Transportation of Dangerous Goods (TDG) Directorate

Dangerous Goods Fundamentals

Presentation to the CIPMM National Workshop

June 2017

RDIMS #: 12911907

Canada

Outline

- Classification
- Dangerous Goods Safety Marks & Means of Containment (MOC)
- Documentation
- Emergency Response Assistance Plan (ERAP)
- Training
- Reporting Requirements
- Exemptions
- Equivalency Certificates
- TDG Contacts

Classification

Transportation of Dangerous Goods

Introduction - Definition

Dangerous goods: means a product, substance or organism included by its nature or by the regulations in any of the classes listed in the schedule to the Act.

9 Classes of Dangerous Goods

- Class 1 – Explosives
- Class 2 – Gases
- Class 3 – Flammable Liquids
- Class 4 – Flammable Solids, Spontaneously Combustible Materials, and Water Reactive Materials
- Class 5 – Oxidizing Substances and Organic Peroxides
- Class 6 – Toxic and Infectious Substances
- Class 7 – Radioactive
- Class 8 – Corrosives
- Class 9 – Miscellaneous

Class 1, Explosives

Class 1.1

Class 1.2

Class 1.3

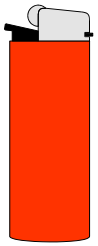
Class 1.4

Class 1.5

Class 1.6 – UN0486
Not found in Canada

Class 2, Gases

Class 2.1
Flammable



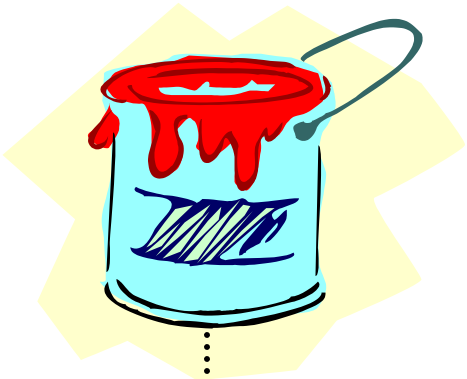
Class 2.2
Non-Flammable,
Non-Toxic

Class 2.3
Toxic

Class 3, Flammable Liquids

Gasoline

Diesel Fuel



Paint, oil based

Jet fuel

Class 4, Flammable Solids, Spontaneously Combustible Substances, and Water Reactive Substances

Class 4.1 – Flint and Matches

Class 4.2
Titanium Powder

Class 4.3 – Lithium

Class 5, Oxidizing Substances and Organic Peroxides

Class 5.1
Ammonium nitrate, Calcium Hypochlorite

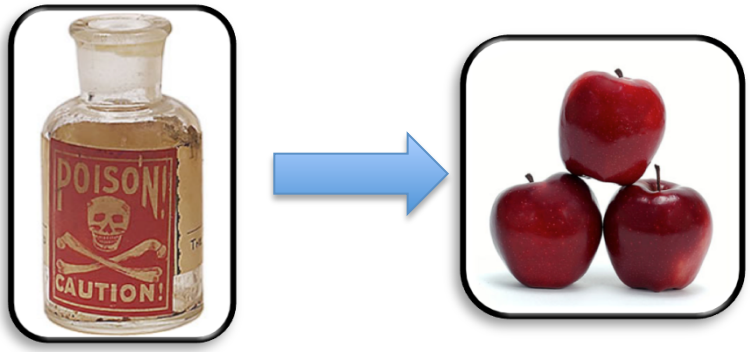
Class 5.1
Oxygen Generator

Class 5.2
Hydrogen peroxide

Class 6.1, Toxic Substances

Class 6.1

- Cyanide (Poison)
- Certain Medicine



Toxic by:

- Inhalation (LC 50)
- Dermal (LD 50)
- Oral (LD 50)

LD 50 = Lethal Dose

LC 50 = Lethal Concentration

Class 6.2 - Infectious Substances

Class 6.2, Infectious Substances

- Category A: Great danger
- Category B: Minor danger

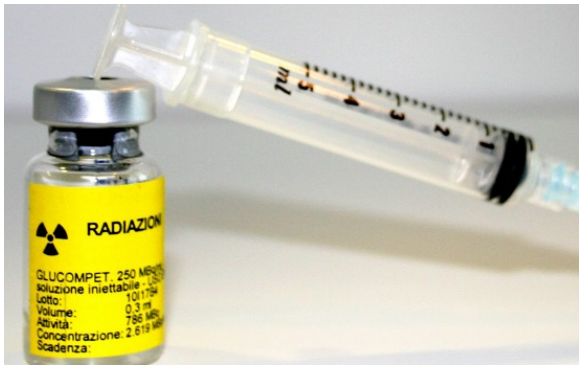
Examples:

- Rabies virus
- Ebola virus
- Human Immunodeficiency virus (**HIV)**

Class 7, Radioactive Materials

Smoke Detectors

Radiopharmaceuticals



Radiography devices for testing welds in pipelines

Class 8, Corrosives

Phosphoric Acid
(Found in Coca-Cola)

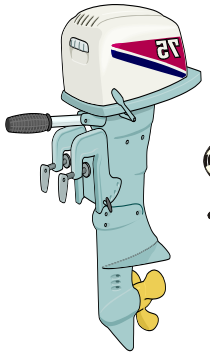
Batteries

Sodium hydroxide
(used in drain cleaner)

Class 9, Miscellaneous Products, Substances or Organisms

PCBs

Engines, vehicles



Dry Ice

Lithium cells/ batteries

Dangerous Goods Safety Marks and MOC

Transportation of Dangerous Goods

Definitions

Means of containment: means a container or packaging, or any part of a means of transport that is or may be used to contain goods.

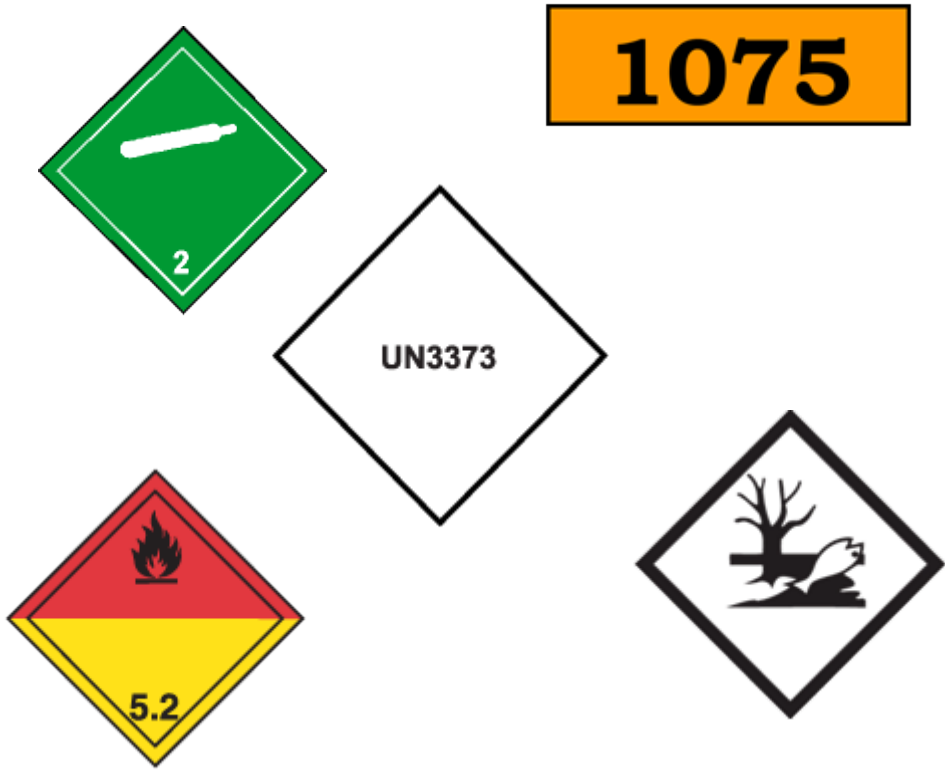
Small means of containment: means a means of containment with a capacity **less than or equal to 450 L**.

Large means of containment: means a means of containment with a capacity **greater than 450 L**.

Dangerous Goods Safety Marks

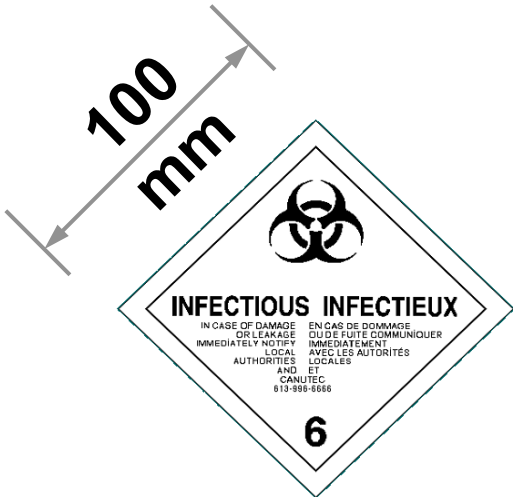
Safety marks include:

- Labels;
- Placards;
- Marks;
- Orange panels;
- Signs;
- Letters;
- Abbreviations; and
- Words.



Labels and Placards

Small MOC

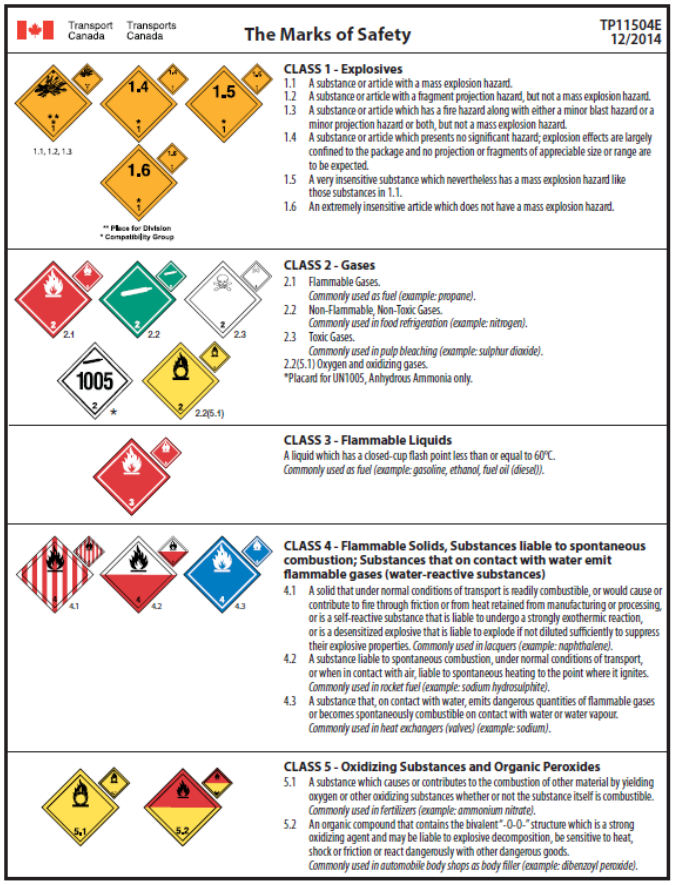


Labels

Large MOC

Placards

Handout on Safety Marks



Transport Canada Transports Canada

The Marks of Safety

TP11504E
12/2014

CLASS 1 - Explosives

1.1 A substance or article with a mass explosion hazard.
1.2 A substance or article with a fragment projection hazard, but not a mass explosion hazard.
1.3 A substance or article which has a fire hazard along with either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.
1.4 A substance or article which presents no significant hazard; explosion effects are largely confined to the package and no projection or fragments of appreciable size or range are to be expected.
1.5 A very insensitive substance which nevertheless has a mass explosion hazard like those substances in 1.1.
1.6 An extremely insensitive article which does not have a mass explosion hazard.

** Place for Division
* Compatibility Group

CLASS 2 - Gases

2.1 Flammable Gases.
Commonly used as fuel (example: propane).
2.2 Non-Flammable, Non-Toxic Gases.
Commonly used in food refrigeration (example: nitrogen).
2.3 Toxic Gases.
Commonly used in pulp bleaching (example: sulphur dioxide).
2.2(5.1) Oxygen and oxidizing gases.
*Placard for UN1005, Anhydrous Ammonia only.

CLASS 3 - Flammable Liquids

A liquid which has a closed-cup flash point less than or equal to 60°C.
Commonly used as fuel (example: gasoline, ethanol, fuel oil (diesel)).

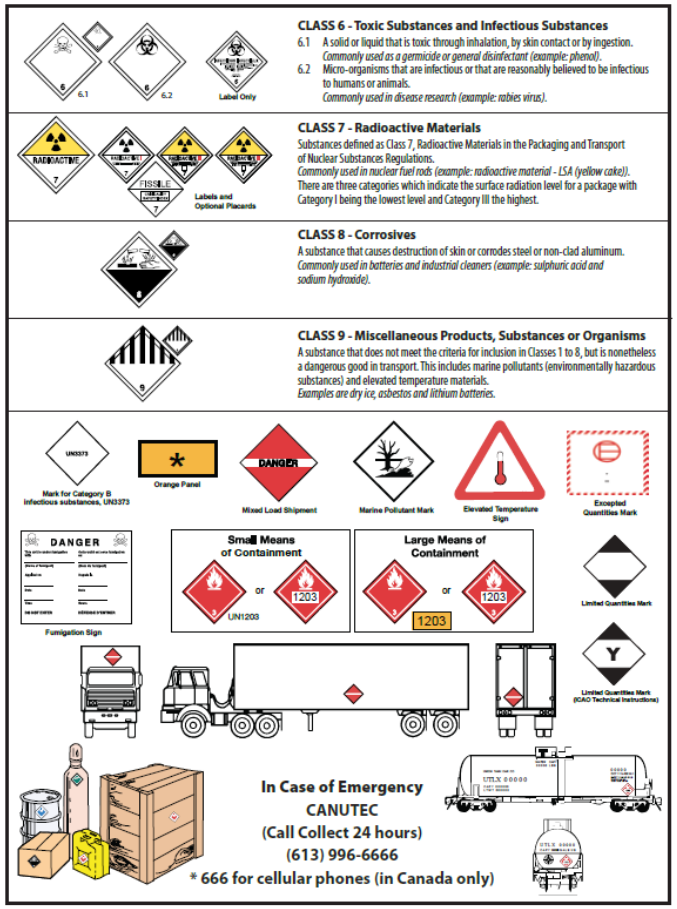
CLASS 4 - Flammable Solids, Substances liable to spontaneous combustion; Substances that on contact with water emit flammable gases (water-reactive substances)

4.1 A solid that under normal conditions of transport is readily combustible, or would cause or contribute to fire through friction or from heat retained from manufacturing or processing, or is a self-reactive substance that is liable to undergo a strongly exothermic reaction, or is a desensitized explosive that is liable to explode if not diluted sufficiently to suppress their explosive properties. *Commonly used in lacquers (example: naphthalene).*
4.2 A substance liable to spontaneous combustion, under normal conditions of transport, or when in contact with air, liable to spontaneous heating to the point where it ignites. *Commonly used in rocket fuel (example: sodium hydrosulphite).*
4.3 A substance that, on contact with water, emits dangerous quantities of flammable gases or becomes spontaneously combustible on contact with water or water vapour. *Commonly used in heat exchangers (valves) (example: sodium).*

CLASS 5 - Oxidizing Substances and Organic Peroxides

5.1 A substance which causes or contributes to the combustion of other material by yielding oxygen or other oxidizing substances whether or not the substance itself is combustible. *Commonly used in fertilizers (example: ammonium nitrate).*
5.2 An organic compound that contains the bivalent "-0-0-" structure which is a strong oxidizing agent and may be liable to explosive decomposition, be sensitive to heat, shock or friction or react dangerously with other dangerous goods. *Commonly used in automobile body shops as body filler (example: dibenzoyl peroxide).*

Canada



CLASS 6 - Toxic Substances and Infectious Substances

6.1 A solid or liquid that is toxic through inhalation, by skin contact or by ingestion. *Commonly used as a germicide or general disinfectant (example: phenol).*
6.2 Micro-organisms that are infectious or that are reasonably believed to be infectious to humans or animals. *Commonly used in disease research (example: rabies virus).*

Label Only

CLASS 7 - Radioactive Materials

Substances defined as Class 7, Radioactive Materials in the Packaging and Transport of Nuclear Substances Regulations. *Commonly used in nuclear fuel rods (example: radioactive material - LSA (yellow cake)).* There are three categories which indicate the surface radiation level for a package with Category I being the lowest level and Category III the highest.

Labels and Optional Placards

CLASS 8 - Corrosives

A substance that causes destruction of skin or corrodes steel or non-clad aluminum. *Commonly used in batteries and industrial cleaners (example: sulphuric acid and sodium hydroxide).*

CLASS 9 - Miscellaneous Products, Substances or Organisms

A substance that does not meet the criteria for inclusion in Classes 1 to 8, but is nonetheless a dangerous good in transport. This includes marine pollutants (environmentally hazardous substances) and elevated temperature materials. *Examples are dry ice, asbestos and lithium batteries.*

Mark for Category B Infectious substances, UN3373
Orange Panel
Mixed Load Shipment
Marine Pollutant Mark
Elevated Temperature Sign
Excepted Quantities Mark
Fumigation Sign
Small Means of Containment
Large Means of Containment
Limited Quantities Mark
Limited Quantities Mark (ICAO Technical Instructions)

In Case of Emergency
CANUTEC
(Call Collect 24 hours)
(613) 996-6666
*** 666 for cellular phones (in Canada only)**

Available on TDG's Webpage: https://www.tc.gc.ca/eng/tdg/marks-safety-1225.html

Means of Containment - Standards

MOCs may include:

- Tank trucks;
- Rail tank cars;
- Cylinders; and
- Boxes.

MOC – Standardized vs Non-Standardized

Standardized

Non-Standardized

Examples of means of containment

Documentation

Transportation of
Dangerous Goods

Shipping Document - Definition

Shipping Document: means a document that relates to dangerous goods that are being handled, offered for transport or transported and that contains the information required by Part 3 (Documentation) of the TDG Regulations relating to the goods **but does not include an electronic record.**

The shipping document must always be in a **paper copy form**.

Shipping Document - Requirements

Purpose of the shipping document

- Identify the dangerous goods being transported.

When is it required?

- Always required unless an exemption applies.

Must it be on a specific form?

- No, but it must list the required information.

Shipping Document - Requirements

The information must be:

- Easy to identify;
- Legible and in indelible print; and
- In French or English.

Transport Canada provides two samples of shipping documents on its website.

EXAMPLE OF SHIPPING DOCUMENT

Destination:City-Town	**Consignor :**
Cornwall Plastics Inc 1011 Boundary Road Cornwall, (ON) K6H 1M9 Att: Sandrine Holly	MCP Chemicals 4444, Willowspring Parkway Ottawa, (ON) K1A 0N5

Name of carrier	**Point of origin**	**Date**	**Shipper's no.**
Brennan Transport	Ottawa, ON	May 16, 2013	3156

UN Number	Shipping Name	Primary Class	Subsidiary Class	Packing Group	Toxic by inhalation	Quantity	Packages requiring labels
UN 3104	**Organic peroxides, type C, solid, (Di-n-octanoyl peroxide)**	**5.2**		**II**		**50 kg**	**2**
UN 1075	**Liquefied petroleum gases not odourized**	**2.1**				**150 L**	**3**
UN 0224	**Barium azide**	**1.1A**	**(6.1)**	**II**		**2 kg**	**1**
UN 2692	**Boron tribromide**	**8**		**I**	X	**50 L**	**4**
UN 0044	**Primers, Cap Type**	**1.4S**		**II**		**2 000 art.**	**20**

24 HOUR NUMBER : 613-996-6666

Shipping Documents

- For more information on the shipping documents requirements, consult Part 3 of the TDG Regulations.

- You will find information such as:
  - What information must be on the shipping document;
  - Where it must be kept; and
  - For how long it must be kept.

Emergency Response Assistance Plan

Transportation of Dangerous Goods

Emergency Response Assistance Plan

WHAT IS AN ERAP?

- A recommendation from the Grange report written after the 1979 Mississauga derailment;
- Requirement of TDG Act;
- Plans are approved by Transport Canada for high risk products (e.g., propane, chlorine, anhydrous ammonia, explosives, flammable solids);
- Provides specialized assistance to first responders.

Emergency Response Assistance Plan

WHO NEEDS AN ERAP?

- Person who offers for transport (shipper) dangerous goods as defined in Part 7 of the TDG Regulations;
- Importer of dangerous goods; and
- Carrier of products that transit through Canada.

Emergency Response Assistance Plan

THE ERAPS APPLY TO?

- Certain dangerous goods, and
- Specific quantities of dangerous goods.

Consult Part 7 of the
TDG Regulations for more information.

Training

Transportation of
Dangerous Goods

Training

- **An individual must not handle, offer for transport, or transport (HOT) dangerous goods (DG) unless he/she is**:
  - Adequately trained and holds a valid training certificate; or
  - Under direct supervision of a person who is adequately trained.
- **Employers must**:
  - Ensure employees are adequately trained or supervised;
  - Not direct or allow employees to HOT DG unless they are adequately trained and hold a valid training certificate.
- **Expiry of training certificate**:
  - Road, Rail, Marine: 36 months.
  - Air: 24 months.
- **Keeping proof of training**:
  - 2 years after the date the training certificate expires.

Reporting Requirements

Transportation of Dangerous Goods

Reporting Requirements

Part 8 of the TDG Regulations

- **Emergency Report** – Advise local authority responsible for emergency response
- **Release or Anticipated Release Report** – Advise CANUTEC, the consignor, and if applicable the Canadian Nuclear Safety Commission (CNSC) or a Vessel Traffic Services Centre or the Canadian Coast Guard (a 30-day Follow-up Report will be required)
- **Accident or Incident Report** – Advise CANUTEC, and if applicable CNSC (a 30-day Follow-up Report will be required)
- **Undeclared or Misdeclared Report** – Advise CANUTEC
- **Loss or Theft Report** – Advise CANUTEC, and if applicable CNSC or Natural Resources Canada
- **Unlawful Interference Report** – Advise CANUTEC, and if applicable CNSC or Natural Resources Canada.

http://www.tc.gc.ca/eng/tdg/part-8-reporting-requirements.html

Exemptions

Transportation of Dangerous Goods

Exemptions

Part 1 of the TDG Regulations

- May provide exemption to certain or all parts of the TDG Regulations.
- Some exemptions apply to certain modes only.
- Must follow all requirements of the Exemption or must follow the entire TDG Regulations.

Equivalency Certificates

Transportation of Dangerous Goods

Equivalency Certificates

Part 14 of the TDG Regulations

- If a person wishes to carry on an activity related to TDG in a way that is not in compliance with TDG Regulations.
- Must show that the way in which the activity will be carried on will provide a level of safety equivalent to complying with the Regulations.
- Must follow all requirements in the Equivalency Certificates or must follow the TDG Regulations.

TDG Contacts

Transportation of
Dangerous Goods

TDG Safety Awareness Materials

- Information available on:
  - ✓ Emergency preparedness and response;
  - ✓ Protective Direction No. 36;
  - ✓ Safety Advisories (e.g., lithium batteries);
  - ✓ TDG Bulletins;
  - ✓ CANUTEC;
  - ✓ And much more!

- Updated regularly and available online at: http://www.tc.gc.ca/eng/tdg/awareness-materials-and-faq-1159.html.

TDG Contacts

For general TDG information: TDG-TMD@tc.gc.ca

For emergencies, dial 1-888-CANUTEC, (613) 996-6666 or *666 on a mobile phone (in Canada only). Available 24 hours a day, 7 days a week.

Websites: www.tc.gc.ca/tdg
www.tc.gc.ca/canutec

TDG Contacts

TDG Regional Offices		
Region	**Telephone Number**	**Email address**
Atlantic	1-866-814-1477	TDG-TMDAtlantic@tc.gc.ca
Quebec	1-514-283-5722	TMD-TDG.Quebec@tc.gc.ca
Ontario	1-416-973-1868	TDG-TMDOntario@tc.gc.ca
Prairie & Northern	1-888-463-0521	TDG-TMDPNR@tc.gc.ca
Pacific	1-604-666-2955	TDGPacific-TMDPacifique@tc.gc.ca