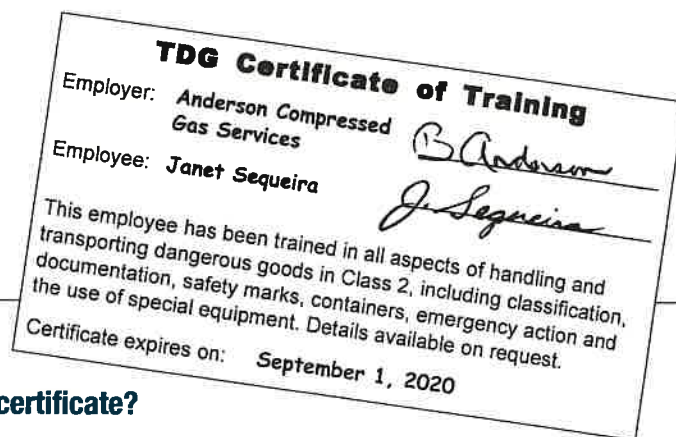
- ▶ your **employer's name, address** and **signature**
- ▶ **your name** and **signature**
- ▶ **"Expires on"** and the **date it expires**
- ▶ a brief description of the **training** you received

If your responsibilities change, you might require **additional** dangerous goods training.

The certificate is **not transferable** – if you change employers, a certificate must be issued by your new employer.

If you are **self-employed**, you can issue your own certificate. This means you have the responsibilities of both an employer and an employee. If you do contract work the company might ask you to take their dangerous goods training course as well.

You must **keep your certificate with you** or near you. You have to produce it at the request of a dangerous goods inspector.



Question



What piece of information is missing from this training certificate?

Uncertified Employees

There could be a temporary situation where a person without a valid TDG certificate is required to handle dangerous goods – for example, a new or occasional employee. This is only allowed while the employee is being **watched and supervised** by someone who is certified. The certified person is responsible for the actions of the uncertified person.

ENFORCEMENT

Dangerous goods regulations are enforced by government-trained **inspectors**. They may be police officers, weigh-scale operators or other government employees.

Inspectors have the **authority** to:

- ▶ search shipments or vehicles
- ▶ seize and hold goods
- ▶ take samples
- ▶ make copies of documents
- ▶ refuse entry into Canada of shipments or vehicles



Just as you will have a certificate showing that you've been trained, inspectors have a **certificate of designation** showing the extent of their training and authorization.

An inspector wants to know that you and your employer are making **reasonable efforts to comply** with the regulations. You must cooperate with any reasonable request an inspector makes.

The inspector will check to make sure:

- ▶ your **training certificate** is current and valid
- ▶ the **shipping document** is complete and correct
- ▶ dangerous goods are **labelled** and **marked** correctly
- ▶ the **correct container** has been used
- ▶ vehicles are **placarded**, if necessary
- ▶ the dangerous goods are loaded, secured and transported **safely**

The **penalties** for failing to obey the dangerous goods regulations can vary from fines to jail terms. Anyone involved can be charged, from the president of the company to a part-time employee.

The best way to avoid problems is to make every effort to comply with the regulations. This is called “**due diligence**.”

Question



When the plant manager at Janson Chemicals hired a new shipper he didn't have time to train him properly. The shipper sent two drums of sulphuric acid without labelling or documenting them as dangerous goods.

The driver was stopped for a routine inspection and could not continue his trip until the dangerous goods were properly labelled, marked and documented.

Who do you think is most responsible for this situation?

- **the new shipper**
- **the plant manager**
- **the driver**

Products and substances are classified as dangerous goods if they could be hazardous during transport or when they spill or leak.

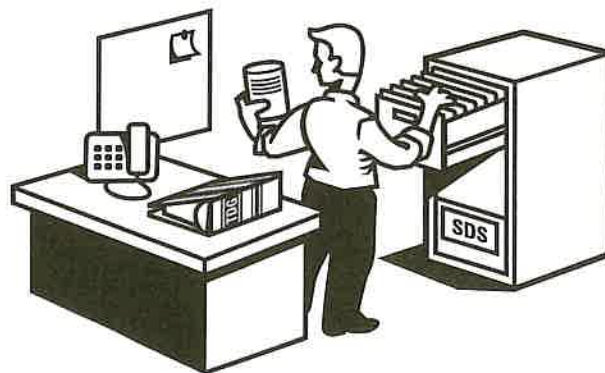
Everyone involved in transportation has to **understand the hazards** of dangerous goods. This includes shippers, handlers, drivers and emergency responders.

It is the **responsibility of the shipper** to know whether an item is flammable, toxic, corrosive, etc. and to find out how it should be classified under the dangerous goods regulations.

The **carrier** should not accept a shipment until all the classification details are listed on the shipping document. Emergency responders will need this information if there is an accident or incident during transport.

The manufacturer is usually the one who conducts the laboratory tests to determine whether the product fits into one or more of the 9 classes of dangerous goods. The shipper may find this information by:

- ▶ checking the **Safety Data Sheet (SDS)**, which should list the dangerous goods classification along with other technical information and safe handling procedures
- ▶ contacting the **manufacturer**



CLASSES 1 TO 9

Each of the 9 classes of dangerous goods represents a different type of hazard. The **colours, symbols** and **numbers** on the **Class Guide** (Dangerous Goods Classes) in the front pocket of this manual show the type of danger of each class.

Question



What kind of danger does the colour blue indicate?

(Refer to the Class Guide.)

- **radioactive**
- **spontaneously combustible**
- **dangerous when wet**

Some classes are separated into divisions that identify the **type of hazard** more clearly.

For example, Class 5 has two divisions:



5.1
Oxidizer



5.2
Organic Peroxide

Question



What colour are Class 5.1 labels?

.....

Primary and Subsidiary Classes

If a product has more than one type of hazard, it may belong to more than one class. The **primary** class is shown first, with **subsidiary** classes in brackets.

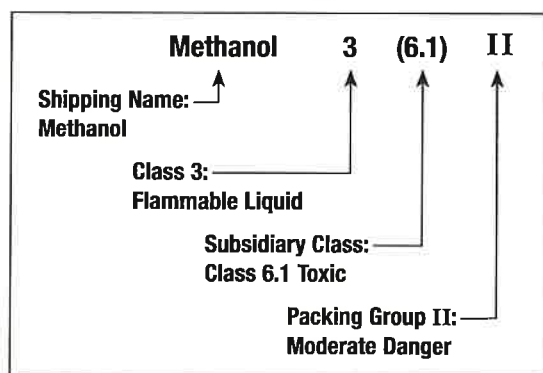
For example, methanol is a Class 3 (6.1). Its primary risk is Class 3 Flammable Liquid and its subsidiary risk is Class 6.1 Toxic.

This information can be important in case of a spill or leak. A trained emergency responder will attack the biggest threat first.

PACKING GROUPS

In some classes, the **degree of hazard** is indicated by **packing groups**, always shown in Roman numerals:

- I** great danger
- II** moderate danger
- III** minor danger



Some classes have no packing groups (for example, Class 2 – Gases) and some are separated in other ways, as explained under each class:

- Class 1 Explosives → compatibility groups
- Class 7 Radioactives → hazard categories

SHIPPING NAMES

There are hundreds of thousands of chemical compounds and millions of trade names.

To reduce confusion, the dangerous goods regulations include a **list of shipping names**. The shipper must choose the correct shipping name from this list.

On the shipping document, minor variations are acceptable. For example:

- ▶ the shipping name may not always have to be in capital letters
- ▶ it can be singular or plural
- ▶ solutions or mixtures may be followed by the word “solution” or “mixture,” as well as the concentration
- ▶ the word order may be slightly different – for example, “Air, Compressed” is in the list, but “Compressed Air” may be used on the shipping document

Some shipping names are very precise, such as “Propane” and “Acetone.”

Other shipping names are more general and are often used to describe mixtures that contain dangerous goods. For example, “Corrosive Liquid, N.O.S.” is the shipping name for many products. (**N.O.S.** stands for “**Not Otherwise Specified.**”)

Some shipping names, including “Corrosive Liquid, N.O.S.,” have **Special Provision 16** beside them in the dangerous goods list. If so, the shipping name must be followed by the **technical name** of the main hazardous ingredient in brackets.

For example, a cleaning product might be shipped as “Corrosive Liquid, N.O.S. (sulphuric acid).”

UN NUMBERS

The same **United Nations (UN) number** is used around the world to identify dangerous goods, even though the shipping name might be different.

For example, gasoline is UN1203 even when it is called *benzin* in Germany or *gasolina* in Mexico. The same UN number is used when gasoline is transported by truck, train, vessel or aircraft.



Here are some common shipping names with their UN numbers:

| <i>Shipping Name</i> | <i>UN Number</i> |
|---------------------------|------------------|
| Acetone | UN1090 |
| Corrosive liquid, N.O.S.* | UN1760 |
| Gasoline | UN1203 |
| Sulphuric acid | UN1830 |

* This shipping name has Special Provision 16, requiring the name of the main hazardous ingredient to be added in brackets.

USING THE LIST OF DANGEROUS GOODS

In the front pocket of this manual is a sheet called “**Dangerous Goods List.**” The examples on the sheet are taken from Schedule 1 of the Transportation of Dangerous Goods Regulations.

These are the first 5 columns of the alphabetical list of dangerous goods for training purposes:

| COLUMN 1 | COLUMN 2 | COLUMN 3 | COLUMN 4 | COLUMN 5 |
|--------------------------------------|------------------|----------------|-------------------------------------|-------------------------------------|
| <i>Shipping Name and Description</i> | <i>UN Number</i> | <i>Class</i> | <i>Packing Group or Category</i> | <i>Special Provisions</i> |
| METHANOL | UN1230 | 3 (6.1) | II | 43 |
| CORROSIVE LIQUID, N.O.S. | UN1760 | 8 | I II III | 16 16 16 |

↑
The **shipping name** is shown in capitals in the list.

↑
The **UN number** always appears with the letters UN.

↑
The **primary class** is listed first, followed by the **subsidiary class** in brackets.

↑
The **packing group** (I, II or III) or the **category** (A or B) shows the degree of hazard.

↑
Special provisions may add definitions, restrictions or exemptions.

Special Provision 16, for example, requires that the name of the main hazardous ingredient be added to the shipping name in brackets on the shipping document and on the small means of containment.

Questions



1. What is the UN number for mercury?

UN

2. An environmental company uses a mixture of alcohol, ethanol and methanol for testing samples. This liquid is classified as “Alcohols, flammable toxic, n.o.s.” in the list of dangerous goods.

What must be added to the shipping name?

(Look up the special provision. Details are on the last page of the Dangerous Goods List.)

..... **the technical name of the most flammable ingredient**

..... **a list of all the ingredients**

..... **the flash point**

Columns 6 to 10 contain **additional information**:

| COLUMN 6 | | | | |
|--|----------------------------|-------------|--|--|
| COLUMN 6a | COLUMN 6b | COLUMN 7 | COLUMN 8 | COLUMN 9 |
| <i>Explosive Limit or Limited Quantity</i> | <i>Excepted Quantities</i> | <i>ERAP</i> | <i>Passenger-Carrying Vessel Index</i> | <i>Passenger-Carrying Road or Rail Index</i> |
| 1L | E2 | | | 1L |
| 0L | E0 | 3000 | | 0.5L |
| 1L | E2 | — | | 1L |
| 5L | E1 | — | | 5L |

↑
This is the maximum quantity (kilograms or litres) per container allowed under the Explosive Limit or Limited Quantity exemption.

↑
This is the code for the maximum quantity that can be transported under the special rules for **Excepted Quantities**.

↑
Quantities above this amount (kilograms or litres) will require a government-approved emergency response assistance plan (ERAP).

↑
Any quantity above this amount per means of containment (kg or L) cannot be transported on a vessel that carries passengers (unless it's a ferry travelling less than 5 km).

↑
Any quantity above this amount per means of containment (kg or L) cannot be transported on a bus or passenger train.

Question



Does a shipment of 3,000 litres of acetone require an emergency response assistance plan? (Refer to the Dangerous Goods List.)

..... YES

..... NO

CLASS 1 – EXPLOSIVES

Products in Class 1 are designed to explode (e.g., dynamite) or create special effects (e.g., fireworks).

All Class 1 Explosives are in **Packing Group II**.

A capital letter on the label or placard indicates the **compatibility group** of the explosives.

| THESE COMPATIBILITY GROUPS... | ...CAN ONLY BE TRANSPORTED WITH THESE COMPATIBILITY GROUPS |
|-------------------------------|--|
| A | A |
| B | B, S |
| C | C, D, E, N, S |
| D | C, D, E, N, S |
| E | C, D, E, N, S |
| F | F, S |
| G | G, S |
| H | H, S |
| J | J, S |
| K | K, S |
| L | L |
| N | C, D, E, N, S |
| S | B, C, D, E, F, G, H, J, K, N, S |

Question



What is the compatibility group for black powder?

(Refer to the Dangerous Goods List.)

.....

A label or placard with an **orange background** indicates explosives.

For materials that have greater hazards, the **bursting bomb symbol** is used:

- ▶ 1.1 Mass explosion hazard
- ▶ 1.2 Projection hazard
- ▶ 1.3 Fire hazard and either a minor blast hazard or a minor projection hazard or both but not a mass explosion hazard



For explosives that have less risk the bomb symbol is not used:

- ▶ 1.4 Minor hazard
- ▶ 1.5 Very insensitive
- ▶ 1.6 Extremely insensitive



* compatibility group

The asterisk (*) does not actually appear on labels or placards. Instead, a capital letter indicates the **compatibility group** of the explosives.

You may need **additional training** in safe handling if you ship or transport explosives.

For more information about Class 1, contact the Explosives Regulatory Division of Natural Resources Canada at 613-948-5200 or www.nrcan.gc.ca/explosives.

Question



Would the label for explosive rivets have a bursting bomb symbol?

(Refer to the Dangerous Goods List.)

..... YES NO

CLASS 2 – GASES

Gases are normally transported **under pressure** and might have several hazards. For example:

- ▶ they might erupt violently
- ▶ the vapours can spread rapidly
- ▶ the vapours might be extremely cold
- ▶ the cylinder could turn into a missile if it's heated, damaged or punctured

Gases in Class 2 are separated into **three divisions**, depending on the type of hazard. There are **no packing groups** for Class 2.

2.1 Flammable Gas

Flammable gases can **ignite easily**, so the symbol is a flame on a red background. *Example: butane*



2.2 Non-Flammable, Non-Toxic Gas

These are hazardous because they're **compressed**. The symbol is a cylinder on a green background. *Example: nitrogen, compressed*



2.3 Toxic Gas

Toxic gases are **poisonous or corrosive** and are very dangerous, as shown by the skull and crossbones. *Example: chlorine*



Oxidizing Gas

A special label and placard must be used for certain **oxidizing gases** with a primary risk of 2.2 and a subsidiary risk of 5.1 (Oxidizer).

Examples: oxygen, compressed, oxygen, refrigerated liquid – Compressed gas, oxidizing, n.o.s. and liquefied gas, oxidizing, n.o.s.



Question



This is a special placard just for anhydrous ammonia, UN1005. What are the primary and subsidiary risks? (Refer to the Dangerous Goods List.)



CLASS 3 – FLAMMABLE LIQUIDS

Materials in Class 3 are dangerous because their vapours can ignite and cause an **explosion** or intense **fire**.

Flammable liquids can **move quickly** and spread over large areas.

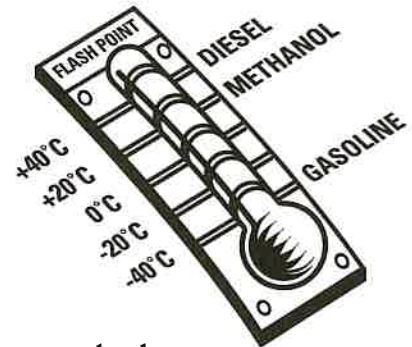


The flame symbol on a red background indicates the danger of fire.

Flammable liquids are separated into **packing groups** according to the flash point and the initial boiling point. The degree of danger is shown by Packing Groups I, II and III.

| CLASS 3 – PACKING GROUPS | | | |
|--------------------------|------------------|----------------|-----------------------|
| PACKING GROUP | DEGREE OF DANGER | FLASH POINT | INITIAL BOILING POINT |
| I | great danger | any | 35°C or less |
| II | moderate danger | less than 23°C | more than 35°C |
| III | minor danger | 23°C to 60°C | more than 35°C |

The flash point test is done in a laboratory to determine the lowest temperature at which the vapours given off by the liquid will ignite when exposed to an ignition source. A **lower flash point** means a **higher risk**, because the vapours catch fire more easily.



The initial boiling point is the lowest temperature at which a liquid will boil. A **lower boiling point** means a **higher risk**.

Question



What is the packing group for the following dangerous goods?

(Refer to the Dangerous Goods List.)

Isobutanol

Methanol

Gasoline

Diesel fuel

CLASS 4 – FLAMMABLE SUBSTANCES

Class 4 products **ignite easily** and have fire hazards that are **difficult to control**. They all have the flame symbol, but on a different background.

Dangerous goods in Class 4 are separated into **divisions** depending on the type of danger: 4.1, 4.2 and 4.3.

They are also separated into **packing groups** to indicate the degree of danger. (Packing Group I is the most dangerous.)

4.1 Flammable Solids

Some flammable solids **catch fire** easily, and others could cause a fire through **friction**. Once they start to burn they are **difficult to extinguish**. *Example: calcium resinate*



4.2 Spontaneously Combustible

Under certain conditions these materials could **ignite without warning**. *Example: carbon, activated*



4.3 Dangerous When Wet

These substances could react with water to give off **flammable gases** or could **burst into flames** on contact with water. *Example: calcium carbide*



Question



Calcium carbide in Packing Group I is forbidden for transport on a passenger carrying Road or Rail vehicle.

(Refer to the Dangerous Goods List.)

..... TRUE FALSE

CLASS 5 – OXIDIZERS / ORGANIC PEROXIDES

Class 5 materials can **provide oxygen** to increase the intensity of a fire. The symbol is a flame supported by an “O” – for oxygen – on a yellow background.

5.1 Oxidizers

These are substances that contain large amounts of readily available oxygen that will feed a fire.

Oxidizers are separated into **packing groups** according to the degree of danger. (Packing Group I is the most dangerous.)

Example: potassium peroxide

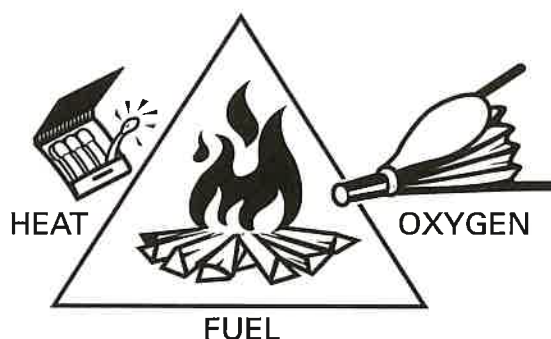


5.2 Organic Peroxides

Organic peroxides are unstable and reactive. When they are combined with other materials they can burst into flames, create heat and provide more oxygen.

All organic peroxides are in **Packing Group II**. They are subject to **Special Provision 16**, requiring the technical name of the main hazardous ingredient to be added in brackets.

Example: organic peroxide Type C, solid (benzoyl peroxide)



Question

Calcium peroxide is a Class 5.2.

..... TRUE FALSE



6.2 Infectious

Infectious substances are divided into two categories:
A (the most hazardous) and B (less hazardous).

Category A

Infectious substances in Category A are known or suspected to cause disease.

The label and placard show a “biomedical” symbol, and the label has specific emergency instructions.

There are two shipping names for Category A:

- ▶ Infectious substances, affecting humans – UN2814
- ▶ Infectious substances, affecting animals – UN2900



Category B

There is only one shipping name for Category B:

- ▶ Biological substance, Category B

Small containers must display UN number 3373 in a diamond.



For more information about Class 6.2, contact the Office of Laboratory Security, Public Health Agency of Canada, at 613-957-1779.

Class 6.2 waste is classified as UN 3291.

Question



What is the UN number for Biological substance, Category B?

(Refer to the Dangerous Goods List.)

UN

CLASS 7 – RADIOACTIVES

Radioactive materials give off a form of energy that can break down atoms and molecules. Exposure to radiation can **damage tissue and bones**. It can cause **cancer** and **genetic mutation**.

The “trefoil” symbol indicates the presence of radioactive material.

Radioactives are separated into **hazard categories** according to the level of radioactivity:

Category III high risk, requires special handling

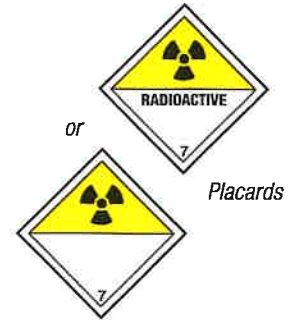
Category II medium risk, requires little special handling

Category I low risk, requires no special handling

Radioactives are highly regulated, and must be packaged, handled, stored and documented under the rules of the **Canadian Nuclear Safety Commission**.

For more information, contact the CNSC at 1-800-668-5284.

If you ship or transport radioactives you may need additional training in packaging and safe handling.



Question



Find the radioactive material in your Dangerous Goods List.
What does LSA stand for?

CLASS 8 – CORROSIVES

Corrosives can damage skin, metal or other materials.



They are separated into **packing groups** according to the results of laboratory tests:

Packing Group I rapid, severe and permanent damage to skin.
Example: selenic acid



Packing Group II severe skin damage after moderate contact.
Example: battery fluid, acid



Packing Group III severe skin damage after longer contact, corrodes steel or aluminum.
Example: mercury



For Class 8, some shipping names may not have a packing group, e.g. UN2794.

Question



What is the packing group for sulphuric acid?

CLASS 9 – MISCELLANEOUS

These are dangerous goods that are **not covered by any of the other 8 classes**, but are still dangerous if they spill or leak while they are being transported.

Class 9 includes products and substances that are:

- ▶ dangerous to human health but are not poisonous
Example: asbestos, chrysotile
- ▶ lithium metal batteries
- ▶ transported at a high temperature (liquids higher than 100°C or solids higher than 240°C)
Example: elevated temperature liquid, n.o.s.



Class 9 materials are in **Packing Group II or III**, but some may have no packing group.

Question



What is the UN number for Elevated Temperature Liquid N.O.S.?

UN

Shipping Document

The image shows three overlapping shipping documents. The top document is a 'SHIPPING ORDER' with fields for Shipper, Consignee, and Carrier. The middle document is a 'DANGEROUS GOODS SHIPPING DOCUMENT' with a table for listing hazardous materials. The bottom document is a 'Hazardous Materials Shipping Document' with a table for listing hazardous materials and a 'Work Order' section.

Every shipment of dangerous goods **must** be accompanied by a shipping document. Some information on the shipping document is for the use of **emergency responders**. For example, if the vehicle is involved in an accident, the police or firefighters will check the shipping document to find out who to contact for more specific information about the dangerous goods.

The shipping document must be clear and easy to read. It can be in English or French.

It **doesn't have to be a special form** just for shipping dangerous goods. The document can be a waybill, trip ticket, manifest or pro-bill and might include information for other purposes.

However, if it's used to ship dangerous goods it **must include specific information** such as:

- ▶ **date** the document was prepared or given to the carrier
- ▶ **shipper's name and address**
- ▶ **24-Hour Number** of the shipper, or a phone number where the shipper can be reached until the dangerous goods are delivered
- ▶ Any other information required by **Special Provisions**

Question



A courier bill can be a dangerous goods shipping document, as long as it contains all the information that's required.

..... TRUE FALSE

DESCRIPTION OF DANGEROUS GOODS

The shipping document must include a description of the dangerous goods in the following order:

- ▶ **UN number**
- ▶ **shipping name** (and the technical name, if required, in brackets – see page 18)
- ▶ primary **class** (followed by subsidiary classes, if any, in brackets)
– for Class 1, the compatibility group, e.g., Class 1.3G
- ▶ **packing group** (if applicable – I, II or III)
– for Class 6.2, the category (A or B)
- ▶ Any other information required by **Special Provisions**

QUANTITY OF DANGEROUS GOODS

The document must indicate the **quantity** of dangerous goods, **unit of measure** (must be metric) and **number** of packages or containers.

If the quantity **changes**, the driver must show the change on the shipping document.

For example, if a driver has 20,000 litres of diesel fuel to deliver to several different locations, the quantity must be amended after each delivery. The document must be up to date so emergency responders will know the quantity of dangerous goods if there is an accident.

The fact that a container is almost empty may be shown on the shipping document with the words “**Residue – Last Contained**” preceded or followed by the shipping name. However this description cannot be used for gases in small containers or radioactives.

Question



Sandy delivers fuel to several construction sites and uses one shipping document, adjusting the amount after each delivery.

Is this okay?

..... YES NO

| Barnabas Construction 1850 Sandy Road Winnipeg, Manitoba 204-555-4545 (24-Hour Number) | | Work Order 060-66715 | |
|---|-----------------------------------|----------------------|---------------------|
| | | Date: July 16, 2016 | |
| Container | Contents | Delivery | Quantity |
| 1 tank | UN1202 DIESEL FUEL Class 3 PG III | | 20,000 L |
| | | Site #12 - 4,000 L | 4,000 L |
| | | Site #6 - 5,500 L | 5,500 L |
| | | Site #14 - 3,000 L | 3,000 L |
| | | | |
| | | | |
| | | | |
| | | | |

EMERGENCY RESPONSE ASSISTANCE PLAN

In the list of dangerous goods, Column 7 contains the **emergency response assistance plan** (ERAP) quantity in kilograms for solids, litres for liquids and for gases, as the capacity in litres of the means of containment. For quantities above this amount, the shipper is required to have a government-approved ERAP.

If an ERAP is required, the shipping document must include:

- ▶ the reference number of the ERAP
- ▶ the phone number to activate the ERAP

ADDITIONAL INFORMATION

The shipper might be required to include other information on the shipping document, such as:

- ▶ for **radioactives**, additional details
- ▶ for unodourized liquefied petroleum gas, the words “**Not Odourized**”
- ▶ for some **toxic substances**, the phrases used in Special Provision 23 or 106 and section 4.23 of the regulations.
- ▶ control and emergency **temperatures**

NON-DANGEROUS GOODS

Dangerous goods can be listed **together with non-dangerous goods** on the same shipping document – as long as the information about the dangerous goods stands out. It can be:

- ▶ listed first, under the heading “Dangerous Goods”
or
- ▶ printed in a contrasting colour
or
- ▶ indicated by an “X” in a column headed “DG”

WASTE

Shippers of waste dangerous goods may be required to complete a special shipping document to comply with environmental requirements and the TDG Regulations.

PREPARATION OF DOCUMENTS

The **shipper** is responsible for preparing the shipping document.

The **checklist** at the back of this handbook should be used by the shipper who prepares the shipping document, and by the driver who checks to make sure the document is complete.

The shipper, or someone acting on behalf of the shipper, must print their name after the **Certification Statement**. The statement reads:

“I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, are properly classified and packaged, have dangerous goods safety marks properly affixed or displayed on them, and are in all respects in proper condition for transport according to the Transportation of Dangerous Goods Regulations.”

The **driver** should not accept a shipment until the document is complete and correct.

A driver who acts as both shipper and carrier (for example, transporting company goods or picking up freight from an unattended location) may be required to complete a shipping document.

Question



Use the Dangerous Goods Checklist to find the three pieces of information missing from this shipping document. (The Checklist is beside the Dangerous Goods Classes chart.)

Shipping Document A



Add the information required to make this a valid dangerous goods shipping document.
Use your checklist.
In the Description column, is the information about the dangerous goods in the correct order?

SHIPPING ORDER

| | |
|---|--|
| CONSIGNOR: Fenton Distributors 166 Airport Road Hamilton, Ontario 24-Hour Number 1-800-555-8787 | Shipping Date: _____ |
| CONSIGNEE: Sylvan Outlets 1824 Eldon Road SE Edmonton, Alberta | Consignee Signature: _____ Delivery Date: _____ |
| CARRIER: Causeway Carriers | Transport Unit Number: _____ |

| Pieces/ Packages | Description | Quantity | Rate |
|---------------------|---|----------|------|
| 1 | UN 1866 RESIN SOLUTION, Class 3, II | 205 | |
| 2 | UN 1760 CORROSIVE LIQUID, N.O.S., (sulphuric acid), Class 8, III | 410 | |
| | | | |

For Office Use Only

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, are properly classified and packaged, have dangerous goods safety marks properly affixed or displayed on them, and are in all respects in proper condition for transport according to the Transportation of Dangerous Goods Regulations.

Individual's Name (Print) _____

Question



Finish filling in this shipping document for all three shipments shown at the top of Shipping Document B. (You'll need your Dangerous Goods List.)

Shipping Document B



Use the dangerous goods list handout to fill in this shipping document for:

- three 205-litre drums of sodium hydroxide solution (packing group II)
- one 205-litre drum of methanol
- one 510-litre cylinder of methyl mercaptan

DANGEROUS GOODS SHIPPING DOCUMENT

Carrier:
Owl's Head Transport

Consignee:
Sandford Industries
14 Riverfront Drive, Abbotsford, BC

| Number of Packages | Container Type | UN Number | Shipping Name | Class | Packing Group | Toxic by Inhalation (SP 23 & 106) | Total Quantity |
|--------------------|----------------|-----------|---------------|-------|---------------|-----------------------------------|----------------|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Shipper:
Allentown Distributors
1418 Edgebank Drive
Surrey, BC
24-Hour Number: 604-555-1616
Date: _____

| | | |
|--|--|--|
| | | |
| | | |
| | | |
| | | |

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, are properly classified and packaged, have dangerous goods safety marks properly affixed or displayed on them, and are in all respects in proper condition for transport according to the Transportation of Dangerous Goods Regulations.

Individual's Name (Print)

LOCATION OF DOCUMENTS

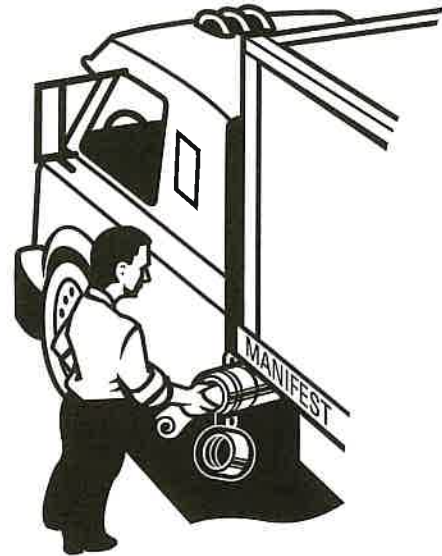
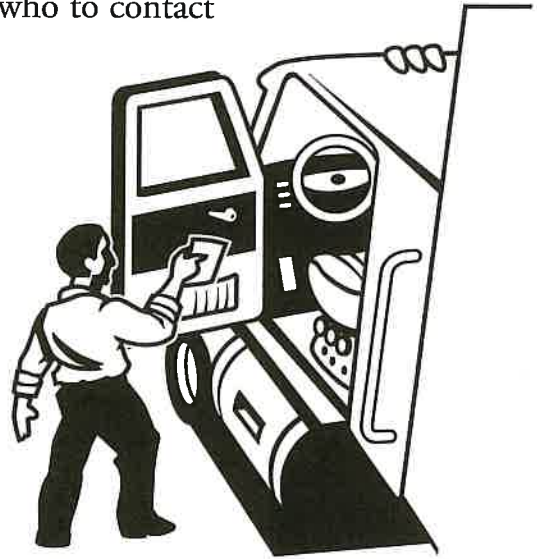
In an emergency involving dangerous goods, the driver or emergency responder needs to find the shipping document quickly. It contains important details about the goods and who to contact for more information.

Shipping documents must be carried **within the driver's reach**.

When the driver leaves the cab, the documents must be left on the driver's seat, in a pocket on the driver's door or in an obvious place in the cab.

If the driver leaves the truck in a **supervised area**, a copy of the shipping document must be left with the person in charge.

If the **trailer is detached** from the tractor *or* the dangerous goods are unloaded and left in an **unsupervised area**, the shipping document must be placed in an accessible, identifiable, waterproof receptacle.



Question



When Dennis parks at a truck stop he puts all the waybills and paperwork under his seat in the cab of the truck.

Is this acceptable?

..... YES NO

TRANSFER OR DELIVERY

When the driver **transfers** the shipment, the next carrier must be given a copy of the **shipping document**.

When the driver delivers the shipment, the receiver must be given a **document that identifies the dangerous goods**. This does not have to be a complete shipping document. It could be a delivery ticket, waybill, electronic notification, etc.

KEEPING COPIES ON FILE

Shippers and carriers must **keep a copy** of each dangerous goods shipping document for two years. The document could be an electronic copy.

This requirement also applies to **importers**, who may be considered shippers under the TDG Regulations.

Dangerous goods safety marks may be the **first warning** that a product is hazardous. The person who needs this information might be a loader, driver or emergency responder.

For example:

- ▶ the “skull and crossbones” on a label shows that a substance is toxic
- ▶ the UN number on a placard tells firefighters what chemical they are dealing with

The safety marks we use in Canada are part of an internationally recognized system and are shown on the **Class Guide** included with this manual. Look at the Class Guide and notice how each class is indicated either by a distinctive **colour** or **symbol**, or by the use of the **class number** in the bottom corner.

For example, there are different labels or placards for Class 2, Gases. They have various symbols at the top, but they all show the number “2” at the bottom.

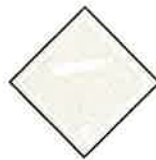
Question



What is the background colour for each of these safety marks?



.....



.....



.....



.....

Questions



1. What kind of danger is shown by red stripes? *(Refer to your Class Guide.)*

- flammable gas
- flammable liquid
- flammable solid

2. What kind of danger is shown by this symbol?

- radioactive
- corrosive
- miscellaneous



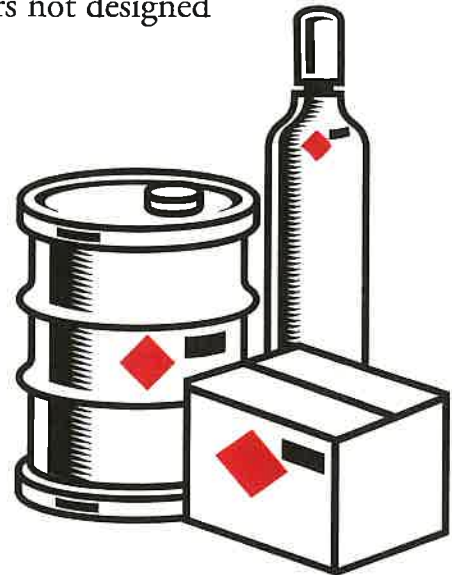
SMALL CONTAINERS

Small containers hold **450 litres or less** (about 100 gallons). This measurement is also used for containers not designed to hold liquids.

Small containers include:

- ▶ drums, pails and cans
- ▶ cardboard boxes and crates
- ▶ aerosols and cylinders

A **label** is usually 100 mm x 100 mm (about 4 inches x 4 inches). If the full-size label can't be used because of the size or shape of the container, a **smaller label** may be used – for example, on the shoulder of a compressed gas cylinder.



Labels cannot be reduced in size for Class 7. Labels may not be reduced to smaller than 30mm x 30mm.

Before handing over the dangerous goods to the driver, the **shipper** must make sure that each package or small container displays:

- ▶ a hazard **label** (for primary and subsidiary classes)
- ▶ the **shipping name** (and technical name, if required – see page 18)
- ▶ the **UN number**



The **shipping name** appears next to the **label** for the primary class.

The **UN number** may be shown with the shipping name or on the primary class label.

When the number is printed on the label, the letters “UN” are not included.



Question



Is the UN number shown correctly on this drum?

..... YES NO

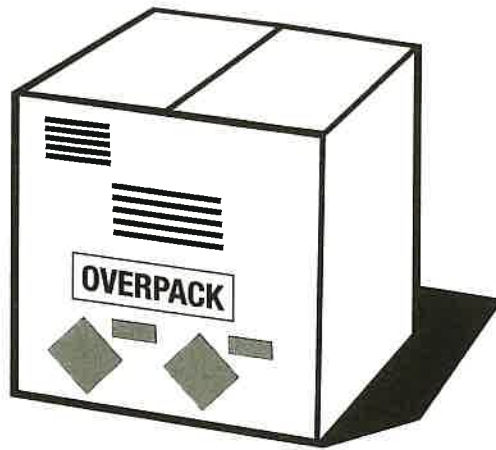


These safety marks are put on at least **one side** of each small container.

The person who removes the dangerous goods from the container (completely, so no danger remains) must remove or cover the dangerous goods safety marks.

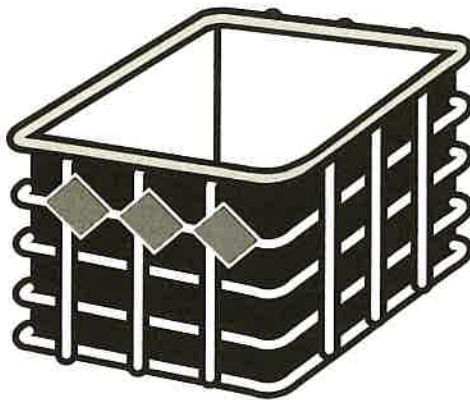
OVERPACKS

An overpack is any enclosure used to consolidate one or more small containers. It may be a larger box or even a shrink-wrapped pallet. If the safety marks cannot be seen the safety marks and the word **OVERPACK** must be shown. If the overpack is larger than 1.8 cubic metres (64 cubic feet or 4 ft x 4 ft x 4 ft) the marks must be shown on opposite sides.



CONSOLIDATION BINS

Boxes, crates and bins are often used to allow small containers to be removed and added during transport. The bin must indicate each class of dangerous goods it contains. Options may include labels or a list of the classes.



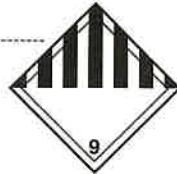
Questions



This box contains six 1-litre cans of concrete etching solution.
The shipping name is sulphuric acid.

1. Which label should appear on the box?

(Refer to the Dangerous Goods List.)



2. What other information must appear on the box?

..... the shipper's 24-hour phone number

..... the packing group

..... the shipping name

3. Which label should appear on this cylinder of nitrogen?



4. Which label or labels should appear on this drum of ethylene dichloride?

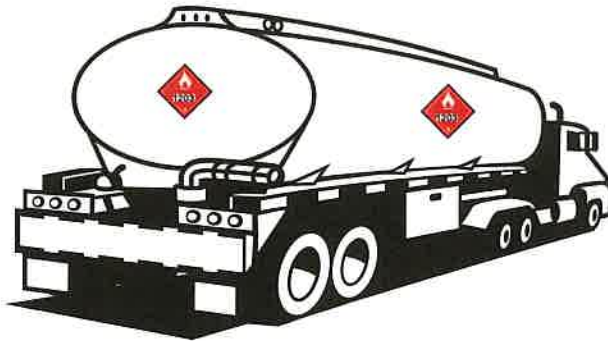


LARGE CONTAINERS

Large containers can hold **more than 450 litres** (about 100 gallons). This term is used to describe containers intended to transport liquids, gases or solids.

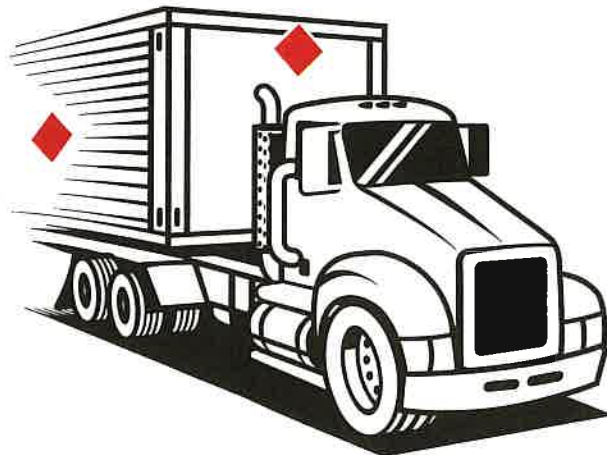
Large containers include:

- ▶ transport trailers, rail tank cars
- ▶ portable tanks and bulk tanks
- ▶ bins and hoppers



The **shipper** makes sure the large container has placards or that the driver has been given any placards that are required for the shipment of dangerous goods. The **driver** should attach the placards to all four sides of the vehicle before the dangerous goods are loaded.

If a large container with placards is loaded on the vehicle and the placards are still visible, that's fine. If not, the vehicle must be **placarded** as well.



A placard is usually 250 mm x 250 mm (about 10 inches x 10 inches). If the full-size placard can't be used because of the size or shape of the container, a **reduced-size placard** may be used.

For example, some portable tanks have small placards.



The placards **must remain in place** until the container is completely empty of dangerous goods, at which time the placards **must be removed**.

Questions



Are these small containers or large containers?

1. A 205-litre barrel

..... small container

..... large container

2. A tank truck with a capacity of 17,000 litres, but containing only 300 litres of diesel fuel

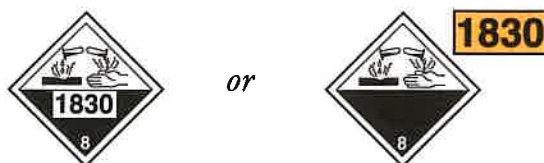
..... small container

..... large container

PLACARDING GUIDELINES

Vehicles carrying certain types and quantities of dangerous goods must display **primary class placards**.

Sometimes the **UN number** of the dangerous goods will have to be shown as well (either **on the placard** or on an **orange panel** next to the placard).



Here are some general guidelines:

1. A shipment of dangerous goods requiring an **emergency response assistance plan (ERAP)**, liquids or gases in a large means of containment always needs:
 - ▶ placards and UN number
If a large container is put in a closed trailer, then the trailer must also show placards and UN number
 - ▶ Petroleum Crude Oil that can develop hydrogen sulphide gas (H₂S) must have near each placard the words “Toxic by Inhalation” or “Inhalation Hazard-Toxic” (see special provision 23 and special provision 106).
 - ▶ in the case of a large means of containment that is an intermediate bulk container (IBC) with a capacity greater than 450 L but less than or equal to 3,000 L,
 - (i) a placard and UN number may be displayed on two opposite sides of the IBC, or
 - (ii) a label for each primary and subsidiary class as well as a UN number and a shipping name may be displayed on two opposite sides of the IBC.

When IBCs that have labels or placards on them are inside a road vehicle or railway vehicle or are loaded onto a road vehicle or railway vehicle, the requirements of this Part for the display of placards on the road vehicle or railway vehicle still apply.

-
2. A truck carrying any quantity of **Classes 2.1 that is transported on a vessel, 2.3, 4.3, 5.2 Type B liquid or solid that requires a control or emergency temperature, 6.1 that is subject to Special Provision 23, or 7 that requires a Category III Yellow label** needs Placards unless guideline 1 applies.
 3. A truck carrying **500 kg or less** of dangerous goods does not need placards or UN numbers unless guideline 1 or 2 applies.
 4. A truck carrying **more than 500 kg** of dangerous goods needs:
 - ▶ placardsunless Guideline 1 or 2 applies.
 5. For a **mixed load of over 500 kg** of different dangerous goods in small means of containment, the driver could use:
 - ▶ class placards
 - or*
 - ▶ DANGER placards
(except for dangerous goods to which guidelines 1 and 2 apply or are in one class and more than 1,000 kg from one shipper)



Questions



1. Is this placard correct for a tank containing 1,800 litres of sodium hydroxide solution? (Guideline #1)

YES NO



2. Is this placard correct for a shipment of 800 kg of sodium Hydroxide, solid if it is in small containers? (Guideline #4)

YES NO



3. Would a truck carrying an 80-kg shipment of chloroform require Class 6.1 placards? (Guideline #3)

YES NO

4. Could a driver display a DANGER placard for 400 kg of corrosives and 400 kg of flammable liquids? (Guideline #5)

YES NO



5. Would a truck carrying a 510L cylinder of methyl mercaptan require placards and UN number? (Guideline #1)

YES NO

INTERMEDIATE BULK CONTAINERS (IBC'S)

IBC's are portable tanks with a capacity of over 450 litres and less than or equal to 3,000 litres (totes, cubes).

IBC's must show:

Placards and UN Number on all four sides or Placards and UN Number on two opposite sides or Labels, UN Number and Shipping Name on two opposite sides. If multiple IBC's are placed inside a trailer then placards and UN numbers for each shipping name must be shown on each side and each end of the trailer.



TOXIC SUBSTANCES

Some dangerous goods can be extremely hazardous if breathed into your lungs. Anhydrous ammonia must have the words on two sides of a large container "Anhydrous Ammonia- Inhalation Hazard" (see special provision 23).

Petroleum Crude Oil that can develop hydrogen sulphide gas (H₂S) must have near each placard the words "Toxic by Inhalation" or "Inhalation Hazard-Toxic" (see special provision 23 and special provision 106).

ELEVATED TEMPERATURE

Elevated temperature signs must be displayed on the sides and ends of the vehicle when certain products are transported at a high temperature. This applies to liquids transported at 100°C or higher and solids transported at 240°C or higher.

The elevated temperature sign is not required for tar or asphalt.



MARINE POLLUTANT

The marine pollutant mark is not required for shipments carried by trucks travelling on ferries within Canada.

It is used for some shipments travelling by sea outside of Canada, in which case it is displayed beside the label or placard. This allows products that are marine pollutants to be easily identified for special stowage when the goods are loaded on a vessel.



LITHIUM BATTERY MARK

Mandatory use after January 12, 2018.



It's the **shipper's responsibility** to select the correct container for dangerous goods.

Shippers should not use (and drivers should not accept) containers unless they are in good condition.

Some dangerous goods can only be transported in containers built to **national or international standards**. These containers have been tested in a laboratory – they've been dropped, crushed, soaked and burned to find out how they will withstand a transportation accident.

Tanks are designed, manufactured, tested and inspected to make sure the contents will not leak during transport.

A coded **certification mark** appears on the container to show the standard that applies.

SMALL CONTAINERS

Some small containers have a **certification mark** that begins with the **United Nations** (UN) symbol. Other containers, such as cylinders for compressed gas, show a certification mark that begins with **TC** (Transport Canada) or **DOT** (U.S. Department of Transport).

This is an example of a UN certification mark you might see on a drum:



The UN symbol is followed by numbers and letters, which (in this example) mean:

- 1** **Container:** Drum
- A** **Material:** Steel
- 1** **Contents:** Liquids only
- Y** **Packing group:** Drum can be used only for Packing Groups II and III
- 1.6** **Maximum Specific Gravity**
- 150** **Test Pressure (kPa)**
- 16** **Year of manufacture:** 2016
- CAN** **Country code:** Canada
- ACME** **Name of manufacturer:** Acme

Here are some of the packaging codes you might see in UN certification marks:

| | |
|-----------------------|--|
| Container: | 1 – drum 3 – jerrican 4 – box 5 – bag 6 – composite packaging |
| Material: | A – steel B – aluminum C – wood D – plywood G – corrugated fibreboard H – plastic |
| Contents: | 1 – Liquids 2 – Solids/inner containers containing liquid |
| Packing Group: | X – for PG I, II or III Y – for PG II or III Z – for PG III only |
| Test Pressure: | A number that describes the maximum pressure to which the container has been tested, noted in kPa. |

Some quantities of dangerous goods may not require certification-marked packaging. (See “Up to 150 Kilograms” on page 66, “Up to 500 Kilograms” on page 67, “Limited Quantities” on page 68 and “Samples” on page 69.)

Questions



1. DOT indicates the Canadian standard for containers.

..... TRUE FALSE

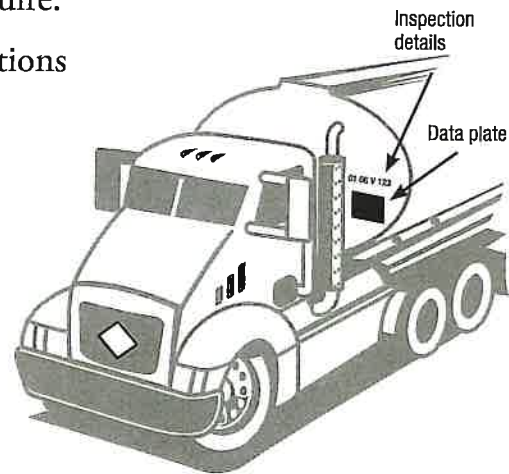
2. UN indicates the international standard for containers.

..... TRUE FALSE

LARGE CONTAINERS

Some large containers, such as tanks, require:

- ▶ a data plate that lists the specifications
- ▶ an inspection code that shows the date and type of inspection

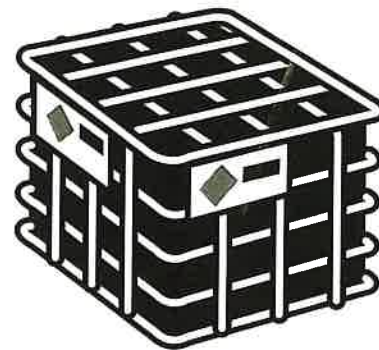


Intermediate Bulk Containers (IBCs)

IBCs are large containers used for transport and storage of dangerous goods. They are often designed to be stacked and moved with a forklift.

IBCs vary in size from over 450-litre capacity to 3,000-litre capacity. They are usually made from plastic or metal and some are protected by metal cages. They are used in many industries to transport and store liquids or dry goods.

IBCs must have a certification mark showing they meet Canadian or international standards.



REUSING CONTAINERS

A shipper may be able to **reuse** a container – as long as it is in good enough condition that the dangerous goods will not spill or leak during transport.

Some containers must be **reconditioned** before refilling.

The container should not display any labels or other safety marks that **do not apply** to the dangerous goods or that are **misleading**.

DANGEROUS GOODS WITH OTHER GOODS

Dangerous goods should not be transported in the same container with **other materials** that could cause them to spill or leak, or if there is a chance they might mix and react to cause a hazard.

TRANS-BORDER SHIPMENTS

Dangerous goods travelling to or from the United States are generally permitted in containers that meet **U.S. standards** (described in the U.S. Code of Federal Regulations, Title 49, or 49 CFR). See parts 9 and 10 of the Transportation of Dangerous Goods Regulations.

SECURING THE LOAD

The driver must comply with other transport regulations to make sure the load is **secure** and **does not shift** during transport.

This section covers some of the special situations where some or all of the dangerous goods regulations do not apply.

They include:

- ▶ shipments **up to 150 kg**
- ▶ shipments **up to 500 kg**
- ▶ **limited quantities**/consumer commodities
- ▶ **samples** that are being sent to a laboratory for testing
- ▶ dangerous goods required for the **safety or operation** of the vehicle
- ▶ up to 5 cylinders of **gases**
- ▶ **LPG** (liquefied petroleum gas)
- ▶ dangerous goods for **agricultural** purposes

Permits for equivalent level of safety provide temporary variation to the rules.

Shipments **to or from the U.S.** are also subject to U.S. regulations.

Different regulations apply to dangerous goods transported by rail, marine or air.

UP TO 150 KILOGRAMS

Dangerous goods are exempt from the regulations in quantities up to **150 kg per vehicle** (gross mass), available to the general public and transported by the purchaser, user or by a retailer to or from the user or purchaser.

Each package or container:

- ▶ must not exceed **30 kg**, except for 2.2 gases – for 2.1 and 2.3 gases, see box below
- ▶ must be **strong and secure** enough that it will not spill or leak (container does not require a certification mark unless it is a gas cylinder)

The exemption cannot be used for the items in the box below or for any Explosives (Class 1) except:

- ▶ UN0012, UN0014, UN0044, UN0055, UN0105, UN0131, UN0161, UN0173, UN0186, UN0191, UN0197, UN0276, UN0312, UN0323, UN0335 if classified as a consumer firework, UN0336, UN0337, UN0351, UN0373, UN0378, UN0404, UN0405, UN0431, UN0432, UN0454, UN0499, UN0501, UN0503, UN0505 to UN0507, UN0509 and UN0510

The 150-kilogram exemption and the 500-kilogram exemption **cannot be used for:**

- ▶ Class 2.1 (Flammable Gases) in cylinders larger than 46-litre capacity
- ▶ Class 2.3 (Toxic Gases)
- ▶ Class 4, Packing Group I (Flammable Solids, Spontaneously Combustible, Dangerous When Wet)
- ▶ Class 5.2 (Organic Peroxides) unless they are limited quantities
- ▶ Class 6.1 (Toxic) Packing Group I, liquids
- ▶ Class 6.2 (Infectious)
- ▶ Class 7 (Radioactive) that requires licensing by the Canadian Nuclear Safety Commission
- ▶ dangerous goods that require an ERAP, or a control or emergency temperature

UP TO 500 KILOGRAMS

Some dangerous goods are exempt from many requirements of the regulations in quantities up to **500 kg per vehicle** (gross mass).

Each small means of containment:

- ▶ must not exceed **30 kg** except for drums that are in compliance with the requirements of section 5.12 of part 5, means of containment, for transporting dangerous goods in drums.
- ▶ must be **strong and secure** enough that it will not spill or leak (container does not require a certification mark – unless it is a gas cylinder)
- ▶ each **means of containment** has displayed on one side, the dangerous goods safety marks required by Part 4 Dangerous Goods Safety Marks or for dangerous goods, other than dangerous goods in class 2, Gases, the shipping name of the dangerous goods and the marks required for them in the Hazardous Products Act or the Pest Control Products Act as long as those marks are legible and visible during transport

Although the document does not need all the information usually required, it must include:

- ▶ the word **“Class”** – followed by the primary **class** of the dangerous goods
- ▶ the words **“Number of means of containment”** – and by the **total number** of packages or containers, e.g., “Class 3, Number of means of containment 10”

The driver must have a valid dangerous goods training **certificate**.

This exemption **cannot be used** for the items in the box on the opposite page, or for any explosives (Class 1) except:

- ▶ Class 1.4S
- ▶ UN0191, UN0197, UN0276, UN0312, UN0336, UN0403, UN0431, UN0453 and UN0493



LIMITED QUANTITIES EXEMPTION

Dangerous goods shipments in limited quantities exempt you from documentation, dangerous goods safety marks, means of containment, training, emergency response assistance plan and reporting.

The **maximum kilograms or litres** are shown in Column 6A of the dangerous goods list. The quantity limit applies to the capacity of each inner container – e.g., for a dozen aerosol cans in a cardboard box, the limit applies to each can. A “0” in the column means that the product cannot be shipped as a limited quantity.

Each package:

- ▶ must not exceed **30 kg**
- ▶ must be **strong and secure** enough so it will not spill or leak (container does not require a certification mark)

Each container:

- ▶ must show the words “**Limited Quantity**” or “**Ltd. Qty.**”, or “**Consumer Commodity**” *or*
- ▶ must show the **UN Number** (or numbers) in a diamond shape *or*
- ▶ must show the **International Limited Quantity mark** *or*
- ▶ must show the **International Air Limited Quantity Mark when shipped by air.**

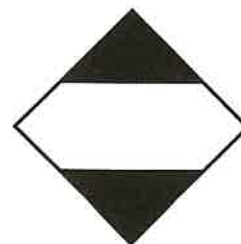
If the package or container is in an overpack, in addition to any of the above markings, the word **OVERPACK** must be shown.



Until December 31, 2020, the words “**Limited Quantity**” can be used on the package. After December 31, 2020 only the International mark can be used.



Until December 31, 2020 only



International

SAMPLES

Dangerous goods that are being sent to a **laboratory** for analysis may be exempt from the regulations.

Each package or container:

- ▶ must not exceed **10 kg**
- ▶ must be **strong and secure** enough so it will not spill or leak (container does not require a certification mark)
- ▶ must show the words “**test samples**”

The sample must be accompanied by a document that includes:

- ▶ the **shipper’s name and address**
- ▶ the words “**test samples**”

This exemption does not apply to explosives, infectious substances or radioactives.



SAFETY OR OPERATION OF THE VEHICLE

Dangerous goods such as fire extinguishers carried for the **safety** of the vehicle are exempt from the regulations. So are items such as fuel or batteries that are used to **power** the vehicle.

Question



A propane-powered vehicle must always display Class 2 placards.

..... TRUE FALSE

CLASS 2, GASES, IN SMALL MEANS OF CONTAINMENT

This is sometimes called the “welder’s exemption.” It is used by people who carry cylinders of compressed gas, including acetylene, dissolved; air, compressed; argon, compressed; nitrogen, compressed; oxygen, compressed; propane; carbon dioxide; and methylacetylene and propadiene mixture, stabilized.

The exemption allows up to 5 cylinders with a total gross weight of up to 500 kg. without a shipping document. The driver is not required to have a training certificate.

The cylinders must be properly labelled and the labels must be visible from outside the vehicle.

LIQUEFIED PETROLEUM GASES

These gases may be shipped under their own shipping name and UN number or under the shipping name “Liquefied petroleum gases” and UN1075

- ▶ butane, UN1011
- ▶ butylene, UN1012
- ▶ isobutylene, UN1055
- ▶ propylene, UN1077
- ▶ isobutane, UN1969
- ▶ propane, UN1978

The UN number on the label, placard and shipping document must all be the same, and the shipping name must match the UN number.

AGRICULTURE

There are several exemptions for farmers, including:

- ▶ up to 3,000 kg from a store to the farm
- ▶ up to 1,500 kg for farm use
- ▶ anhydrous ammonia used as fertilizer
- ▶ herbicides and pesticides in spray tanks

Some restrictions apply.

PERMITS FOR EQUIVALENT LEVEL OF SAFETY

Permits exempt you from **some of the dangerous goods requirements**, but only if you comply with all the **conditions** of the permit.

For example, you may not need a shipping document as long as you carry a copy of the permit.

Permits for equivalent level of safety are issued to companies or organizations for **specific activities**.

Check with your employer to see if there are any permits that apply to the dangerous goods you ship or transport. Write the information here.

LOCAL RESTRICTIONS

Drivers should check for **dangerous goods routes** through towns or cities. In some areas there are roads, tunnels or bridges where dangerous goods are prohibited.

TRANS-BORDER SHIPMENTS

Canadian importers, exporters and drivers carrying dangerous goods to or from the U.S. might be subject to additional requirements.

For example, in order to carry dangerous goods from Canada into the U.S., drivers must:

- ▶ produce a valid training certificate
- ▶ have emergency response information for the dangerous goods being transported and know what to do in case of an emergency
- ▶ make sure the 24-Hour Number on the shipping document is accessible from the U.S.

Drivers may have to comply with certain provisions of the U.S. Code of Federal Regulations, Title 49 (49 CFR).

Additional security requirements may also apply. The carrier may have to:

- ▶ register with the U.S. Department of Transportation
- ▶ have a written security plan
- ▶ provide in-depth security training for Canadian drivers who carry dangerous goods into the U.S.



OTHER MODES OF TRANSPORT

Dangerous goods to be transferred to or from a plane, vessel or rail car may also have to meet the requirements of other regulations:

Air

- ▶ International Air Transport Association (IATA) Dangerous Goods Regulations – based on rules of the International Civil Aviation Organization (ICAO)

Marine

- ▶ International Maritime Dangerous Goods (IMDG) Code – based on rules of the International Maritime Organization (IMO)
- ▶ Marine Transport – Transportation of Dangerous Goods Regulations

Rail

- ▶ Canada Transportation Act
- ▶ Railway Safety Act

If there is a spill or leak of dangerous goods while they are in your care, you need to:

- ▶ **protect yourself**
- ▶ **keep other people away**
- ▶ try to **keep the danger from spreading** (without putting yourself in danger)

If your company has an emergency response plan there might be special guidelines for you to follow.

In addition, you might check the following:

- ▶ Is there a fire extinguisher in the vehicle or on the loading dock?
- ▶ Is there a spill kit nearby?
- ▶ Do you have gloves or other protective equipment for handling dangerous goods?
- ▶ Is there a phone or radio handy in case there's an emergency?

Question



Terry was unloading a truck and accidentally punctured a plastic drum with the forklift. The drum was marked "Dichloromethane".

Terry's main concern should be: *(Look up the classification in the Dangerous Goods List.)*

- **make sure the spill does not ignite**
- **avoid inhaling the fumes and keep people away**
- **clean up the liquid before it damages the floor**

EMERGENCY REPORTING

You must report immediately:

- ▶ if there is a spill or leak exceeding the amount shown in the **reporting quantities** table (next page)

or

- ▶ if there **could be** a spill or leak exceeding the amount shown in the **reporting quantities** table (next page)

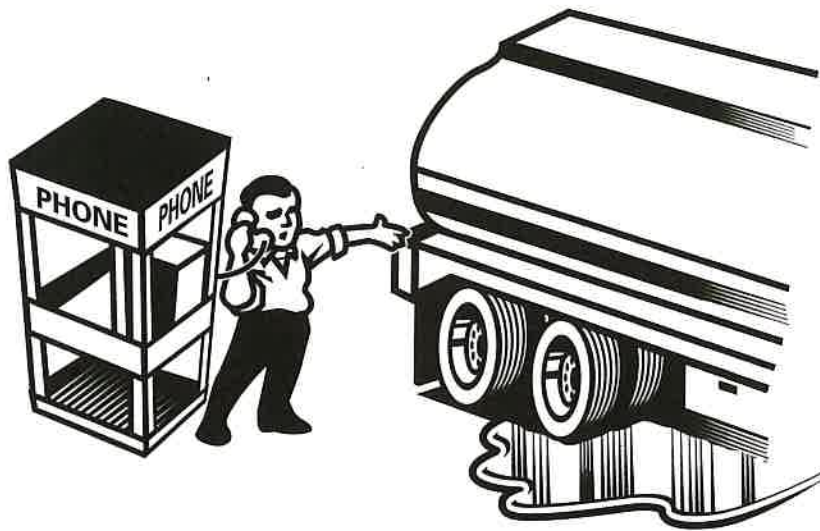
or

- ▶ dangerous goods are lost or stolen

or

- ▶ dangerous goods are interfered with.

The people you must notify are shown on page 78 and 79.



| REPORTING QUANTITIES TABLE | | |
|-----------------------------------|---------------------------------------|---|
| Class | Packing Group or Category | Quantity |
| 1 | II | Any quantity |
| 2 | Not applicable | Any quantity |
| 3, 4, 5, 6.1, 8 | I or II | Any quantity |
| 3, 4, 5, 6.1, 8 | III | 30 L or 30 kg |
| 6.2 | A or B | Any quantity |
| 7 | Not applicable | A level of ionizing radiation greater than the level established in section 39 of the "Packaging and Transport of Nuclear Substances regulations, 2015" |
| 9 | II or III, or without a packing group | 30 L or 30 kg |

Questions



1. Is a spill of 10 litres of dichloromethane a reportable quantity?

..... YES NO

2. Is a spill of 85 litres of gasoline a reportable quantity?

..... YES NO

3. Is a spill of 10 litres of sulphuric acid a reportable quantity?

..... YES NO

You must immediately report to local emergency services (police, fire department) and if applicable, provincial emergency services (see page 79).

In addition, if the incident involves:

- ▶ death or injury requiring medical treatment by a health care professional
- ▶ evacuation of people or their shelter in place
- ▶ closure of a loading/unloading facility
- ▶ closure of a road, rail line or waterway
- ▶ major damage to the means of containment or a railcar

You must ALSO contact the following:

1. **CANUTEC** (Canadian Transport Emergency Centre) and the shipper must be called
2. For vessel, a vessel traffic services center or a Canadian coast guard radio station
3. **If radioactive materials (Class 7) are involved, contact the Canadian Nuclear Safety Commission**

The emergency report should include:

- ▶ your name and contact information
- ▶ the date, time and location of the release or anticipated release
- ▶ the mode of transport
- ▶ the shipping name or UN Number
- ▶ the quantity before the incident and the amount released
- ▶ a description of the incident (collision, rollover, derailment, fire etc.)
- ▶ an estimate of the number of people evacuated or sheltered in place, killed, or injured

| YOU MUST IMMEDIATELY NOTIFY: | |
|--|--|
| Alberta | 911 (or local police) and relevant provincial authorities (1-800-272-9600) or Canadian Coast Guard (1-800-889-8852) |
| British Columbia | 911 (or local police) and Provincial Emergency Program (1-800-663-3456) or Canadian Coast Guard (1-800-889-8852) |
| Prince Edward Island | 911 (or local police) or Canadian Coast Guard (1-800-565-1633) |
| Manitoba | 911 (local police or fire department) and Department of Conservation (204-945-4888) or Canadian Coast Guard (1-800-889-8852) |
| New Brunswick | 911 (or local police) or Canadian Coast Guard (1-800-565-1633) |
| Nova Scotia | 911 (or local police) or Canadian Coast Guard (1-800-565-1633) |
| Ontario | 911 (or local police) or Canadian Coast Guard (1-800-265-0237) |
| Quebec | 911 (or local police) or Canadian Coast Guard (1-800-363-4735) |
| Saskatchewan | Local police, Spill Control Centre (1-800-667-7525) or Canadian Coast Guard (1-800-889-8852) |
| Newfoundland and Labrador | 911 (or local police) and Canadian Coast Guard (1-800-563-9089) |
| Nunavut Territory | 911 (or local police) and relevant authorities (867-920-8130) |
| Nunavut Territory and arctic waters (waters north of the Northwest and Yukon Territories) | Canadian Coast Guard (1-800-265-0237) |
| Yukon Territory | 911 (or local police) and relevant authorities (867-667-7244) or Canadian Coast Guard (1-800-889-8852) |
| Northwest Territories | 911 (or local police) and relevant authorities (867-920-8130) or Canadian Coast Guard (1-800-889-8852) |
| CANUTEC | 1-888-CAN-UTEC (226-8832), 613-996-6666, or *666 on a cellular phone |
| Canadian Nuclear Safety Commission | CNSC duty officer emergency line (613-995-0479) |
| Natural Resources Canada | 613-995-5555 |

The list on the previous page tells you who to notify immediately in case of an accident or incident involving dangerous goods. This could be an actual or imminent spill. Emergency responders will use this information to determine how to deal with the incident.

They will be able to look up the dangerous goods in the Emergency Response Guidebook. Using the information you provide will help them respond effectively and safely.



30 DAY REPORTING

If you report an accident, spill, leak or imminent spill or leak involving dangerous goods, you or your employer must send a follow-up report to Transport Canada within 30 days.

You may need to provide additional details for the 30-day report.

SUMMARY

The TDG system provides information to everyone who comes in contact with dangerous goods, including shippers, drivers, receivers and emergency responders. Everyone should:

- ▶ recognize and understand the hazards
- ▶ carry a valid TDG training certificate
- ▶ handle dangerous goods carefully to prevent spills and leaks

Each person involved in the transportation of dangerous goods is responsible for making sure the goods are transported safely to their final destination.

SUPPLEMENTARY INFORMATION

Check the back pocket of this manual to see if your employer has included specific information about the dangerous goods you work with. If so, review it before you continue.

OTHER TRAINING

Your employer may need to provide more training before you are ready to handle, ship or transport dangerous goods. For example:

- ▶ the use of safety equipment
- ▶ safe loading and unloading procedures
- ▶ special training for explosives or radioactives
- ▶ guidelines for selecting appropriate packages and containers
- ▶ more information about how to classify dangerous goods

The additional training might be related to the specific products you deal with or the type of work you do.

COMPETENCY CHECK

Once you have completed the self-teach manual you are ready to move on to the **competency check** – a brief quiz that will help you remember what you’ve learned.

You can refer to the manual, the Class Guide, the Dangerous Goods List and any of the other material as you answer the questions.

When you are finished, hand in the competency check to be marked. (If you are self-employed, you can mark it yourself. There is an answer key in the *Administrator’s Package*.)

CERTIFICATE

If your employer is satisfied that you have completed the course and passed the competency check, he or she will fill out and sign your **certificate**. Make sure you sign the wallet certificate as well, and keep it with you whenever you are at work.

CONGRATULATIONS

You have successfully completed the dangerous goods self-teach training program.

Here are some suggestions. You can:

- ▶ post the Class Guide/Checklist/Placard Guide on the wall at work (there is also a large poster version available)
- ▶ keep this manual handy for reference
- ▶ order the pocket-size TDG handbook, which contains a summary of the information you’ve learned in this course

If you have any comments or suggestions about this course or any questions about TDG, contact the Danatec representative in your region (listed at www.Danatec.com) or call Danatec at 1.800.465.3366.

Some of these terms have specific meanings for transporting dangerous goods.

boiling point – see “initial boiling point”

CANUTEC – Canadian Transport Emergency Centre. Call 1-888-226-8832 or 1-613-996-6666 for dangerous goods emergencies

carrier – the driver or trucking company that transports the dangerous goods

category A and B – for infectious substances (Class 6.2), indicates the degree of hazard (Category A is the most hazardous)

category I, II and III – for radioactive material (Class 7), indicates the degree of hazard (Category III is the most hazardous)

certification mark – a combination of numbers, letters and symbols that describes the standards used to construct and test a container

class – one of the 9 classes of dangerous goods

classification – a description of the dangerous goods that includes shipping name, class, UN number, packing group, etc.

compatibility group – the type of explosive, shown by a capital letter

consignee – the intended receiver of the dangerous goods

consignor – see “shipper”

emergency response assistance plan (ERAP or ERP) – a plan that outlines what is to be done if the shipment of dangerous goods is involved in an accident

Emergency Response Guidebook – a reference that lists dangerous goods by shipping name and UN number, describes potential hazards and recommends emergency procedures

ERAP or ERP – see “emergency response assistance plan”

flash point – the lowest temperature at which the vapours given off by a liquid will ignite when exposed to a source of ignition

handling – packing, unpacking, loading or unloading dangerous goods; also storing them during transport

hazard category – for radioactives (Class 7), the degree of danger, shown by Roman numerals III, II or I (Category III is the most dangerous)

initial boiling point – the lowest temperature at which a liquid will boil

label – small diamond-shaped safety mark placed on packages and small containers to indicate the type of dangerous goods

large container – capacity greater than 450 litres

list – usually refers to a list of dangerous goods arranged in order of shipping name or UN number

N.O.S. – Not Otherwise Specified, a term used in the list of dangerous goods as part of a shipping name

orange panel – an optional way of displaying the UN number with a placard

packing group – the degree of hazard, shown by a Roman numeral:
Packing Group I – great danger
Packing Group II – moderate danger
Packing Group III – minor danger

passenger – an extra person in the vessel, road vehicle, railway vehicle or an aircraft, unless the person is working for the trucking company or is there to accompany the cargo

placard – large diamond-shaped safety mark used on a vehicle or large container to indicate the type of dangerous goods

primary class – the main hazard of a product

safety marks – labels, placards and markings that provide visual clues about the type of dangerous goods

shipper – the person who prepares the dangerous goods for transport, makes arrangements for transport or imports the goods into Canada

shipping document – a document that contains detailed information about a dangerous goods shipment

shipping name – the manufacturer or shipper selects the correct shipping name from a list in the dangerous goods regulations

small container – capacity of 450 litres or less

subsidiary class – the secondary hazard of a product

training certificate – indicates that a person has been trained in the Transportation of Dangerous Goods

UN number – a 4-digit number that identifies the dangerous goods (“UN” stands for United Nations)

These are brief descriptions. For legal definitions, see Part 1 of the Transportation of Dangerous Goods Regulations.

Answers to Questions in Manual

- page 1* **Emergency Response Assistance Plan**
- page 6* **FALSE** Loaders and other people who handle dangerous goods need to be trained.
- page 9* **TRUE** In this example, Stan is acting as shipper, handler and driver.
- page 10* **All three** answers are correct.
- page 11* The **employer's address** is missing.
- page 13* The **plant manager** should have made sure the new employee was trained or was working under the direct supervision of someone who was trained.
- page 16* 1. Blue indicates **dangerous when wet**.
2. Class 5.1 labels and placards are **yellow**.
- page 20* 1. mercury: **UN2809**
2. **the technical name of the most flammable ingredient** must be added
- page 21* **NO** There is no number in the ERAP Index column, so gasoline does not require an emergency response assistance plan.
- page 22* **D** is the compatibility group for black powder.
- page 23* **NO** The label for Class 1.4 does not have a bursting bomb symbol.
- page 24* Anhydrous ammonia: primary risk is **toxic gas**, and subsidiary risk is **corrosive**
- page 25* Isobutanol: Packing Group **III**
Methanol: Packing Group **II**
Gasoline: Packing Group **II**
Diesel fuel: Packing Group **III**
- page 26* **TRUE** See Column 9
- page 27* **FALSE** Calcium peroxide is a Class 5.1.
- page 29* Biological substance, Category B: **UN3373**
- page 30* LSA stands for **Low Specific Activity**.
- page 31* Sulphuric acid: Packing Group **II**
- page 32* Elevated Temperature Liquid N.O.S.: **UN3257**
- page 35* **YES** A courier bill can be a dangerous goods shipping document.
- page 37* **YES** Multiple deliveries or pickups can be shown on a document.

page 39 The **date, unit of measure** (in this case, litres) and **printed name** are missing.

page 40

| Number Pieces | Type of Packages | UN Number | Shipping Name | Class | Packing Group/Category | Toxic by Inhalation (SP 23 & 106) | Quantity |
|---------------|------------------|-----------|---------------------------|----------|------------------------|-----------------------------------|----------|
| 3 | Drums | UN1824 | Sodium hydroxide solution | 8 | II | | 615L |
| 1 | Drum | UN1230 | Methanol | 3(6.1) | II | | 205L |
| 1 | Cylinder | UN1064 | Methyl mercaptan | 2.3(2.1) | | Toxic by inhalation | 510L |

page 41 **NO** They must be in an obvious place.

page 45 **Red, Green, White, Yellow.**

page 46 1. Red stripes indicate **flammable solid**.
2. The trefoil symbol indicates **radioactive**.

page 48 **YES** The UN number can be shown on the label.

page 50 1. box containing sulphuric acid:

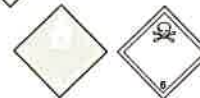


2. The **shipping name** is also required.

3. cylinder containing nitrogen:



4. drum containing ethylene dichloride:



page 52 1. **small container**
2. **large container** (It's the capacity that matters.)

page 55 1. **YES** It is in a large container, so it requires the UN number as well.
2. **YES** It does not require a UN number.
3. **NO** It is less than 500 kg of one class.
4. **YES** (Unless any of the dangerous goods require an ERAP)
5. **YES** More than 500L tank of mercaptan requires an ERAP (see Column 7).

page 61 1. **FALSE** DOT indicates the U.S. standard.
2. **TRUE** UN indicates the international standard.

page 69 **FALSE** The propane is exempt, since it is necessary for the operation of the vehicle.

page 75 Terry's main concern should be to **avoid inhaling the fumes and keep people away**, because dichloromethane is Class 6.1, Toxic.

page 77 1. **NO** It is Class 6.1, Packing Group III.
2. **YES** It is Class 3, Packing Group II.
3. **YES** It is Class 8 Packing Group II.

