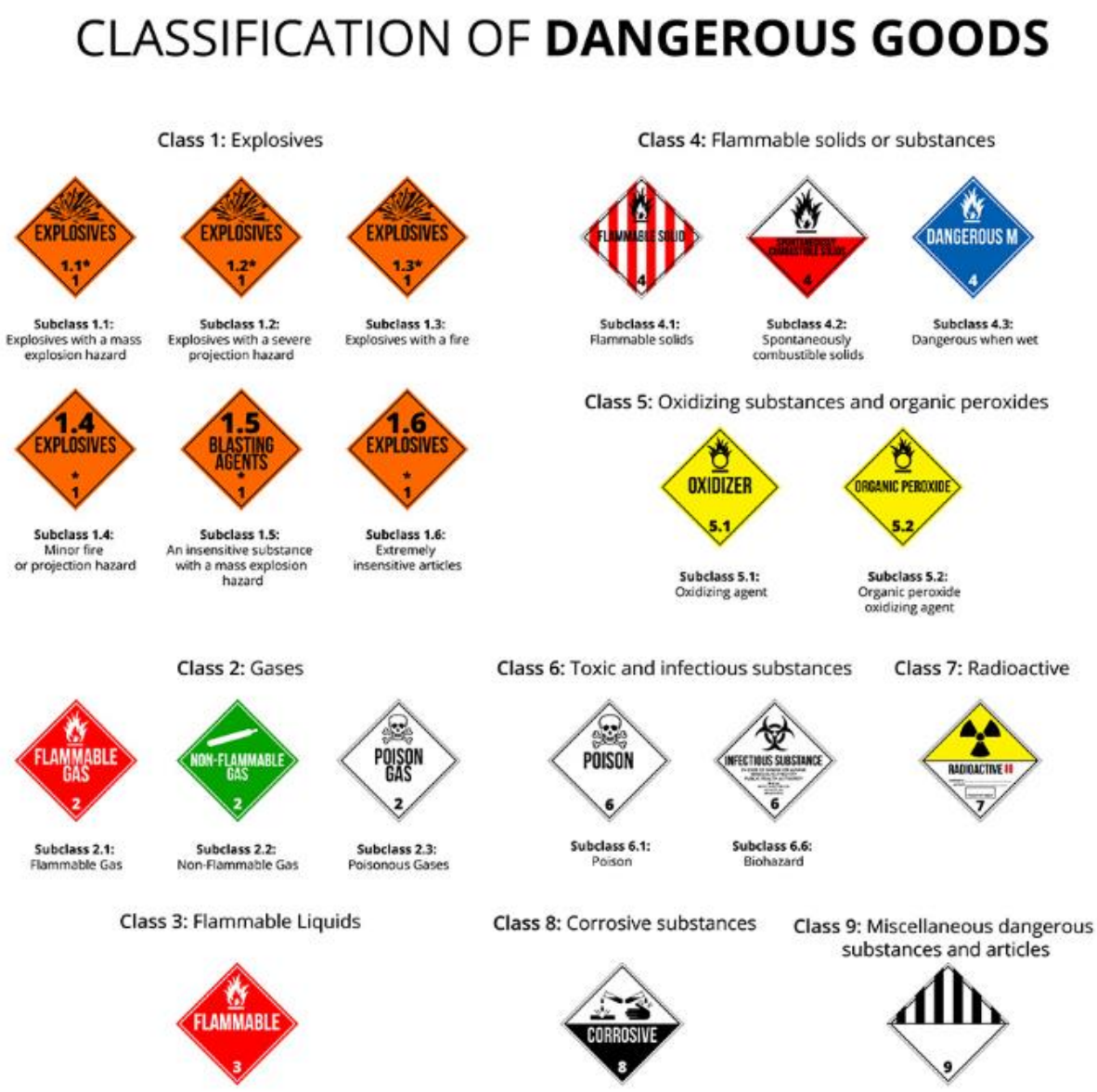
TDG-001 Chapter 2 Notes

Classification and Division

Dangerous goods are classified according to the Transportation of Dangerous Goods (TDG) Regulations. These regulations establish a classification system that categorizes hazardous materials based on their inherent properties and potential risks during transportation. Each of the 9 classes of dangerous good represents a certain type of hazard.



The classification system in Canada is based on international standards established by the United Nations, specifically the UN Recommendations on the Transport of Dangerous Goods. The TDG Regulations classify dangerous goods into nine primary classes, each with its own set of hazards and characteristics

Each class of dangerous goods is further divided into divisions or subdivisions based on specific hazards and characteristics. Additionally, dangerous goods may be assigned one or more packing groups based on their degree of danger. Class 1, 2, 3, 4, 5, & 6 all have subdivisions.

To identify the divisions of dangerous goods in Canada, you typically refer to the following sources:

1. **Transportation of Dangerous Goods Regulations (TDG Regulations)**: The TDG Regulations provide comprehensive guidance on the classification, packaging, labeling, and transportation requirements for dangerous goods in Canada. Division-specific requirements can be found within the regulations.
2. **Schedule 1 of the TDG Regulations**: Schedule 1 lists the dangerous goods, their classifications, and associated safety requirements. It provides detailed information on the classification criteria for each class and division of dangerous goods.
3. **TDG Classification Chart**: Transport Canada provides a classification chart that summarizes the classification criteria for each class and division of dangerous goods. This chart can help identify the appropriate division for a given substance or article.
4. **Safety Data Sheets (SDS)**: Manufacturers and suppliers of dangerous goods are required to provide Safety Data Sheets (SDS) that contain information about the hazards, classification, and safe handling of the substances. The SDS typically indicates the appropriate TDG classification and division for the substance.
5. **Placards and Labels**: During transportation, vehicles and containers carrying dangerous goods must display placards and labels indicating the class and division of the goods. These placards and labels provide visual cues to emergency responders and others about the nature of the hazards.

Packing Groups

The packing group classification system is used to categorize hazardous materials based on their degree of danger during transportation. The packing group of a substance determines the level of risk associated with its transportation and helps determine the appropriate packaging requirements. The packing groups are assigned based on the

hazardous characteristics of the materials and their potential impact on health, safety, and the environment.

The packing groups are divided into three categories:

6. **Packing Group I (PG I)**:
    - Substances in Packing Group I present the highest level of danger during transportation.
    - They pose a severe risk to health, safety, and the environment.
    - Examples of substances in Packing Group I include highly toxic materials, extremely reactive substances, and substances that pose a significant risk of fire or explosion.
7. **Packing Group II (PG II)**:
    - Substances in Packing Group II present a moderate level of danger during transportation.
    - They pose a lesser risk compared to Packing Group I materials but still require careful handling and packaging.
    - Examples of substances in Packing Group II include moderately toxic materials, moderately reactive substances, and substances with a moderate risk of fire or explosion.
8. **Packing Group III (PG III)**:
    - Substances in Packing Group III present a low level of danger during transportation.
    - They pose the least risk compared to Packing Group I and II materials but still require appropriate packaging and handling precautions.
    - Examples of substances in Packing Group III include mildly toxic materials, substances with low reactivity, and substances with a low risk of fire or explosion.

The assignment of packing groups is based on the properties and hazards of the substances as determined by standardized testing and assessment methods. Packing groups are indicated on shipping documents and packaging labels to communicate the level of risk associated with the hazardous materials being transported.

Examples below are of a few classes with packing group information:

Class 4 Division 4.1 Flammable Solids Packing Group

- **Packing group II**: Assigned to readily combustible solids (**other than metal powders**) if the burning time is less than 45 seconds and the flame passes the wetted zone or assigned to powders of metal **or** assigned to **metal alloys** if the zone of reaction spreads over the whole length of the sample in 5 minutes or less.
- **Packing group III**: Assigned to readily combustible solids (**other than metal powders**) if the burning rate time is less than 45 seconds and the wetted zone stops the flame propagation for at least 4 minutes **or** assigned to **metal alloys** if the reaction spreads over the whole length of the sample in more than 5 minutes but not more than 10 minutes.

Class 8 Corrosive Substances Packing Group

- **Packing Group I**: Materials that cause full thickness destruction of intact skin tissue within an observation period of up to 60 minutes starting after the exposure time of three minutes or less.
- **Packing Group II**: Materials other than those meeting Packing Group I criteria that cause full thickness destruction of intact skin tissue within an observation period of up to 14 days starting after the exposure time of more than three minutes but not more than 60 minutes.
- **Packing Group III**: Materials, other than those meeting Packing Group I or II criteria but cause full thickness destruction of intact skin tissue or exhibit a corrosion on either steel or aluminum surfaces exceeding 6.25 mm (0.25 inch) a year.

Some classes do not have packing groups but they are separated by:

Class 1 – Explosives are separated into compatibility groups

Class 2 – Gases do not have packing groups

Class 6 – Toxic and infectious substances are either category A or B

Class 7 – Radioactives have hazard categories I, II, III

Shipping Names

The Transportation of Dangerous Goods (TDG) Act and Regulations provide a **standardized system** for identifying and classifying hazardous materials for transportation purposes. Shipping names refer to the official names assigned to hazardous substances and materials for shipping and transportation.

The TDG Regulations include a comprehensive list of shipping names for hazardous materials, organized by their primary hazard class and subsidiary hazard classes. Each shipping name is assigned a specific UN number and hazard class, allowing for standardized identification and classification of dangerous goods.

The same shipping name may apply to serval products with different concertation and varying degrees of danger.

Here are some examples of common shipping names for hazardous materials and the explanation of some of the columns :

Col 1	Col 2	Col 3	Col 4	Col 5	Col 6		Col 7	Col 8	Col 9
Shipping Name and Description	**UN Number**	**Class**	**Packing Group / Category**	**Special Provisions**	**6(a) Explosive Limit and Limited Quantity**	**6(b) Excepted Quantities**	**ERAP Index**	**Passenger Carrying Vessel Index**	**Passenger Carrying Road or Rail Index**
ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	UN **1986**	**3 (6.1)**	**I** **II** **III**	16 16 16	0 1 L 5 L	E0 E2 E1	1,000	Forbidden	Forbidden 1 L 60 L

Max amount permitted under the limited quantity exemption

If shipment requires a government approved ERAP (emergency response assistance plan

Col 1	*Col 2*	*Col 3*	*Col 4*	*Col 5*
Shipping Name and Description	UN Number	Class	Packing Group / Category	Special Provisions
ACETONE	UN **1090**	**3**	**II**	
ACETYLENE, DISSOLVED	UN **1001**	**2.1**		38
AIR, COMPRESSED, not more than 23.5% oxygen, by volume	UN **1002**	**2.2**		
ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	UN **1986**	**3 (6.1)**	**I** **II** **III**	16 16 16
ANHYDROUS AMMONIA; or **AMMONIA, ANHYDROUS**	UN **1005**	**2.3 (8)**		23, 158
ARSENIC	UN **1558**	**6.1**	**II**	
ASBESTOS, CHRYSOTILE, when not fixed in a natural or artificial binder material or included in a manufactured product	UN **2590**	**9**	**III**	139
BATTERIES, WET, FILLED WITH ACID, electric storage	UN **2794**	**8**		
BATTERY FLUID, ACID; SULFURIC ACID with not more than 51% acid	UN **2796**	**8**	**II**	

Shipping names are located in Column 1. It's okay to change the word order as long as its still makes sense. For example: "Air, Compressed" can be "Compressed Air"

At often times you may notice N.O.S. which is an acronym for: Not otherwise specified

Dangerous Goods List

The Transportation of Dangerous Goods (TDG) Act and Regulations govern the transportation of hazardous materials. The "Dangerous Goods List" is a comprehensive classification system used to categorize hazardous substances and materials for transportation purposes. It provides standardized criteria for identifying and classifying dangerous goods based on their inherent properties and associated hazards.

The Dangerous Goods List categorizes hazardous materials into nine primary hazard classes, each with its own subcategories and specific criteria.

The Dangerous Goods List provides detailed criteria for classifying substances within each hazard class, including specific definitions, criteria for classification, and packing group assignments. It serves as a valuable reference for shippers, carriers, and regulatory authorities involved in the transportation of hazardous materials.

Below is an example of a List of Dangerous Goods

Col 1	*Col 2*	*Col 3*	*Col 4*	*Col 5*	*Col 6*		*Col 7*	*Col 8*	*Col 9*
Shipping Name and Description	UN Number	Class	Packing Group / Category	Special Provisions	6(a) Explosive Limit and Limited Quantity Index	6(b) Excepted Quantities	ERAP Index	Passenger Carrying Vessel Index	Passenger Carrying Road or Rail Index
RESIN SOLUTION, flammable	UN **1866**	**3**	**I**		0.5 L	E3		Forbidden	1 L
			II		5 L	E2			5 L
			III		5 L	E1			60 L
RIVETS, EXPLOSIVE	UN **0174**	**1.4S**	**II**		25	E0			
SELENIC ACID	UN **1905**	**8**	**I**		0	E0	3,000		Forbidden
SODIUM HYDROXIDE, SOLID	UN **1823**	**8**	**II**		1 kg	E2			15 kg
SODIUM HYDROXIDE SOLUTION	UN **1824**	**8**	**II**		1 L	E2			1 L
			III		5 L	E1			5 L
STRYCHNINE	UN **1692**	**6.1**	**I**		0	E5	1,000		5 kg

COLUMN 1 - **Shipping Name and Description**

This column gives the shipping names for dangerous goods in alphabetical order within each primary class and within each packing group. The alphabetical order has been determined by ignoring all numerical digits and all lower case letters that precede the first capital letter in the shipping name. The most appropriate designation for the dangerous goods must be selected based on each class, UN number and packing group established per the classification requirements of clause 4.5.

COLUMN 2 – UN Number

This column gives the UN number assigned to the dangerous goods under the UN system. It is used around the world an as an ID number for shipping. Ie. Acetone is UN 1090 around the world even when the word Acetone is different in many language.

COLUMN 5 - **Special Provisions**

This column gives the special provisions that apply to the dangerous goods. Shipping names that have "16" beside them require extra information. This extra information is normally the technical name of the main ingredient surrounded by brackets.

COLUMN 6 – Quantity Limits

This column refers to various exemptions. 6a) refers to kilograms or litres and 6b) shows the code for maximum quantity that can be transported under special rules for expected quantities.

COLUMN 7 – **Emergency Response Assistance Plan (ERAP)**

This column refers to quantities above a certain amount that requires a government approved emergency assistance plan or otherwise known as an ERAP.

COLUMN 8 - **Vessel Index**

Maximum quantity (for each containment) that can be transported on a ship.

COLUMN 9 - **Road or Railway Index**

Maximum quantity (for each containment) that can be transported on a bus or a passenger train.