

THE IMDG CODE



A GUIDE
FOR SHIPPERS

Preface

This guide is intended to be read alongside the relevant shipping regulations, by persons who have received the pre-requisite training.

Whilst every care has been taken in preparation and we believe the contents to be correct, we do not warrant the accuracy of the information provided.

Further advice and the clarification of provisions may be obtained from the team at EcoStar Environmental Ltd:

01724 732138

info@ecostarenvironmental.co.uk

For details of our 24/7 advice service, dangerous goods consultancy and online dangerous goods training, please see our website:

www.ecostarenvironmental.co.uk

From our website, we invite you to sign up for our newsletter, in order to be informed of the latest dangerous goods updates.



Version 2. © 2019 EcoStar Environmental Ltd.

Table of Contents

Introduction	6
Applicability of the IMDG Code	7
Domestic law	7
Applicability of other regulations	7
Principles of classification	9
Classes	9
UN Numbers and Proper Shipping Names	10
Packing Groups	10
Mixtures and solutions	12
The Dangerous Goods List	12
Class 1: Explosives	14
Hazard Divisions	14
Division 1.1 - mass explosion hazard	15
Division 1.2 - major projectile hazard	15
Division 1.3 - major fire hazard	16
Division 1.4 - no significant hazard	16
Division 1.5 - very insensitive substances having a major explosion hazard	17
Division 1.6 - extremely insensitive articles with no mass explosion hazard	18
Compatibility Groups	18
Classification	19
Class 2: gases	20
Class 3: flammable liquids	21
Class 4: flammable solids e.t.c.	22
Class 4.1:	22
Flammable solids	22
Self-reactive substances	23
Solid desensitised explosives	23
Polymerising substances	24
Class 4.2: substances liable to spontaneous combustion	25
Class 4.3: substances which, in contact with water, emit flammable gas	25
Class 5: oxidising substances and organic peroxides	27
Class 5.1: oxidising substances	27
Class 5.2: organic peroxides	27
Class 6: toxic and infectious substances	29
Class 6.1: toxic substances	29
Class 6.2: infectious substances	30
Clinical waste: multimodal considerations	30
Class 7: radioactive material	31
Class 8: corrosive substances	33

Class 9: miscellaneous dangerous substances and articles	34
Marine Pollutants	35
Waste classification	37
“UN tested” packagings	38
The Limited Quantity provisions	41
Limited Quantity vs. Excepted Quantity packages	43
Intermediate Bulk Containers (IBCs)	45
Package marks and labels	47
Labels	47
Marks	48
The UN number and proper shipping name	48
Orientation arrows	48
Marine pollutant/environmentally hazardous substance marks	49
Seawater immersion	49
IBCs and large packagings	50
Overpacks	50
Tanks	52
UN portable tanks: design approval and testing requirements	52
Offshore portable tanks	53
IMO tanks	53
Road tank vehicles: long international voyages	55
Road tank vehicles: short international voyages	55
Multi-Element Gas Containers (MEGCs)	57
What are MEGCs?	57
Construction and testing of MEGCs	57
Permitted use of MEGCs	58
The CSC	59
Loading and stowage	61
The CTU Code	61
General considerations	61
Segregation	62
Loading	62
Securing	64
Segregation	66
Step 1: identify whether the segregation provisions apply	66
Step 2: general segregation provisions	66
Step 3: UN number entry specific segregation requirements	67
Step 4: additional provisions not listed in the IMDG Code	68
Multimodal requirements	68
CTU marks and placards	69
Limited quantity goods	69
Limited quantity goods and other dangerous goods	69
Full placarding requirements	69

Format and responsibility	70
Multimodal considerations: vehicles carrying packages by road	71
Tank marking and placarding	72
Format	72
Multimodal considerations	73
Documentation	74
Supplementing the proper shipping name and dangerous goods description	74
Shipper's declaration	76
Container/vehicle packing certificate	76
Multimodal Requirements	77
Stowage categories	79
General stowage provisions	79
Limited quantity goods	79
Why is this important to shippers?	79
49 CFR: the USA HazMat regulations	81
The applicability of international standards in 49 CFR	81
Marine pollutants	81
Combustible liquids	82
Additional documentation requirements	82

Introduction

As a general principle, dangerous goods can be defined as articles, substances, or mixtures of substances; possessing an inherent hazard or hazards, that pose a risk to health, safety, property or the environment, and which are shown in the dangerous goods list of the International Maritime Dangerous Goods (IMDG) Code or are classified in accordance with the IMDG Code.

The objective of the IMDG Code is to ensure the "safe carriage of dangerous goods whilst facilitating the free" ... and... "unrestricted movement of such goods and prevent pollution to the environment".

The IMDG Code is applicable internationally and amplifies the requirements of two important international conventions.

1. The International Convention for the Safety of Life at Sea, 1974, (SOLAS), as amended, specifically Chapter VII, the mandatory provisions governing the carriage of dangerous goods in packaged form or in solid form in bulk.
2. The International Convention for the Prevention of Pollution from Ships, 1973, (MARPOL) as modified, which deals with the prevention of marine pollution and includes in Annex III, the mandatory provisions for the prevention of pollution by substances carried in packaged form by sea.

The IMDG Code is produced by the Maritime Safety Committee (MSC) of the International Maritime Organisation (IMO), a United Nations Organisation based in London, UK.

The IMDG Code in current form is formatted in accordance with the UN Recommendations on the Transport of Dangerous Goods, also known as the "UN Model Regulations" or the "Orange Book" on account of the colour of the publication.

The IMDG Code is revised every two years in accordance with the revision schedule of the UN Model Regulations.

When each revision is introduced, the first year is seen as voluntary. During this year either the previous version, which is still legally mandatory, can be used, or the new version can be applied voluntarily. The following year the new version is mandatory.

Corrigenda, which are corrections to the text agreed after publication, for the IMDG Code, are available on the IMO Website.

Applicability of the IMDG Code

The IMDG Code applies to all ships carrying dangerous goods to which SOLAS applies.

These requirements are summarised in IMDG 1.1.1.

Not all parts of the IMDG Code are mandatory, but it is usually observed as best practice to comply with all requirements.

The provisions of the IMDG Code that are only recommendations rather than mandatory requirements are summarised in IMDG 1.1.1.5.

Domestic law

In the UK, the requirements of the IMDG Code are applied and given the force of law through The Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1997.

Applicability of other regulations

For the transport of dangerous good via other modes, such as by road or air, there are other regulations, also published by the UN, which must be observed.

For example; the European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR) for road transport and the International Civil Aviation Organisation's Technical Instructions and the International Air Transport Association's Dangerous Goods Regulations for air transport.

This guide does not cover the requirements of those regulations, but it is important to note that there are other regulations, for other modes of transport, that must be observed for multi-modal journeys.

Principles of classification

Classes

Substances, mixtures of substances and articles are tested and assigned to one or more "classes" based on the hazard or hazards they present.

There are nine hazard classes.

Class 1:	Explosives
Class 2.1:	Flammable gases
Class 2.2:	Non-flammable, non-toxic gases
Class 2.3:	Toxic gases
Class 3:	Flammable liquids
Class 4.1:	Flammable solids, self-reactive substances, solid desensitised explosives and polymerising substances
Class 4.2:	Substances liable to spontaneous combustion
Class 4.3:	Substances which, in contact with water, emit flammable gases
Class 5.1:	Oxidising substances
Class 5.2:	Organic peroxides
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

Some classes are sub-divided and goods can be assigned more than one class if they exhibit additional hazards.

However, one class will always take precedence.

Goods with multiple hazards are assigned to the class of the most predominant of the hazards they pose in transport, in accordance with the precedence rules outlined in IMDG 2.0.3.

UN Numbers and Proper Shipping Names

Each entry in the different classes has been assigned its own "UN Number" and corresponding "Proper Shipping Name" (PSN) in the Dangerous Goods List contained in Part 3, Volume 2 of the IMDG Code.

UN Dangerous Goods Classification System

UN Numbers:

**UN 1950
UN 3480**

Proper Shipping Names:

**UN 1950, AEROSOLS
UN 3480, LITHIUM ION BATTERIES**

Principles of classification

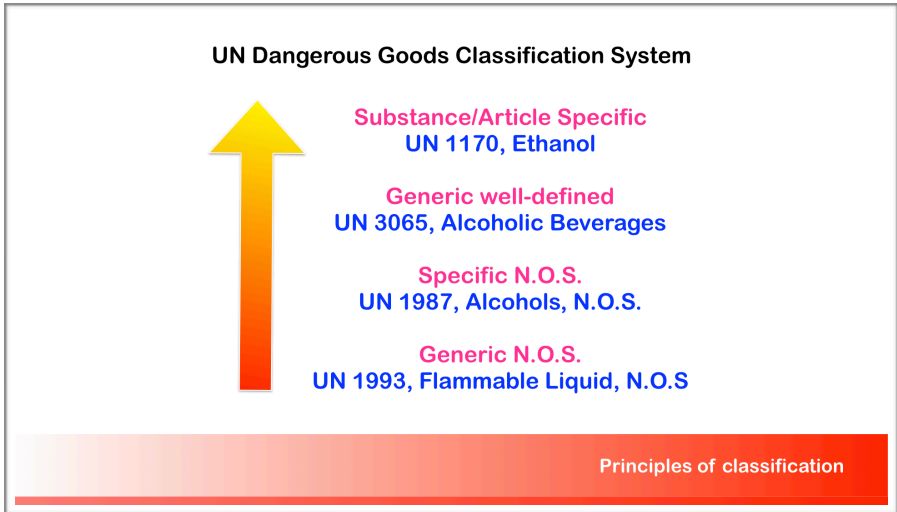
Common substances, mixtures and articles may be listed by name.

Other goods may be covered by generic entries, or specific or general "Not Otherwise Specified" (N.O.S.) entries.

Goods must be assigned to the most specific entry possible in accordance with the classification provisions outlined in IMDG 2.0.2.

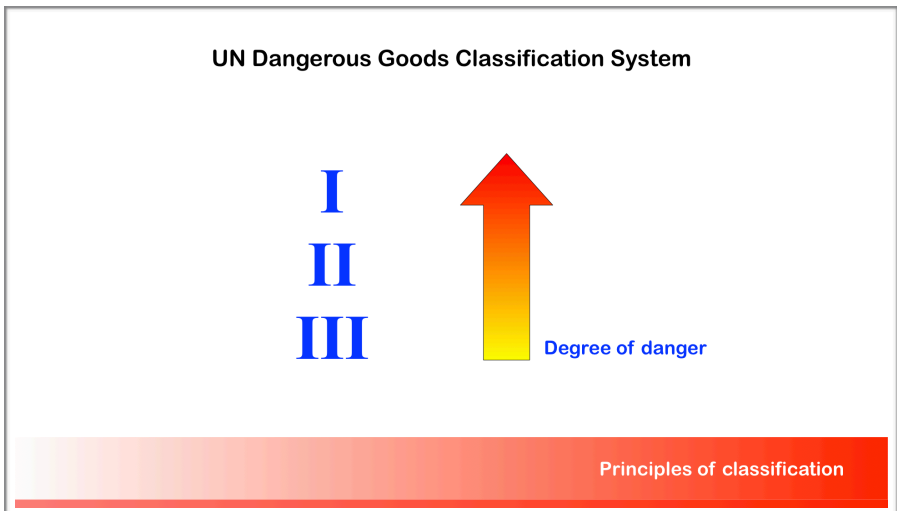
Packing Groups

For packing purposes, goods of classes 3, 4 (excluding self-reacting substances), 5.1, 6.1, clinical waste of class 6.2, 8 and 9 are assigned to a "packing group" (PG), based on the degree of danger they present.



Articles are not assigned to packing groups.

For goods not assigned to a packing group, for packing purposes, any requirement for a specific packaging performance level is set out in the applicable packing instruction.



There are three packing groups and the PG is always written in roman numerals.

- Goods of PG I are the most dangerous,
- goods of PG II are less dangerous and
- goods of PG III are the least dangerous.

Mixtures and solutions

There are rules in the IMDG Code for the classification of mixtures of dangerous goods and mixtures of dangerous goods mentioned by name, these are detailed in IMDG 2.0.2.5 to 2.0.2.10.

Where a substance, mixture or article is specifically mentioned by name in the dangerous goods list it must be transported according to the provisions detailed under that entry.

That is unless the associated primary or subsidiary hazards assigned to it are not appropriate, in which case a generic or Not Otherwise Specified (N.O.S.) entry may be used, in accordance with IMDG 3.1.1.2.

The Dangerous Goods List

Here's an example of an entry in the dangerous goods list:

UN No. (1)	PSN (2)	Clas or Div (3)	Subsidiary Risk(s) (4)	Packing Group (5)	Special Provisions (6)	Limited quantities (7a)	Excepted quantities (7b)	Packing		IBC	
								Instructions (8)	Provisions (9)	Instructions (10)	Provisions (11)
	3.1.2	2.0	2.0	2.0.1.3	3.3	3.4	3.5	4.1.4	4.1.4	4.1.4	4.1.4
3144	NICOTINE COMPOUND, LIQUID, N.O.S. or NICOTINE PREPARATION, LIQUID, N.O.S.	6.1	-	II	43 274	100 ml	E4	P001	-	IBC02	-
3144	NICOTINE COMPOUND, LIQUID, N.O.S. or NICOTINE PREPARATION, LIQUID, N.O.S.	6.1	-	III	43 223 274	5 l	E1	P001 LP01	-	IBC03	-

As you can see from the above;

Column 1: details the UN Number,

Column 2: gives the Proper Shipping Name (PSN),

Column 3: provides the main class/division,

Column 4: lists any subsidiary risks,

Column 5: contains the packing group when assigned,

Column 6: lists applicable special provisions.

Whilst goods are listed in numerical order by UN Number in the dangerous goods list, there is an A-Z by PSN in the index at the back of Volume 2.

Class 1: Explosives

The range of substances and articles classed as explosive is wide and covers a variety of risks and hazards.

Class 1 includes the following:

- Explosive substances: solid or liquid substances (or mixtures) capable by chemical reaction of producing gases at such a temperature and pressure and at such a speed as to cause damage to the surroundings.
- Pyrotechnic substances: substances or mixtures of substances designed to produce an effect by heat, light, sound, gas or smoke or a combination of these as the result of non-detonating self-sustaining exothermic chemical reactions.
- Explosive articles: articles containing one or more explosive or pyrotechnic substances.

Explosives are assigned to a "hazard division" and unique to Class 1, a "compatibility group".

Hazard Divisions

Explosives are sub-divided into hazard divisions to indicate the nature and degree of hazard as follows.



Division 1.1 - mass explosion hazard

Defined as "substances and articles which have a mass explosion hazard".

If one part of a load of 1.1 detonates, it is likely that the entire load will detonate simultaneously in a single mass explosion.

Example: UN 0033, BOMBS.



Division 1.2 - major projectile hazard

Defined as "substances and articles which have a projection hazard but not a mass explosion hazard".

If a load of 1.2 explosives is detonated, the load will not detonate instantly and no major explosive blast will result.

However, a series of smaller explosions is possible, throwing out projectiles that may themselves explode away from the original explosion.

Example: UN 0007, CARTRIDGES FOR WEAPONS



Division 1.3 - major fire hazard

Defined as "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".

Example: UN 0010, AMMUNITION, INCENDIARY.



Division 1.4 - no significant hazard

Defined as "substances and articles which present only a slight risk of explosion in the event of ignition or initiation during carriage. The effects are largely confined to the package and no projection of fragments of appreciable size or range is expected".

Explosives may be categorised in division 1.4 due to their chemical nature or by design and construction of their packaging.

Example: UN 0337, FIREWORKS



Division 1.5 - very insensitive substances having a major explosion hazard

These substances have a major blast hazard but are so insensitive that there is little chance of explosion under normal conditions of carriage.

Example: UN 0331, EXPLOSIVE, BLASTING, TYPE B.



Division 1.6 - extremely insensitive articles with no mass explosion hazard

These articles are so insensitive that there is little chance of accidental initiation or propagation.

Example: UN 0486, ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE

Compatibility Groups

In addition to the division, explosives are also assigned to a compatibility group, identified by a capital letter of:

A, B, C, D, E, F, G, H, J, K, L, N or S.

The compatibility group is used to determine which explosives can be shipped together.

Unlike the class divisions, there is no hierarchy given to the compatibility group. Further information and the definitions for compatibility groups can be found in IMDG 2.1.2.

Classification

The classification of substances, mixtures and articles to Class 1 is usually based on test results, or for fireworks; by testing, or classification to a known specification known as: "by analogy".

All explosives classifications, even if by analogy, must be approved by the competent authority of the country of manufacture prior to transport.

If manufactured abroad, explosives, particularly N.O.S. entries and fireworks, must also be approved by the competent authority in the UK prior to import.

This process can sometimes take many weeks and should therefore be completed prior to arranging the import or shipping of the goods.

The competent authority for the classification of non military explosives in the UK is the Health and Safety Executive (HSE).

The competent authority for the classification of military explosives in the UK is the Explosives Storage and Transport Committee (ESTC) of the Ministry of Defence.

Once the competent authority has agreed a classification it issues a Competent Authority Document (CAD).

Class 2: gases



The IMDG Code defines a gas as:

"a substance which at 50 °C has a vapour pressure greater than 300 kPa (3 bar); or is completely gaseous at 20 °C at the standard pressure of 101.3 kPa".

Class 2 covers pure gases, mixtures of gases, mixtures of one or more gases with one or more other substances and articles containing such substances.

Class 2 is subdivided as follows, according to the primary hazard of the gas during transport:

- Class 2.1: Flammable gases
- Class 2.2: Non-flammable non-toxic gases
- Class 2.3: Toxic gases

Class 3: flammable liquids



In terms of Class 3 a liquid is classed as a "flammable liquid" if it has a flash point of 60 °C or less.

Flammable liquids are assigned to packing groups based on the degree of hazard they present, determined by their boiling point and flash point as follows:

Packing group	Flashpoint in °C closed cup (c.c.)	Initial boiling point in °C
I	-	≤ 35
II	< 23	> 35
III	≥ 23 to ≤ 60	> 35

The full criteria for Class 3 is given in Chapter 2.3.

Viscous flammable liquids may be assigned to PG III if they meet the criteria outlined at 2.3.2.2.

Other flammable liquids that are very viscous are not subject to the provisions for marking, labelling and testing of packagings if they meet certain requirements. The criteria for this is detailed further in IMDG 2.3.2.5.

Class 4: flammable solids e.t.c.

Class 4.1:



Flammable solids

"Solids" are defined by IMDG as goods, other than gases, that do not meet the definition of liquids in chapter 1.2

Simply put, if it's not a liquid or a gas, it's probably going to be a solid.

"Flammable solids" are defined in IMDG as "readily combustible solids and solids which may cause fire through friction".

Substances are classified as flammable solids by the test methods outlined in IMDG 2.4.2.2.1 which references a document called the "Manual of Tests and Criteria".

The Manual of Tests and Criteria is another UN publication, which describes the test methods to be used and procedures to follow, to classify many types of dangerous goods, including flammable solids.

The tests for flammable solids involve finding out whether the substance will ignite and sustain combustion after brief contact with a flame and how quickly the flame will pass up a line made up of the material, part of which has been "wetted".

This testing is also used to determine the packing group.

The IMDG Code assigns packing groups to flammable solids in accordance with the test methods outlined in 2.4.2.2.3.

Self-reactive substances

The IMDG Code defines "self-reactive substances" as: "thermally unstable substances liable to undergo a strongly exothermic decomposition even without the participation of oxygen (air)".

Self-reactive substances permitted for transport in packages are listed by name in section 2.4.2.3.2.3, those permitted for transport in IBCs are listed in packing instruction IBC520 and those permitted for transport in portable tanks are listed in portable tank instruction T23.

The classification of self-reactive substances is based on procedures and methods in the Manual of Tests and Criteria.

Some self-reactive substances require temperature control during transport.

Substances not mentioned by name are not permitted for carriage, unless they have been tested and assigned to a generic entry by the competent authority of the country of origin on the basis of a test report.

This statement of approval should contain details of the classification and the relevant transport conditions.

Solid desensitised explosives

Solid desensitised explosives are wetted with a diluent, such as water or alcohols, or are diluted with other substances, in order to desensitise their explosive properties.

They are still dangerous which is why they are assigned to Class 4.1, but they no longer display explosive properties or no longer display explosive properties in their current state.

For example, some wetted substances if allowed to dry, would be explosive.

Polymerising substances

Polymerising substances are substances that unless inhibited, may undergo a strongly exothermic (heat generating) reaction resulting in the formation of larger molecules or polymers.

Substances are considered to be polymerising substances of Class 4.1 when they do not belong to any other class.

Polymerising substances of Class 4.1 are assigned to UN 3531, UN 3532, UN 3533, and UN 3534.

Special provision 386 is added for each of these UN numbers in column 6 of the dangerous goods list, to clarify the temperature control and chemical stabilisation requirements in more detail.

Temperature control is required for substances with a Self-Accelerating Polymerisation Temperature (SAPT); of

- 50 degrees Celsius, or less, when carried in packages, or
- 45 degrees Celsius, or less, when carried in tanks.

Whatever the classification, chemically unstable substances must not be shipped, unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition, or polymerisation, under normal conditions of carriage.

Class 4.2: substances liable to spontaneous combustion



This class includes "pyrophoric" substances and mixtures, in either liquid or solid form.

Pyrophoric substances are those which spontaneously ignite in air and are assigned to PG I.

This class also includes "Self-heating substances and articles" which may self-heat without an energy supply, in contact with air.

These substances may ignite if present in sufficient quantities and may be assigned to PG II or PG III, depending on tests and procedures outlined in the Manual of Tests and Criteria.

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



Also known as "dangerous when wet".

Class 4.3 covers substances which react with water to emit flammable gases liable to form explosive mixtures with air and articles which contain such substances.

Test methods apply to determine if sufficient flammable gases are released to warrant classification in Class 4.3.

Packing groups are assigned in accordance with the test methods in the Manual of Tests and Criteria.

For example: UN 1402, Calcium carbide.

Class 5: oxidising substances and organic peroxides

Class 5.1: oxidising substances



Oxidising substances; whilst not combustible themselves, may cause or contribute to the combustion of other material, generally by providing oxygen.

Class 5.1 substances and mixtures of substances may be liquid or solid and are assigned to packing groups based on tests and procedures outlined in the Manual of Tests and Criteria.

Such substances may also be contained in articles.

For reference, the full classification criteria is detailed in IMDG 2.5.2

Class 5.2: organic peroxides



Organic peroxides are liable to exothermic decomposition.

This may be initiated by heat, impact or contact with impurities.

Decomposition may lead to the formation of harmful or flammable gases or vapours and many organic peroxides burn vigorously.

Many organic peroxides also have additional hazardous, **some organic peroxides are also very corrosive to the skin and eyes so must be handled with care and in accordance with safe working practices.**

Due to their potential for exothermic decomposition to be initiated by heat, many organic peroxides are subject to temperature control to prevent this hazard during transport.

When transporting organic peroxides subject to temperature control, a control temperature must be maintained.

This control temperature is derived from a term called the "SADT" (Self-Accelerating Decomposition Temperature) which is defined as:

"the lowest temperature at which self-accelerating decomposition may occur with a substance in the packaging as used during carriage".

Organic peroxides permitted for transport in packages are listed at IMDG 2.5.3.2.4.

They are classified in accordance with the Manual of Tests and Criteria and are not assigned a packing group.

If an organic peroxide is not listed by name in the IMDG Code, approval must be obtained from the competent authority of the country of origin in order to transport it.

Class 6: toxic and infectious substances

Class 6.1: toxic substances



These are substances that cause severe harm or even death if they enter the human body.

Entry can be by inhalation of vapour or dust particles, by swallowing (ingestion) or by absorption through the skin.

Toxic substances and mixtures may be liquid or solid and **attention must be paid to avoid any contact with damaged packages or residues.**

Toxic substances are classified based on human poisoning experiences or animal testing and are assigned to packing groups based on the degree of danger they present from toxicity studies.

Toxic substances are assigned to packing groups according to their severity via oral, dermal or inhalation routes and mixtures are assigned a packing group by way of the formulas at 2.6.2.3

The full criteria is outlined in the IMDG Code at 2.6.2

Class 6.2: infectious substances



Infectious substances are known or reasonably believed to contain pathogens such as bacteria, viruses, parasites or prions, which can cause disease in humans or animals.

These substances represent a biological hazard and consignments may consist of infected products, diagnostic specimens or medical wastes.

Infectious substances are assigned to either "Category A" or "Category B".

Category A infectious substances have the potential to cause serious disabling, life-threatening or fatal disease in humans. Everything else is assigned to Category B.

Category A substances are therefore seen as the most dangerous.

Clinical waste: multimodal considerations

Medical and clinical wastes containing, or believed to contain, infectious substances of Category B are assigned to UN 3291.

Authorisation must be obtained from the Maritime and Coastguard Agency to allow the transport of clinical waste by sea.

The international transport of clinical waste by sea must also be authorised by the Environment Agency and is subject to strict International law.

Class 7: radioactive material



Radioactive material means material containing radionuclides above both the activity concentration and total activity thresholds at IMDG 2.7.2.2.1.

This also includes packages and other objects that have become contaminated with radioactive material.

The provisions in the IMDG Code concerning radioactive material are based on the International Atomic Energy Agency (IAEA) Regulations for the Safe Transport of Radioactive Material.

Radioactive material is not assigned to packing groups but is assigned to different UN numbers in accordance with the levels of activity.

Packages and overpacks are labelled in accordance with the levels of radiation. In contrast to packing groups for other classes of dangerous goods, the degree of danger increases the higher the roman numeral printed on some labels.

For example, a "Category III" label indicates a higher level of radiation and therefore greater danger than a "Category I" label.

Certain types of material and packages require competent authority approval or certification, the details of which are summarised in IMDG 5.1.5.1 and 5.1.5.2.

The transport of radioactive material is a very specialised area of dangerous goods transport and all parties involved in the transport must ensure that they

fully understand the requirements. This may require advice from a Radiation Protection Advisor (RPA) and specific, detailed emergency plans to be in place.

Despite the high profile risks surrounding radioactive material, provided consignments are packed under controlled conditions by qualified persons, they will be safe to handle in transport.

Packages of radioactive material must never be opened except by persons qualified to do so.

Class 8: corrosive substances



Corrosive substances and mixtures of Class 8 cause irreversible damage to the skin.

They may be liquid or solid and may evolve dangerous vapours when they react. In the case of leakage, they may damage or destroy other goods or the means of transport.

Corrosive substances may be acids or bases (alkali) and therefore, different corrosive substances, although assigned to the same class, may react dangerously with each other.

In the event of spillages from damaged packages or the presence of hazardous residues, there is risk of serious injury from contact, or from the inhalation of vapours from liquids, or dusts from solid materials.

Substances and mixtures of Class 8 are assigned to packing groups according to the degree of danger they present in carriage:

Packing group I: highly corrosive substances - very dangerous

Packing group II: corrosive substances presenting medium danger

Packing group III: substances and mixtures presenting minor danger.

Packing groups are assigned in accordance with IMDG 2.8.3

Class 9: miscellaneous dangerous substances and articles



Class 9 covers substances and articles which present a danger during transport not covered by any of the other classes.

Examples include: asbestos, safety devices, lithium ion, polymer and lithium metal batteries.

Lithium batteries are marked and labelled differently to other goods of Class 9, depending upon their lithium or energy content.



* Place for UN Number(s)

** Place for telephone number for additional information



Marine Pollutants

Marine pollutants may be identified by the 'P' symbol in Column 4 of the dangerous goods list, as detailed in IMDG 2.10.2.4, or, may be self-classified in accordance with IMDG 2.9.3.

The term “marine pollutant” is very similar to the term “environmentally hazardous substance” (EHS) used in other dangerous goods regulations.

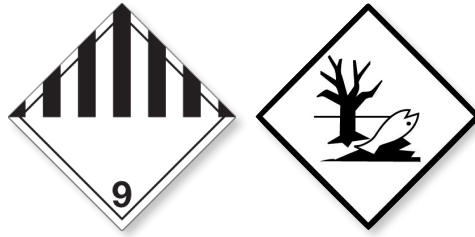
It is important to note that the absence of the 'P' symbol for an entry in the dangerous goods list does not preclude that entry from classification in accordance with 2.9.3.

Substances are not classed as marine pollutants when contained in packages or inner packagings of 5 L or 5 kg or less as outlined in IMDG 2.10.2.7.

Marine pollutants may be liquid or solid. If these substances present a hazard covered by any other class, they are assigned to that class, but are identified as a marine pollutant by an additional statement added to the proper shipping name (see IMDG 5.4.1.4.3.5) and by additional marks.

If they do not present any hazards covered by other classes, marine pollutants are assigned to

- UN 3077 for solids and
- UN 3082 for liquids.



Marine pollutants of Class 9, UN 3077 or UN 3082, are labelled with the Class 9 label and also marked with the EHS/marine pollutant mark above.

Waste classification

The same classification criteria apply to wastes as they do to other dangerous substances and articles.

Wastes are then identified as such by the addition to the Proper Shipping Name (PSN) of the word "Waste" in the dangerous goods transport document as required by IMDG 5.4.1.4.3.3 unless this is already part of the shipping name.

Wastes that are not classified as dangerous goods and therefore not otherwise subject to the provisions of the IMDG Code (i.e. those not identified by application of IMDG 5.4.1.4.3.3) but which are subject to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes, may be assigned to UN 3082 for liquids, or UN 3077 for solids. In accordance with IMDG 2.0.5.4.6.

Please note also the additional documentation requirements referred to in IMDG 2.0.5.3.2 for international waste shipments.



“UN tested” packagings

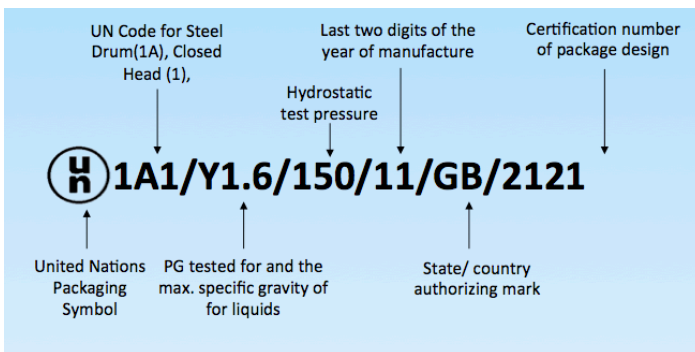
In order to choose an authorised packaging for dangerous goods, the packing instruction listed in Column 8, or IBC instruction listed in Column 10 of the dangerous goods list, if present, references the appropriate packaging instruction in Chapter 4.1.

When a packing instruction authorises the use of a package "subject to the provisions of 4.1.1" this means that, unless otherwise stated in IMDG, each package must conform to a design type that has been successfully tested in accordance with UN requirements.

UN testing is not necessary for inner packagings of combination packages or packagings used for the Limited Quantity or Excepted Quantity provisions.

To confirm that packages meet the design type and have been tested and approved, they are marked with the UN package markings in accordance with the relevant part of IMDG Part 6.

Here is an example of the package marking for a steel drum intended to carry liquids:



The first symbol is that of the UN packaging approval symbol.

The next letters and numbers detail the type of packaging.

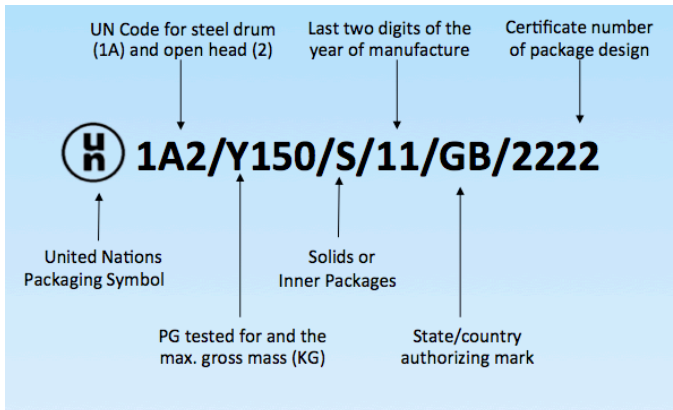
Packagings tested for carrying packing groups I, II or III are marked with an "X", for PG II or III with a "Y" and packages only tested for packing group III with a "Z".

Whilst some goods are not assigned to a packing group, the applicable packing instruction for those goods or a provision of the IMDG Code will specify the standard of approved packaging required.

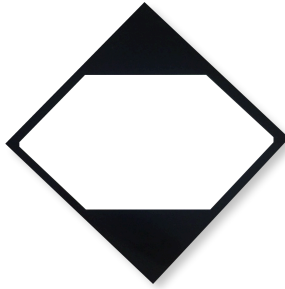
For example, IMDG 4.1.5.5 requires that packagings intended to contain goods of Class 1, meet the test requirements for PG II.

Packagings intended to transport liquids are marked with the specific gravity and hydraulic test pressure, also known as the hydrostatic test pressure.

Packagings intended for carrying solids or inner packagings are marked with the gross mass in kgs and the letter "S" denoting that the packaging is intended for the carriage of solids or inner packagings, as illustrated by the following example for an open head steel drum:



The year of manufacture is very important for plastic packagings as these have a shelf-life of 5 years from the date of manufacture (IMDG 4.1.1.15) unless otherwise specified.



The Limited Quantity provisions

The limited quantity provisions are a useful exemption from many, but not all, of the requirements of the IMDG Code, especially useful for curtailing the segregation provisions between packages in the same Cargo Transport Unit (CTU).

Goods may be transported as limited quantities provided the provisions outlined in IMDG Chapter 3.4 can be met.

Firstly, each UN Number entry in the Dangerous Goods List, is provided with a limited quantities inner packaging quantity limit in Column 7a.

If the quantity is '0' then the limited quantity provisions can not be used.

If a quantity is displayed, typically of a few litres or kilos, then the limited quantity provisions may be applied.

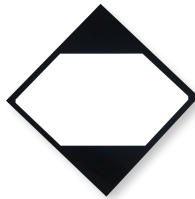
The goods must be packed as per the descriptions in Chapter 3.4, namely in inner packagings placed in suitable outer packagings, to form a combination package.

The limited quantity provisions only apply to combination packages, single packagings, that is those without an inner packaging, can not be used.

The gross mass of each combination package should not exceed 30 kg, or 20 kg for shrink or stretch-wrapped trays.

Articles, such as aerosols, do not require packing in inner packagings.

Completed packages must be marked with the limited quantity mark:



This is a white or suitably contrasting coloured diamond with black tips at the top and bottom, of dimensions 100 mm by 100 mm with a minimum border width of 2 mm.

If the size of the package so requires, the dimensions can be reduced to 50 mm by 50 mm with a minimum border width of 1 mm.

Combination packages containing liquids should also be marked with orientation arrows on two opposite sides (see IMDG 5.2.1.7).

For mixed packing within the same outer package, the segregation restrictions must still be considered and in addition, different goods may only be packed together in the same package if they do not react dangerously with each other.

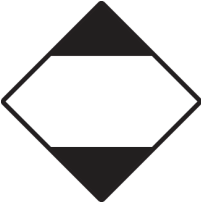
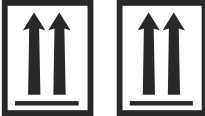
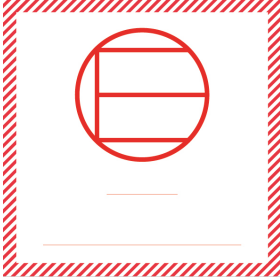
All persons who are involved in the packing, handling, shipment and carriage of goods in limited quantities must receive training and a record of this training must be kept.

A dangerous goods note is required for limited quantities transported via sea and this should be provided at the point of dispatch, regardless of whether this is required for other modes of transport.

Limited Quantity vs. Excepted Quantity packages

Dangerous goods packed in limited or excepted quantities for road and sea transport applicability using ADR & the IMDG Code

Requirement	Limited quantity	Excepted quantity
Applicability of the provisions	See column 7a of the dangerous goods list	See column 7b of the dangerous goods list
Type of package required	Suitable combination package, that conforms to the construction requirements (Part 6 construction requirements)	Suitable combination package, with intermediate packaging, cushioning material and absorbent material for liquids (see 3.5.2) <i>From ADR 2017 onwards and in IMDG amendment 38, absorbent material may be contained in either intermediate or outer packaging.</i>
Typical package example	Strong outer double-walled fibreboard/cardboard box containing inner packagings.	Strong outer fibreboard/ cardboard box, with plastic intermediate packaging, inner packagings and vermiculite.
Segregation provisions	Road: within packages must not react dangerously Sea: segregation provisions apply within packages & must not react dangerously Sea segregation provisions do not apply between LQ packages & other DG.	Road & sea: must not react dangerously within packages Sea segregation provisions do not apply between EQ packages & other DG
Inner packaging size	See column 7a (typically in L / kg)	See 3.5.1.2 (typically in mL or g)

Requirement	Limited quantity	Excepted quantity
Outer/Complete Package size	30 kg gross mass per package	See 3.5.1.2
Package testing	None required	Must be capable of passing tests in 3.5.3
Package markings	 <p>Plus orientation arrows for liquids:</p> 	
Overpack markings	Reproduce with word "OVERPACK" unless clearly visible	Reproduce with word "OVERPACK" unless clearly visible
Documentation	Road: none Sea: full DGN with "LTD QTY" or similar following description	Road: none Sea: full DGN with "dangerous goods in excepted quantities"
Placards	Road: above 8 tonnes Sea: any quantity	None
Vehicle/ container limits	None	1000 packages

Intermediate Bulk Containers (IBCs)

IBCs are a type of packaging which is designed for mechanical handling. Like the name suggests, they are like the stage between a package and a tank or bulk container.



IBCs may be of a "composite" type, in that they may have a rigid or flexible "inner receptacle" surrounded by an outer packaging such as a metal cage.

IBCs can also be constructed of just one material, such as metal IBCs often used as fuel bowsers.

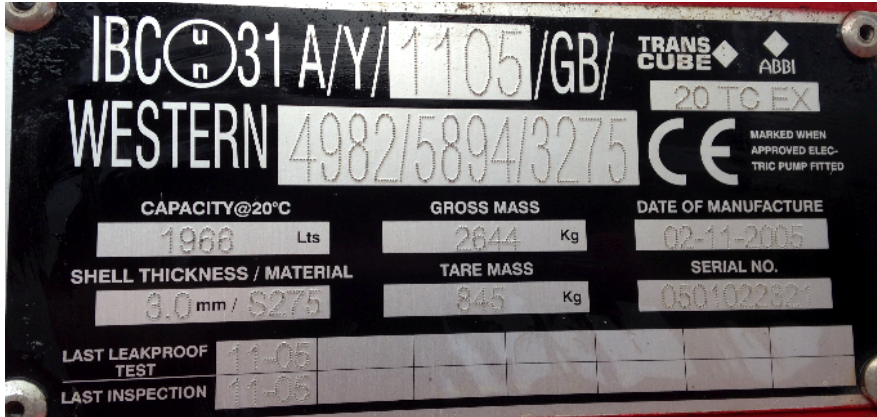


In each case, the construction and testing requirements for IBCs are given in IMDG Chapter 6.5.

IBCs should be UN certified and marked for the carriage of dangerous goods, just like other packages.

The certification markings required for IBCs are detailed in IMDG 6.5.2 and the testing, certification and inspection requirements are given in IMDG 6.5.4.

Unlike single use packages, however, IBCs are often regularly re-used and must be inspected every 2.5 and 5 years.



IBCs intended to contain liquids must also have a leakproofness test every 2.5 years.

The details of these tests should be marked on a plate attached to the IBC.

In accordance with IMDG 4.1.1.15, unless otherwise excepted or approved by the competent authority, IBCs made of rigid plastic and plastic composite IBCs have a finite life of 5 years from the date of manufacture for the carriage of dangerous goods.

Package marks and labels

The provisions for marking and labelling in the IMDG Code are given in Chapter 5.2.

Labels

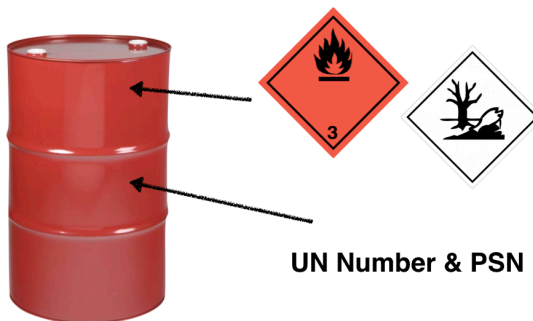
Packages must display a label for the primary hazard as identified in Column 3 of the Dangerous Goods List plus a label or labels for any subsidiary hazards identified in Column 4 of the Dangerous Goods List.

Where more than one danger label is required, these should be placed next to each other.

Any special provisions as indicated in Column 6 of the Dangerous Goods List must be checked, as these may except the requirement to affix the relevant label or labels.

Labels should be a minimum dimension of 100 mm by 100 mm.

These dimensions may be reduced, but only where the package size requires smaller labels, provided the symbols and other elements of the label remain clearly visible.



Marks

The UN number and proper shipping name

Packages must be marked with the UN number of the dangerous goods contained within, including the letters "UN".

The UN number and the letters "UN" should be at least 12 mm high.

This may be reduced to 6 mm high for packages of 30 L capacity or 30 kg net mass or less and for cylinders of 60 litres water capacity or less. For packages or 5 L capacity or 5 kg net mass or less, the UN number must be of an appropriate size.

The Proper Shipping Name (PSN) must be displayed, supplemented when required with the technical name or names of the goods, as determined by IMDG 3.1.2.8 and 3.1.2.9.1.

There is no size requirement for the proper shipping name but it must be readily visible and legible.

The proper shipping name must be displayed on the same surface of the package as the hazard label or labels and it is also best practice to include the UN number adjacent to the proper shipping name, although this is not specified in the IMDG Code.

Both the UN number and proper shipping name should be displayed on a background of contrasting colour.

Orientation arrows

Combination packages containing liquids, single packages fitted with vents and others identified at 5.2.1.7.1 must be marked on two opposite vertical sides with orientation arrows, also known as 'this way up' marks.

Orientation arrows have no size requirements but they are required to be clearly visible commensurate with the size of the package.

Marine pollutant/environmentally hazardous substance marks



Unless excepted by IMDG 2.10.2.7 (e.g. single packages ≤ 5 L or 5 kg and combination packages containing inner packagings ≤ 5 L or 5 kg), packages containing dangerous goods classed as marine pollutant or environmentally hazardous must be marked with the Marine Pollutant (MP) mark.

The marine pollutant mark must be located adjacent to the proper shipping name and UN number.

The marine pollutant mark must be 100 mm by 100 mm just like a hazard label. The size of the mark may be reduced if the dimensions of the package require, but it must remain clearly visible.

Seawater immersion

Hazard labels, the marine pollutant mark, the UN number and the proper shipping name must be capable of still being identifiable following three months immersion in the sea.

There is a British Standard, BS 5609: 1986 which is often used by label suppliers as evidence that externally purchased labels meet this requirement.

Compliance with this standard, is not specifically mandated by the IMDG Code, but can be used as an assurance of compliance.

Additional markings may be required and there may be additional labelling provisions detailed for specific classes.

These are contained in IMDG Chapter 5.2 and should be verified for each class of dangerous goods transported.

IBCs and large packagings

IBCs of greater than 450 L capacity and large packagings should be marked and labelled on two opposite sides.

UN 1230, Methanol



UN 1230, Methanol



Overpacks

If the marks and labels **representative** of all dangerous goods contained within an overpack are not visible, they must be reproduced on the outside of the overpack along with the word "OVERPACK" which must be at least 12 mm high.

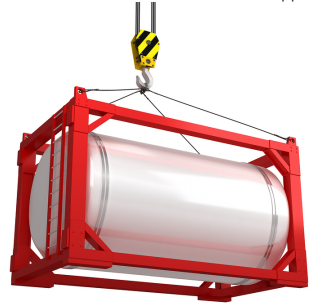
This includes orientation arrows for overpacks containing packages marked with orientation arrows.

Overpacks containing limited quantity goods only, with no other dangerous goods, must be marked with the limited quantity mark, the word "OVERPACK" and orientation arrows if required (when representative marks of the packages contained within are not visible).

When overpacks contain both limited quantity and other hazard labelled goods, where the marks and labels of these are not visible, they must be marked and labelled as for both the limited quantity goods and other goods.

Tanks

The tank codes referred to in Column 13 of the Dangerous Goods List and detailed further in IMDG Chapter 4.2, refer specifically to UN portable tanks and bulk containers.



UN portable tanks are often used for maritime transport including offshore use and must meet the construction requirements of IMDG Chapter 6.7.

UN portable tanks: design approval and testing requirements

Portable tanks must be of a design type approved by the competent authority and must be tested in accordance with IMDG 6.7.2.18.

Every 5 years a periodic inspection and test is required and every 2.5 years an intermediate inspection and test is required.

Following damage or repair, as a minimum, the 2.5 year intermediate inspection and test must be performed.

Tests must be performed or witnessed by the competent authority for sea transport or its authorised body.

Periodic inspections and tests must be marked on the portable tank or on a plate attached to the portable tank. For tank fillers, this identifies that the tanks are in date of the required tests.

HYDROSTATIC TEST & INTERNAL INSPECTION RECORD PLATE	
TANK NUMBER	
2,5 YEAR	5 YEAR
11 5 08	13 3 11
2	2
3	3

Offshore portable tanks

Portable tanks used offshore must meet further requirements, in addition to the tank construction and testing requirements of IMDG Chapter 6.7.

These requirements are not contained in the IMDG Code, they are instead published in a document referred to as MSC/Circ.860, available online.

Note that BS 7072, referenced in MSC/Circ.860 has now been withdrawn.

IMO tanks

The reason that Column 12 in the Dangerous Goods List is now left empty, is that previous to amendment 30 of the IMDG Code, tanks were identified, constructed and used to a different coding system and referred to as IMO Tanks.

Their meanings are as follows:

IMO type 1 tank: means a portable tank for the transport of substances of classes 3 to 9 fitted with

pressure-relief devices, having a maximum allowable working pressure of 1.75 bar and above.

IMO type 2 tank: means a portable tank fitted with pressure-relief devices, having a maximum allowable working pressure equal to or above 1.0 bar but below 1.75 bar, intended for the transport of certain dangerous liquids of low hazard and certain solids.

IMO type 4 tank: means a road tank vehicle for the transport of dangerous goods of classes 3 to 9 and includes a semi-trailer with a permanently attached tank or a tank attached to a chassis, with at least four twist locks which comply with ISO standards, (e.g. ISO International Standard 1161:1984).

IMO type 5 tank: means a portable tank fitted with pressure-relief devices which is used for non- refrigerated gases of class 2.

IMO type 6 tank: means a road tank vehicle for the transport of non-refrigerated liquefied gases of class 2 and includes a semi-trailer with a permanently attached tank or a tank attached to a chassis which is fitted with items of service equipment and structural equipment necessary for the transport of gases.

IMO type 7 tank: means a thermally insulated portable tank fitted with items of service and structural equipment necessary for the transport of refrigerated liquefied gases. The portable tank shall be capable of being transported, loaded and discharged without the need of removal of its structural equipment, and shall be capable of being lifted when full. It shall not be permanently secured on board the ship.

IMO type 8 tank: means a road tank vehicle for the transport of refrigerated liquefied gases of class 2 and includes a semi-trailer with a permanently attached thermally insulated tank fitted with items of service equipment and structural equipment necessary for the transport of refrigerated liquefied gases.

IMO type 9 tank: means a road gas elements vehicle for the transport of compressed gases of Class 2 with elements linked together by manifold, permanently attached to a chassis, which is fitted with items of service equipment and structural equipment necessary for the transport of gases.

For reference, these previous tank types are detailed in IMDG 4.2.0.1.

Their use is still permitted, subject to passing regular tank tests. Indeed, IMO type 9 tanks have only been recently introduced.

New portable tanks should have been built to the UN requirements since 2003.

Further details are provided in the document CCC.1/Circ.3, also available online.

The construction of IMO type 4, 6, 8 multimodal tanks (plus type 9 tanks which are road gas elements vehicles) is still permitted.

Road tanks of IMO type 4, 6 and 8, for the transport of dangerous goods by sea are still identified by their IMO tank type as by their definition, they can not be classed as a UN multimodal portable tank.

The provisions for road tank vehicles are detailed further in Chapter 6.8.

Road tank vehicles: long international voyages

For long international voyages, i.e. those greater than 600 miles and/or more than 200 miles from a port of place of safety, road tank vehicles must comply with 6.8.2 and be approved and their tests verified by the competent authority for sea transport - they will also require approval and testing for road transport by the relevant competent authority.

Road tank vehicles: short international voyages

IMO type 4, 6 and 8 road tank vehicles and type 9 road gas elements vehicles are permitted for short international voyages via chapter 6.8.3 and must be approved and tested for road transport by the competent authority for road transport.

In addition Type 4, 6 and 8 road tank vehicles and type 9 road gas elements vehicles must hold a certificate of compliance to IMDG issued by the competent authority for sea transport (or their authorised agents) that should also include any special provisions for certain substances as applicable.

Thus they do not require periodic and intermediate test approval from the competent authority for sea transport.

In the United Kingdom, the competent authority for road transport is the Department for Transport and the competent authority for sea transport is the Maritime and Coastguard Agency.

Both of these authorities designate responsibility for the approval and test approval of tanks to the VCA, who in turn designate this responsibility to their authorised agents, such as Lloyds, SGS or DNV.

Details of organisations that are currently appointed on behalf of the VCA are available on the VCA Website

Multi-Element Gas Containers (MEGCs)



What are MEGCs?

Multi-element gas containers (MEGCs) are defined by the IMDG Code as:

"multimodal assemblies of cylinders, tubes or bundles of cylinders which are interconnected by a manifold and which are assembled within a framework. The MEGC includes service equipment and structural equipment necessary for the transport of gases."

MEGCs are typically used for the transport of compressed gases, such as Hydrogen.

Construction and testing of MEGCs

The provisions for the construction and testing of MEGCs are contained in IMDG Chapter 6.7.5.

MEGCs must design approved by the competent authority. The competent authority must also perform or witness the required periodic inspections of the service equipment suitability. These periodic inspections must be performed at least every 5 years in accordance with IMDG 6.7.5.12.2.

The elements making up the MEGC, such as the cylinders themselves, are subject to their own test requirements as detailed in IMDG 6.2.1.6 and at the intervals specified in packing instruction P200.

Permitted use of MEGCs

Whether a particular UN entry in the dangerous goods list may be carried in MEGCs is determined by the packing instruction P200 in column 8 of the dangerous goods list.

Within the packing instruction itself in IMDG Chapter 4.1.4.1 is a further table, this is where it is specified as to whether the particular entry may be transported in MEGCs.

If the substance concerned may be transported in MEGCs, the general provisions of IMDG 4.2.4 must also be met.

The requirements of IMDG 4.2.4. are important as they include instructions and responsibilities for fillers and shippers of MEGCs.

For example, the leakproofness of the closures and equipment must be verified by the shipper after filling, in accordance with IMDG 4.2.4.5.5.



The CSC

The IMDG Code at the start of Chapter 7.3 states at 7.3.2.2 that unless otherwise stated, the applicable provisions of the International Convention for Safe Containers (CSC), 1972, as amended must be followed for the use of any CTU that meets the definition of a "container" within the terms of the CSC.

The purpose of the CSC is two fold.

1. Firstly, to ensure a high standard of safety in the transport and handling of containers by providing internationally recognised test procedures and related strength requirements.
2. The second purpose of the CSC is to ensure that these standards apply uniformly to CTUs internationally, to ensure a comprehensive level of safety worldwide.



The scope of the convention is limited to containers of a prescribed minimum size having devices which permit handling, securing and stacking.

Containers must be fitted with a safety approval plate detailing their conformity.

The CSC does not apply to offshore containers, such as offshore supply containers, often referred to as cargo carrying units (CCUs) and to the frames of offshore portable tanks.

These units must instead meet one of the standards referred to in MSC/Circ.860, the Guidelines for the Approval of Offshore Containers handled in Open Seas.

Offshore containers should be clearly marked with the words "OFFSHORE CONTAINER" on their safety approval plate.



**OFFSHORE CONTAINER INFORMATION/INSPECTION DATE
DNV STANDARD FOR CERTIFICATION No 2.7-1 (2006) /
EN12079 - 1:2006**

Loading and stowage

The IMDG provisions concerning the packing and use of Cargo Transport Units (CTUs) are detailed in Chapter 7.3.

Please familiarise yourself with these two pages.

You should be familiar with the preferred location for dangerous goods to be at the doors when loading a CTU of mixed dangerous goods and non-dangerous goods (7.3.3.10) and the requirement to distribute cargo evenly (7.3.3.14).

The CTU Code

The IMO has approved detailed requirements for the loading of Cargo Transport Units (CTUs).

Known as The CTU Code, this guidance is available online.

Whilst this guidance is not mandatory, following the guidelines is seen as best practice, and in some countries, must be followed in order to show compliance with the law.

General considerations

- A safe working environment must be provided. The use of ramps and loading bays must be appropriately risk-assessed with procedures and control measures communicated to all staff involved.
- The use of safe handling equipment is preferential to manual handling where possible.
- All work equipment, including handling equipment and any vehicles or CTUs must be checked and found to be in sound condition.
- Appropriate personal protective equipment must be worn

- Persons must not smoke, eat or drink during packing, securing or unpacking.
- The correct type of vehicle or container should be chosen in advance taking into account the types of dangerous goods to be transported, any class-specific provisions or requirements e.g. temperature control, and the mode(s) of transport to be utilised.
- To maximise efficiency, avoid demurrage charges and enhance safety; a loading plan may be drawn up prior to the loading operation taking place.

Segregation

There are different segregation rules dependant upon the mode or modes of transport.

These apply at all stages of the packing operation, from mixing different inner packagings in the same package, to the mixed loading of different packages in the same overpack and on the same transport unit or CTU.

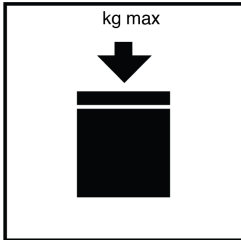
Incompatibilities may not be obvious, for example, goods of the same class may be incompatible.

Ensure that the segregation requirements have been made clear to you before handling or loading dangerous goods, refer to the relevant regulations and safety data sheets where necessary.

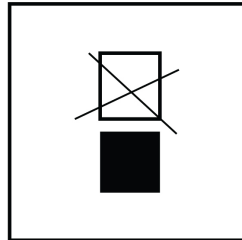
Loading

Packages must not be stacked unless designed for that purpose. Where different design types of packages that have been designed for stacking are to be loaded together, consideration must be given to their compatibility for stacking with each other.

Some packages require testing to verify that they are suitable to be stacked. This includes packages for air transport and IBCs (Intermediate Bulk Containers). Ensure that reference is made to the manufacturers details and test reports to confirm these requirements. IBCs should be marked with the following:



IBCs capable of being stacked



IBCs NOT capable of being stacked

Observe all handling instructions and symbols on packages such as “this way up” marks. Only load drums with the bungs and openings to the top unless you have permission to do otherwise. Ensure all closure and secondary closure devices are in place and properly closed in accordance with the manufacturers requirements, e.g. torque requirements for drum bungs, which flaps go over each other for UN certified boxes.



Ensure that stacked packages are prevented from damaging the package below by the use of load-bearing devices.

Packages must be appropriately secured to pallets and within overpacks.

Banding is preferable to shrink-wrap.

Edges must be protected in order to prevent damage to the packages from over-tightened banding or cargo securing straps.



Distribute the weight of cargo evenly. Take account of vehicle load and axle load limits. Do not overload vehicles or containers. The axle weights and load capacity of vehicles should be displayed on a DfT Plating Certificate in the cab. The capacity of containers is detailed on the container doors.

Do not build up irregular layers of packages or load with eccentric load distribution, such as loading heavy cargo on small areas of the floor. Ensure containers are loaded correctly to reflect the centre of gravity. Load heavy goods below light goods and liquids below solids.

Load IBCs with the taps facing outwards to the openings of the transport unit.

Securing

Loads must be secured to prevent movement during the journey. Account must be taken of the forces that loads will be subject to and the type of transport unit.

Curtain side vehicles and trailers must be treated as open vehicles, the curtains do not have load bearing capacity and loads must be secured as such.

Secure each single loaded item independently where necessary and ensure that forces are distributed over an appropriate area of a unit.

Protect stacked packages from damaging the package below by using load-bearing devices.

Ensure that the cargo is prevented from sliding and tipping in any direction, but do not damage packages or over-stress securing devices or transport units. Do not use hooks or shackles to fasten lashings or fasten web lashings by means of knots.

Fill void spaces where necessary and use non-slip matting.



When loading and securing is completed, affix any required seals, marks and placards and complete the necessary paperwork.

Only complete a packing certificate for a CTU where you have loaded the CTU yourself, **do not complete this part of the paperwork for a groupage load** where you are not in control of what may be loaded next, otherwise you may be making a false declaration.

Segregation

We recommend the following four-step procedure to help determine the segregation that may be required between different types of dangerous goods.

Step 1: identify whether the segregation provisions apply

The segregation provisions do not apply between packages of limited and excepted quantities (see chapters 3.4 and 3.5).

The segregation provisions do apply between different dangerous goods within the same outer packaging, including for goods packed to the limited quantity provisions.

There are additional exceptions detailed in IMDG 7.2.6.

Step 2: general segregation provisions

Check the general segregation table in IMDG 7.2.4.

The table takes into account the main hazard class and up to one subsidiary hazard.

The most stringent segregation provisions always take precedence.

For goods with more than one subsidiary hazard, the segregation provisions are instead detailed in Column 16b of the Dangerous Goods List.

In the segregation table, where a segregation requirement exists, such as "away from" or "separated from" those goods are not permitted to be packed in the same packaging or loaded in the same CTU as each other.

IMDG General Segregation Requirements

Class		1.1 1.2 1.5	1.3 1.6	1.4	2.1	2.2	2.3	3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7	8	9
Explosives	1.1, 1.2, 1.5	See IMDG Code 7.2.7.1			4	2	2	4	4	4	4	4	4	2	4	2	4	X
	1.3, 1.6				4	2	2	4	3	3	4	4	4	2	4	2	2	X
	1.4				2	1	1	2	2	2	2	2	2	X	4	2	2	X
Flammable gases	2.1	4	4	2	X	X	X	2	1	2	2	2	2	X	4	2	1	X
Compressed gases	2.2	2	2	1	X	X	X	1	X	1	X	X	1	X	2	1	X	X
Toxic gases	2.3	2	2	1	X	X	X	2	X	2	X	X	2	X	2	1	X	X
Flammable liquids	3	4	4	2	2	1	2	X	X	2	2	2	2	X	3	2	X	X
Flammable solids (etc)	4.1	4	3	2	1	X	X	X	X	1	X	1	2	X	3	2	1	X
Spontaneously combust.	4.2	4	3	2	2	1	2	2	1	X	1	2	2	1	3	2	1	X
Dangerous when wet	4.3	4	4	2	2	X	X	2	X	1	X	2	2	X	2	2	1	X
Oxidising substances	5.1	4	4	2	2	X	X	2	1	2	2	X	2	1	3	1	2	X
Organic peroxides	5.2	4	4	2	2	1	2	2	2	2	2	2	X	1	3	2	2	X
Toxic substances	6.1	2	2	X	X	X	X	X	X	1	X	1	1	X	1	X	X	X
Infectious substances	6.2	4	4	4	4	2	2	3	3	3	2	3	3	1	X	3	3	X
Radioactive material	7	2	2	2	2	1	1	2	2	2	2	1	2	X	3	X	2	X
Corrosive substances	8	4	2	2	1	X	X	X	1	1	1	2	2	X	3	2	X	X
Miscellaneous	9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

- X = Compatible, but may be subject to additional provisions, e.g. Column 16b
- 1 = Away from
- 2 = Separated from
- 3 = Separated by a complete compartment or hold from
- 4 = Separated longitudinally by an intervening complete compartment or hold from

Step 3: UN number entry specific segregation requirements

Check the specific segregation requirements in Column 16b of the Dangerous Goods List.

UN numbers assigned to segregation groups are listed in IMDG 3.1.4. There are 18 segregation groups with codes detailed at 7.2.5.2.

Where in the Dangerous Goods List in Column 16b a particular segregation requirement refers to a group of substances, such as "acids", the particular segregation requirement applies to the respective segregation group.

The segregation requirements listed in Column 16b take precedence over the general segregation provisions detailed in the segregation table.

The codes given in Column 16b are detailed at IMDG 7.2.5.2 and 7.2.8

Step 4: additional provisions not listed in the IMDG Code

Check whether any goods shipped as Not Otherwise Specified (NOS) entries require assigning to a segregation group by the consignor in accordance with IMDG 3.1.4.2.

Note: this will require an additional entry in the transport document, see IMDG 5.4.1.5.11.

Check whether any segregation provisions require implementing on a voluntary basis in accordance with IMDG 3.1.4.3.

Multimodal requirements

Consideration must be given to any additional segregation that may be a requirement of other regulations for part of the journey.

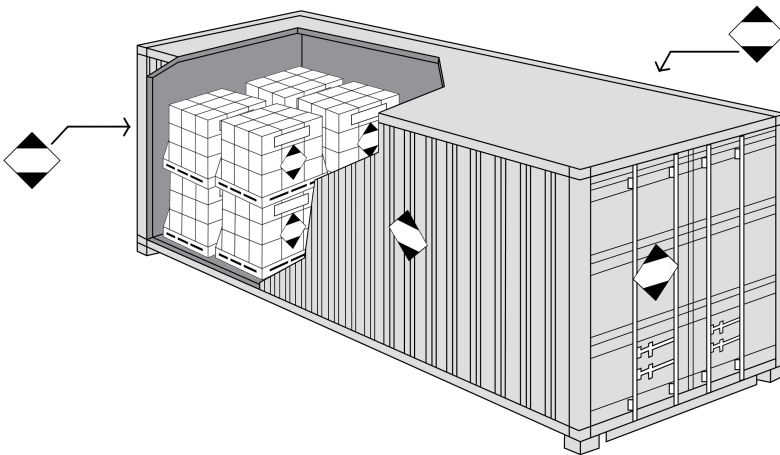
Given that the goods will most often be loaded into a sealed CTU, these rules must be complied with at the point of dispatch.

However, it should be noted, that typically the IMDG segregation rules are either the same as, or more restrictive, than the segregation rules of other modes of transport.

CTU marks and placards

Limited quantity goods

Containers and semi-trailers carrying limited quantity goods and no other dangerous goods, should be marked on all four sides with limited quantity placards.



Vehicles, such as vans, need only be marked on both sides and the rear.

The marine pollutant placard is not required.

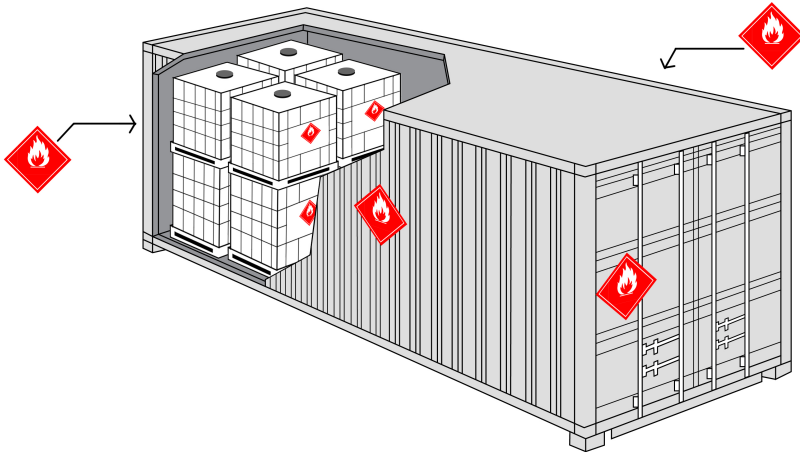
Limited quantity goods and other dangerous goods

The placarding requirements for the other dangerous goods take precedence and the limited quantity placards are not required.

Full placarding requirements

Hazard placards, plus hazard placards for any subsidiary risks should be affixed on both sides and on both ends of containers, semi-trailers and on

both sides and the rear of vehicles, plus the marine pollutant placard if



applicable.

Cargo Transport Units (CTUs) containing 4000 kg gross mass or more of goods to which only one UN number has been assigned, should in addition be marked with the UN number (not including the letters UN), either within a white box in the placard or on an adjacent orange plate in accordance with the IMDG Code 5.3.2.1.2.

The full requirements are detailed in IMDG Chapter 5.3.

Format and responsibility

Where required by the IMDG Code, placards should be a minimum of 250 mm by 250 mm.

In terms of a CTU, it is the responsibility of the loader of the CTU to affix the marks and placards and this is confirmed by one of the conditions signed for as part of the packing certificate.

Multimodal considerations: vehicles carrying packages by road

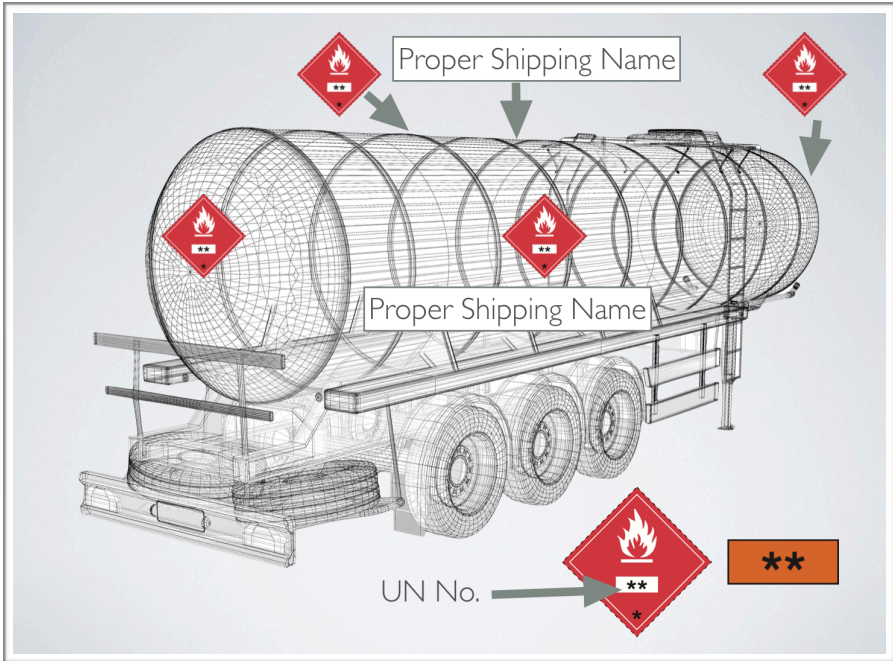
Vehicles carrying packaged dangerous goods, unless otherwise exempted e.g. below the load threshold of ADR 1.1.3.6 or carrying only limited quantity goods, must display orange plates.

Vehicles must display an orange plate to the front and to the rear of the vehicle, in accordance with ADR 5.3.2.

Vehicles & CTUs carrying packages under a combined ADR & IMDG journey placarding and marking requirements:

Goods	Placards (250x250mm)	Orange Plates on Vehicle	Additional Placards	UN Number
UN Class/ Division but no LQ	Yes, both sides and both ends	Yes, if above ADR Transport Category Threshold	Fumigation Mark if Applicable	If applicable under 5.3.2.1 (only one UN number carried & if > 4000kg)
Limited Quantity Goods	Yes, LQ	No	Fumigation Mark if Applicable	No
Mixed UN Class/ Division & Limited Quantity	No LQ but placards for other goods	Yes, if above ADR Transport Category Threshold	If Applicable for DGs Marine Pollutant & or Fumigation Mark	No

Tank marking and placarding



Hazard placards, plus hazard placards for any subsidiary risks, and the UN number; should be affixed on both sides and on both ends of tanks, along with the marine pollutant placard if applicable.

The proper shipping name should be marked on both sides of each tank.

The full requirements are detailed in IMDG Chapter 5.3.

Format

Placards should be a minimum of 250 mm by 250 mm and the UN number should be at least 65 mm high.

The proper shipping name should also be 65 mm high and be displayed on a background of contrasting colour.

Sizes may be reduced for portable tanks of less than 3000 L.

Multimodal considerations

Where a journey is multimodal, the provisions of other regulations must be taken into account, such as the requirement to display orange plates on the vehicle in ADR (see ADR 1.1.4.2.1 and 1.1.4.2.2 depending on the type of tank involved - note tank vehicles are not covered by 1.1.4.2.1 (c) but are instead covered by ADR 1.1.4.2.2).

Documentation

All dangerous goods, including those packed to the limited quantities provisions, when transported by sea, must be declared on a dangerous goods transport document.

The dangerous goods transport document is often referred to as a dangerous goods note or "DGN" for short.

The following information is required:

- Consignor name and address
- Consignee name and address
- The dangerous goods description for each dangerous substance identified by each UN number
- Number and description of packages and total quantity of each item of dangerous goods

The dangerous goods description should be presented in the following order:

- UN number,
- proper shipping name (supplemented as required),
- class (with subsidiary hazard/hazards in brackets if applicable),
- packing group (if applicable)

Supplementing the proper shipping name and dangerous goods description

The proper shipping name can be written in caps or lower case.

For solutions or mixtures, qualifying words such as "SOLUTION" or "MIXTURE" are added as part of the proper shipping name. For example: "ACETONE SOLUTION".

For N.O.S. entries, the proper shipping name should be supplemented with up to **two technical names** of the main substances contributing to the classified hazards.

For marine pollutants, the dangerous goods description should be supplemented with the words "MARINE POLLUTANT" or "MARINE POLLUTANT/ENVIRONMENTALLY HAZARDOUS".

For generic or not otherwise specified (NOS) entries, the proper shipping name should also be supplemented with the chemical name of the marine pollutant (see also IMDG 3.1.2.9).

For wastes, the proper shipping name should be preceded by the word 'waste'.

For flammable liquids, the minimum flash point should be indicated.

For example:

UN 1992, Waste Flammable Liquid, Toxic, N.O.S. (Contains Methanol and Petroleum distillates), 3 (6.1), PG II, (12 °C c.c.), MARINE POLLUTANT.

Limited quantity goods must be declared on the multimodal DGN with the words "LIMITED QUANTITY" or "LTD QTY" following the dangerous goods description.

There are additional requirements for empty tanks, empty packages and certain class specific provisions, particularly for Class 1 and Class 7. These are detailed in IMDG Chapter 5.4.

Shipper's declaration

The transport document must include a certification, as detailed by IMDG 5.4.1.6.1 that is to be signed and dated by the consignor.

Container/vehicle packing certificate

This is often combined into the DGN in addition to the shipper's declaration and is a separate section to be signed for containers or vehicles carrying packages.

It is not required for tanks, but must be signed for packages when applicable.

This declaration must only be signed by the packer or loader if they themselves have had responsibility for loading the full CTU.

The declaration is not always included on the DGN, but the following is being certified:

1. The container/vehicle was clean, dry and apparently fit to receive the goods;
2. Packages which need to be segregated in accordance with applicable segregation requirements have not been packed together onto or in the container/vehicle (unless approved by the competent authority concerned in accordance with 7.3.4.1);
3. All packages have been externally inspected for damage, and only sound packages have been loaded;
4. Drums have been stowed in an upright position, unless otherwise authorised by the competent authority, and all goods have been properly loaded and, where necessary, adequately braced with securing material to suit the mode(s) of transport for the intended journey;

5. Goods loaded in bulk have been evenly distributed within the container/ vehicle;
6. For consignments including goods of class 1 other than division 1.4, the container/vehicle is structurally serviceable in accordance with 7.1.2;
7. The container/vehicle and packages are properly marked, labelled and placarded, as appropriate;
8. When substances presenting a risk of asphyxiation are used for cooling or conditioning purposes (such as dry ice (UN 1845) or nitrogen, refrigerated liquid (UN 1977) or argon, refrigerated liquid (UN 1951)), the container/ vehicle is externally marked in accordance with 5.5.3.6, and,
9. A dangerous goods transport document, as indicated in 5.4.1, has been received for each dangerous goods consignment loaded in the container/ vehicle.

Multimodal Requirements

When the journey involves road transport for which ADR is applicable, the dangerous goods description must be supplemented with the tunnel code after the PG (if applicable), unless it is known that the vehicle will not pass through any tunnels.

When CTUs are marked and placarded in accordance with the IMDG Code and this marking and placarding is not in accordance with ADR, but is never the less permitted by ADR under the multimodal provisions of 1.1.4.2.1 (e.g. for containers and portable tanks) the DGN should include the following statement:

"Carriage in accordance with 1.1.4.2.1".

Dangerous Goods Note

1. Exporter:		2. Customs reference/status:			
		3. Booking number:		4. Exporters reference:	
		5. DSHA Notification (in accordance with DSHA Regulations (as amended)) given by:			
6. Consignee:		Shipper:	Cargo Agent:	Transport operator:	Shipper:
		8. International carrier:			
		For use of receiving authority only			
7. Freight Forwarder:					
9. Other transport details:					
10. Vessel		Port of Loading			
11. Port of discharge		Destination			
TO THE RECEIVING AUTHORITY – Please receive for shipment the goods described below subject to your published regulations and conditions (including those as to liability.)					
12. Shipping marks Number and kind of packages, description of goods Specify: Proper Shipping Name*, Hazard Class, UN No., additional information (if applicable) attached. For RID/ADR/CDG Road requirements see notes attached.			13. Net wt (kg) of goods	13a. Gross wt (kg) of goods	14. Cube (m3) of goods
*Proper Shipping Name – Trade names alone are unacceptable					
15. CONTAINER VEHICLE PACKING CERTIFICATE I hereby declare that the goods described above have been packaged/ loaded into the container/ vehicle identified below in accordance with the provisions shown attached THIS DECLARATION MUST BE COMPLETED AND SIGNED FOR ALL CONTAINER/VEHICLE LOADS BY PERSON RESPONSIBLE FOR PACKING/ LOADING			Name of Company: Name/Status of Declaration: Place and Date: Signature of declarant		Total Gross weight of goods
16. Container identification number/vehicle registration number:		16a. Seal Number:	16b. Container/vehicle size and type		16C. Tare (Kg).
16D. Tare (Kg).		DOCK/TERMINAL RECEIPT			17. Name and telephone number of shipper preparing this note
HAULIER DETAILS: Haulier's name: Vehicle reg. no.: Drivers Signature:		RECEIVING AUTHORITY REMARKS Received the above number of packages/containers/trailers in apparent good order and condition unless stated hereon Receiving authority signature and date:			Name/status of declarant Place and date: Signature of declarant:

Stowage categories

General stowage provisions

The stowage categories for each UN entry, excluding classes 1 and 6.2 are given in column 16a of the dangerous goods list.

Additional stowage and handling codes are also given in column 16a.

These codes are further interpreted in IMDG 7.1.3.2 and 7.1.5 and 7.1.6.

The stowage provisions for Class 1 goods are detailed at 7.1.3.1.

For class 6.2, the stowage provisions are given by the competent authority.

Limited quantity goods

Limited quantity goods are assigned to Category A and any other stowage provisions detailed in column 16a of the dangerous goods list are not applicable.

Why is this important to shippers?

These provisions, as detailed in chapter 7.1, along with the segregation provisions detailed in chapter 7.2, detail how CTUs are to be stowed on different types of ships, as detailed in chapters 7.4 to 7.7.

At first glance you may not find this of much relevance as a shipper of dangerous goods.

However, the stowage provisions will also determine whether the goods in question may be transported by passenger ship or cargo ship.

Therefore these provisions may be very important in determining the route of transport available for the goods you wish to ship.

For example, goods of stowage categories 03, 04, 05, D and E are **prohibited on passenger ships**.

Certain locations may not be served by cargo ships and you may therefore require approval or exemption from the competent authority (see IMDG 7.9.1) and permission of the shipping line in order to circumvent these requirements.

49 CFR: the USA HazMat regulations

Dangerous goods are referred to as "Hazardous Materials" abbreviated to "HazMat" in the USA.

The transport of HazMat within the USA is governed by Title 49 to the Code of Federal Regulation (49 CFR).

49 CFR is based on the UN Model Regulations but there are some important differences, especially with regards to marine pollutants and combustible liquids.

49 CFR is updated regularly and the most up to date version is published online.

The applicability of international standards in 49 CFR

49 CFR recognises the IMDG Code as an international standard and allows the use of the IMDG Code for the transportation of HazMat in subsection 171.22.

Subject to the shipment also conforming to §171.23 and §171.25 of 49 CFR.

Marine pollutants

For domestic transport in the USA, marine pollutants are classified differently to the requirements of the IMDG Code.

Specific substances are identified as marine pollutant in Appendix B to §172.101 but there is no additional classification criteria given in 49 CFR, as there is in the IMDG Code and in the UN Model Regulations.

In addition, certain hazardous substances, listed in Appendix A to §172.101 are included in Class 9 as UN 3082 or UN 3077, regardless of their classification as a marine pollutant or environmental hazard.

Therefore many substances which would be classified as marine pollutant via the IMDG Code, may not be classified as marine pollutant for US domestic transport.

49 CFR recognises this problem however, and allows the application of either set of rules for classification, in accordance with sub paragraph 4 of Appendix B to §172.101.

This should therefore be taken into account for HazMat exiting the USA via ship (referred to as vessel in 49 CFR), to ensure that the proper classification has been declared for international transport by sea.

Combustible liquids

Whilst the IMDG Code covers 'flammable' liquids in Class 3, in addition, 49 CFR includes liquids which although may not have a low flash point, are nevertheless 'combustible'. The definition of a combustible liquid is given in subparagraph (b) of §173.120.

Note that where a combustible liquid with no other hazard characteristics is imported or exported from or to the USA, additional provisions may have to be complied with, in accordance with 49 CFR, as required by §171.22 (c).

Additional documentation requirements

For shipments to the USA, in accordance with 49 CFR §171.22 (g)(1) the shipment must be accompanied by:

- Emergency Response Information, and
- an Emergency Response Telephone Number.

This is usually complied with by providing a copy of the Safety Data Sheet with the dangerous goods documentation and providing a 24 hour telephone number on the dangerous goods documentation itself.



www.ecostarenvironmental.co.uk