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Chapter 4-1: International Maritime Dangerous Goods Code (IMDG Code)

Objectives

- This chapter will cover the basic understanding on the applicable transport regulation by Sea (International Maritime Dangerous Goods Code : IMDG Code)
- The History, Principles and Layout of IMDG Code will be explained.
- It covers Basic Hazard Classification and Hazard Communication under IMDG Code.
- The core element of the IMDG Code will be explained on how to read the information in Dangerous Goods List (DGL)
- The Training Requirements under IMDG Code will be explained.

1. Introduction

1.1 The International Legal Framework of IMDG Code

Carriage of dangerous goods by sea is regulated in order to reasonably prevent injury to persons or damage to ships and their cargoes. Carriage of marine pollutants is primarily regulated to prevent harm to the marine environment. The objective of the IMDG Code is to enhance the safe carriage of dangerous goods while facilitating the free unrestricted movement of such goods and prevent pollution to the environment.

Over the years, many maritime countries have taken measures to regulate the transport of dangerous goods by sea. The various regulations, codes and practices, however, differed in their framework and, in particular, in the identification and labelling of such goods. Both the terminology used and the provisions for packaging and stowage varied from country to country and created difficulties for all directly or indirectly concerned with the transport of dangerous goods by sea.

The need for international regulation of the transport of dangerous goods by sea was recognized by the 1929 International Conference on Safety of Life at Sea (SOLAS), which recommended that rules on the subject have international effect. The classification of dangerous goods and certain general provisions concerning their transport in ships were adopted by the 1948 SOLAS Conference. This Conference also recommended further study with the object of developing international regulations.

Meanwhile, the Economic and Social Council of the United Nations had appointed an ad hoc 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 labelling of dangerous goods and with the transport documents required for such goods. This report, with subsequent modifications, offered a general framework to which existing regulations could be harmonized and within which they could be further developed. The primary goal aims at being world-wide uniformity for regulations concerning the transport of dangerous goods by sea as well as other modes of transport.

As a further step towards meeting the need for international rules governing the transport of dangerous goods in ships, the 1960 SOLAS Conference, in addition to laying down a general framework of provisions in chapter VII of the SOLAS Convention, invited IMO (Recommendation 56) to undertake a study with a view to establishing a unified international code for the transport of dangerous goods by sea. This study would be pursued in co-operation with the UN Committee of Experts and should take account of existing maritime practices and procedures. The Conference further recommended that the unified code be prepared by IMO and that it be adopted by the Governments that were Parties to the 1960 Convention.

To implement Recommendation 56, IMO's Maritime Safety Committee (MSC) appointed a working group drawn from those countries having considerable experience in the transport of dangerous goods by sea. Preliminary drafts for each class of substances, materials and articles were subsequently brought under close scrutiny by the working group to take into account throughout the practices and procedures of a number of maritime countries in order to make the Code as widely acceptable as possible. This new International Maritime Dangerous Goods (IMDG) Code was approved by the MSC and recommended to Governments by the Assembly of IMO in 1965.

During another SOLAS Conference held in 1974, chapter VII of the Convention remained essentially unchanged. Since that date, several amendments to chapter VII adopted by the MSC have entered into force. Although invoked by a footnote reference in regulation 1 of chapter VII, the IMDG Code itself had only recommendatory status until 31 December 2003.

At the International Conference on Marine Pollution, 1973, the need was recognized to preserve the marine environment. It was further recognized that negligent or accidental release of marine pollutants transported by sea in packaged form should be minimized. Consequently, provisions were established and adopted by the Conference, and are contained in Annex III of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). The Marine Environment Protection Committee (MEPC) decided in 1985 that Annex III should be implemented through the IMDG Code. This decision was also endorsed by the MSC in 1985. Since that date, several amendments to Annex III to MARPOL 73/78 have entered into force.

The UN Committee of Experts has continued to meet until the present day and its published "Recommendations on the Transport of Dangerous Goods" are updated biennially. In 1996, the MSC agreed that the IMDG Code should be reformatted consistent with the format of the UN Recommendations on the Transport of Dangerous Goods. The consistency in format of the UN Recommendations, the IMDG Code and other dangerous goods transport regulations is intended to enhance user-friendliness, compliance with the regulations, and the safe transport of dangerous goods.

In 2002, the MSC adopted amendments to SOLAS chapter VII to make the IMDG Code mandatory, which came into force on 1 January 2004. Since then, further amendments were adopted to facilitate user friendliness and promote uniform implementation of the Code. In addition, at its 90th session in May 2012, the MSC adopted amendment 36-12 to the mandatory IMDG Code, which is a complete consolidated and updated version of its text and which will enter into force on 1 January 2014 without any transitional period.

In order to keep the Code up to date from the maritime transport operational aspect, the MSC will continue to take into account technological developments, as well as changes to chemical classifications and the related consignment provisions that primarily concern the shipper/consignor. The two-year periodicity of amendments to the UN Recommendations on Transport of Dangerous Goods will also provide the source of most future updating of the IMDG Code.

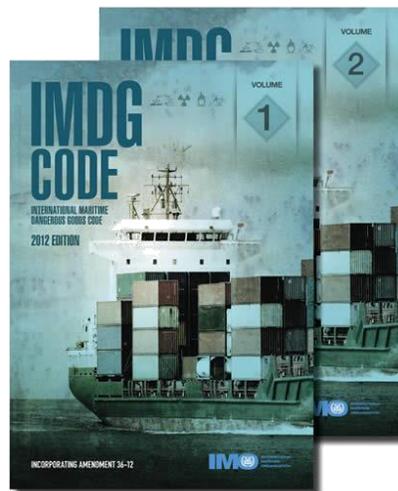


Figure 4-1-1: International Maritime Dangerous Goods Code (IMDG Code) 2012 Edition (Incorporating Amendment 36-12)

1.2 Principles of IMDG Code

The IMDG Code is basically designed to cover comprehensive range of dangerous goods handling aspects in maritime transport. Those include the specific handling issues as below:-

- **Hazard Classification:** Dangerous goods are grouped together based on the hazards they present in transport), proper packaging
- **Proper Packing:** Dangerous goods are contained in packagings/tanks which are of appropriate strength and which will prevent the goods escaping (spill/leakage)
- **Hazard Communication:** Hazard warning labels and other identifying marks shall be used to identify dangerous goods in transport.
- **Documentation:** Standard documentation is required to be provided when dangerous goods are being transported.
- **Segregation:** Principles are laid down for ensuring that those dangerous goods which will react dangerously together are kept apart for the safety reason.
- **Stowage:** Principles are laid down for where to place dangerous goods on board ship to ensure safe transport.
- **Emergency Response:** Emergency response advice is provided for dangerous goods involved in a fire or spillage on board ship.

Updating IMDG Code

The IMDG Code is an international regulation which is continuously evolving and is updated every two years to take account of:

- new dangerous goods which have to be included;
- new technology and new methods of working with/handling dangerous goods
- safety concerns which arise as a result of human experience.
- each version of the Code is given an Amendment Number to signify how many times it has been updated. This number appears at the bottom of each page together with the year of amendment.
- current Amendment 36-12 must be used.

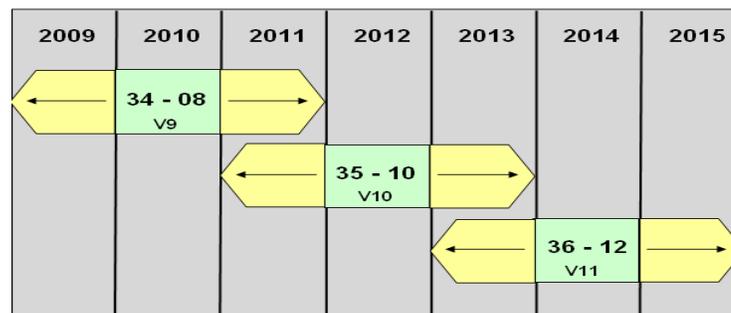


Figure 4-1-2: Updates and years of implementation of IMDG Code and its amendments

Each Amendment is valid for up to three years. There are alternating years for implementation. In January of the yellow years, a new Amendment is published and can be used immediately, subject to the timing of National Competent Authority adoption. During the yellow years, the preceding Amendment can also be used, so it is a transition year. In the green years, only the current Amendment may be used.

1.3 Layout of IMDG Code

The IMDG Code has been designed in an easy-to-use structure. It contains Volume 1, Volume 2 and a supplement. Each of the text contains specific part or portion of information. The central core of the text lies in the Dangerous Goods Lists (DGL) which is in the Part 3 under the Volume 2. In a later part of this document, the readers will be guided as a step-by-step approach on how to use the IMDG code.

Volume 1 (Part 1-2, 4-7 of the Code) contains the following:

Part 1: General provisions, definitions and training

Part 2: Classification

Part 4: Packing and Tank Provision

Part 5: Consignment Procedures

Part 6: Construction and Testing of Packaging, Intermediate Bulk Containers (IBCs), Large Packaging, Portable Tanks, Multiple-Element Gas Containers (MEGC'S) and Road Tank Vehicles

Part 7: Requirements Concerning Transport Operations

Volume 2 (Part 3 and the Appendices) contains the following:

Part 3: Dangerous Goods List (DGL) and Limited Quantities Exceptions

The DGL is the central core of the IMDG Code and presents information on the transport requirements for all dangerous goods in a coded form

Appendix A: List of Generic and N.O.S. Proper Shipping Names

Appendix B: Glossary of terms

Alphabetical Index

The Supplement contains the following texts related to the Code:

- Emergency Response Procedures for Ships Carrying Dangerous Goods ;
- Medical First Aid Guide (MFAG);
- Reporting Procedures;
- IMO/ILO/ECE Guidelines for Packing Cargo Transport Units;
- Safe Use of Pesticides in Ships
- International Code for the Carriage of Packaged Irradiate Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on board ships.

1.4 IMDG Code Dangerous Goods Classification System

The purpose of the IMDG Code's Dangerous Goods classification system is to distinguish between goods which are considered to be dangerous for maritime transport and those which are not. It also identifies the dangers which are presented by dangerous goods in maritime transport and correct measures to be properly taken to enable these goods to be transported safely without risk to persons or property (both within the port and on the ship).

Dangerous goods are classified into one of 9 classes which all have different properties. The way in which different classes of dangerous goods are handled in transport will depend upon these properties and the hazards presented and effects. For more details of dangerous goods classification, please refer to Chapter 2: International Classification of Dangerous Goods since the classification criteria under IMDG Code and UN Model recommendations are mostly similar and interrelated.

9 Classes of Dangerous Goods

As a quick review in specific for maritime transport, dangerous goods are classified into 9 Classes as follows:-

Substances (including mixtures and solutions) and articles subject to the provisions of this Code are assigned to one of the classes 1-9 according to the hazard or the most predominant of the hazards they present. Some of these classes are subdivided into divisions. These classes or divisions are as listed below:

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

Class 2: Gases

Class 2.1: flammable gases

Class 2.2: non-flammable, non-toxic gases

Class 2.3: toxic gases

Class 3: Flammable liquids

Class 4: Flammable solids; substances liable to spontaneous combustion; substances which, in contact with water, emit flammable gases

Class 4.1: flammable solids, self-reactive substances and solid desensitized explosives

Class 4.2: substances liable to spontaneous combustion

Class 4.3: substances which, in contact with water, emit flammable gases

Class 5: Oxidizing substances and organic peroxides

Class 5.1: oxidizing substances

Class 5.2: organic peroxides

Class 6: Toxic and infectious substances

Class 6.1: toxic substances

Class 6.2: 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.

These 9 hazard classes have been established internationally by a United Nations (UN) committee to ensure that all modes of transport (road, rail, air and sea) classify dangerous goods in the same way.

Marine Pollutant

Marine pollutants means substances which are subject to the provisions of Annex III of MARPOL 73/78, as amended.

The Index indicates by the symbol P in the column headed MP those substances, materials and articles that are identified as marine pollutants.

Marine pollutants shall be transported under the appropriate entry according to their properties if they fall within the criteria of any of the classes 1 to 8. If they do not fall within the criteria of any of these classes, they shall be transported under the entry: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., UN 3077 or ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., UN 3082, as appropriate, unless there is a specific entry in class 9.

Column 4 of the Dangerous Goods List also provides information on marine pollutants using the symbol P.

1.5 UN Number & Proper Shipping Names

Within each of the 9 hazard classes, dangerous goods are assigned to UN Numbers (A four-digit number known as the UN Number which is preceded by the letters UN) and Proper Shipping Names (PSN) according to their hazard classification and their composition. These 9 hazard classes have been established internationally by a United Nations (UN) committee to ensure that all modes of transport (road, rail, air and sea) classify dangerous goods in the same way.

For example, kerosene is identified in the IMDG Code by its UN Number UN 1223 and the PSN Kerosene.

Together the UN Number and PSN uniquely identify dangerous goods to enable rapid and precise identification during transport to ensure the correct handling, stowage, segregation etc, and in the event of an emergency, ensure that the correct procedures are followed.

Dangerous goods commonly transported are listed in the Dangerous Goods List (DGL). Where an article or substance is specifically listed by name, it shall be identified in transport by the Proper Shipping Name in the Dangerous Goods List. Such substances may contain technical impurities (for example those deriving from the production process) or additives for stability or other purposes that do not affect their classification. However, a substance listed by name containing technical impurities or additives for stability or other purposes affecting its classification shall be considered a mixture or solution. For dangerous goods not specifically listed by name, "generic" or "not otherwise specified" entries are provided to identify the article or substance in transport.

Each entry in the Dangerous Goods List is assigned a UN Number. This list also contains relevant information for each entry, such as hazard class, subsidiary risk(s) (if any), packing group (where assigned), packing and tank transport provisions, EmS, segregation and stowage, properties and observations, etc. Please refer to the next section of more detailed explanation of Dangerous Goods List.

1.6 Understanding the Dangerous Goods List (DGL)

The Dangerous Goods List (DGL) lists many of the dangerous goods most commonly transported. The list includes entries for specific chemical substances and articles and generic or "not otherwise specified" entries. Since it is not practical to include a separate entry for every chemical substance or article of commercial importance specifically by name, especially names for mixtures and solutions of various chemical constituents and concentrations, the Dangerous Goods List also includes generic or "not otherwise specified" names (e.g. EXTRACTS, FLAVOURING, LIQUID, UN 1197 or FLAMMABLE LIQUID, N.O.S., UN 1993). On this basis, the Dangerous Goods List is intended to include an appropriate name or entry for any dangerous good which may be transported.

Where a dangerous good is specifically listed by name in the Dangerous Goods List, it shall be transported in accordance with the provisions in the List which are appropriate for that dangerous good. A generic or "not otherwise specified" entry may be used to permit the transport of substances, materials or articles which do not appear specifically by name in the Dangerous Goods List. Such a dangerous good may be transported only after its dangerous properties have been determined. Dangerous goods shall be classified according to the class definitions, tests and criteria. The name which most appropriately describes the dangerous goods shall be used. Only when the specific name of the dangerous goods does not appear in the Dangerous Goods List or the associated primary or subsidiary hazards assigned to it are not appropriate may a generic or "not otherwise specified" name be used. The classification shall be made by the shipper/consignor or by the appropriate competent authority where so specified in the Code. Once the class of the dangerous good has been so established, all conditions for transport, as provided in this Code, shall be met. Any dangerous good having or suspected of having explosive characteristics shall first be considered for inclusion in class 1. Some collective entries may be of the generic or "not otherwise specified" type provided that the Code contains provisions ensuring safety, both by excluding extremely dangerous goods from normal transport and by covering all subsidiary risks inherent in some goods.

Structure of Dangerous Goods List (DGL)

The DGL is presented across 2 pages of the IMDG Code and is divided into 18 columns for each individual dangerous good listed. Much of the information contained in the DGL is coded to make it easier to present in a table. The DGL is arranged in UN Number order; column 1 and column 18 contains the UN Number. To look up an entry, the readers just need to have the UN Number. However, dangerous goods can also be searched using the Proper Shipping Names (PSN). Therefore, if the readers do not have the UN Number but have the PSN, you can find its associated UN Number by looking at the alphabetical index at the back of Volume 2 of IMDG Code textbook.

Column 1 – UN Number

Contains the United Nations Number assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods (UN List).

Column 2 – Proper Shipping Name (PSN)

Contains the Proper Shipping Names in upper case characters which may be followed by additional descriptive text in lower-case characters.

Column 3 – Class or Division

Contains the class and, in the case of class 1, the division and compatibility group.

Column 4 – Subsidiary Risk(s)

Contains the class number(s) of any subsidiary risk(s) which have been identified by applying the classification system described in part 2. This column also identifies a dangerous good as a marine pollutant as follows:

P - Marine pollutant: a non-exhaustive list of known marine pollutants, based on previous criteria and assignment

Column 5 – Packing Group

Contains the packing group number (i.e., I, II or III) where assigned to the substance or article. If more than one packing group is indicated for the entry, the packing group of the substance or formulation to be transported shall be determined, based on its properties, through application of the hazard grouping criteria.

Column 6 – Special Provisions

Contains a number referring to any special provision(s) indicated in chapter 3.3.

Column 7a – Limited Quantities

Provides the maximum quantity per inner packaging.

Column 7b – Excepted Quantities

Provides a code which can be referenced to determine the maximum quantity per inner and outer packaging.

Column 8 – Packing Instructions

Contains alpha-numeric codes which refer to the relevant packing instruction(s). The packing instructions indicate the packagings (including large packagings) which may be used for the transport of substances and articles.

Column 9 – Special Packing Provisions

Contains special packing provisions. The special packing provisions indicate the packagings (including large packagings).

Column 10 – IBC Packing Instructions

Contains alpha-numeric codes that refer to the relevant IBC instruction, which indicates the type of IBC that shall be used for the transport of the substance under reference.

Column 11 – IBC Special Provisions

Contains an alpha-numeric code, including the letter "B", which refers to special packing provisions applicable to the use of packing instructions bearing the code "IBC".

Column 12 – IMO Tank Instructions

[Reserved] This column is no longer used but used to apply to IMO portable tanks and road tank vehicles.

Column 13 – UN Tank and Bulk Container Instructions

Contains T codes applicable to the transport of dangerous goods in portable tanks and road tank vehicles.

When a T code is not provided in this column, it means that the dangerous goods are not authorized for transport in tanks unless specifically approved by the competent authority.

Column 14 – Tank Special Provisions

Contains TP notes applicable to the transport of dangerous goods in portable tanks and road tank vehicles. The TP notes specified in this column apply to the portable tanks specified in column 13.

Column 15 – EmS

Refers to the relevant emergency schedules for FIRE and SPILLAGE in "The EmS Guide - Emergency Response Procedures for Ships Carrying Dangerous Goods".

The first EmS code refers to the relevant Fire Schedule (e.g., Fire Schedule Alfa "F-A" General Fire Schedule).

The second EmS code refers to the relevant Spillage Schedule (e.g., Spillage Schedule Alfa "S-A" Toxic Substances).

Underlined EmS codes (special cases) indicate a substance, material or article for which additional advice is given in the emergency response procedures. For dangerous goods offered for transport under N.O.S. entries or other generic entries, the most relevant emergency response procedures may vary with the properties of the hazardous constituents. As a consequence, shippers may have to declare different EmS codes from those indicated, if, to their knowledge, such codes are more appropriate. The provisions in this column are not mandatory.

Column 16 – Stowage and Segregation

Contains the stowage and segregation provisions as prescribed in part 7.

Column 17 – Properties and Observations

Contains properties of and observations on the dangerous goods listed. The provisions in this column are not mandatory.

Properties of most gases include an indication of its density in relation to air. The figures in brackets give the density relative to air.

1. "lighter than air" when the vapour density is down to half that of air;
2. "much lighter than air" when the vapour density is less than half that of air;
3. "heavier than air" when the vapour density is up to twice that of air; and
4. "much heavier than air" when the vapour density is more than twice that of air.

The ease and extent to which different liquids mix with water varies greatly and most entries have included an indication of miscibility. In these cases "miscible with water" normally means capable of being mixed with water in all proportions to form a completely homogeneous liquid.

Column 18 – UN Number

Contains the United Nations Number for ease of reference across both pages of the printed book.

1.7 Marking, Placarding and Labelling

Hazard Labels

Each of the hazard classes are also identified by labels as follows:



Figure 4-1-3: 9 Classes of Dangerous Goods Classification

Placarding and Marking of Cargo Transport Units

- 1) Enlarged labels (placards) and marks and signs shall be affixed to the exterior surfaces of a cargo transport unit to provide a warning that the contents of the unit are dangerous goods and present risks, unless the labels and/or marks affixed to the packages are clearly visible from the exterior of the cargo transport unit;
- 2) The methods of placarding and marking on cargo transport units shall be such that this information will still be identifiable on cargo transport units surviving at least three months' immersion in the sea. In considering suitable marking methods, account shall be taken of the ease with which the surface of the cargo transport unit can be marked; and
- 3) all placards, orange panels, marks and signs shall be removed from cargo transport units or masked as soon as both the dangerous goods or their residues which led to the application of those placards, orange panels, marks or signs are discharged.

4) A placard shall:

(i) be not less than 250 mm by 250 mm, with a line running 12.5 mm inside the edge and parallel with it. In the upper half of the placard the line shall have the same colour as the symbol and in the lower half it shall have the same colour as the figure in the bottom corner;

(ii) correspond to the label for the class of the dangerous goods in question with respect to colour and symbol; and

(iii) display the number of the class or division (and, for goods in class 1, the compatibility group letter) of the dangerous goods in question for the corresponding label, in digits not less than 25 mm high.

Display of Proper Shipping Name

The Proper Shipping Name of the contents shall be durably marked on at least both sides of:

1) tank cargo transport units containing dangerous goods;

2) bulk containers containing dangerous goods; or

3) any other cargo transport unit containing packaged dangerous goods of a single commodity for which no placard, UN Number or marine pollutant mark is required. Alternatively, the UN Number may be displayed.

The Proper Shipping Name for the goods shall be displayed in characters not less than 65 mm high. The Proper Shipping Name shall be of contrasting colour with the background.

Display of UN Numbers

The UN Number shall be displayed on consignments of:

1) solids, liquids or gases transported in tank cargo transport units, including on each compartment of a multi-compartment tank cargo transport unit;

2) packaged dangerous goods loaded in excess of 4000 kg gross mass, to which only one UN Number has been assigned and which are the only dangerous goods in the cargo transport unit

3) solid dangerous goods in bulk containers.

The UN Number for the goods shall be displayed in black digits not less than 65 mm high, either:

(i) against a white background in the area below the pictorial symbol and above the class number and the compatibility group letter in a manner that does not obscure or detract from the other required label elements

(ii) on an orange rectangular panel not less than 120 mm high and 300 mm wide, with a 10 mm black border, to be placed immediately adjacent to each placard or marine pollutant mark. When no placard or marine pollutant mark is required, the UN Number shall be displayed immediately adjacent to the Proper Shipping Name.

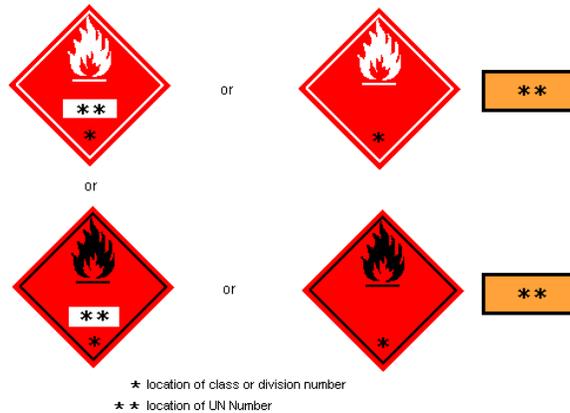


Figure 4-1-4: Example of Display of UN Numbers

Elevated temperature substances

Cargo transport units containing a substance that is transported or offered for transport in a liquid state at a temperature equal to or exceeding 100°C or in a solid state at a temperature equal to or exceeding 240°C shall bear on each side and on each end the mark shown in the figure. The triangular shaped mark shall have sides of at least 250 mm and shall be shown in red.

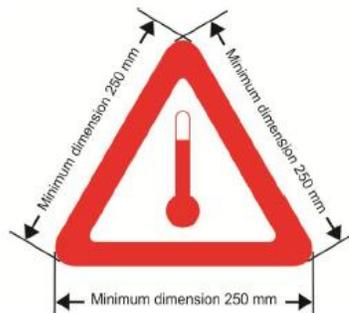


Figure 4-1-5: Marking for transport at elevated temperature

In addition to the elevated temperature mark, the maximum temperature of the substance expected to be reached during transport shall be durably marked on both sides of the portable tank or insulation jacket, immediately adjacent to the elevated temperature mark, in characters at least 100 mm high.

Marine pollutant mark

Cargo transport units containing marine pollutants shall clearly display the marine pollutant mark, even if the cargo transport unit contains packages not required to bear the marine pollutant mark. The mark shall conform to the specifications given in the IMDG Code regulations, and shall have minimum dimensions of 250 mm x 250 mm.



Figure 4-1-6: Marking for marine pollutant

Limited quantities

Cargo transport units containing dangerous goods packed in limited quantities shall be placarded and marked.

1.8 Multimodal Dangerous Goods Form

Based on the similar template and format of multimodal dangerous goods form of UN Model regulations stated in the Chapter 2, the given guidance can also be applied in preparation of the multimodal dangerous goods form or shipper's dangerous goods declaration. Therefore it is highly recommended that the readers go through all the details in Chapter 2 in order to prepare dangerous goods declaration document.

1.9 Training Requirements

In the 2002f edition of the IMDG Code, training was introduced for the first time.

The IMO Member Governments recognized that the safe transport of dangerous goods by sea is dependent upon the appreciation, by all persons involved, of the risks involved and on a detailed understanding of the IMDG Code requirements.

The training requirements became mandatory with Amendment 34-08.

The highlight of IMDG Code is how to understand Dangerous Goods List (DGL) which is central core information in the IMDG Code. Nevertheless, there is a large number of the information from the IMDG Code textbooks which are too specific to be summarized in this Chapter. Therefore by reading this guidance document, there is no possible way that all specific rules of handling specific hazards of dangerous goods are fully covered. It remains highly necessary that the readers refer to the full text of IMDG Code for detailed working references especially when handling the international transport of dangerous goods by sea on a case by case basis.

References

1. International Maritime Organization (IMO) (2012) IMDG Code International Maritime Dangerous Goods Code 2012 Edition: Volume I, II and Supplement Incorporating Amendment 36-12, United Kingdom: CPI Books Limited
2. <http://www.imdgsupport.com/index.asp>