SMSA Express Transportation Co., Ltd.
P.O. Box 63259 Riyadh 11526, K.S.A.

Dangerous Goods Sea Freight Manual

Guidance as per the current IMDG Code

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SMSA EXPRESS

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Kingdom of Saudi Arabia

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Important Note:

This is not a Country specific GUIDE and is allowed for general SMSA use for conducting its day to day operations. However, the major reference for DG by SEA remains to be the IMDG Code latest Edition.

IMDG CODE (SEAFREIGHT) GUIDANCE SECTION

TABLE OF CONTENTS/INDEX

1) IMDG Code

The IMDG Code is **mandatory in international law** and is a set of norms, prescriptions regulations and information on dangerous cargo for shipment by Sea. SMSA personnel shipping dangerous goods by Sea are therefore required to adhere to the Provisions of the IMDG Code.

2) Training

To ensure dangerous goods shipments are shipped in **compliance** and **safely** and to meet the **mandatory** training requirements. As per **Chapter 1.3** of the IMDG Code on Training from **1 January 2010** IMDG Code **training became mandatory for all shore-side personnel** involved in dangerous goods transport by sea:-

Shippers and forwarders, Container packers and consolidators, Shipping line operations and booking staff, Stevedores, Port staff, Transport companies.

As SMSA is a Forwarder, training and re-training is therefore mandatory.

DANGEROUS GOODS CLASSIFICATION

Classifying Dangerous Goods

Definition

Dangerous goods are substances or articles that pose a risk to people, property or the environment, due to their **chemical or physical properties**. They are usually classified with reference to their **immediate risk.**

Classification of Dangerous Goods

The same as for other modes of transport, the classification is made by the consignor/shipper or by the appropriate competent authority. The IMDG Code classifies dangerous goods as follows by its main Classes (further divisions shown below):

- Class 1: Explosives
- Class 2: Gases
- Class 3: Flammable Liquids
- Class 4: Flammable solids; substances liable to spontaneous combustion; substances which, in contact with water, emit flammable gases
- Class 5: Oxidizing substances and organic peroxides
- Class 6: Toxic and infectious substances
- Class 7: Radioactive material

• Class 8: Corrosive substances
• Class 9: Miscellaneous dangerous substances and articles
The numerical order of the classes and divisions does not indicate the degree of danger.

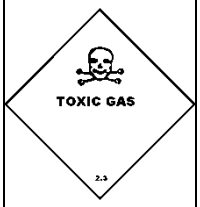
Classes, divisions, packing groups
Substances (including mixtures and solutions) and articles subject to the provisions of this Code are assigned to one of the classes 1-9 according to the hazard or the most predominant of the hazards they present. Some of these classes are subdivided into divisions. These classes or divisions are as listed below:
Class 1: Explosives
Class 1
Where a ***** is shown on a placard/label for Class 1, it is the designated space for the Compatibility Letter, used for segregation of incompatible dangerous goods of Class 1.

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 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
Marine pollutants and wastes
Many of the substances assigned to classes 1 to 9 are deemed as being marine pollutants. Certain marine pollutants have an extreme pollution potential and are identified as severe marine pollutants.

CLASS	CLASS NAME	SYMBOL	EXAMPLES	POTENTIAL HAZARDS / EFFECTS	SOURCES OF IDENTIFICATION
1	EXPLOSIVES: DEFINITION: A substance, article or device that is designed to function by explosion i.e., an extremely rapid release of gas, heat or pressure	There are **6 divisions** in this class! 	• Dynamite • Black powder • Bombs • Cartridges for weapons • Flash powder • Ammunition • Detonating Cord • Fertilizer-fuel mixtures	• Capable of producing gas at such a temperature, pressure and speed resulting in damage to the surroundings • May explode and throw fragments • Risk of fire • Risk of toxicity – may produce irritating, corrosive and/or toxic gases	• Establish the chemical or product name • Refer to specific container labeling • Refer to the U.N Number • Refer to the suppliers Material Safety Data Sheet (MSDS) • Refer to an Emergency Response Guidebook e.g. North American) • Refer to Trec Cards (i.e Manifest of chemicals /products on a load • Refer to the vehicle placard
2 2.1	GASES: Flammable Gas DEFINITION: A substance that easily catches fire	There are 3 **divisions** in this class! 	• Methane • Butane • LP Gas	• Easily ignited by heat, sparks or flames • Will form explosive mixtures with air	• Establish the chemical or product name • Refer to specific container labeling • Refer to the U.N Number

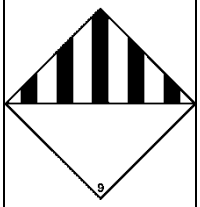
	when exposed to a spark or flame		• Propane • Propylene	• Vapours may travel to source of ignition and flash back • Containers may explode when heated • Ruptured cylinders may rupture • May cause dizziness or asphyxiation • Contact with gas may cause burns, severe injury and/or frostbite • Fire may produce irritating and/or toxic gases	• Refer to the suppliers Material Safety Data Sheet (MSDS) • Refer to an Emergency Response Guidebook e.g. North American) • Refer to Trec Cards (i.e Manifest of chemicals /products on a load • Refer to the vehicle placard
2.2	Non-flammable, non-toxic gas DEFINITION: May not easily cause fire, yet are dangerous because: * they are compressed; or * may deprive the air of oxygen; or * may intensify a fire by feeding it extra oxygen		• Carbon Dioxide • Helium • Oxygen	• Containers may explode when heated • Ruptured cylinders may rupture • Many gases will spread along the ground and collect in low, confined areas e.g. sewers, basements, tanks • Some may burn, but none ignite readily • May cause dizziness or asphyxiation • Contact with gas may cause burns, severe injury and/or frostbite • Fire may produce irritating and/or toxic gases	• Establish the chemical or product name • Refer to specific container labeling • Refer to the U.N Number • Refer to the suppliers Material Safety Data Sheet (MSDS) • Refer to an Emergency Response Guidebook e.g. North American) • Refer to Trec Cards (i.e Manifest of chemicals /products on a load • Refer to the vehicle placard

2.3	Toxic gases DEFINITION: These are so poisonous or corrosive that they are known to be extremely dangerous to life and animals		• Chlorine • Carbon monoxide • Methyl bromide • Sulphur dioxide	• Some may burn, but none ignite readily • Vapours spread along the ground • Containers may explode when heated • Ruptured cylinders may rupture • May be fatal if inhaled or absorbed through the skin • Vapours may be irritating • Contact with gas may cause burns, severe injury and/or frostbite • Fire may produce irritating, corrosive and/or toxic gases	• Establish the chemical or product name • Refer to specific container labeling • Refer to the U.N Number • Refer to the suppliers Material Safety Data Sheet (MSDS) • Refer to an Emergency Response Guidebook e.g. North American) • Refer to Trec Cards (i.e Manifest of chemicals /products on a load • Refer to the vehicle placard
3	Flammable liquids DEFINITION: Liquids that ignite easily and burn fiercely. They have a flashpoint of 60.5º C or below.		• Acetone • Benzene • Petrol • Diesel • Toluene • Isobutanol • Pine oil • Diethyl ether	• The mixture of vapour given off from the substance and air may ignite. • Ignition may be explosive and violent • Fumes may be toxic • Fire risk • Eye, and skin contact, ingestion and inhalation may be toxic, harmful or irritant. • Vapours may cause dizziness	• Es Establish the chemical or product name • Refer to specific container labeling • Refer to the U.N Number • Refer to the suppliers Material Safety Data Sheet (MSDS) • Refer to an Emergency Response Guidebook e.g. North American) • Refer to Trec Cards (i.e Manifest of chemicals /products on a load • Refer to the vehicle placard

4 4.1 4.2 4.3	Other flammable substances Flammable Solids DEFINITION: A substance that is easily lit by spark or flame, burns easily or catches fire through friction Spontaneously Combustible materials DEFINITION: Liquids or solids that self-ignite when exposed to air for 5 minutes Dangerous when wet DEFINITION: Substances that catch fire by themselves or emit flammable or toxic gases when exposed to moisture	There are 3 divisions in this class!   	• Sulphur • Rubber scrap • Aluminium • Matches • Animal fibers • Carbon • Oily rags • Sodium sulphide • Phosphorous • Magnesium powder • Potassium metal alloys • Sodium • Zink dust	• Risk of fire • May re-ignite after fire is extinguished • May give off corrosive or toxic gases when heated, on fire or wet • May burn skin and eyes • Ingestion or inhalation of vapours may cause severe injury or death	• Establish the chemical or product name • Refer to specific container labeling • Refer to the U.N Number • Refer to the suppliers Material Safety Data Sheet (MSDS) • Refer to an Emergency Response Guidebook e.g. North American) • Refer to Trec Cards (i.e. Manifest of chemicals /products on a load • Refer to the vehicle placard

5 5.1 5.2	Oxidizers and organic peroxides Oxidizers DEFINITION: Although not necessarily flammable they can produce large amounts of oxygen increasing the risk and intensity of fire in other materials Organic peroxides DEFINITION: Substances which are sensitive to heat, are thermally unstable and generate increasing amounts of heat as they decompose. This speeds up the chemical breakdown which in turn accelerates the heat buildup.	There are 2 divisions in this class!   	• Ammonium nitrate mixed fertilizer • Calcium hypochlorite • Lead nitrate • Lead dioxide • Acetyl benzoyl peroxide • Methyl ethyl ketone peroxides	• Will accelerate burning when in involved in a fire • May explode from heat or contamination • Inhalation, ingestion or contact may cause severe injury, burns or death • Intense heat generation can lead to violent explosion • Containers may explode • Inhalation, ingestion or contact may cause severe injury, burns or death • May cause damage to the eye	• Establish the chemical or product name • Refer to specific container labeling • Refer to the U.N Number • Refer to the suppliers Material Safety Data Sheet (MSDS) • Refer to an Emergency Response Guidebook e.g. North American) • Refer to Trec Cards (i.e Manifest of chemicals /products on a load • Refer to the vehicle placard

6 6.1 6.2	Toxic and infectious substances Toxic substances DEFINITION: Substances that can cause illness or death if swallowed, inhaled or if absorbed by the skin Infectious substances DEFINITION: Substances which may cause severe disabling or fatal disease in humans or animals	There are 2 divisions in this class!   	• Arsenic • Cyanide • Phenol • Lead acetate • Some Pesticides • Hospital waste • Biological samples for testing • Vaccines • Blood • Needles	• Emit poisonous gases in a fire • Reaction with water/moist air releases toxic, corrosive or flammable gases • Highly toxic. Fatal if inhaled, swallowed or absorbed through the skin • Inhalation or contact with substance may cause infection, disease or death • Risk of disease e.g. HIV , Hepatitis B • Keep away from food • Present a severe pollution problem • Difficult to dispose of and remain dangerous for long periods of time	• Establish the chemical or product name • Refer to specific container labeling • Refer to the U.N Number • Refer to the suppliers Material Safety Data Sheet (MSDS) • Refer to an Emergency Response Guidebook e.g. North American) • Refer to Trec Cards (i.e. Manifest of chemicals /products on a load • Refer to the vehicle placard
7	Radioactive materials DEFINITION:		• X-ray machines • Radiation sources used for x-ray	• Exposure may cause damage to living tissue ○ **Alpha particles** do not penetrate the skin and	• Establish the chemical or product name • Refer to specific container labeling

	Liquids that ignite easily and burn fiercely. They have a flashpoint of 60.5º C or below.		examination of people and metals e.g. Radium, Cobalt, Radon, Uranium and Plutonium	are not hazardous unless swallowed or absorbed in the body e.g. via a wound ○ **Beta particles** may penetrate the skin causing damage to body cells unless shielding is employed ○ **Gamma rays and X-ray radiation** need thicker shielding and neutrons require very thick shielding	• Refer to the U.N Number • Refer to the suppliers Material Safety Data Sheet (MSDS) • Refer to an Emergency Response Guidebook e.g. North American) • Refer to Trec Cards (i.e. Manifest of chemicals /products on a load • Refer to the vehicle placard
8	Corrosives DEFINITION: Solids or liquids that attack skin, clothing and other materials. They comprise of acids or caustic substances which chemically eat away a substance and can severely damage living tissue		• Mercury • Sodium hydroxide (caustic soda) • Sulphuric acid	• Toxic • Fire will produce irritating, corrosive and/or toxic gases • Corrosion gives of flammable gases • Metallic corrosion gradually erodes holes and can cause a container with other hazardous substances to leak and react with other substances	• Establish the chemical or product name • Refer to specific container labeling • Refer to the U.N Number • Refer to the suppliers Material Safety Data Sheet (MSDS) • Refer to an Emergency Response Guidebook e.g. North American) • Refer to Trec Cards (i.e. Manifest of chemicals /products on a load • Refer to the vehicle placard
9	Miscellaneous DEFINITION: These are goods that present a danger during transportation but cannot be classified in any of the other		• Substances which have anaesthetic or noxious effect, fine dusts, lifesaving appliances, wet battery operated appliances and	• Environmentally hazardous • Anaesthetic or noxious effect • Fine dusts could endanger health by inhalation • May burn skin and eyes	• Establish the chemical or product name • Refer to specific container labeling • Refer to the U.N Number • Refer to the suppliers Material Safety Data Sheet (MSDS)

	classes		substances carried at elevated temperatures e.g. ○ Airbag inflators ○ Asbestos ○ Battery-powered wheelchairs ○ Dry ice ○ Lithium batteries		• Refer to an Emergency Response Guidebook e.g. North American) • Refer to Trec Cards (i.e. Manifest of chemicals /products on a load • Refer to the vehicle placard

To determine the class of a substance, mixture or solution having more than one hazard when it is not specifically listed by name in the IMDG Code.
Classification of substances, mixtures and solutions with multiple hazards (precedence of hazard characteristics) – SEE CHAPTER 2.0.3 OF THE IMDG CODE.
Precedence of hazards Table – Chapter 2.0.3.6

3.4 Packing Groups, Classifying Criteria

The risks presented by dangerous goods in maritime transport are related to their packaging, therefore it must be safe, well designed and manufactured and in good condition. It is very unlikely you will suffer injuries due to this cargo, but if the cargo is damaged, it is possible for dangerous substances or vapors to be released.
The packages/containers must comply with the following requirements:

• Must not be affected by the cargo it contains
• Must be strong enough to endure the rough treatment and risks involved in maritime transport
• Must be able to endure rain, wind and sea water
• Must be practical and adequate for the cargo they carry
• Must be in good condition
• Must be correctly marked, label and signposted

For packing purposes, dangerous goods belonging to all classes, except for class 1, 2, 6.2 and 7 have been divided into three “packing groups” depending on the degree of danger they represent:

• **Packing Group I – High level of danger**
• **Packing Group II – Medium level of danger**

• **Packing Group III – Low level of danger**

'Packing Group' (referred to as 'Packaging Group' in earlier versions of the Regulations and Code) does not apply to those Classes/Divisions of Dangerous Good against which 'Not applicable' appears in the table.

The following Class/Packing Groups may be encountered:

Class/Division	**Packing Group/s**
1	Not applicable
2	Not applicable
3	I, II or III
4	I, II or III
5.1	I, II or III
5.2	II only
6.1	I, II or III
6.2	Not applicable
7	Not applicable
8	I, II or III
9	II or III

Packing Groups shown on packaging

The UN assigns a packing group classifying the regulated material further by the amount of risk each material poses during transportation. **The packing group also determines the degree of protective packaging required**.

Packing Group I – Greatest Danger

- Shown as X in the UN marking on the package.
- Some combinations of different classes of dangerous goods on the same vehicle or in the same container are forbidden if one of the goods is Packing Group I.

Packing Group II – Medium Danger

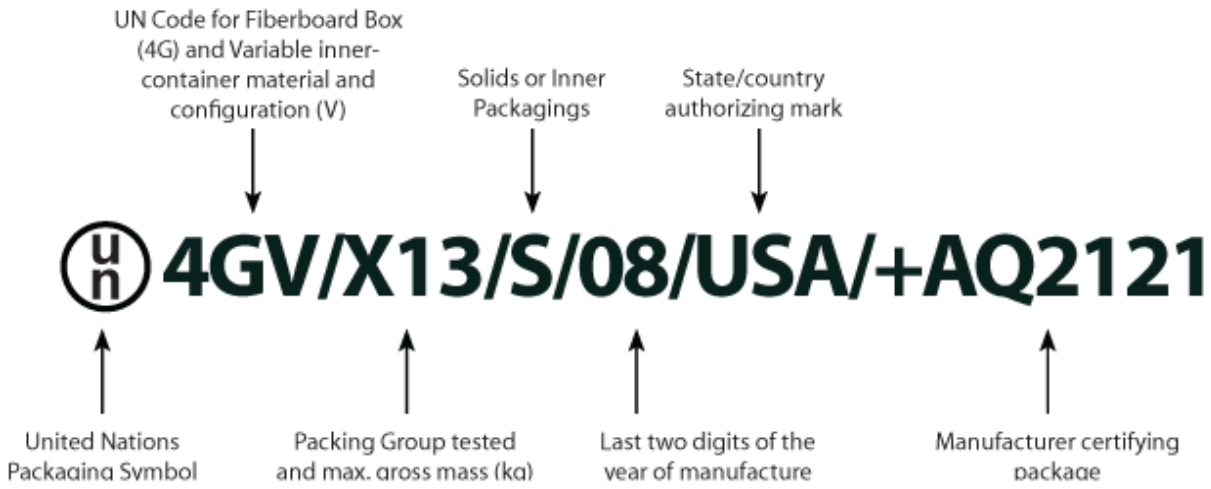
- Shown as Y in the UN marking on the package.

Packing Group III – Least Danger

- Shows as Z in the UN marking on the package.

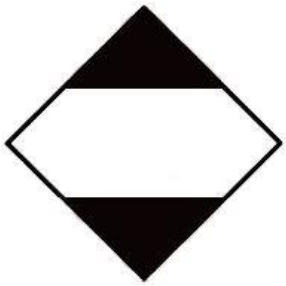
3.5 UN Packaging and Approval Marking

Most packages also need to bear the UN packaging approval mark confirming that the packaging has been tested and approved in accordance with relevant United Nations performance standards. Example below:



No person may offer to transport dangerous goods unless the goods are properly marked, labeled, placarded, described and certified on a document.

4) Limited quantity & Excepted quantity consignments



Different marking requirements apply to packages consigned in accordance· with the "Limited Quantity" & "Excepted Quantity" provisions of Part 3 Volume 2 of the Code.

3.9.1 a) Limited quantities

Part 3 (chapter 3.4) of the Code provides concessions from a number of the duties normally placed on the consignor when dangerous goods are being shipped in small packages which qualify for "limited quantities" status. The "limited quantities" section comprises:
details of the inner packaging quantity limitations on a class, packaging group and product state (solid, liquid or gas) for substances, articles and materials which do qualify as limited quantities; the general packing requirements for limited quantity consignments; directions relating to the mixed packing and segregation of different dangerous goods shipped as limited quantities; details of the concessions which apply to limited quantities consignments.

Permitted consignments

The table of articles and substances by UN number in chapter 3.2 (page 24 ff) has a column for permissible limited quantities - column (7a) - and if the figure 0 is given this means no amount of limited quantities is permitted to be transported.

Packaging requirements

Dangerous goods shall be packed only in inner packagings placed in suitable outer packagings. Intermediate packagings may be used. In addition, for articles of Division 1.4, Compatibility Group S, the provisions of section 4.1.5 shall be fully complied with. The use of inner packagings is not necessary for the transport of articles such as aerosols or "receptacles, small, containing gas". The total gross mass of the package shall not exceed 30 kg.
The packagings must meet the general packing requirements of 3.4.2.1 (e.g., quality, product compatibility, ullage (for liquids) and venting) but they do not have to be tested and approved to the UN specification standards (see part 10) - i.e., they do not have to be UN-certified packs. Shrink-wrapped or stretch-wrapped trays are acceptable as outer packagings for limited quantities but only up to a maximum gross weight of 20 kg.
There is no limit on the number of limited quantities packages which may be consigned together.

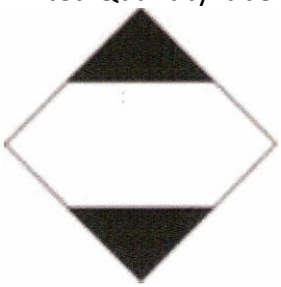
Mixed packing, segregation and stowage

Different dangerous goods may be packed together in the same outer packaging provided that they do not require segregation and will not interact dangerously in the event of leakage (see 3.4.4.1).
No segregation is required between packages containing limited quantities or in relation to other dangerous goods. (3.4.4.2). All dangerous goods carried as limited quantities are allocated to stowage category A (see 3.4.3).

Consignment concessions

Limited quantities packages do not have to be labelled nor bear the marine pollutant mark. However, unless otherwise provided, packages must be marked with either:
the PSN and UN Number; or
the words dangerous goods in limited quantities of class/classes ....

If the latter option is used, it is regarded as the proper shipping name and no UN Number is required on the package.
Limited quantities consignments packed and distributed for the purposes of personal care or household use do not require any marks on the packages.
"Cargo transport units" (freight containers, vehicles, trailers, rail wagons) packed only with limited quantities do not have to be placarded. However, they must be marked with the words limited quantities.
The standard documentation requirements apply to limited quantities consignments - see 3.4.6. In addition to the other information required, the description of the consignment must include the words limited quantity.
For AEROSOLS (UN 1950), no division is assigned and the class can be shown as 2 on the DGN.
Limited Quantity label:



3.9.1 b) EXCEPTED QUANTITIES
Part 3 (chapter 3.5) of the Code provides concessions from a number of the duties normally placed on the consignor when dangerous goods are being shipped in very small packages which qualify for "excepted quantities" status.
The "excepted quantities" section comprises:
details of the inner packaging quantity limitations on a class, packaging group and product state (solid, liquid or gas) for substances, articles and materials which do qualify as excepted quantities; the general packing requirements for excepted quantity consignments; directions relating to the mixed packing and segregation of different dangerous goods shipped as excepted quantities; details of the concessions which apply to excepted quantities consignments.

Permitted consignments
The table of articles and substances by UN number in chapter 3.2 (page 24 ff) has a column for excepted quantities - column (7b) - and if the code E0 is given this means no amount of excepted quantities is permitted to be transported. (See also 3.5.1.2).

Packaging requirements
In all cases, dangerous goods shipped as excepted quantities must be packed in inner packagings placed inside a suitable outer packaging – i.e., in combination packaging.
The packagings must meet the general packing requirements of 3.5.2.1
The contents shall be surrounded with cushioning material such that the full contents will be absorbed if there was a leak of all the quantity carried.
The total gross weight of any package must not exceed 30 grams or 30 milliliters or as specified (refer 3.5.1.2).
The total mass permissible is as per this table (3.5.1.2) but not exceeding 1000 grams or milliliters.

Maximum number of packages in any cargo transport unit
The maximum number of packages containing excepted quantities that are allowed in one container (CTU) is 1000.

Labelling
Excepted quantities packages have to be labelled with the appropriate label see 3.5.4.1

5) Labelling of packages
Except where otherwise specified in the Code, every package and IBC must bear a diamond label or stencil of the label indicating the danger class of the substance it contains. Where the substance has a subsidiary risk or risks, the appropriate subsidiary risk label(s) must also be displayed.
The appropriate danger class and subsidiary risk labels can be identified by reference to the substance entry in the DG List in volume 2 of the Code. Examples of the labels and signs are shown inside the front cover of each volume of the Code and in 5.2.2.2.2 of volume 1.
The class number must be shown in the bottom corner of the label which represents the danger class of the substance. In the case of labels for class 5 substances, the appropriate division must be indicated - i.e., 5.1 or 5.2.

The use of text on labels - e.g., *TOXIC* or *FLASHPOINT* - is optional, except for class 7, when the specified text must be shown (5.2.2.2.1.5).
Labels must be not be less than 100 mm x 100 mm except in the case of a package which, because of its size, can only bear smaller labels.

Exemptions
Some substances are exempt from" the package labelling requirements. Any such exemption is identified on the schedule page for the substance concerned. In certain cases other marks are required to be displayed instead - e.g., the danger class of the substance.

Marking, labelling and placarding

The IMDG Code states that all packaging, packages and drums carrying dangerous goods must be labeled. The labels are in the shape of a diamond in white, orange, blue, green or red, or a combination of these colors. Symbols illustrating the danger of the class are also required. In general, each label is divided into two parts, the bottom half and the top half.

The top half is for the symbol of the class of the good(s), and the lower half is for the text, class or division number. The minimum dimensions of labels are 10 cm x 10 cm. Labels must be firmly adhered to and placed on the package so that it can easily be seen. The quality of the labels must be such so they do not deteriorate outdoors and remain unaltered during the complete transport period and at least three months in the sea.

Due to the fact that dangerous goods can pose more than one risk, it is also necessary to use “secondary risk labels”. These labels are the same as the ones showing the primary risk, regarding their color, shape and symbols. Even though the IMDG Code says nothing to this effect, in some countries the class number is only indicated in the primary risk label, and that the secondary risk label does not include the class number. This is an effective way to distinguish between both.

Placards
The IMDG Code determines that all “cargo transport units” containing dangerous goods must be placarded. In this context, cargo transport units are containers, containers for liquids, tank

vehicles, vehicles transporting goods by land, railway wagons with water tanks, good tanks destined for intermodal transport. Placards have the same shape, colors and symbols as the labels, but their dimension is 25 x 25 cm. Containers **carrying more than 4000 kilograms of dangerous goods, and all tanks for liquids and gases must have the "United Nations number**". The UN number has four digits and is the number assigned by the United Nations to all goods identified and classified as dangerous.

• Containers carrying dangerous goods must display at least one placard on each side and one on each end of the unit (this is to say, on its four sides)
• Rail wagons must be placarded on at least both sides
• Freight containers, semi-trailers and portable tanks must be placarded on all four sides
• Road vehicles must display appropriate placards on both sides as well as the rear

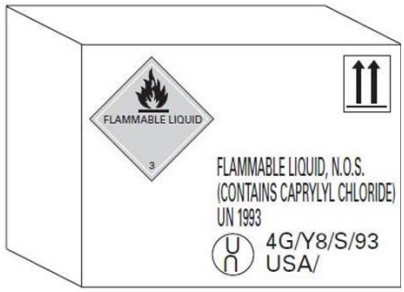
Shapes and Colors of Labels and Placards

Packages and cargo transport units containing dangerous substances which are classified by the IMDG Code as "marine pollutants", must have the markings shown here, which must be durable. They must be placed close to the risk labels or risk placards of the goods. The dimensions of the marine pollutant markings must be a minimum of 10 cm per side for packages and 25 cm per side for cargo transport units.

Marking and labelling of packages (including IBCs)

Marking of packages

Except where otherwise specified in the Code, every package and IBC must be durably marked with the following two items of information, both as determined by the identification procedures:



Check all shipping containers for proper DOT labeling and marking.

Proper Shipping Name (PSN) of the contents;
UN Number (preceded by the letters UN)
There are no particular specifications with respect to the dimensions of these marks.
Together with these marks will go with the label showing the class/es.
These 3 items PSN; UN Number and label must be on one face for conventional packagings and two opposing sides for IBC's (Ref: 5.2.2.1.7)

Marine pollutants

Packages containing marine pollutants in single packagings or in inner packagings with contents of 5 *l* or 5 kg or more, or severe marine pollutants in inner packagings with contents of 0.5 *l* or 500g or more, must also be durably marked with a marine pollutant mark.

This mark must be in a contrasting colour to the outside of the package or, when applied by means of a sticker, coloured black and white. It must have sides of at least 100 mm except in the case of a package which, because of its size, can only bear smaller marks. It should be located adjacent to any label(s) required to be displayed on the package.

6) MARKING OF CONTAINERS CARRYING DANGEROUS CARGOES

The CTU packing guidelines state in Section 4.4.1 in relation to placarding of containers carrying dangerous cargoes:

4.4.1.1 Placards (enlarged labels) (minimum size 250 mm x 250 mm) and, if

SMSA Express Transportation Co., Ltd.
P.O. Box 63259 Riyadh 11526, K.S.A.

applicable for maritime transport, "MARINE POLLUTANT" marks (minimum size of a side 250 mm) and other signs should be affixed to the exterior surfaces of a CTU or unit load or overpack to provide a warning that the contents of the unit are dangerous cargoes and present risks, unless the labels, marks or signs affixed to the packages are clearly visible from the exterior of the unit. This type of marking can be omitted on unit loads and overpacks if the hazard labels, markings or warning symbols are clearly visible from the outside.

Correct marking on a container side

The container is loaded with Class 1.

Correct marking on a container front side

The CTU packing guidelines give additional instructions for affixing placards, these being explained in more detail in the CTU packing guidelines Point 4.4.1.2: This paragraph reads:
(4.4.1.1 contd.) If possible, the placards, hazard labels, markings or warning symbols on the outsides of the CTU should not be obscured when the CTU is opened.

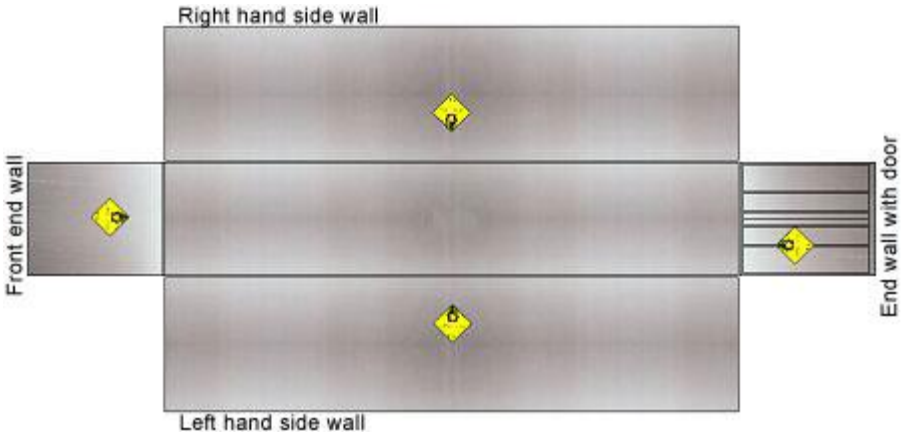
Non-regulation affixing of a placard

4.4.1.2 CTUs containing dangerous cargoes or residues of dangerous cargoes should clearly display placards and, if applicable for maritime transport, "MARINE POLLUTANT" marks or other signs as follows:

1. *a container, one on each side and, in the case of carriage by ocean-going vessel, also one on each of the ends of the unit;*

2. *a railway wagon [railroad car], at least one on each side;*

3. *any other CTU, at least one on both sides and on the back of the CTU and, in the case of a semitrailer, also one on the front of the CTU.*



Correct marking of a container for maritime transport according to the CTU packing guidelines

Point 4.4.1.3 deals with dangerous cargoes which present several risks:
Whenever dangerous cargoes present several risks, subsidiary risk placards should be displayed in addition to primary risk placards.

According to the regulations in force since 2002, both primary and subsidiary risk placards must carry the class numbers.

Primary and subsidiary risk placards bear class number.

Point 4.4.1.3 of the CTU packing guidelines continues:
... CTUs containing cargoes of more than one class, however, need not bear a subsidiary risk placard if the hazard represented is already indicated by the primary risk placard.

Dangerous cargo container carrying dangerous goods of various classes

For dangerous cargo containers carrying dangerous goods of only one class, the regulations in point 4.4.1.6 of the CTU packing guidelines apply:
Consignments of packaged dangerous cargoes of a single commodity, other than cargoes of class 1, which constitute a full load for the CTU should have the UN Number for the commodity displayed in black digits not less than 65 mm high either against a white background in the lower half of the class placard or 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 the placard (see Annex 2). In those cases the UN Number should be displayed immediately adjacent to the Proper Shipping Name.

According to the IMDG Code, the regulation applies from a mass of 4,000 kg.

Primary and subsidiary risk placards plus UN Number.

The placards have been incorrectly positioned. They are obscured when the door is opened.

Correct: >4,000 kg consignment with hazardous materials, therefore UN number stated

Correct: < 4,000 kg consignment with hazardous materials, therefore UN number not stated

Incorrect: > 4,000 kg consignment with hazardous materials, no UN number stated

Correct: 3 classes, therefore no UN Number.

Point 4.4.1.9 of the CTU states the following:
When solid carbon dioxide (CO_2 - dry ice) or other expendable refrigerant is used for cooling purposes, a warning sign should be affixed to the outside of the doors so that it is clearly visible to any person operating the doors. The sign should warn of the possibility of an asphyxiating atmosphere. ...

The name of the gas used as refrigerant should be inserted beneath the word WARNING.

Warning sign for CTUs in which dry ice or other expendable refrigerants are used for refrigeration purposes

The IMDG Code recommends the following wording for the "Container Packing Certificate":
When solid carbon dioxide (CO_2 - dry ice) is used for cooling purposes, the container/vehicle is externally marked or labelled in a conspicuous place, such as, at the door end, with the words:
"DANGEROUS CO_2 (DRY ICE) INSIDE.
VENTILATE THOROUGHLY BEFORE ENTERING."

The CTU packing guidelines contain a reminder that cargoes under fumigation may require special precautions:
4.4.1.10 As CTUs offered for shipment under fumigation may require special precautions, they should only be accepted with the agreement of the carrier and they should be identified to him prior to loading. CTUs under fumigation are now included in class 9 of the IMDG Code.

The following is stated about the labeling of such CTUs:
4.4.1.11 When a closed CTU or its contents has been fumigated and is to be shipped under fumigation, a warning sign should be affixed to the outside of the doors so that it is clearly visible to any person operating the door. An example of such a warning sign is given in Annex 2. The sign should state the fumigant, the method of fumigation employed and the date and time when it took place. The sign should only be removed when the unit has been ventilated after fumigation, to ensure that no harmful concentration of gas remains.

The intention of this Section was merely to provide some tips for marking dangerous cargo containers. In a real packing situation, obviously, the other regulations in the CTU packing guidelines should be consulted, especially the valid dangerous cargo regulations.

Picture of the warning sign "FUMIGATION WARNING"

7) DANGEROUS GOODS DOCUMENTATION

Dangerous Goods Transportation Document

Information which must be included in the Dangerous Goods Transportation Document:

- The United Nations number preceded by the letters UN
- The Proper Shipping Name or correct technical name (no commercial names will be accepted)
- The Class and Division when applicable. The Class or Division can be included in the risk class number. The compatibility group will also be indicated in goods from class 1; and in the case of gases involving secondary risks, information will be extended to indicate such risks
- The subsidiary risks not indicated in the shipping name
- The packing group when assigned
- The number and types of bundles, as well as the total quantity of dangerous goods per volume or mass
- The flashpoint for materials having a flashpoint the same or lower than 60 C
- When applicable, the goods shall be identified as “Marine Pollutant”
- Empty means of containment, which contain the residue of dangerous goods shall be described as such, for example, by placing the words “Empty”, “Uncleaned” or “Residue Last Contained” before or after the proper shipping name
- For dangerous goods in limited quantities, the phrase “Dangerous Goods in Limited Quantity” shall be included
- For class 5.2 or self reactive substances of class 4.1, the regulation and emergency temperatures
- A statement signed in the name of the consignor, saying that the goods are correctly described, classified, packed, marked and labeled and that its conditions are appropriate for transport
- Additional information may also be required in certain cases for explosives, radioactive materials, dangerous goods transported in a molten state, etc.

Standard information requirements (See IMDG Code Chapter 5.4.1.4.1)

The basic items of information required for all dangerous goods consignments are:

(a) the UN number (preceded by the letters UN); the proper shipping name (PSN); primary hazard class and division with compatibility group (if assigned); subsidiary hazard class when assigned & the division and compatibility group ; the packaging group (if applicable). These items of information must appear in this order.

(b) a description of the manner in which the consignment has been packed – i.e., the number and kind of packages/IBCs/tanks and the total quantity of dangerous goods covered by the description (by volume or mass).

This information may precede or follow the information required under (a) above.

There is no restriction on the number of individual consignment descriptions which may appear on a single D.G. Transport Document.

The following are examples of dangerous goods descriptions:
UN 1098, ALLYL ALCOHOL 6.1 (3) I (21°C c.c.)
UN 1098, ALLYL ALCOHOL, CLASS 6.1, (class 3), PG I, (21°C c.c.)
UN 1092, ACROLEIN, STABILIZED, CLASS 6.1 (3), PG I, (-24°C c.c.) MARINE POLLUTANT/ENVIRONMENTALLY HAZARDOUS
UN 2761, ORGANOCHLORINE PESTICIDE, SOLID, TOXIC, (Aldrin 19%), CLASS 6.1, PG III, MARINE POLLUTANT

Container/Vehicle Packing Certificate on next page.

SMSA Express Transportation Co., Ltd.
P.O. Box 63259 Riyadh 11526, K.S.A.

CONTAINER PACKING CERTIFICATE
OR
VEHICLE PACKING DECLARATION

Person responsible for packing the cargo transport unit (vehicle/container) will complete the checklist. Cross out "vehicle" or "container", as applicable. After completion, sign the certificate.

1. It is declared that the undersigned has visually inspected (Container/Vehicle) Number: _____ (cross out whichever item does NOT apply) and it has been loaded/packed in accordance with the provisions of 5.4.2.1 (IMDGC) and CFR 49 and that (indicate "N/A" for all items that do NOT apply):

	a. The cargo transport unit (container/vehicle) was clean, dry, and apparently fit to receive the goods.
	b. If the consignment includes goods of class 1, other than 1.4, the cargo transport unit (container/vehicle) is structurally serviceable in conformity with 7.4.6 (IMDGC).
	c. Goods that should be segregated, have not been packed together onto or in the cargo transport unit (container/ vehicle) (unless approved by the competent authority concerned in accordance with 7.2.2.3 (IMDGC)).
	d. All packages have been externally inspected for damage, leakage, or sifting, and only sound packages have been packed.
	e. Drums have been stowed in an upright position, unless otherwise authorized by the competent authority.
	f. All packages have been properly packed onto or in the cargo transport unit (container/vehicle) and secured.
	g. When dangerous goods are transported in bulk packagings, the cargo has been evenly distributed.
	h. The cargo transport unit (container/vehicle) and packagings therein are properly marked, labeled, and placarded.
	i. When solid carbon dioxide (CO_2 - dry ice) is used for cooling purposes, the cargo transport unit (container/vehicle) is externally marked or labeled in a conspicuous place, such as the door, and with the words: "**DANGEROUS CO_2 GAS (DRY ICE) INSIDE. VENTILATE THOROUGHLY BEFORE ENTERING**".
	j. The dangerous goods transport document required in 5.4.1 (IMDGC) has been received for each dangerous goods consignment packed in the cargo transport unit (container/vehicle).
	k. If container is stowed with a vehicle and/or mechanical equipment with fuel in the tank, a warning label has been affixed to access doors legibly reading: "**WARNING - MAY CONTAIN EXPLOSIVE MIXTURES WITH AIR - KEEP IGNITION SOURCES AWAY WHEN OPENING**" in accordance with §176.905(a)(5), 49 CFR.

2. PERSON RESPONSIBLE FOR PACKING

a. PRINTED NAME *(Last, First, Middle Initial)*	b. RANK/GRADE	c. TITLE	d. ORGANIZATION

e. PLACE PACKED	f. SIGNATURE	g. DATE *(YYYYMMDD)*

DD FORM 2781, JUN 2005 PREVIOUS EDITION IS OBSOLETE. Adobe Professional 7.0

When dangerous goods are packed or loaded into any container or vehicle, those responsible for packing or loading shall provide a “container/vehicle packing certificate”.
Basically this document certifies the following:

- The cargo transport unit was clean, dry and apparently fit to receive the goods
- Incompatible substances have not been placed into the cargo transport unit (unless this had been specifically authorized by the competent national authority)
- All packages have been externally inspected for damage, and only sound packages have been loaded
- All packages have been properly loaded and secured within the cargo transport unit
- The cargo transport unit and the packages are properly marked, labeled and placarded
- A dangerous goods transport document has been received for each dangerous goods consignment loaded in the container/vehicle

The certificate must be signed by the person responsible of stowing the goods in the cargo transport unit. It is possible to incorporate this certificate and the Dangerous Goods Declaration into a single document, the “Dangerous Goods Multimodal Transport”.

Multimodal Model of the Transport Document

There is no mandatory model for the dangerous goods declaration. The IMDG Code recommends the use of the following document for the multimodal transport of dangerous goods, where the dangerous goods declaration is combined with the vehicle/container packing certificate (Regulation 4, Chapter VII, Solas 74) or Declaration of Dangerous Goods.

SMSA Express Transportation Co., Ltd.
P.O. Box 63259 Riyadh 11526, K.S.A.

MULTIMODAL DANGEROUS GOODS FORM

1. Shipper/Consignor/Sender (full style address is mandatory)		**2. Transport document number** **BOOKING REFERENCE:**		
		3. Page of pages	4. Shipper's reference	
			5. Freight forwarder's reference	
6. Consignee (full style address is mandatory)		7. Carrier **SHIPPER'S DECLARATION** I hereby declare that the contents of this consignment are fully and accurately described below by the Proper Shipping Name, and are classified, packaged, marked and labelled/ placarded and are in all respects in proper condition for transport according to the applicable international and national government regulations.		
8. This shipment is within the limitations precribed for : (Delete non-applicable) PASSENGER AND CARGO AIRCRAFT / CARGO AIRCRAFT ONLY		9. Additional handling information		
10. Vessel/Flight No. and date	**11. Port/place of loading**			
12. Port/place of discharge	**13. Destination**			

14. Shipping marks	* Number and kinds of packages; description of goods	Gross mass (Kg)	Net Mass (Kg)	Cube (m3)
UNNO	:			
PROPER SHIPPING NAME:	:			
IMO (sub risk, if any) *	:			
PACKAGING GROUP				
FLASH POINT (DEG C)	:			
NO/TYPE OF INNER PACKAGING	:			
NET/GROSS CARGO WT	:			
MARINE POLLUTANT	:			
EMERGENCY CONTACT (24HRS)	:			

15. Container identification No./ vehicle registration No.	16. Seal number(s)	17. Container/vehicle size & type	18. Tare mass (Kg)	19. Total gross mass (including tare) (Kg)

CONTAINER/VEHICLE PACKING CERTIFICATE I hereby declare that the goods described above have been packed/loaded into the container/vehicle identified above in accordance with the applicable provisions. ** **MUST BE COMPLETED AND SIGNED FOR ALL CONTAINER/ VEHICLE LOADS BY PERSON RESPONSIBLE FOR PACKING/ LOADING.**	21. RECEIVING ORGANIZATION RECEIPT Received the above number of packages/containers/trailers in apprent good order and condition, unless stated hereon; RECEIVING ORGANIZATION REMARKS:	
Loader Training Certificate No: Packager Training Certificate No:	Name of the Port:	
20. Name of company (stamp and signature are mandatory)	Haulier's name	**22. Name of company (OF SHIPPER PREPARING THIS NOTE)**
Name/status of declarant	Container/Vehicle/Vagon reg. No. Signature and date	**Name/status of declarant**
Place and date	Carrier Training Certificate No:	**Place and date**
Signature of declarant	DRIVER'S SIGNATURE	**Signature of declarant**
Sender/ Consignor/Shipper Training Certificate No:	Driver Training Certificate No:	

* DANGEROUS GOODS:
You must specify: Proper Shipping Name, hazard class, UN No, packing group (where assigned) marine pollutant and observe the mandatory requirements under applicable national and international governmental regulations. For the purpose of the IMDG Code see 5.4.1.4.

** For the purpose of the IMDG Code, see 5.4.2.

Reliable information can be gathered from the shipper's Marine Safety Data Sheet (MSDS)

MATERIAL SAFETY DATA SHEET (MSDS)

A Material Safety Data Sheet (MSDS) is designed to provide both workers and emergency personnel with the proper procedures for handling or working with a particular substance. MSDS's include information such as physical data (melting point, boiling point, flash point etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill/leak procedures. These are of particular use if a spill or other accident occurs.

Layout

Section 1. Chemical product and company identification

Links the MSDS to the material. Identifies the supplier of the MSDS. Identifies a source for more information. You must include the manufacturer’s name.

Section 2. Composition/information on ingredients

Lists the OSHA hazardous components May also list significant nonhazardous components. May also include additional information about components (e.g., exposure guidelines)

You can patent your product to protect the contents, but you must disclose all hazardous constituents.

Section 3. Hazards identification, including emergency overview

Provides information on the potential adverse human health effects and symptoms that might result from reasonably foreseeable use and misuse of the material. May provide emergency overview.

Typically, this section is brief, one or two paragraphs.

Section 4. First aid measures

Provides instructions to be taken if accidental exposure requires immediate treatment. May also include instructions to medical professionals. This should include specific instructions to medical professionals; not general platitudes, like “seek medical help” or “apply CPR”

Section 5. Fire fighting measures

Provides basic fire fighting guidance, including appropriate extinguishing media. Describes other fire and explosive properties useful for avoiding and fighting fires involving the material, such as flash point or explosive limits.

Section 6. Accidental release measures

Describes actions to be taken to minimize the adverse effects of an accidental spill, leak or release of the material.

Section 7. Handling and storage

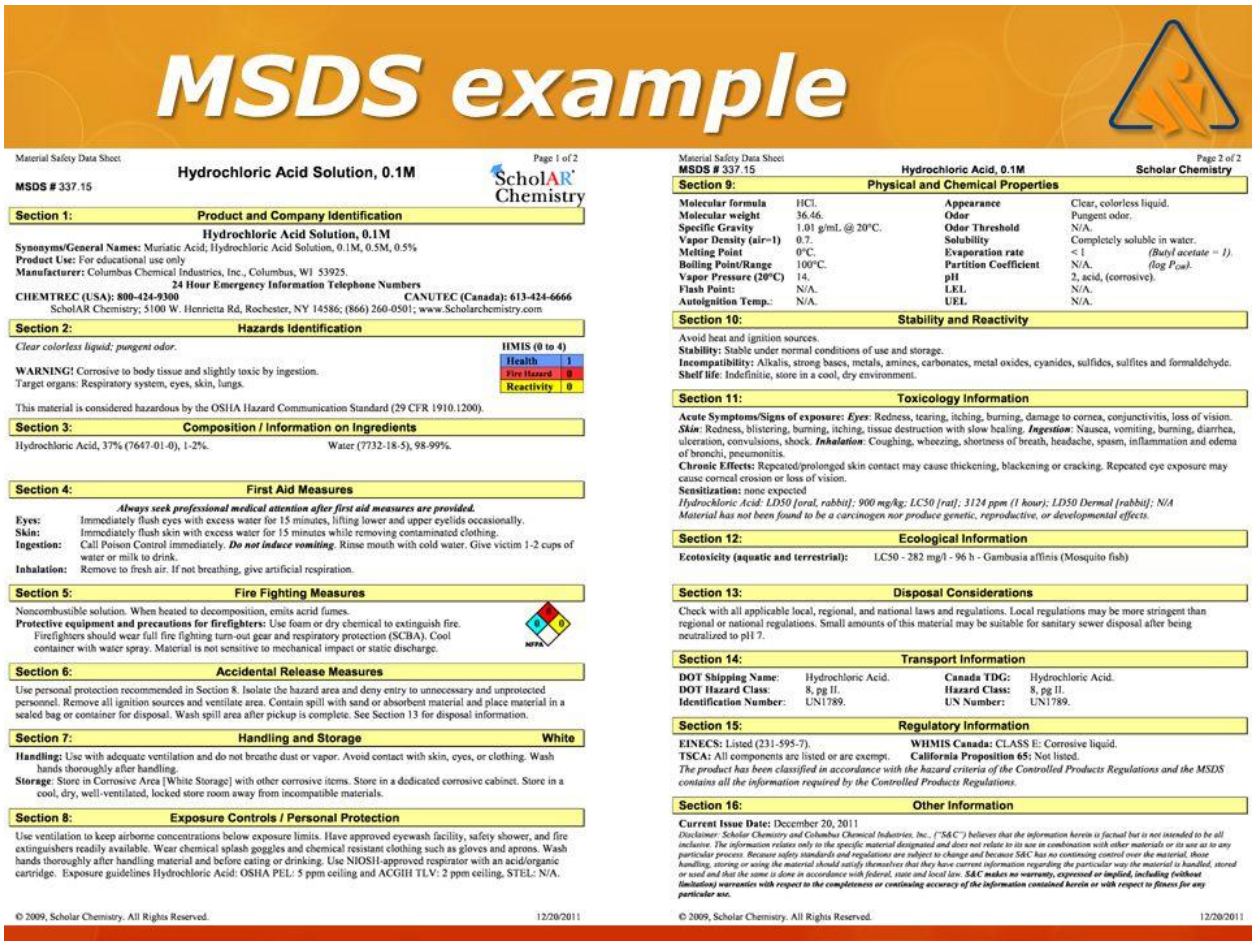
Provides information on appropriate practices for safe handling and storage.

Section 8. Exposure controls/personal protection

Provides information on practices, or equipment, or both, that are useful in minimizing worker exposure. May also include exposure guidelines. Provides guidance on personal protective equipment.

Section 9. Physical and chemical properties
Provides additional data that can be used to help characterize the material and design safe work practices.
Section 10. Stability and reactivity
Describes the conditions to be avoided or other materials that may cause a reaction that would change the intrinsic stability of the material.
Section 11. Toxicological information
May be used to provide background toxicological information on the material, its compounds, or both.
Section 12. Ecological information
May be used to provide information on the effects the material may have on plants or animals and on the material's environmental fate.
Section 13. Disposal considerations
May provide information that is useful in determining appropriate disposal measures.
Section 14. Transport information
May provide basic shipping classification information. [Comment: If any specific transportation label is required state it here. For bulk chemicals include the UN number. Otherwise just say "May be shipped normally as a nonhazardous matererial"
Section 15. Regulatory information
May be used to provide any additional information on regulations affecting the material.
Section 16. Other information
May be used to provide any additional information.

Example of an MSDS:



MSDS example

Material Safety Data Sheet — Page 1 of 2

Hydrochloric Acid Solution, 0.1M

MSDS # 337.15

ScholAR Chemistry

Section 1: Product and Company Identification

Hydrochloric Acid Solution, 0.1M

Synonyms/General Names: Muriatic Acid; Hydrochloric Acid Solution, 0.1M, 0.5M, 0.5%
Product Use: For educational use only
Manufacturer: Columbus Chemical Industries, Inc., Columbus, WI 53925.
24 Hour Emergency Information Telephone Numbers
CHEMTREC (USA): 800-424-9300 **CANUTEC (Canada): 613-424-6666**
ScholAR Chemistry; 5100 W. Henrietta Rd, Rochester, NY 14586; (866) 260-0501; www.Scholarchemistry.com

Section 2: Hazards Identification

Clear colorless liquid; pungent odor.

HMIS (0 to 4)

Health	1
Fire Hazard	0
Reactivity	0

WARNING! Corrosive to body tissue and slightly toxic by ingestion.
Target organs: Respiratory system, eyes, skin, lungs.

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Section 3: Composition / Information on Ingredients

Hydrochloric Acid, 37% (7647-01-0), 1-2%. Water (7732-18-5), 98-99%.

Section 4: First Aid Measures

Always seek professional medical attention after first aid measures are provided.

Eyes: Immediately flush eyes with excess water for 15 minutes, lifting lower and upper eyelids occasionally.
Skin: Immediately flush skin with excess water for 15 minutes while removing contaminated clothing.
Ingestion: Call Poison Control immediately. ***Do not induce vomiting***. Rinse mouth with cold water. Give victim 1-2 cups of water or milk to drink.
Inhalation: Remove to fresh air. If not breathing, give artificial respiration.

Section 5: Fire Fighting Measures

Noncombustible solution. When heated to decomposition, emits acrid fumes.
Protective equipment and precautions for firefighters: Use foam or dry chemical to extinguish fire. Firefighters should wear full fire fighting turn-out gear and respiratory protection (SCBA). Cool container with water spray. Material is not sensitive to mechanical impact or static discharge.

NFPA

Section 6: Accidental Release Measures

Use personal protection recommended in Section 8. Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Remove all ignition sources and ventilate area. Contain spill with sand or absorbent material and place material in a sealed bag or container for disposal. Wash spill area after pickup is complete. See Section 13 for disposal information.

Section 7: Handling and Storage — White

Handling: Use with adequate ventilation and do not breathe dust or vapor. Avoid contact with skin, eyes, or clothing. Wash hands thoroughly after handling.
Storage: Store in Corrosive Area [White Storage] with other corrosive items. Store in a dedicated corrosive cabinet. Store in a cool, dry, well-ventilated, locked store room away from incompatible materials.

Section 8: Exposure Controls / Personal Protection

Use ventilation to keep airborne concentrations below exposure limits. Have approved eyewash facility, safety shower, and fire extinguishers readily available. Wear chemical splash goggles and chemical resistant clothing such as gloves and aprons. Wash hands thoroughly after handling material and before eating or drinking. Use NIOSH-approved respirator with an acid/organic cartridge. Exposure guidelines Hydrochloric Acid: OSHA PEL: 5 ppm ceiling and ACGIH TLV: 2 ppm ceiling, STEL: N/A.

 12/20/2011

Material Safety Data Sheet — Page 2 of 2

MSDS # 337.15 — **Hydrochloric Acid, 0.1M** — Scholar Chemistry

Section 9: Physical and Chemical Properties

Molecular formula	HCl.	**Appearance**	Clear, colorless liquid.
Molecular weight	36.46.	**Odor**	Pungent odor.
Specific Gravity	1.01 g/mL @ 20°C.	**Odor Threshold**	N/A.
Vapor Density (air=1)	0.7.	**Solubility**	Completely soluble in water.
Melting Point	0°C.	**Evaporation rate**	< 1 *(Butyl acetate = 1).*
Boiling Point/Range	100°C.	**Partition Coefficient**	N/A. *(log P_{OW}).*
Vapor Pressure (20°C)	14.	**pH**	2, acid, (corrosive).
Flash Point:	N/A.	**LEL**	N/A.
Autoignition Temp.:	N/A.	**UEL**	N/A.

Section 10: Stability and Reactivity

Avoid heat and ignition sources.
Stability: Stable under normal conditions of use and storage.
Incompatibility: Alkalis, strong bases, metals, amines, carbonates, metal oxides, cyanides, sulfides, sulfites and formaldehyde.
Shelf life: Indefinitie, store in a cool, dry environment.

Section 11: Toxicology Information

Acute Symptoms/Signs of exposure: ***Eyes***: Redness, tearing, itching, burning, damage to cornea, conjunctivitis, loss of vision. ***Skin***: Redness, blistering, burning, itching, tissue destruction with slow healing. ***Ingestion***: Nausea, vomiting, burning, diarrhea, ulceration, convulsions, shock. ***Inhalation***: Coughing, wheezing, shortness of breath, headache, spasm, inflammation and edema of bronchi, pneumonitis.
Chronic Effects: Repeated/prolonged skin contact may cause thickening, blackening or cracking. Repeated eye exposure may cause corneal erosion or loss of vision.
Sensitization: none expected
Hydrochloric Acid: LD50 [oral, rabbit]: 900 mg/kg; LC50 [rat]: 3124 ppm (1 hour); LD50 Dermal [rabbit]: N/A
Material has not been found to be a carcinogen nor produce genetic, reproductive, or developmental effects.

Section 12: Ecological Information

Ecotoxicity (aquatic and terrestrial): LC50 - 282 mg/l - 96 h - Gambusia affinis (Mosquito fish)

Section 13: Disposal Considerations

Check with all applicable local, regional, and national laws and regulations. Local regulations may be more stringent than regional or national regulations. Small amounts of this material may be suitable for sanitary sewer disposal after being neutralized to pH 7.

Section 14: Transport Information

DOT Shipping Name:	Hydrochloric Acid.	**Canada TDG:**	Hydrochloric Acid.
DOT Hazard Class:	8, pg II.	**Hazard Class:**	8, pg II.
Identification Number:	UN1789.	**UN Number:**	UN1789.

Section 15: Regulatory Information

EINECS: Listed (231-595-7). **WHMIS Canada:** CLASS E: Corrosive liquid.
TSCA: All components are listed or are exempt. **California Proposition 65:** Not listed.
The product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Section 16: Other Information

Current Issue Date: December 20, 2011
Disclaimer: Scholar Chemistry and Columbus Chemical Industries, Inc., ("S&C") believes that the information herein is factual but is not intended to be all inclusive. The information relates only to the specific material designated and does not relate to its use in combination with other materials or its use as to any particular process. Because safety standards and regulations are subject to change and because S&C has no continuing control over the material, those handling, storing or using the material should satisfy themselves that they have current information regarding the particular way the material is handled, stored or used and that the same is done in accordance with federal, state and local law. ***S&C makes no warranty, expressed or implied, including (without limitation) warranties with respect to the completeness or continuing accuracy of the information contained herein or with respect to fitness for any particular use.***

 12/20/2011

8) SEGREGATION

Introduction

Incompatible hazardous substances must be adequately separated from each other during transport and storage. Improper stowage or segregation of dangerous goods may result in the release of toxic fumes, fire, spill and degradation of the product's quality. For this reason the IMDG Code has provided provisions in Volume 1 Part 7 titled "Provisions Concerning Transport Operations", which focuses on stowage and segregation.

SEGREGATION CODES

The IMDG Code defines four segregation terms:
1. "Away from" (the minimum separation between two incompatible goods)
2. "Separated from"
3. "Separated by a complete compartment or hold from"
4. "Separated longitudinally by an intervening complete compartment or hold from" (this is the maximum separation between two incompatible goods)

Numbers and symbols relate to the following terms as defined in this chapter:

Segregation should also take account of subsidiary risk labels.			
Key	**Co-Load?**	**Remarks**	**Distance**
X	Yes	Please refer to individual schedules for any particular requirements	
1	No	"Away from"	3 meter
2	No	"Separated from"	6 meter
3	No	"Separated by a complete compartment of hold from"	12 meter
4	No	"Separated longitudinally by an intervening complete compartment or hold from	24 meter

The general provisions regarding segregation between different classes of dangerous goods can be found in the code in the following Segregation Table below.

IMO 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
1.1, 1.2, 1.5	Segregation rules within Class 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
2.1	4	4	2	X	X	X	2	1	2	X	2	2	X	4	2	1	X
2.2	2	2	1	X	X	X	1	X	1	X	X	1	X	2	1	X	X
2.3	2	2	1	X	X	X	2	X	2	X	X	2	X	2	1	X	X
3	4	4	2	2	1	2	X	X	2	1	2	2	X	3	2	X	X
4.1	4	3	2	1	X	X	X	X	1	X	1	2	X	3	2	1	X
4.2	4	3	2	2	1	2	2	1	X	1	2	2	1	3	2	1	X
4.3	4	4	2	X	X	X	1	X	1	X	2	2	X	2	2	1	X
5.1	4	4	2	2	X	X	2	1	2	2	X	2	1	3	1	2	X
5.2	4	4	2	2	1	2	2	2	2	2	2	X	1	3	2	2	X
6.1	2	2	X	X	X	X	X	X	1	X	1	1	X	1	X	X	X
6.2	4	4	4	4	2	2	3	3	3	2	3	3	1	X	3	3	X
7	2	2	2	2	1	1	2	2	2	2	1	2	X	3	X	2	X
8	4	2	2	1	X	X	X	1	1	1	2	2	X	3	2	X	X
9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Segregation within the Cargo Transport Units
Dangerous goods which need to be segregated from each other must not be stowed in the same cargo transport unit (container). Nevertheless, goods which require to be segregated “away from” may be transported in the same cargo transport unit upon authorization by the corresponding authority. In this case an equivalent safety degree must be kept.
Explosives require special segregation in accordance with the compatibility group.
Explosives which have the same letter can be stowed together, whatever their class subdivision may be. Since the properties of the substances, materials or articles of a same Class can be very different to each other, in each and every case it will be necessary to consult the Dangerous Goods list previously, to determine the applicable specific segregation provisions.

ALSO SEE SEGREGATION FLOW CHART: IMDG Code Chapter 7.2.8

Table 2 - For co-loading various IMO Class 1 compatibility groups into 1 container
(Definition - Class 1.4G - 1.4 is IMO Class / G is the Compatibility Group)

Compatibility Group	A	B	C	D	E	F	G	H	J	K	L	N	S
A	X												
B		X											X
C			X	X	X		X					X	X
D			X	X	X		X					X	X
E			X	X	X		X					X	X
F						X							X
G			X	X	X		X						X
H								X					X
J									X				X
K										X			X
L											X		
N			X	X	X							X	X
S		X	X	X	X	X	X	X	X	X		X	X

9) EMERGENCY SCHEDULE (EMS)

The guide provided by the IMDG Code is intended for fire and/or spillage (leakage) emergencies on board a ship involving packaged dangerous goods transported in accordance with the provisions of the IMDG Code.

Every consignor, consignee and carrier must have a checklist on how to manage when an incident involving dangerous goods occur.

Emergencies at SMSA premises will follow the guidelines provided in the Manual specific to the applicable Facility (e.g. warehouse) that the incident occurs in.