TDG-001 Chapter 3 Notes

Explosives

Explosives are classified as Class 1 dangerous goods according to the Transportation of Dangerous Goods (TDG) Regulations. Class 1 includes substances and articles that are capable of producing hazardous effects due to their explosive properties. Explosives are further divided into different divisions based on their characteristics and the nature of the hazards they present during transportation.

Here's an overview of the divisions within Class 1 - Explosives:

Division 1.1: Mass Explosives

- Substances or articles that have a mass explosion hazard. This means that an explosion of the entire quantity of the substance or article will occur almost instantaneously.
- Examples include TNT (Trinitrotoluene), dynamite, and certain types of military munitions.

Division 1.2: Projection Hazard

- Substances or articles that have a projection hazard but not a mass explosion hazard. This means that the explosion of the substance or article will produce flying fragments or fragments that will only travel a short distance.
- Examples include certain types of fireworks and some types of small arms ammunition.

Division 1.3: Fire Hazard, Minor Blast or Projection Hazard

- Substances or articles that have a fire hazard and either a minor blast hazard or a minor projection hazard or both but not a mass explosion hazard.
- Examples include most types of consumer fireworks and certain types of small arms ammunition.

Division 1.4: Minor Explosion Hazard

- Substances or articles that present no significant hazard beyond the package in the event of ignition or initiation during transport.
- Examples include most types of ammunition, cartridges for small arms, and some types of consumer fireworks.

Division 1.5: Very Insensitive Explosives

- Substances that have a mass explosion hazard but are so insensitive that there is very little probability of accidental initiation or propagation.

- Examples include certain types of military munitions and specialized industrial explosives.

Division 1.6: Extremely Insensitive Articles

- Articles that do not have a mass explosion hazard. These articles are so insensitive that there is virtually no probability of accidental initiation or propagation.
- Examples include certain types of detonators and other highly specialized explosives.

Orange labels always means the product is designed to explode like dynamite.

All Class 1 products have been assigned to a compatibility group, to make sure that certain types of explosives are never transported together. It is shown with a capital letter. The asterisk * is just a placeholder that isn't shown on a label or placard. The capital letter appears in place of the asterisk.

Gases

In the context of the Transportation of Dangerous Goods (TDG) Regulations in Canada, gases are classified as Class 2 dangerous goods. Class 2 dangerous goods encompass substances and articles that are gases at 20°C (68°F) or less and 101.3 kPa (14.7 psi) of pressure, or that have a boiling point of 20°C (68°F) or less at 101.3 kPa (14.7 psi) and are in a gaseous state in transportation.

Class 2 dangerous goods are further subdivided into three divisions based on their properties and associated risks during transportation:

1. **Division 2.1: Flammable Gases**:
    - Flammable gases are substances that can ignite and burn in the presence of an ignition source when mixed with air in certain proportions. Examples include propane, butane, methane, hydrogen, and acetylene.
2. **Division 2.2: Non-Flammable, Non-Toxic Gases**:
    - Non-flammable, non-toxic gases are substances that are not flammable and do not pose immediate health hazards when inhaled. Examples include nitrogen, carbon dioxide, helium, and neon.
3. **Division 2.3: Toxic Gases**:
    - Toxic gases are substances that can cause harm to human health when inhaled, even at low concentrations. Exposure to toxic gases can result in respiratory irritation, poisoning, or other health effects. Examples include chlorine, ammonia, hydrogen sulfide, and sulfur dioxide.

Oxygen and similar gasses (UN 1072, Class 2.2) have a special placard.

The primary risk of Class 2.2 is non-flammable and non toxic, however, the subsidiary risk is 5.1 (oxidizing gasses)

Flammable Liquids

In the Transportation of Dangerous Goods (TDG) Regulations in Canada, flammable liquids are classified as Class 3 dangerous goods. Class 3 dangerous goods encompass liquids, mixtures of liquids, or liquids containing solids in a solution or suspension that emit flammable vapors at temperatures of not more than 60.5°C (141°F). These liquids have a flash point below 60.5°C (141°F).

Flammable liquids pose a fire hazard during transportation due to their ability to produce flammable vapors that can ignite in the presence of an ignition source. Examples of flammable liquids include gasoline, diesel fuel, alcohol, acetone, and many solvents.

Flammable liquids are separated into 3 packing groups which are based on the combination of the flash point and the initial boiling point.

Flash point: Lowest temperature at which vapours will ignite when exposed to an ignition source.

Flammable Substances

In the context of the Transportation of Dangerous Goods (TDG) Regulations in Canada, flammable substances are generally classified as Class 3 dangerous goods, along with flammable liquids. Class 3 dangerous goods encompass liquids, mixtures of liquids, or liquids containing solids in a solution or suspension that emit flammable vapors at temperatures of not more than 60.5°C (141°F). These substances have a flash point below 60.5°C (141°F) and pose a fire hazard during transportation due to their ability to produce flammable vapors that can ignite in the presence of an ignition source.

Examples of flammable substances that fall under Class 3 dangerous goods include:

- Liquids such as gasoline, diesel fuel, kerosene, ethanol, methanol, and various solvents.
- Mixtures or solutions containing flammable components.
- Certain solids or powders that can produce flammable vapors under certain conditions.

Oxidizers and Organic Peroxides

In the Transportation of Dangerous Goods (TDG) Regulations in Canada, oxidizers and organic peroxides are classified as Class 5 dangerous goods. Class 5 dangerous goods encompass substances and articles that are oxidizing substances or organic peroxides, which can cause or contribute to the combustion of other materials.

Class 5 dangerous goods are further subdivided into two divisions based on their properties and associated risks during transportation:

4. **Division 5.1: Oxidizing Substances**:
    - Oxidizing substances are materials that can readily release oxygen or other oxidizing agents and can enhance the combustion of other materials. They promote or sustain combustion in other materials, even if they are not themselves combustible. Examples include hydrogen peroxide, sodium chlorate, potassium permanganate, and ammonium nitrate.
5. **Division 5.2: Organic Peroxides**:
    - Organic peroxides are organic compounds containing the peroxide functional group (-O-O-) and are highly reactive substances. They can decompose exothermically and may ignite or cause combustion. Organic peroxides are often used as initiators or catalysts in chemical reactions. Examples include benzoyl peroxide, cumene hydroperoxide, and tert-butyl hydroperoxide.

Remember oxygen plays an important role in sustaining a fire

Toxic and Infectious Substances

In the Transportation of Dangerous Goods (TDG) Regulations in Canada, toxic and infectious substances are classified as Class 6 dangerous goods. Class 6 dangerous goods encompass substances and articles that pose a risk to human health due to their toxicity or infectious properties.

Class 6 dangerous goods are further subdivided into two divisions based on their properties and associated risks during transportation:

6. **Division 6.1: Toxic Substances**:
    - Toxic substances are materials that can cause harm to human health when inhaled, ingested, or absorbed through the skin. They may have acute or chronic effects and can cause a range of health problems, including

poisoning, respiratory irritation, organ damage, or even death. Examples include pesticides, certain chemicals, and industrial by-products.

7. **Division 6.2: Infectious Substances**:
    - Infectious substances are materials containing pathogens, such as bacteria, viruses, or other microorganisms, that can cause disease in humans or animals. These substances pose a risk of infection to individuals who come into contact with them. Examples include medical specimens, cultures, and biological products containing infectious agents.

6.2 (category A are more hazardous than category b) – has emergency instructions right on the label.

There are only 2 shipping names for Category A which are

Infectious substances affecting humans – UN 2814

Infectious substance affecting animals – UN 2900

Class 6.2 (category B which are less hazardous than category A) – only show the UN number on a diamond placard.

Radioactives

In the Transportation of Dangerous Goods (TDG) Regulations in Canada, radioactive materials are classified as Class 7 dangerous goods. Class 7 dangerous goods encompass substances and articles that emit ionizing radiation.

Radioactive materials are further categorized into different levels of radioactivity, known as Radioactive Material Types (Types I to V), based on their activity levels. These types determine the packaging and transport requirements for radioactive materials.

Transportation of radioactive materials in Canada is also governed by the Canadian Nuclear Safety Commission (CNSC), which regulates the use, transportation, and disposal of nuclear substances and radioactive materials to ensure the protection of the environment and the health and safety of Canadians.

Corrosives

In the Transportation of Dangerous Goods (TDG) Regulations in Canada, corrosive substances are classified as Class 8 dangerous goods. Class 8 dangerous goods

encompass substances that can cause severe damage to living tissue, other materials, or the environment by chemical action.

Corrosive substances are further defined as materials that, by chemical action, can cause severe damage when in contact with living tissue, such as skin or mucous membranes, or cause significant destruction to other materials, including metals and other substances. These substances can include acids, bases, and other corrosive chemicals.

Examples of corrosive substances include sulfuric acid, hydrochloric acid, sodium hydroxide (caustic soda), potassium hydroxide (caustic potash), and certain cleaning solutions.

Corrosives can damage organic tissue, metals or other materials and are separated in to 3 packing groups.

Miscellaneous

In the Transportation of Dangerous Goods (TDG) Regulations in Canada, miscellaneous dangerous goods are classified as Class 9 dangerous goods. Class 9 dangerous goods encompass substances or articles that do not fit into any of the other hazard classes but still pose risks during transportation.

Miscellaneous dangerous goods may include substances or articles that have environmental hazards, elevated temperature materials, or other hazardous materials not covered by the other classes. These materials may present hazards such as toxicity, flammability, reactivity, or environmental harm.

Examples of miscellaneous dangerous goods include:

- Environmentally hazardous substances: Substances that can harm the environment if released, such as certain pesticides, chemicals, or pollutants.
- Elevated temperature materials: Substances that, when transported at elevated temperatures, may pose risks due to their increased reactivity or potential for ignition.
- Other hazardous materials: Substances or articles that present risks during transportation but do not fit into any of the other hazard classes, such as lithium batteries, asbestos, and certain consumer products.