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## **Sustainable Human Resource Development in logistics services for ASEAN Member States**



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## Sustainable Human Resource Development in logistics services for ASEAN Member States



## Dangerous Goods Handling International Classification of Dangerous Goods

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## Sustainable Human Resource Development in logistics services for ASEAN Member States

# International Classification of Dangerous Goods

### Objectives:

- ❖ This chapter will explain **UN Transport regulations**, its history and basis as a model regulation for international classification system for other modes of transport.
- ❖ The linkage into the **ASEAN Protocol 9** framework on the international carriage of dangerous goods in ASEAN will also be explained.
- ❖ **9 classes** of dangerous goods classification shall be key content in this chapter. **Other relevant basic terms** such as Class, Division, Packaging Group (PG), UN Number (UNNO) and Proper Shipping Names (PSN) will also be covered.



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# International Classification of Dangerous Goods

### Objectives:

- Basic hazard communication such as **Labelling requirements, Dangerous Goods Declaration (DGD) or Multi-modal Dangerous Goods Form** shall be explained.
- As supplement knowledge in classification of substances or mixtures that have more than one hazard, the explanation on **precedence of hazard characteristics** will be given.



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# International Classification of Dangerous Goods

### Presentation Outline

- ❖ UNTDG - United Nations Recommendations on the Transport of Dangerous Goods
- ❖ International Classification of Dangerous Goods
- ❖ System of Linkage / ASEAN Protocol 9
- ❖ Hazard Classification and Hazard Communication
- ❖ Classification of Dangerous Goods (9 Classes)
- ❖ Primary Terms in UNTDG
- ❖ UN Packing Group (PG)
- ❖ UN Number and Proper Shipping Name (PSN)



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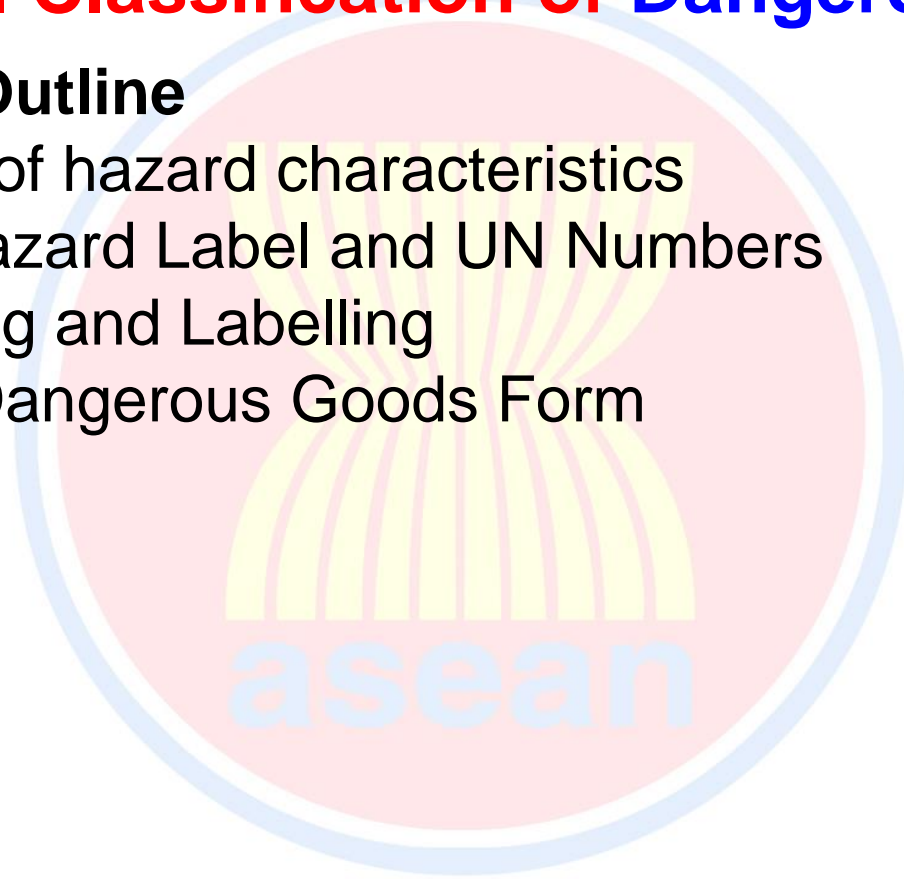


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# International Classification of Dangerous Goods

## Presentation Outline

- ❖ Precedence of hazard characteristics
- ❖ Display of Hazard Label and UN Numbers
- ❖ Other Marking and Labelling
- ❖ Multimodal Dangerous Goods Form





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# UNTDG: United Nations Recommendations on the Transport of Dangerous Goods

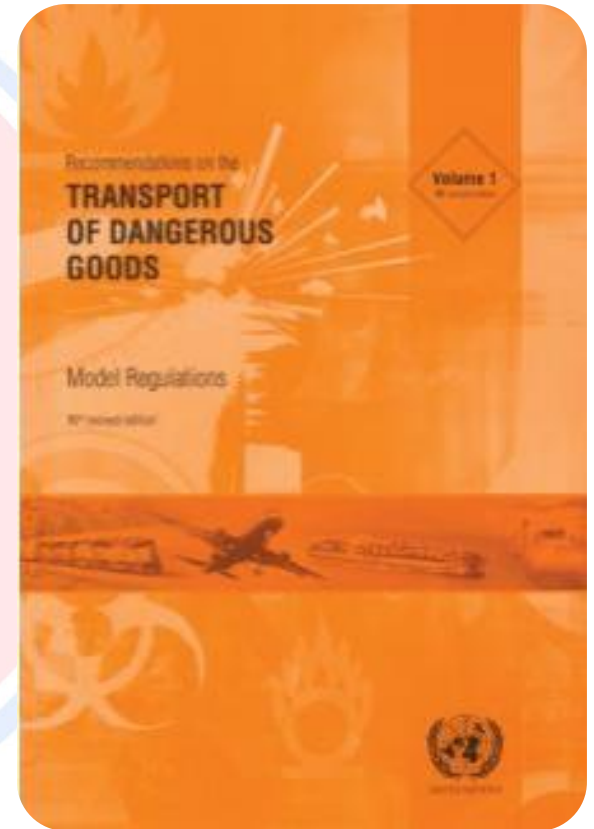
- ❖ The Economic and Social Council of the United Nations had appointed an adhoc Committee of Experts on the Transport of Dangerous Goods (UN Committee of Experts), which had been actively considering the international aspect of the transport of dangerous goods by **all modes of transport**.
- ❖ This Committee completed a report in 1956 dealing with classification, listing and labeling of dangerous goods and with the transport documents required for such goods. The report has been first published under the name: **Transport Of Dangerous Goods**

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# UNTDG: United Nations Recommendations on the Transport of Dangerous Goods

- ❖ This report, with subsequent modifications, has been published since 1976 under the title: **Recommendations** prepared by the Committee of Experts on the transport of dangerous goods.

**“The Orange Book”**  
**18<sup>th</sup> Revised Edition (2013)**

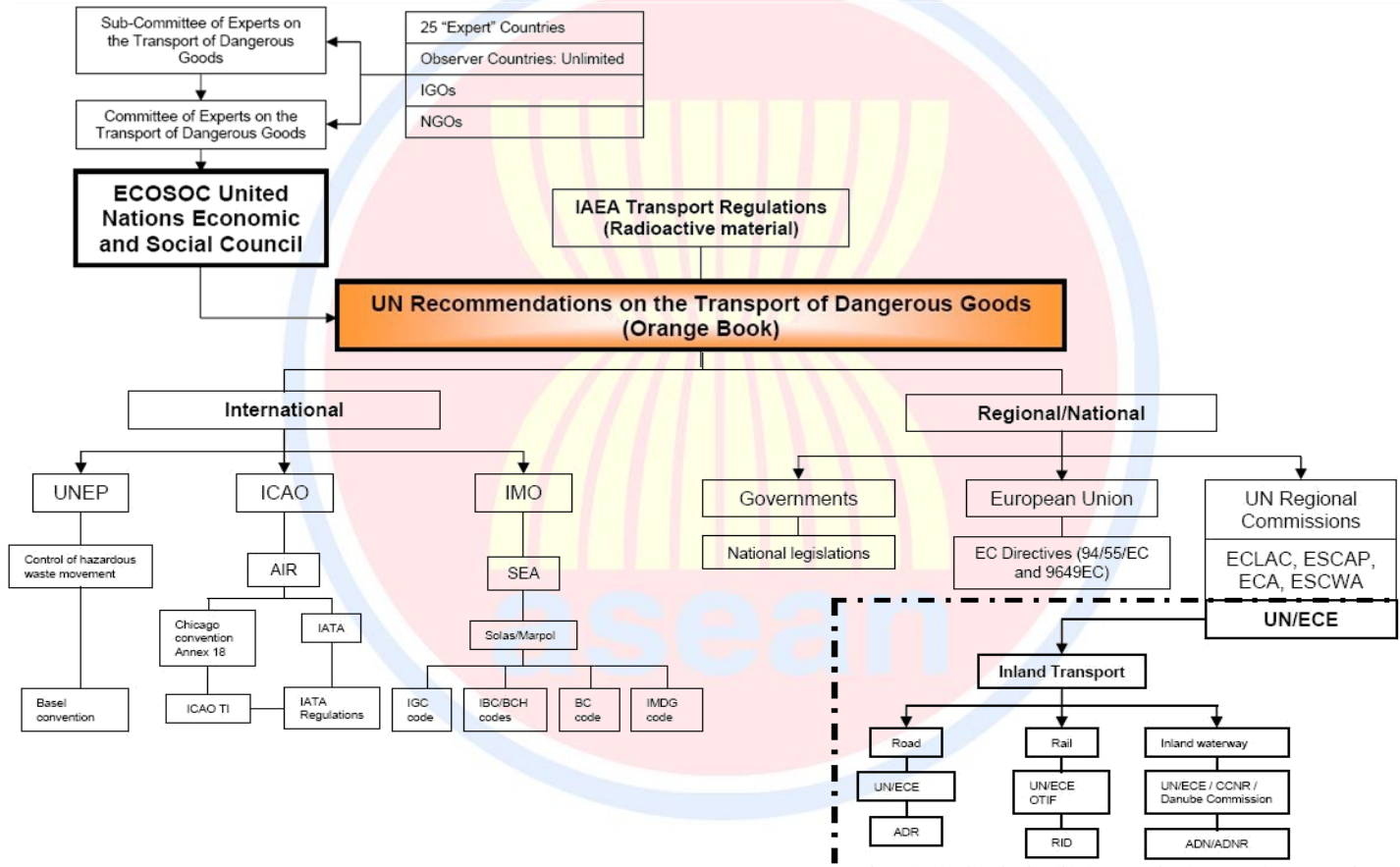


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## International Classification of Dangerous Goods





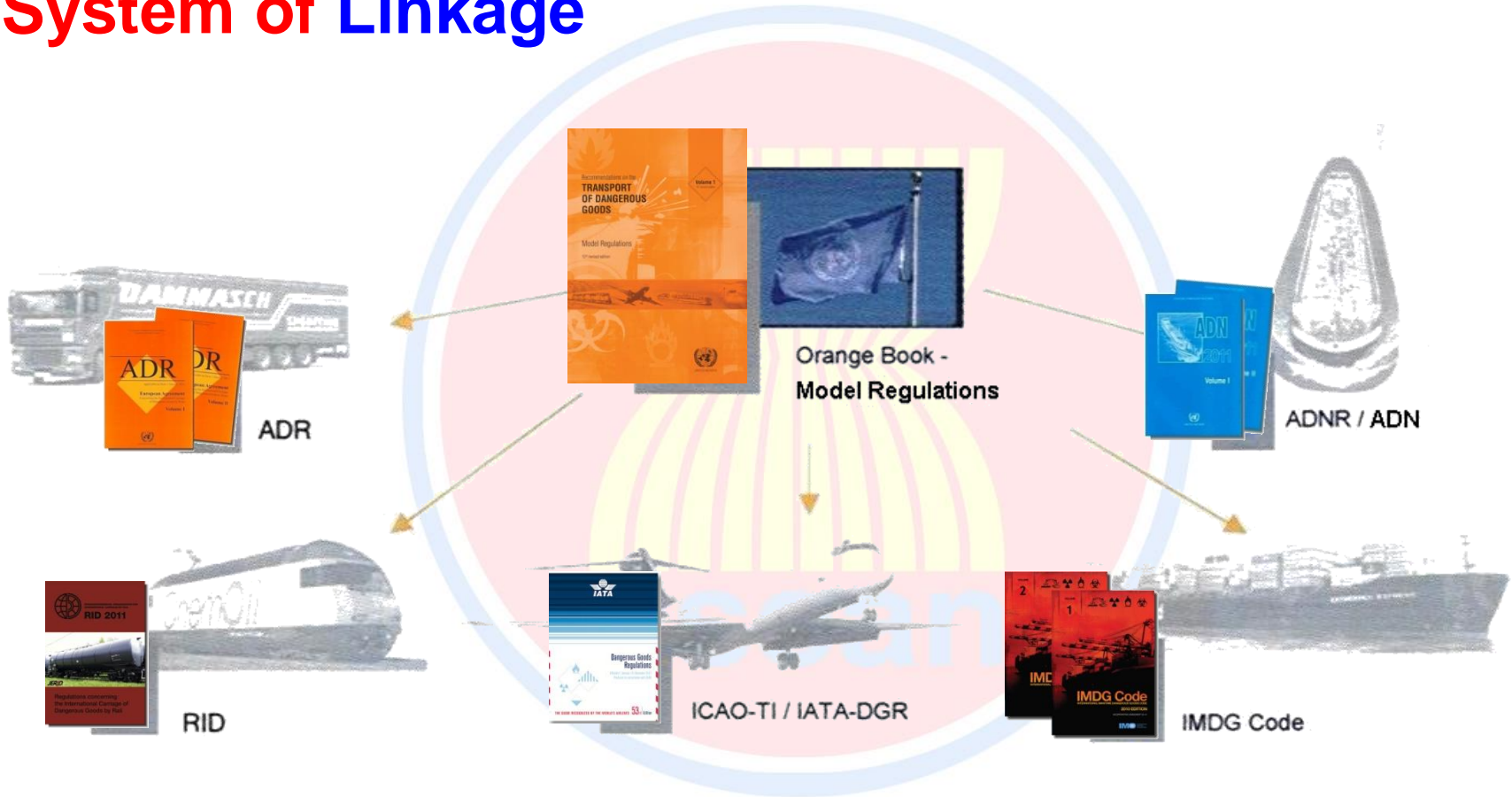
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### Abbreviation

<b>UNTDG</b>	: United Nations Recommendation on Transport of Dangerous Goods
<b>UNEP</b>	: United Nations Environment Programme
<b>ICAO</b>	: International Civil Aviation Organization
<b>ICAO TI</b>	: ICAO Technical Instructions
<b>IATA</b>	: International Air Transport Association
<b>IATA DGR</b>	: IATA Dangerous Goods Regulations
<b>IMO</b>	: International Maritime Organization
<b>IMDG Code</b>	: International Maritime Dangerous Goods Code
<b>UNECE</b>	: United Nations Economic Commission for Europe
<b>ADR</b>	: European Agreement concerning the International Carriage of Dangerous Goods by Road
<b>ADN</b>	: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
<b>ADNR</b>	: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterway on Rhine

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## System of Linkage





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## ASEAN Protocol 9



### PROTOCOL 9 DANGEROUS GOODS

The Governments of Brunei Darussalam, the Kingdom of Cambodia, the Republic of Indonesia, the Lao People’s Democratic Republic, Malaysia, the Union of Myanmar, the Republic of the Philippines, the Republic of Singapore, the Kingdom of Thailand and the Socialist Republic of Viet Nam, Member States of the Association of Southeast Asian Nations (hereinafter referred to as “Contracting Parties”);

RECALLING the ASEAN Framework Agreement on the Facilitation of Goods in Transit signed on 16 December 1998 in Hanoi, Viet Nam (hereinafter referred to as “the Agreement”);

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# Classification of Dangerous Goods

Dangerous goods shall be divided into the following classes:

- ❖ **Class 1** - Explosives
- ❖ **Class 2** - Gases
- ❖ **Class 3** - Flammable liquids
- ❖ **Class 4** - Flammable solids; substances liable to spontaneous combustion; substances which, in contact with water, emit flammable gases
- ❖ **Class 5** - Oxidizing substances and organic peroxides
- ❖ **Class 6** - Toxic and infectious substances
- ❖ **Class 7** - Radioactive material
- ❖ **Class 8** - Corrosive substances
- ❖ **Class 9** - Miscellaneous dangerous substances and articles

The numerical order of the classes and divisions is not that of the degree of danger.  
"Flammable" has the same meaning as "inflammable".

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## Hazard Classification & Hazard Communication

### CLASS 1: EXPLOSIVES



Division 1.1, 1.2 and 1.3  
 Division 1.4  
 Division 1.5  
 Division 1.6

### CLASS 2: GASES



Division 2.1  
Flammable gases  
 Division 2.2  
Non-flammable, non-toxic gases  
 Division 2.3  
Toxic gases

### CLASS 3: FLAMMABLE LIQUIDS



### CLASS 4: FLAMMABLE SOLIDS



Division 4.1  
Flammable solids  
 Division 4.2  
Substances liable to spontaneous combustion  
 Division 4.3  
Substances which in contact with water emit flammable gases

### CLASS 5: OXIDIZING SUBSTANCES AND ORGANIC PEROXIDES



Division 5.1  
Oxidizing substances  
 Division 5.2  
Organic peroxides

### CLASS 6: TOXIC AND INFECTIOUS SUBSTANCES



Division 6.1  
Toxic substances  
 Division 6.2  
Infectious substances

### CLASS 7: RADIOACTIVE MATERIALS



### CLASS 8: CORROSIVE SUBSTANCES



### CLASS 9: MISCELLANEOUS DANGEROUS SUBSTANCES AND ARTICLES



## Sustainable Human Resource Development in logistics services for ASEAN Member States

### Class 1: Explosives



- Division 1.1:** substances and articles which have a **mass explosion hazard**
- Division 1.2:** substances and articles which have a **projection hazard** but not a mass explosion hazard
- Division 1.3:** substances and articles which have a **fire hazard** and either a **minor blast hazard** or a **minor projection hazard** or both, but not a mass explosion hazard
- Division 1.4:** substances and articles which present **no significant hazard**
- Division 1.5:** **very insensitive substances** which have a **mass explosion hazard**
- Division 1.6:** **extremely insensitive articles** which do **not** have a **mass explosion hazard**

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### Class 1: Explosives



#### Examples:

Dynamite, Dry TNT, Black Powder, Propellant Explosives, Rocket Motors, Special Fireworks, Common Fireworks, Small Arms Ammunition, Ammonium Nitrate - Fuel Oil Mixtures

#### General Hazardous Properties:

Sensitive to heat and shock, Contamination could cause explosion, Thermal and mechanical potential



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### Class 2: Gases

A gas is a substance which:

- (a) at 50°C has a vapour pressure greater than 300 kPa; or
- (b) is completely gaseous at 20°C at a standard pressure of 101.3 kPa.

The transport condition of gas is described according to its physical state as:

1. **Compressed gas** - a gas which, when packaged under pressure for transport, is entirely gaseous at -50°C; this category includes all gases with a critical temperature less than or equal to -50°C;
2. **Liquefied gas** - a gas which, when packaged under pressure for transport, is partially liquid at temperature above -50°C. A distinction is made between:
  - **High pressure liquefied gas** – a gas with a critical temperature between -50°C and +65°C and
  - **Low pressure liquefied gas** – a gas with a critical temperature above +65°C



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### Class 2: Gases



- 3. Refrigerated liquefied gas** - a gas which, when packaged for transport, is made partially liquid because of its low temperature; or
- 4. Dissolved gas** – a gas which, when packaged under pressure for transport, is dissolved in liquid phase solvent.

Class 2 comprises compressed gases, liquefied gases, dissolved gases, refrigerated liquefied gas, mixtures of one or more gases with one or more vapours of substances of other classes, article charged a gas and **aerosols**.

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### Division 2.1: Flammable Gases



Gases which at 20°C and a standard pressure of 101.3 kPa:

1. **are ignitable** when in a **mixture of 13% or less** by volume **with air**; or
2. have a **flammable range** with air **of at least 12 percentage points** regardless of the lower flammable limit. Flammability should be determined by tests or calculation in accordance with methods adopted by the International Organization for Standardization (see ISO standard 10156:2010). Where insufficient data are available to use these methods, tests by a comparable method recognized by a national competent authority may be used.

**Examples:**

LPG, Propane, Hydrogen, Acetylene, Aerosols

**General Hazardous Properties:**

Flammable



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### Division 2.2: Non-flammable, non-toxic gases



Gases which:

1. are **Asphyxiant** - gases which dilute or **replace the oxygen** normally in the atmosphere; or
2. are **oxidizing** - gases which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does (means pure gas or gas mixtures with an oxidizing power greater than 23.5% as determined by a method specified in ISO 10156: 2010); or
3. do **not** come under the **other classes**.

**Examples:**

Nitrogen; any inert gas

**General Hazardous Properties:**

Non Flammable & Non Toxic



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### Division 2.3: Toxic gases



Gases which:

1. are **known to be so toxic** or **corrosive to humans** as to pose a **hazard to health**; or
2. are **presumed to be toxic** or **corrosive to humans** because they have a **LC50 (Lethal Concentration) value equal to or less than 5,000 ml/m<sup>3</sup> (ppm)**.

Note: Gases meeting the above criteria owing to their corrosivity are to be classified as toxic with a subsidiary corrosive risk.

**Examples:**

Coal Gas, Chlorine, Ammonia, Hydrogen Cyanide

**General Hazardous Properties:**

Poisonous

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### Precedence of gases



Gases and gas mixtures with hazards associated with more than one division take the following precedence:

1. **Division 2.3** takes precedence over **all other classes**;
2. **Division 2.1** takes precedence over **class 2.2**



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### Class 3: Flammable liquids



Flammable liquids are **liquids, or mixtures of liquids, or liquids containing solids in solution or suspension** (for example paints, varnishes, lacquers, etc., but not including substances otherwise classified on account of their other dangerous characteristics), which **give off a flammable vapour** at temperature of not more than **60°C**, closed cup test or not more than 65.6°C open-cup test, normally referred to as the **flashpoint**. This also includes:

1. Liquids offered for transport at temperatures at or above their flashpoint; and
2. Substances transported or offered for transport at elevated temperatures in a liquid state and give off a flammable vapour at a temperatures at or below the maximum transport temperature.

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### Class 3: Flammable liquids



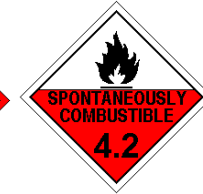
#### Hazard grouping based on flammability

Packing Group	Flashpoint in °C (closed cup test)	Initial boiling point in °C
I (high danger)	-	<35
II (medium danger)	<23	>35
III (low danger)	>23 to <60	>35



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### Class 4: Flammable solids



Class 4 is divided into 3 divisions as follows:-

**Division 4.1 Flammable solids:** Solids which, under conditions encountered in transport, are readily combustible or may cause or contribute to fire through friction; self-reactive substances (solids and liquids) which are liable to undergo a strongly exothermic reaction; solid desensitized explosives which may explode if not diluted sufficiently;

**Division 4.2 Substances liable to spontaneous combustion:** Substances which are liable to spontaneous heating under normal conditions encountered in transport, or to heating up in contact with air, and being then liable to catch fire;

**Division 4.3 Substances which, in contact with water, emit flammable gases:** Substances which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.

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### Division 4.1: Flammable solids



**Flammable solids means combustible solids and solids which may cause fire through friction.**

**Readily combustible solids means powdered, granular, or pasty substances which are dangerous if they can be easily ignited by brief contact with an ignition source** such as, a burning match, and if the flame spreads rapidly. The danger may come not only from the fire but also from toxic combustion products. Metal powders are especially dangerous because of the difficulty of extinguishing a fire, since normal extinguishing agents such as carbon dioxide or water can increase the hazard.

**Self-reactive substances are thermally unstable substances** liable to undergo a strongly exothermic decomposition even without participation of oxygen (air).



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### Division 4.1: Flammable solids



#### Examples:

Pyroxylin Plastics, Magnesium-Aluminum Powder, Safety Matches

**General Hazardous Properties:** Readily ignite and burn explosively, some spontaneously



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# Division 4.2: Substances liable to spontaneous combustion



Division 4.2 includes:

**1. Pyrophoric substances**, which are substances, including mixtures and solutions (liquid or solid), which even in **small quantities ignite within 5 minutes** of coming into **contact with air**. These are the Division 4.2 substances are the most liable to spontaneous combustion; and

**2. Self-heating substances**, which are substances, other than pyrophoric substances, which in **contact with air** without energy supply, are liable to **self-heating**. These substances will ignite only when in **large amounts (kilograms) and after long periods of time (hours or days)**.

**Examples:**

Sodium and Potassium Metals, Calcium Carbide

**General Hazardous Properties:**

Water reactive potential



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### Division 4.3: Substances which, in contact with water, emit flammable gases



The substances in this division are either **liquids or solids** which, by **interaction with water are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities**.

Certain substances, in contact with water, may emit flammable gases that can form explosive mixtures with air. Such mixtures are easily ignited by all ordinary sources of ignition, for example naked lights, sparking hand tools or unprotected light bulbs. The resulting blast wave and flames may endanger people and the environment.

**Examples:**

Phosphorus

**General Hazardous Properties:**

Toxic and corrosive potentials

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### Class 5: Oxidizing substances and organic peroxides



Class 5 is divided into two divisions as follows:

**Division 5.1 Oxidizing substances:** Substances which, while in themselves not necessarily combustible, may, **generally by yielding oxygen**, cause, or contribute to, the combustion of other material. Such substances may be contained in an article;

**Division 5.2 Organic peroxides :** Organic substances which contain the bivalent -O-O- structure and may be considered derivatives of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. **Organic peroxides are thermally unstable substances which may undergo exothermic self-accelerating decomposition.** In addition, they may have one or more of the following properties:

- be liable to explosive decomposition; burn rapidly; be sensitive to impact or friction;
- react dangerously with other substances; cause damage to the eyes.



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## Sustainable Human Resource Development in logistics services for ASEAN Member States

### Division 5.1: Oxidizing substances



**Oxidizing substances:** Substances which, while in themselves not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material. Such substances may be contained in an article;

**Oxidizing Solids:** Tests are performed to measure the potential for the solid substance to increase the burning rate or burning intensity of a combustible substance when the two are thoroughly mixed.

**Oxidizing Liquids:** A test is performed to measure the potential for a liquid substance to increase the burning rate or burning intensity of a combustible substance or for spontaneous ignition to occur when the two are thoroughly mixed.

**Examples:**

Ammonium Nitrate Fertilizer, Hydrogen Peroxide Solution

**General Hazardous Properties:**

Supply oxygen to support combustion of normally non-flammable materials



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### Division 5.2: Organic peroxides



**Organic peroxides are liable to exothermic decomposition at normal or elevated temperatures.** The decomposition can be initiated by heat, contact with impurities (such as acids, heavy-metal compounds, amines), friction or impact. The rate of decomposition increases with temperature and varies with the organic peroxide formulation. Decomposition may result in the evolution of harmful, or flammable, gases or vapours. **For certain organic peroxides the temperature should be controlled during transport.** Some organic peroxides may decompose explosively, particularly if confined. This characteristic may be modified by the addition of diluents or by the use of appropriate packagings. Many organic peroxides burn vigorously.

Contact of organic peroxides with the eyes is to be avoided. Some organic peroxides will cause serious injury to the cornea, even after brief contact, or will be corrosive to the skin.





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### Division 5.2: Organic peroxides



**Examples:**

**General Hazardous Properties:**

Benzoyl Peroxide, Peracetic Acid Solution  
Explosively sensitive to heat, shock, friction.  
Potentially toxic



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### Class 6: Toxic and Infectious substances



Class 6 is divided into two divisions as follows:

#### Division 6.1 Toxic substances

These are substances liable either to cause death or serious injury or to harm human health if swallowed or inhaled, or by skin contact.

#### Division 6.2 Infectious substances

These are substances known or reasonably expected to contain pathogens. Pathogens are defined as micro-organisms (including bacteria, viruses, rickettsiae, parasites, fungi) and other agents such as prions which can cause disease in humans or animals.

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# Division 6.1: Toxic substances



These are substances liable either to cause death or serious injury or to harm human health if swallowed or inhaled, or by skin contact.

### GROUPING CRITERIA FOR ADMINISTRATION THROUGH ORAL INGESTION, DERMAL CONTACT, INHALATION OF DUSTS AND MISTS

Packing Group	Oral Toxicity LD <sub>50</sub> (mg/kg)	Dermal Toxicity LD <sub>50</sub> (mg/kg)	Inhalation Toxicity by Dusts and Mists LC <sub>50</sub> (mg/l)
I	≤ 5	≤ 50	≤ 0.2
II	> 5 and ≤ 50	> 50 and ≤ 200	> 0.2 and ≤ 2.0
III*	> 50 and ≤ 300	> 200 and ≤ 1000	> 2.0 and ≤ 4.0

\*Tear gas substances shall be included in packing group II even if their toxicity data corresponds to packing group III values.



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### Division 6.1: Toxic substances



**Examples:**

Arsine, Hydrocyanic Acid, Phosgene Aniline,  
Arsenic, Methyl Bromide

**General Hazardous Properties:**

Harm from inhalation, ingestion, absorption



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### Division 6.2: Infectious substances



Infectious substances are substances which are known or are reasonably expected to contain pathogens. **Pathogens are defined as microorganisms (including bacteria, virus, rickettsiae, parasites, fungi) and other agents such as prions, which can cause disease in humans or animals.**

Infectious substances shall be classified in Division 6.2 and assigned to UN 2814, UN 2900, UN 3291 or UN 3373 as appropriate. Infectious substances are divided into the following categories.

**Category A: (UN 2814/UN 2900)** An infectious substance which is transported in a form that when exposure to it occurs, is capable of causing permanent disability, life threatening or fatal disease in otherwise healthy humans or animals.

**Category B: (UN 3373)** An infectious substance which does not meet the criteria for inclusion in Category A. Infectious substance in Category B shall be assigned to UN 3373.



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### Division 6.2: Infectious substances



**Examples:**

**General Hazardous Properties:**

Xylyl Bromide, Anthrax, Botulism, Rabies, Tetanus  
Harm from inhalation, ingestion, absorption



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### Class 7: Radioactive materials



Radioactive material means any material containing radio nuclides where both the activity concentration and the total activity in the consignment exceed the values specified in 2.7.2.2.1 - 2.7.2.2.6.

#### Examples:

Plutonium, Cobalt, Uranium, Uranium  
Hexafluoride

#### General Hazardous Properties:

Harm : Particulate - alpha and beta particles,  
Radiation - gamma rays internal and external



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### Class 8: Corrosive substances



Class 8 substances (corrosive substances) are substances which, by chemical reaction, will cause severe damage when in contact with living tissue, or, in the case of leakage, will materially damage, or even destroy, other goods or the means of transport.

#### Examples:

**Acids** : Hydrochloric Acid, Nitric Acid, Oleum, Sulfuric Acid

**Bases** : Caustic Soda, Caustic Potash

#### General Hazardous Properties:

Harm : Disintegration of tissues, external fuming potential, Oxidizing effect, Solaner potential





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### Class 8: Corrosive substances



Packing groups are assigned to corrosive substances in accordance with the following criteria:

- 1. Packing group I** is assigned to substances that cause full thickness destruction of intact skin tissue within an observation period of up to **60 minutes** starting after an exposure time of **3 minutes or less**.
- 2. Packing group II** is assigned to substances that cause full thickness destruction of intact skin tissue within an observation period of up to **14 days** starting after an exposure time of **more than 3 but not more than 60 minutes**.



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### Class 8: Corrosive substances



Packing groups are assigned to corrosive substances in accordance with the following criteria:

**3. Packing group III** is assigned to substances that:

- 1) cause full thickness destruction of intact skin tissue within an observation period of up to **14 days** starting after an exposure time of **more than 60 minutes but not more than 4 hours**; or
- 2) are judged not to cause full thickness destruction of intact skin tissue but which exhibit a corrosion rate on either steel or aluminium surfaces **exceeding 6.25 mm a year at a test temperature of 55°C** when tested on both materials.



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# Class 9: Miscellaneous dangerous substances and articles



Class 9 substances and articles (miscellaneous dangerous substances and articles) are substances and articles which, during transport present a danger not covered by other classes.

### The substances and articles of Class 9 are subdivided as follows:

- Environmentally hazardous substances (aquatic environment)  
(UN 3082 – Liquids, UN 3077 – Solids)
- Hazardous wastes
- Substances transported or offered for transport at elevated temperatures  
(UN 3257 – Liquids at or above 100°C and below its flashpoint, UN 3258 – Solids at or above 240 °C)
- Substances which, on inhalation as fine dust, may endanger health  
(ie. Blue/Brown/White Asbestos)



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# Class 9: Miscellaneous dangerous substances and articles



The substances and articles of Class 9 are subdivided as follows:

- Substances evolving flammable vapour
- Lithium batteries (UN 3090 and UN 3091 Lithium Metal Batteries & UN 3480 and UN 3481 Lithium Ion Batteries)
- Electric double layer capacitors (UN 3499)
- Live-saving appliances (& airbag inflators/modules & seat-belt pretensioner)
- Substances and articles which, in the event of fire, may form dioxins
- Genetically modified micro-organism (GMMOs) and genetically modified organisms (GMOs) (UN 3245)
- Other substances or articles presenting a danger during transport, but not meeting the definitions of another class



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### Primary Terms in UNTDG

- ❖ Class and Division designating the primary risks
- ❖ Secondary risk (sub-risk)
- ❖ UN Packing Group (PG I/PG II/PG III)
- ❖ UN number
- ❖ Proper Shipping Names
- ❖ Other labels in transport regulations



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## Sustainable Human Resource Development in logistics services for ASEAN Member States

### UN Packing Group (PG)

For packing purposes, **substances other than those of Classes 1, 2 and 7, division 5.2 and 6.2 and other than self-reactive substances of Division 4.1** are assigned to three packing groups in accordance with the degree of danger they present:

- ❖ **Packing group I: (PG I)** Substances presenting **high danger**
- ❖ **Packing group II: (PG II)** Substances presenting **medium danger**
- ❖ **Packing group III: (PG III)** Substances presenting **low danger**



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# UN Numbers and Proper Shipping Names (PSN)

Dangerous goods are assigned to UN numbers and proper shipping names according to their hazard classification and their compositions.

Entries in the Dangerous Good List are of the following four types

### (a) Single entries for well-defined substances or articles e.g.

UN 1090	ACETONE
UN 1194	ETHYL NITRITE SOLUTION

### (b) Generic entries for well-defined group of substances or articles e.g.

UN 1133	ADHESIVES
UN 1266	PERFUMERY PRODUCT
UN 2757	CARBAMATE PESTICIDE, SOLID, TOXIC
UN 3101	ORGANIC PEROXIDE, TYPE B, LIQUID



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# UN Numbers and Proper Shipping Names (PSN)

**(c) Specific n.o.s. entries covering a group of substances or articles of a particular chemical or technical nature e.g.**

UN 1477            NITRATES, INORGANIC, N.O.S. (not otherwise specified)

UN 1987            ALCOHOLS, N.O.S.

**(d) General n.o.s. entries covering a group of substances or articles meeting the criteria of one or more classes or divisions e.g.**

UN 1325            FLAMMABLE SOLID, ORGANIC, N.O.S.

UN 1993            FLAMMABLE LIQUID, N.O.S.





Japan-ASEAN Cooperation



## Sustainable Human Resource Development in logistics services for ASEAN Member States

### Precedence of hazard characteristics

These primary characteristics always take precedence:-

- ❖ Substances and article of class 1;
- ❖ Gases of Class 2;
- ❖ Liquid desensitized explosives of Class 3;
- ❖ Self-reactive substances and solid desensitized explosives of Division 4.1;
- ❖ Pyrophoric substances of Division 4.2;
- ❖ Substances of Division 5.2
- ❖ Substances of Division 6.1 with a packing group I inhalation toxicity
- ❖ Substances of Division 6.2
- ❖ Material of Class 7

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## Precedence of hazard characteristics

### 2.0.3.3 Precedence of hazards

Class or Division and Packing Group	4.2	4.3	5.1 I	5.1 II	5.1 III	6.1, I Dermal	6.1, I Oral	6.1 II	6.1 III	8, I Liquid	8, I Solid	8, II Liquid	8, II Solid	8, III Liquid	8, III Solid
3 I <sup>a</sup>		4.3				3	3	3	3	3	-	3	-	3	-
3 II <sup>a</sup>		4.3				3	3	3	3	8	-	3	-	3	-
3 III <sup>a</sup>		4.3				6.1	6.1	6.1	3 <sup>b</sup>	8	-	8	-	3	-
4.1 II <sup>a</sup>	4.2	4.3	5.1	4.1	4.1	6.1	6.1	4.1	4.1	-	8	-	4.1	-	4.1
4.1 III <sup>a</sup>	4.2	4.3	5.1	4.1	4.1	6.1	6.1	6.1	4.1	-	8	-	8	-	4.1
4.2 II		4.3	5.1	4.2	4.2	6.1	6.1	4.2	4.2	8	8	4.2	4.2	4.2	4.2
4.2 III		4.3	5.1	5.1	4.2	6.1	6.1	6.1	4.2	8	8	8	8	4.2	4.2
4.3 I			5.1	4.3	4.3	6.1	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
4.3 II			5.1	4.3	4.3	6.1	4.3	4.3	4.3	8	8	4.3	4.3	4.3	4.3
4.3 III			5.1	5.1	4.3	6.1	6.1	6.1	4.3	8	8	8	8	4.3	4.3
5.1 I						5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
5.1 II						6.1	5.1	5.1	5.1	8	8	5.1	5.1	5.1	5.1
5.1 III						6.1	6.1	6.1	5.1	8	8	8	8	5.1	5.1
6.1 I Dermal										8	6.1	6.1	6.1	6.1	6.1
6.1 I Oral										8	6.1	6.1	6.1	6.1	6.1
6.1 II Inhalation										8	6.1	6.1	6.1	6.1	6.1
6.1 II Dermal										8	6.1	8	6.1	6.1	6.1
6.1 II Oral										8	8	8	6.1	6.1	6.1
6.1 III										8	8	8	8	8	8

<sup>a</sup> Substances of Division 4.1 other than self-reactive substances and solid desensitized explosives and substances of Class 3 other than liquid desensitized explosives.

<sup>b</sup> 6.1 for pesticides.

- Denotes an impossible combination.

For hazards not shown in this table, see 2.0.3.

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# Display of Hazard Label and UN Numbers



- \* location of class or division number
- \*\* location of UN number

### Label

Size : 100 x 100 mm (Packagings)  
250 x 250 mm (Cargo Transport Unit)

### UN No.

Not less than 65 mm high



### UN No.

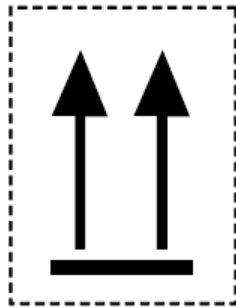
Orange rectangular panel  
(120 mm high x 300 mm wide with  
10 mm black border)

# Sustainable Human Resource Development in logistics services for ASEAN Member States

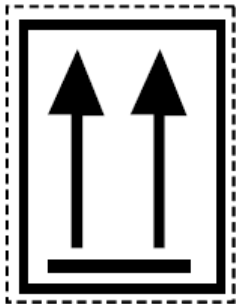
## Other Marking and Labelling



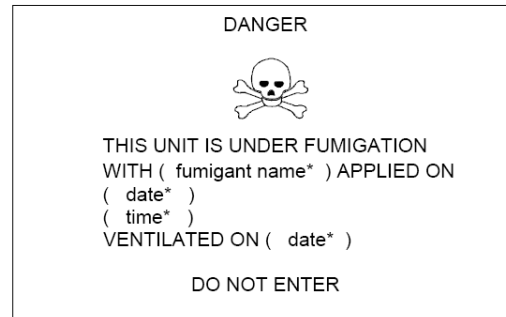
**The Environmentally Hazardous Substances**  
Size : 100 x 100 mm  
(Packagings)  
250 x 250 mm  
(Cargo Transport Unit)



**Orientation Arrow**  
ISO 780 (1997)



**Elevated Temperature Substances**  
Size : 250 mm each



\* Insert details as appropriate

Not less than 300 mm

**Fumigation Warning Mark**

Size : 250 mm high and 300 mm wide



Not less than 250 mm

Not less than 150 mm

**As Coolant/  
As Conditioner Mark**  
Size : 250 mm high  
and 150mm wide

# Sustainable Human Resource Development in logistics services for ASEAN Member States

## Multimodal Dangerous Goods Form

**MULTIMODAL DANGEROUS GOODS FORM**  
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1. Shipper/Consignor/Sender		2. Consignee/Receiver/End User	
3. Page 1 of _____ Pages		4. Shipper's reference	
5. Consignee		6. Freight Forwarder's reference	
7. Centre (to be completed by the carrier)			
<p><b>SHIPPER'S DECLARATION</b></p> <p>I hereby declare that the contents of this consignment are fully and accurately described below by the proper shipping name, and are classified, packaged, marked and labelled (where applicable) and are in all respects in proper condition for transport according to the applicable international and national governmental regulations.</p>			
8. This shipment is within the description prescribed for (delete non-applicable)		9. Additional handling information:	
PASSENGER AND CARGO AIRCRAFT ONLY			
10. Vessel / Flight no. and date		11. Port / place of loading	
12. Port / place of discharge		13. Destination	
14. Shippings marks			
* Number and kind of packages, description of goods		Gross mass (kg)	Net mass
			Cube (m <sup>3</sup> )
15. Container identification No./ vehicle registration No.		16. Seal number (s)	17. Container/vehicle size & type
			18. Tare (kg)
			19. Total gross mass (including tare) (kg)
<p><b>CONTAINER/VEHICLE PACKING CERTIFICATE</b></p> <p>I hereby declare that the goods described above have been packed/unpacked into the container/vehicle identified above in accordance with the applicable provisions **</p> <p>NOTE: BE COMPLETED AND SIGNED FOR ALL CONTAINER/VEHICLE LOADS BY PERSON RESPONSIBLE FOR PACKING/UNPACKING</p>		<p><b>RECEIVING ORGANISATION RECEIPT</b></p> <p>I received the above number of packages/containers/vehicles in apparent good order and condition and in accordance with the applicable provisions **</p>	
20. Name of consignor		21. Name of company (if different from shipper)	
Name / Street of declarant		Name / Street of declarant	
Place and date		Place and date	
Signature of declarant		Signature of declarant	
DRIVER'S SIGNATURE		Signature of declarant	

\*\* For the purposes of these Model Regulations, see 5.4.1.1



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## Dangerous Goods Handling International Classification of Dangerous Goods

Mr. Chalernsak Karnchanawarin