EUROPEAID/120540/C/SV/MULTI

Freight Forwarders Training Courses

for Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan

Module 11 Safety, Security & Dangerous Goods

This project is funded by the European Union

A project implemented by NEA and its partners STC, TRADEMCO and Wagener & Herbst Management Consultants

Contents

11.1 Role of the Parties in the Transport Chain

Learning objectives
The student should understand what safety and security, and dangerous goods means in the transport of dangerous goods.
The student should understand the main responsibilities of the main parties involved in the transport chain.
The student should realize the importance of in-house policy and risk management, and understand what they pertain to respectively.

The carriage of dangerous goods has increased substantially since 1945 owing to the enormously increased use of many of these goods. Transport of dangerous goods is regulated in order to prevent injury to persons, damage to property, or harm to the environment. Because they are dangerous, government and other agencies regulate them.

Various parties are involved in the transport of dangerous goods. To provide the safe transport of dangerous goods, everyone involved shall properly prepare, handle, and transport the goods. Due diligence is necessary for all the parties. Based on the role it plays in the transport chain, every party assumes different responsibilities.

11.1.1 Basic concepts and definitions

Learning objectives
The student should understand what safety and security, and dangerous goods mean in the transport of dangerous goods.

Dangerous goods

Dangerous Goods can be defined as goods which can damage the health and safety of persons, or which could bring damage to property, to the environment, to the means of transport and to other equipment employed, or to other goods.

Dangerous goods can be carried safely providing certain principles are adopted. Such principles have been used in developing international and

national regulations for the safe transport of dangerous goods by air, inland waterways, rail, road or sea.

Safety & Security

Safety can be defined as the condition of being safe, which means free from danger, risk, or injury/damage. This condition may apply to persons, objects, goods and to the environment.

While security implies the freedom from risk or danger, which is similar to safety, security also refers to the measures adopted to prevent danger, risk, or injury/damange. The measures can be adopted by government, business or homeowner.

Accidents / Incidents

In spite of the preventive regulations, measures and cautions, accidents or incidents with dangerous goods during transport will happen occasionally.

Accident is defined as an occurrence associated with and related to the transport of dangerous goods which results in:

- fatal or serious injury to a person; or
- major damage to property or the environment

If, other than an accident, the occurrence has resulted in either of the following, it is defined as an incident:

- injury to a person;
- damage to property of the environment;
- fire;
- breakage;
- spillage;
- leakage of fluid or radiation; or
- Other evidence that the integrity of the packaging has not been maintained.

Any occurrence relating to the transport of dangerous goods which seriously jeopardizes a person, property or the environment is also deemed to be a dangerous goods incident.

Test Questions

1. The goods can be defined as dangerous goods if they may lead to one or a few of the results as below:

a. Damage to the health and safety of persons, or to properties

b. Damage to the environment

c. Damage to the means of transport and to other equipment employed, or to other goods

d. All of above

(d)

2. True or false?

- Since dangerous goods impose such a threat to the safety of person, property and environment, it is recommended not to transport dangerous goods but in exceptional cases (F)
- Safety and security are similar concepts, meaning the condition of being safe, i.e. a status free from danger, risk or injury/damage(T)
- Accidents and incidents are similar concepts and can be used interchangeably (F)

11.1.2 Role of the parties in the transport chain

Learning objectives

The student should understand the main responsibilities of the parties involved in the transport chain.

Shipper's responsibility

The shipper is the key to the transport of dangerous goods. They have the majority of responsibilities prior to the carriage. In general the shipper must properly:

- Recognize and identify that there are dangerous goods in their shipment
- Provide clear information on the nature of the goods, and classify the item into 1 of 9 classes
- Package the item
- Apply the applicable markings, labels and placarding
- Complete the required documentation
- Ensure that all national and international regulations have been complied with; and
- Ensure their shipment is made safe for transport

Apart from the shipper, some countries' national laws also impose responsibilities on the importer of dangerous goods, to ensure that the shipper of the shipment has complied with their responsibilities.

Freight forwarder's responsibiity

As only an agent, the freight forwarder's responsibilities are somewhat limited. The freight forwarder as a middle-man has, in general, the following main duties:

- Select safe ways of transportation and handling of the goods
- Advise the shipper on all implications and requirements of the transport of the goods and verify that the shipper has followed the regulations

Should the freight forwarder physically handle the shipment, he will assume more responsibilities such as:

- Proper handling and storage
- Proper loading into trucks to transfer the items to the carrier
- Inspection of packages every time they are handled, to ensure the package is intact for transport and handling
- Reporting of any accidents/incidents
- Following emergency procedures in the event of an accident/incident

If the freight forwarder further expands his functions by acting as a carrier, he shall naturally assume many of the carrier's responsibilities.

Carrier's responsibility

The carrier makes the final decision whether to accept a shipment for carriage or not. The carrier has many responsibilitite in the transport of dangerous goods. They are generally responsible for:

- Acceptance or verification that the shipment of dangerous goods has been properly prepared
- Provision of capable staff and appropriate equipment for transport and handling of the goods
- Provision of the appropriate marks, signs to the vehicles, and documents
- Storage, loading and unloading of the shipments
- Inspection of the shipment during handling, for any leaks or damage
- Reporting of any accidents/incidents, and corresponding emergency procedures
- Training of all employees that may come into contact with dangerous goods

Third party liability (warehousing)

There may be third parties involved in the supply chain of the dangerous goods. In such a case, the third party also assumes responsibilities based on the activities they take. A warehousing company for example, will have the following responsibilities in general:

- Provide capable staff for handling of dangerous goods
- Provide appropriate and well maintained equipment for the storage and handling of dangerous goods
- Store and handle the dangerous goods in separated areas if needed.

Test Questions

1. True or false?

- Since every party is important to secure the safety of dangerous goods transport, each party has equal responsibilities in the transport chain (F)
- The shipper is a key in the transport of dangerous goods and therefore bears major responsibilities particulary prior to the carriage (T)

- To inform the shipper of all implications and requirements of the transport of the goods and verify that the shipper has followed the regulations, is the responsibility of freight forwarder's (T)
- The carrier and the warehousing company are responsible for providing capable staff and appropriate equipment for the transport and handling of dangerous goods (T)

2. Which party would be most responsible for the following subjects? Please indicate.

Appropriate packaging	Drag to	Shipper
Advice on safe mode of transport	Drag to	Forwarder
Well documented and marked transport equipment	Drag to	Carrier
Safe storage and handling of the goods	Drag to	Warehouser

11.1.3 In-house policy and risk management

Learning objectives
The student should realize the importance of in-house policy and risk management, and understand what they pertain to respectively.

In house policy concerning safety, security and dangerous goods

The company's effective in-house policy forms the foundation of the company's entire approach to safety, security and dangerous goods. It also forms the base for successfully implementing specific projects in the future. With a clear and comprehensive policy, standards can be established by assigning responsibilities and providing basic rules, guidelines, and definitions for everyone in the organisation. By doing so, the inconsistencies thay may lead to risks can be prevented, and the safety and security level enhanced.

It is therefore suggested that all parties concerned should develop, implement and maintain human resources management policies and operational working procedures, which not only address issues such as efficiency and quality, but pay equal attention to safety issues and the proper treatment of dangerous goods.

Risk management

A risk is the probability or threat that the safety or security of an asset, person, or object is damaged e.g. injured, lost, or destroyed.

Risk management should provide protective measures to reduce these risks. This is a continuous, repetitive process, comprising the following steps:

- Selecting the relevant assets and activities which are important to protect;
- Defining the related risks (weaknesses, including human factors in the infrastructure, policies and procedures) and their potential consequences;
- Defining and implementation of protective measures to eliminate / reduce the risks;
- Monitoring the effectiveness of these measures in practice;
- Adjusting the protective measures where needed.

The implementation costs of the protective measures should of course be adjusted to the likelihood and the severeness of the expected damage.

Legislation and rules such as ISPS, SOLAS and others provide a legal framework for risk management in logistics activities, as will be explained in the next chapters.

Test Questions

1. Put the following steps of risk management in the right sequence.

Select relevant assets	Drag to	1
Implement protective measures	Drag to	3
Adjust the protective measures where needed	Drag to	5
Monitor the effectiveness of the measures	Drag to	4
Define risks and potential consequences	Drag to	2

11.2 Safety and Security Requirements

Learning objectives
The student should understand the main safety requirements on dangerous goods in transport and warehousing, as well as in inspection at interfaces.
The student should have knowledge of the provisions of the ISPS Code.

11.2.1 Safety and security requirements for transport and warehousing

Learning objectives
The student should understand the main safety requirements on dangerous goods in transport and warehousing. The student shall have some knowledge about the GPS system used in transport.

In order to protect the safety of people, logistics objects and the environment, The United Nations has determined a list of over 3,000 dangerous goods and their characteristics. This list forms the basis for international legislation in the field of dangerous goods transport by water, road, air, and rail. These will be explained in detail in the following chapters.

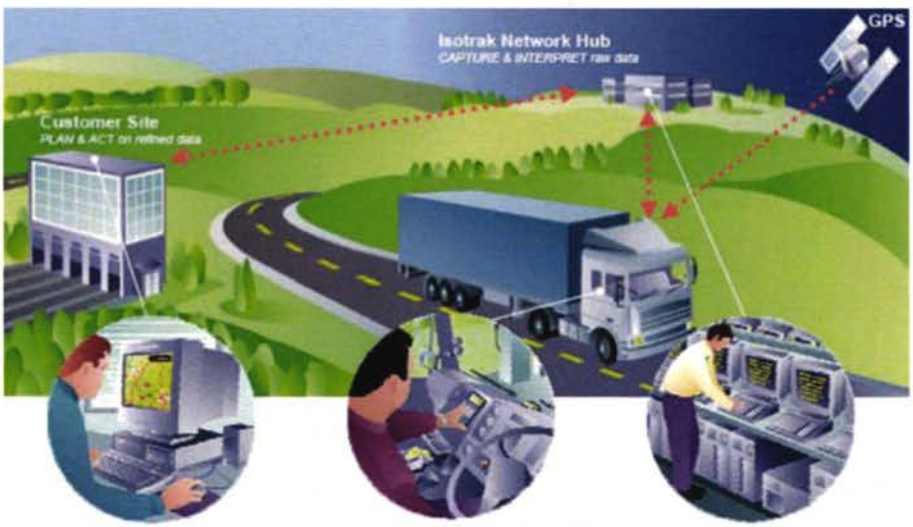
The safety requirements for transport and warehousing depend on the type of goods and the type of transport. These requirements generally address the following main topics:

- Construction and equipment of means of transport;
- Marks and placarding, giving proper information on the nature of the goods;
- Maximum allowed quantities of certain substances;
- Capability of staff;
- Packaging;
- Stowage, segregation of certain substances.

GPS based monitoring and information systems for vehicles and units
Road transport companies operate integrated systems for planning, communication and tracking & tracing.

These integrated systems comprise:

- Computer systems for flexible vehicle scheduling and route planning;
- Continuous communication between planning department and truck drivers using telephone / internet applications;
- Real time vehicle positioning using satellites and GPS (Global Positioning System).



Moreover, computer supported systems are implemented to identify shipments, pallets etc. during each step in the transport process, using barcode or RFID techniques (Radio Frequency Identification, using computer chips in products etc.)

This not only enables the transport company to increase the efficiency of operations and to improve their service level to the customers, but also to continually be informed about the exact location of dangerous goods which are under their responsibility.

Safe warehouses

In the EU, the handling and storage of dangerous substances is subject to the so-called "Seveso II Directive 96/82" and related regulations. These regulations aim at the prevention of major accidents and at the limitation of the consequences of such accidents for human beings (safety and health aspects) and for the environment (environmental aspects). The mentioned EU regulations are based on the ADR Convention. More information is available at http://ec.europa.eu/environment/seveso/index.htm.

EU member states are entitled to incorporate these regulations into their national legislation. As an example, in the Netherlands the so-called "PGS 15" Guidelines have been implemented, which contain valuable information for the warehousing section.

PGS Guidelines – safe warehouse Dutch example

In principle PGS 15 covers all dangerous goods classes 1 - 9, however for some classes, e.g. explosives and radioactive materials, additional legislation has been implemented. PGS 15 makes a distinction between walled-in and open-air storage. PGS 15 is applicable above a minimum level of approx.. 25 kg for many substances.

- PGS 15-1 focuses on storage locations where dangerous substances between 25 kg and 10,000 kg can be kept.
- PGS 15-2 is applicable to storage locations with capacities of more than 10,000 kg.

General rules are given, applicable for both 15-1 and 15-2, concerning

- Constructional provisions: floors, storage equipment, ventilation, lightning, collection of spilled products and water, etc.;
- Packaging, labelling, separation of the goods;
- Procedural provisions: non-smoking, fire, limited access, emergency plans & provisions, escape, fire fighting, first aid etc.

For PGS 15-2 (over 10,000 kg.) additional rules apply. Before starting its activities, the warehouse must notify the competent authority. The warehouse must implement a safety management system and an internal emergency plan. The competent authority will develop an external emergency plan, to avoid the emergencies that would affect adjacent companies (domino – effect).

Three levels of protection have been determined within the framework of PGS 15-2. These levels and the required provisions are indicated in the table below.

Level 1	Level 2	Level 3
Automatic fire-extinguishing system		
Storage fire-extinguishing water	Storage fire-extinguishing water	
Fire detection	Fire detection	
Product spill storage	Product spill storage	Product spill storage (in certain occasions)
Preventative measures	Preventative measures	Preventative measures
Equipment specifications	Equipment specifications	Equipment specifications

Among the abovementioned different levels of protection, for example the automatic fire extinguishing system can be a sprinkler or a foam system. Fire-extinguishing water is stored in underground reservoirs or in tanks that have been established outside the storage location. A popular tendency that is seen in the storage of chemicals at the building site of new warehouses these days is that open spaces are created underneath the scaffolding in order to store the goods. As a result, waste from fire-extinguishing mediums and chemicals can be removed in a manner that benefits the environment.

Test Questions

1. True or false?

Judge whether the following topics are relevant to safety in general in transport.

- Construction and equipment of means of transport (T)
- Marks and placarding, giving proper information on the nature of the goods (T)
- Maximum allowed quantities of certain substances (T)
- Deployment of staff within the organisation (F)
- Capability of staff (T)
- Packaging (T)
- Stowage, segregation of certain substances (T)

2. Which description of commodities applies to which PGS Warehouse? Please indicate.

Dangerous substances between 25 kg and 10,000 kg	Drag to PGS 15-1
Dangerous substances of more than 10,000 kg	Drag to PGS 15-2

11.2.2 Safety and security inspections at interfaces and preventive actions

Learning objectives
The student should understand the main safety requirements and the inspections conducted at interfaces in dangerous goods transport.

The international legislation on dangerous goods also provides rules & regulations on inspection by appointed national and local authorities, to safeguard that transport, handling and storage will be performed according to the rules. These authorities may also issue specific certificates, permissions and exemptions.

In air transport, the appointed inspection body will not only monitor the rules applicable to the airplane, but also to the transport to / from the airport, the temporary storage at the airport and the transport to / from the airplane. Also in water, rail and road transport they will not only monitor the transport itself but also the (un)loading, transhipment and temporary storage.

Inspection can be performed in different ways:

- Non-selective: incidentally, without having prior information that something could be wrong;
- Selective: focusing on certain transports or commodities, based on specific information or on systematic risk analysis.

Inspectors may pay attention to the state of the equipment, packaging, labelling, stowage & segregation, and required documents as well as licences. Inspectors may issue warnings, give penalties or even may stop transport until the rules are obeyed.

Test Questions:

1. According to laws, the inspectors at interfaces may check the following:

a. State of the equipment

b. Packaging, labelling, stowage and segretation

c. Documents and licences

d. All of the above

(d)

2. True or false?

- Penalties may be given by the inspectors at interfaces should the relative rules not obeyed (T)
- International legislations monitor not only the transport itself, but also the loading and unloading, transhipment and temporary storage (T)
- Inspections at transport interfacrs are carried out always at random (F)

11.2.3 ISPS Code in seaborne traffic

Learning objectives

The student should have knowledge of the provisions of the ISPS Code, as well as the provisions reflected in other codes, and be aware that what is required in compliance with the ISPS Code.

After the terrorist attacks in the USA on 11 September 2001, many national and international security measures have been developed in order to prevent these attacks. This applies also to the maritime industry because ships can also be used to carry out terrorist attacks or to transport materials for these attacks.

The International Maritime Organisation (IMO) has developed provisions in order to enhance maritime security, such as:

- The International Ship and Port Facility Security (ISPS) Code based on chapter XI-2 of the International Convention for the Safety of Life at Sea (SOLAS 74), as amended; and
- Chapter 1.4 (Security provisions) of the International Maritime Dangerous Goods (IMDG) Code.

ISPS Code

The ISPS Code entered into force on 1 Juli 2004 and applies to international voyages of passenger ships and cargo ships of more than 500 gross tons. The Code has been divided in part A and part B.

Part A comprises mandatory provisions. Part B comprises recommendations on the implementing of part A.

Based on the provisions of part A, the following persons shall be appointed:

- A Company Security Officer (CSO) and appropriate shore-based personnel by the shipping company;
- A Ship Security Officer (SSO) and shipboard personnel with specific security duties on board the ship; and
- A Port Facility Security Officer (PFSO), appropriate security personnel and port facility personnel having specific security duties by the port facility.
- A port facility is a location assigned by the competent authority where interaction takes place between ship and port.

The specific security duties, knowledge and skills of these persons are mentioned in part A of the ISPS Code (www.imo.org, "Maritime Security").

IMDG Code

The provisons of chapter 1.4 of the IMDG Code are recommendatory except subsection 1.4.1.1, which refers to the provisions of chapter XI-2 of SOLAS 74 and part A of the ISPS Code.

General provisions for companies, ships and port facilities

Chapter XI-2 of SOLAS 74 and part A of the ISPS Code applies to companies, ships and port facilities engaged in the tranport of dangerous goods. In subsections 1.4.1.2 to 1.4.1.5 of the IMDG Code the following recommendations are mentioned for ships and personnel engaged in the transport of dangerous goods:

- For cargo ships of less than 500 gross tons it is recommended that Contracting Governments to SOLAS 74 consider security provisions for these cargo ships.
- Any shore based company personnel, ship based personnel and port facility personnel should be aware of the security requirements

for those dangerous goods, in addition to those specified in the ISPS Code and commensurate with their responsibilities.

- The training of the company security officer, shore-based company personnel having specific security duties, port facility security officer and port facility personnel having specific duties should also include elements of security awareness related to those dangerous goods.
- All other shipboard personnel and port facility personnel should be familiar with the provisions of the relevant security plans related to those dangerous goods, commensurate with their responsibilities.

Security training of shore-side personnel

With regard to the training of shore-side personnel engaged in the transport of dangerous goods, the following recommendations apply:

- Training shall also include elements of security awareness.
- Security awareness training should address the nature of security risks, recognizing security risks, methods to address and reduce risks and actions to be taken in the event of a security breach.
- Training should include awareness of security plans commensurate with the responsibilities of individuals and their part in implementing security plans.
- Training should be provided or verified upon employment in a position involving dangerous goods transport and should be periodically supplemented with retraining.
- Records of all security training undertaken should be kept by the employer and made available to the employee if requested.

(IMDG Code, volume 1, part 1, subsection 1.4.2.3)

General provisions for shore-side personnel

Shore-side personnel who are not mentioned in the ISPS Code and are engaged in the transport by sea of dangerous goods should consider security provisions for the transport of dangerous goods commensurate with their responsibilities.
(IMDG Code, volume 1, part 1, section 1.4.2)

Provisions for high consequence dangerous goods

High consequence dangerous goods are those which have the potential for misuse in a terrorist incident and which may, as a result, produce serious consequences such as mass casualities or mass destruction.

Consigners and others engaged in the transport of high consequence dangerous goods should adopt, implement and comply with a security plan. The minimum requirements for such a security plan can be found in volume 1, part 1, and subsection 1.4.3.4 of the IMDG Code.

The following table comprises an indicative list of dangerous goods which are considered high consequences dangerous goods when the indicated quantity has been exceeded.

Class	Division/ subclass	Substances, materials or articles	Quantity greater than		
			Tank (kg/litre)	Bulk container (kg)	Package (kg)
1	1.1	Explosives	n.a	n.a	0
	1.2	Explosives	n.a	n.a	0
	1.3	Compatibility group C explosives	n.a	n.a	0
	1.5	Explosives	0	n.a	0
2	2.1	Flammable gases	3000 L	n.a	n.a
	2.3	Toxic gases	0	n.a	0
3		Flammable liquids of packing groups I and II	3000 L	n.a	n.a
		Desensitized liquid explosives	n.a	n.a	0
4.1		Desensitized solid explosives	n.a	n.a	0
4.2		Goods of packing group I	3000	3000	n.a
4.3		Goods of packing group I	3000	3000	n.a
5.1		Oxidizing liquids of packing group I	3000 L	n.a	n.a

		Perchlorates, ammonium nitrate and ammonium nitrate fertilizers	3000	3000	n.a
6.1		Toxic substances of packing group I	0	n.a	0
6.2		Infectious substances of category A	n.a	n.a	0
7		Radioactive material	3000 A_1 (special form) or 3000 A_2 in type B or type C packages		
8		Corrosive substances of packing group I	3000	3000	n.a

NOTE: For purposes of non-proliferation of nuclear material, the Convention on Physical Protection of Nuclear Materials applies to international transport, supported by IAEA INFCIRC/225 (Rev.4).

Test Questions:

1. Which field of attention fits which ISPS Security Oficer? Please indicate.

Appropriate shore-based personnel in a shipping company	Drag to	CSO
Shipboard personnel well trained on security	Drag to	SSO
Well instructed port facility personnel	Drag to	PFSO

2. In order to enhance maritime security, the IMO has developed provisions which are reflected in the following codes or conventions:

a. ISPS Code

b. IMDG Code

c. SOLAS convention

d. All of the above

(d)

11.3 Dangerous Goods Regulations

Learning objectives
The student should have knowledge of the main provisions of the international dangerous goods regulations, general (UN) as well as specific for each mode of transport.

11.3.1 UN Recommendations on the Transport of Dangerous Goods (Orange book)

Learning objectives
The student should understand what Model Regulations is, its main purpose as well as its main provisions.
The student shall understand what the dangerous goods list can be used for, and be able to use the list in real life.

The UN Recommendations on the Transport of Dangerous Goods was prepared by the United Nations Economic and Social Council's (ECOSOC) Committee of Experts on the Transport of Dangerous Goods (CETDG), and was first published in 1956. Because of the colour of the cover, the publication is known also in business as "Orange book".

The Recommendations are addressed to governments and to the international organisations concerned with safety in the transport of dangerous goods. In response to developments in technology and the changing needs of users, the Recommendations are amended and updated regularly at succeeding sessions of the Committee of Experts. The latest publication is the fourteenth revised edition issued in 2005.

Model Regulations

At its eighteenth session (28 November – 7 December 1994), the UN ECOSOC Committee of Experts decided to reform the Recommendations into Model Regulations, which could be directly integrated into national and international regulations pertaining to each specific model.
The aim of the Model Regulations is to present a basic scheme of provisions that will allow the uniform development of national and international

regulations governing the various modes for transport. Using a UN-system ensures compatibility between the international modes of transport so a consignment may be carried by more than one mode without intermediate reclassification, repacking and relabelling. Modifications are only made to the system to take account of the peculiarities of the different modes of transport.

Scope and structure of Model Regulations

Scope

The Model Regulations covers amongst other aspects:

- principles of classification and definition of classes;
- listing of the principal dangerous goods;
- identification of dangerous goods;
- general packing requirements;
- testing procedures;
- marking;
- labelling or placarding; and
- Transport documents.

Structure

The UN Model Regulations consists of seven parts, two appendices and an alphabetical index of substances and articles in two volumes. Each part is subdived into chapters, sections and subsections. The layout is as follows:

Volume I

1. General provisions, definitions, training and security
2. Classification
3. Dangerous goods list and limited quantities exceptions

Appendix A – List of generic and N.O.S. proper shipping names

Appendix B – Glossery of terms

Alphabetical index of substances and articles

Volume II

4. Packing and tank provisions
5. Consignment procedures
6. Requirements for the construction and testing of packagings, intermediate bulk containers (IBCs), large packagings, portable tanks, multiple-element gas containers (MEGCs) and bulk containers
7. Provisions concerning transport operations

Dangerous goods list

The dangerous goods list is central to the use of the UN Model Regulations. The List is contained in part 3, chapter 3.2 of the Model Regulations, which contains dangerous goods and articles in the numerical order of UN numbers.

The dangerous goods list is divided into 11 columns. In these columns you can find the relevant provisions and information in text, numbers and alpha-numeric codes after each UN number. At the beginning of the list in section 3.2.1 you are able to find the explanation of the data in the columns and the references to the detailed provisions in the relevant parts, chapters and sections.

Below is an example of the dangerous goods list from the UN Orange book.

UN No.	Name and description	Class or division	Subsidiary risk(s)	UN packing group	Special provisions	Limited quantities	Packagings and IBCs		Portable tanks and bulk containers	
							Packing instruc-tions	Special packing provisions	Instruc-tions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1671	PHENOL, SOLID	6.1		II	279	500 g	P002 IBC08	B2, B4	T3	TP33

How to use the list

To be able to use the list you need to know the UN number of the substance or article. If the UN number is not known you may find it via the alphabetical index.

The UN number is a four digit number assigned to a dangerous good by the United Nations Sub-Committee of Experts on the Transport of Dangerous Goods. Once the UN number of a specific dangerous substance or article has been determined, the table provides cross-references to specific requirements to be applied for the carriage of that substance or article, and to the chapters or sections where these specific requirements may be found.

Nevertheless, it should be borne in mind that the general requirements or class specific requirements of the various Parts have to be applied with in addition to specific requirements, as relevant.

The use of the alphabetical index is limited because it does not comprise every existing substance or substance to be produced. Therefore a substance or article which cannot be found in the alphabetical index may not simply be considered harmless.

Test Questions:

1. What is the purpose of the UN Model Regulations?

a. To present a basic scheme of provisions that will allow the uniform development of national and international regulations governing the various modes for transport
b. To present a basic scheme of provisions that will allow the uniform development of national and international regulations governing international sea transport
c. To present a basic scheme of provisions that will allow the uniform development of national and international regulations governing international air transport
d. To present a basic scheme of provisions that will allow the uniform development of national and international regulations governing international rail transport.

(a)

2. The dangerous goods list is central to the UN Model Regulations. In order to use the list, the index to be used to find all related information with regard to the substance or article concerned is

a. The four digit UN number
b. The alphabetical index
c. Either of the above
d. If the substance can not be found in the alphabetical index, it is not included in the dangerous goods list either

(c)

11.3.2 IATA-DGR and ICAO-TI (Air)

Learning objectives
The student should learn respectively what IATA-DGR and ICAO-TI are, and be able to understand and use the dangerous goods list contained therein.

There are two international organisations that are related to international civial aviation. They are The International Civil Aviation Organisation (ICAO), set up by 52 States in 1944 in Chicago, USA, and The International Air Transport Association (IATA) which was founded in Havana, Cuba, in April 1945.

Both ICAO and IATA have laid down regulations concerning the transport of dangerous goods by air. Respectively they are Dangerous Goods Regulations (DGR) from IATA and Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO TI's) from ICAO.

Since the IATA's DGR is stricter in terms of requirements than the ICAO TI's, in business practice the DGR is simply and widely used. The DGR also comprises the text of ICAO TI's as well as the additional reqauirements and information from IATA. DGR is known as a "field manual" version of the ICAO Technical Instructions.

ICAO TI's

In November 1944 in the International Civil Aviation Conference when the ICAO was founded, the participating 52 states also signed the Convention on International Civil Aviation (known as the Chicago Convention). The Conference laid the foundation for a set of rules and regulations regarding air navigation as a whole which brought safety in flying a great step forward and paved the way for the application of a common air navigation system throughout the world.

Annex 18 to the Convention of Chicago agreed on the broad principles governing the international transport of dangerous goods. The detailed and technical requirements are concluded in the ICAO TI's.
The ICAO TI's are based on material produced by the United Nations, and for radioactive materials, the International Atomic Energy Agency Regulations for the Safe Transport of Radioactive Material. Modifications are made to the system to take into account the peculiarities of air transport, while keeping in mind the need to ensure modal compatibility.

IATA's DGR

Since its foundation in Cuba in 1945, IATA is the prime vehicle for inter-airline co-operation in promoting safe, reliable, secure and economical air services for the benefit of world's consumers. IATA had 57 Members from 31 nations, mostly in Europe and North America at its foundation. Today IATA has grown to include over 270 members from more than140 nations in every part of the globe.

The IATA recognized in the early 1950's that there was a need to standardise the rules governing the transport of dangerous goods by air. In consequence, a team of airline and technical expertise developed the IATA "Restricted Article Regulations" (RAR) in 1956; meanwhile IATA continues publishing its Regulations in the form known as the Dangerous Goods Regulations (DGR). DGR is published annually with the latest rules on air mode dangerous goods from states, operators and the ICAO.

DGR structure

The structure of the IATA DGR is different from the structure of the UN Model Regulations and the ICAO TI's. The IATA DGR contains 10 sections, subdivided into subsections and seven appendices.

The titles of the 10 sections are:

1. Applicability
2. Limitations
3. Classification
4. Identification
5. Packing
6. Packaging specifications and performance tests
7. Marking and labelling
8. Documentation
9. Handling
10. Radioactive material

The titles of the appendices are:

A. Glossary
B. Nomenclature
C. Currently assigned substances
D. List of IATA member, associate member an other airlines
E. Competent authorities
F. Packaging testing facilities, manufacturers and suppliers
G. Related services

DGR list of dangerous goods

Contrary to the UN Model Regulations the IATA DGR contains a list of dangerous goods in alphabetical order in subsection 4.2. The UN numerical list can be found in subsection 4.3.

At the beginning of the list in subsection 4.1.6 of DGR you are able to find the explanation of the data in the columns and the references to the detailed provisions in the relevant sections and subsections.

Below is an example of the dangerous goods list from DGR.

						Passenger and Cargo Aircraft				Cargo Aircraft Only			
						Ltd Qty							
UN/ ID No.	Proper Shipping Name/Description	Class or Div.	Sub Risk	Hazard Label(s)	PG	Pkg Inst	Max Net QTY/Pkg	Pkg Inst	Max Net QTY/ Pkg	Pkg Inst	Max Net QTY/Pkg	S.P. See 4.4	ERG Code
A	B	C	D	E	F	G	H	I	J	K	L	M	N
2248	Di-n-butylamine	8	3	Corrosive & Flamm. liquid	II	Y808	0.5 L	808	1 L	812	30 L		8F

Test Questions

1. True or false?

- Compared to IATA DGR, ICAO TI's contains stricter provisions concerning dangerous goods transport in air (F)
- IATA DGR is generally considered to be the field manual version of ICAO TI's (T)
- The structure of IATA DGR contains 10 sections and seven appendices, different from the UN Model Regulations (T)
- In business practice, the IATA DGR is simple and widely used (T)

11.3.3 IMDG Code (Sea)

Learning objectives
The student should understand about the international agreement governing dangerous goods in sea transport (IMDG Code), the development of the code, and its coverage in general.

IMO

The international body in sea transport is the International Maritime Organisation (IMO), based in London. IMO received its name in 1982 after its predecessor IMCO (Inter-Governmental Maritime Consultative Organisation), which was the first ever international body devoted exclusively to maritime matters since 1948.

From the very beginning, the improvement of maritime safety and the prevention of marine pollution have been IMO's most important objectives.

In order to achieve its objectives, IMO has, over the past decades, promoted the adoption of some 40 conventions and protocols and adopted well over 700 codes and recommendations concerning maritime safety, the prevention of pollution and related matters.

Within IMO, the most senior committee is the Maritime Safety Committee (MSC), which is responsible for the improvement of maritime safety. MSC also has a number of sub-committees. One of the sub-committees is the sub-committee on the Carriage of Dangerous Goods, Solid Cargoes and Containers (DSC).

International Maritime Dangerous Goods Code (IMDG)

IMDG overview
As a further step towards meeting the need for international rules governing the carriage of dangerous goods in ships, the International Conference on Safety of Life at Sea, held in 1960, laid down a general framework of provisions in chapter VII of the Convention and invited IMO to undertake a study with a view to establishing a unified international code for the carriage of dangerous goods by sea.

In 1965 the first edition of this Code was completed by the working group, approved by the MSC and adopted by the Assembly of IMO. The Assembly recommended the IMDG Code to Governments for adoption or for use as the basis for national regulations.

As far as contracting governments of the SOLAS Convention and the MARPOL Convention is concerned, the contracting governments should implement the regulations of the IMDG Code in their national legislation in pursuance of their obligations under:

- Chapter VII, regulation 1.4 of the 1974 SOLAS Convention, as amended; and
- Annex III, regulation 1 (3) of MARPOL 73/78, as amended.

Observance of the IMDG Code ensures compliance with the mandatory provisions of the SOLAS Convention and of Annex III of MARPOL 73/78.

IMDG scope

The IMDG Code covers, among other things the following subjects:

- classification
- identification (description)
- a list of dangerous goods
- labelling
- the shipping documents
- packing;
- container traffic; and
- stowage, with particular reference to the segregation of incompatible substances.

IMDG evolution

This Code has undergone many changes, both in layout and content, in order to keep pace with the expansion and progress of industry and to achieve and maintain a level of harmonization between the IMDG Code, the UN Recommendations on the Transport of Dangerous Goods, and the regulations of the other transport modes according to ADN, ADR, ICAO-TI's and RID.

For example since 1 July 1992 the IMDG Code also comprises regulations for the carriage of harmful substances, referred to as Marine Pollutants.

These are based on the regulations of Annex III of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78), which deals with the prevention of pollution by harmful substances carried by sea in packaged form. Annex III is referring to the IMDG Code.

The MSC adopted on 23 May 2000 Amendment 30-00 to the IMDG Code, which comprises the first full revision in reformatted style. This amendment entered into force on 1 January 2002. In May 2004 the MSC adopted Amendment 32-04, which entered into force from 1 January 2006. At its will, governments might have applied this Amendment from 1 January 2005.

IMDG structure

The structure of the IMDG Code is consistent with that of the UN Model Regulations.

The IMDG Code contains 7 parts, subdivided into chapters, sections and subsections, and two appendices and an alphabetical index.

The titles of the seven parts are:

1. General provisions
2. Classification
3. Dangerous goods list and limited quantities exceptions
4. Packing and tank provisions
5. Consignment procedures
6. Construction and testing of packagings, intermediate bulk containers (IBC's), large packagings, portable tanks and road tank vehicles
7. Provisions concerning transport operations

The titles of the appendices are:

a) List of generic and N.O.S. Proper Shipping Names
b) Glossery of terms in class 1
c) Alphabetical Index

The official IMO edition has been published in two volumes. Volume 1 contains parts 1, 2 and 4 to 7. Volume 2 contains part 3 and the appendices A and B and the alphabetical index.

There is also a supplement to the IMDG Code which comprises the following publications:

- Emergency Response Procedures (The EmS Guide)
- Medical First Aid Guide (MFAG)
- Reporting procedures
- Packing Cargo Transport Units (IMO/ILO/UN ECE Guidelines)
- Safe use of Pesticides in Ships
- International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on board Ships (INF Code)
- Appendix (Resolutions and Circulars)

Dangerous goods list

The dangerous goods list in IMDG is divided into 20 columns. In the official IMO publication the columns 1 to 11 have been printed on the left page, and the columns 12 to 18 on the right page. In these columns you can find after each UN number the relevant provisions and information in text, numbers and alpha-numeric codes.

Test Questions:

1. What is the main purpose of the following IMO regulations? Please indicate.

Transport of dangerous goods by sea	Drag to	IMDG
Prevention of pollution at sea	Drag to	MARPOL
Maritime safety	Drag to	SOLAS

2. The below statements about IMDG are correct except;

a. The member countries of SOLAS Convention and MARPOL Convention are obliged to implement IMDG in pursuance of their obligations in the two mentioned conventions

b. The IMDG, since its adoption by IMO Assembly in 1965, has not undergone any changes

c. IMDG contains provisions, among others, concerning classification, identification, labelling, and packaging of dangerous goods

d. IMDG uses UN number to identify dangerous goods

(b)

11.3.4 ADR (Road)

Learning objectives

The student should understand what the international agreement governing dangerous goods in road transport is (ADR), and its application in general.

In international road transport, the governing regulation is the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR). ADR was agreed upon at Geneva on 30 September 1957 under the auspices of the United Nations Economic Commission for Europe, and became effective since 29 January 1968.

The detailed regulations concerning the transport of dangerous goods can be found in the Annexes A and B of the ADR, which have been regularly amended and updated since the entry into force of ADR.

The Agreement itself is short and simple. The key article is the second, which says that apart from some excessively dangerous goods, other dangerous goods may be carried internationally in road vehicles subject to compliance with:

- The conditions laid down in Annex A for the goods in question, in particular as regards their packaging and labelling; and
- The conditions laid down in Annex B, in particular as regards the construction, equipment and operation of the vehicle carrying the goods in question.

The layout of the ADR is as follows:

Annex A: General provisions and provisions concerning dangerous articles and substances

Part 1	General provisions (exemptions, definitions, training, etc)	ADR RID IMDG-code
Part 2	Classification	
Part 3	Dangerous goods list and limited quantities	
Part 4	Use of packaging, IBC's and tanks	
Part 5	Consignment procedures (marking, labelling and	
Part 6	Requirements for the construction and testing of packaging, IBC's and tanks	
Part 7	Conditions of carriage, loading, unloading and handling	

Annex B: Provisions concerning transport equipment and transport operations

Part 8	Vehicle crews, equipment and operation of vehicles	ADR
Part 9	Construction and approval of vehicles	

The structure of ADR is consistent with that of the UN Model Regulations. The Annex A comprising Part 1 to 7 is in line with the UN Model Regulations. Annex B from part 8 and 9, contains specific provisions affecting road transport only.

Dangerous goods list

Like the UN Model Regulations the dangerous goods list may be considered as the entry to the ADR regulations. The dangerous goods list of ADR is divided into 20 columns. In the official ADR publication the columns 1 to 11 have been printed on the left page and the columns 12 to 20 on the right page.

Test Questions

1. The below statements about ADR are correct except;

a. ADR is a European agreement governing road transport of dangerous goods

b. The layout of Annex A of ADR follows the UN Model Regulations and is in principle the same as other international conventions such as RID and IMDG

c. The conditions laid down in particular related to road transport, such as the equipment and operation of the vehicles carrying dangerous goods, are in Annex B

d. ADR is applicable to road transport and multimodal transport of dangerous goods

(d)

11.3.5 RID (Rail)

Learning objectives

The student should understand what the international agreement governing dangerous goods in rail transport is (RID), and its application in general.

The regulation related to international railway transport in dangerous cargo is the Regulation concerning the International Carriage of Dangerous Goods by Rail (RID).

RID applies to the international carriage of dangerous goods by rail on the territory of all member states of the COTIF (Convention concerning International Carriage by Rail, 9 May 1980, modified by the Vilnius Protocol of 3 June 1999). Also as a consequence of the COTIF, the Intergovernmental Organisation for the International Carriage by Rail (OTIF) was set up on 1 May 1985. One of the activities of OTIF is the ongoing updating of RID.

The structure of the RID is consistent with that of the UN Model Regulations. The RID contains seven parts. Each part is subdived in chapters, sections and subsections.

The layout is as follows:

1. General provisions
2. Classification
3. Dangerous goods list, special provisions and exemptions related to dangerous goods packed in limited quantities
4. Packing and tank provisions
5. Consignment procedures
6. Requirements for the construction and testing of packagings, intermediate bulk containers (IBC's), large packagings, tanks and bulkcontainers
7. Provisions concerning the conditions of carriage, loading, unloading and handling

Like the UN Model Regulations the dangerous goods list is the entry to the RID regulations.

The RID dangerous goods list is divided into 20 columns. In the official RID publications the columns 1 to 11 are printed on the left page and the columns 12 to 20 on the right page.

Test Questions

1. The below statements about RID are correct except;

a. The structure of RID is consistent with UN Model Regulations

b. RID applies to all member countries of COTIF in dangerous goods transport

c. Like the UN Model Regulations, RID dangerous goods list is divided into 11 columns

d. OTIF takes care of the ongoing updating of RID

(c)

11.3.6 Inland waterway transport (ADN)

Learning objectives

The student should understand what the European agreement governing dangerous goods in inland waterway transport is (ADN), its effective status, and its provisions in general.

In inland waterway transport there is no general international convention, but national regimes, e.g. the Russian inland waterway system, and some international conventions on certain rivers, like the respective conventions for the Rhine River and the Danube River in Europe.

The UNECE together with CCNR organised a Diplomatic Conference during which the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterway (ADN) was adopted on 25 May 2000. The ADN provisions are the same as those applicable already on the Rhine, hence the Agreement is intended to set up the same high level of safety on the entire European inland waterways network. The ADN however has not entered into force yet.

CCNR

The Final Act of the Congress of Vienna in 1815 established the principle of freedom of navigation on international waterways. On 17 October 1868 the signing of the Mannheim Convention established the principles for navigation on the Rhine which are still in force today. Belgium, France, Germany, the Netherlands and Switzerland are member States of this Convention, and they founded the Central Commission for the Navigation of the Rhine (CCNR) which is composed of the representatives, called Commissioners.

ADN

The ADN consists of a main legal text and regulations annexed thereto. The annexed regulations contain provisions concerning the carriage of dangerous goods in packages and in bulk on board inland navigation vessels and tank vessels, as well as provisions concerning the construction and operation of such vessels. They also address requirements and procedures for inspection, issue of certificates of approval, recognition of classification societies, monitoring, and training and examination of experts.

The annexed regulations of ADN contains nine parts, of which part 1 to 7 are in line with the UN Model Regulations while part 8 and 9 contain specific provisions affecting transport by inland waterway only.

The titles of part 1 to 7 are:

1. General provisions
2. Classification
3. Dangerous goods list, special provisions and exemptions related to dangerous goods packed in limited quantities
4. Packing and tank provisions
5. Consignment procedures
6. Requirements for the construction and testing of packagings, intermediate bulk containers (IBC's), large packagings, tanks and bulkcontainers
7. Provisions concerning the conditions of carriage, loading, unloading and handling

The titles of part 8 and 9 are:

8. Requirements for vehicle crews, equipment, operation and documentation

Requirements concerning the construction and approval of ships

Contrary to the UN Model Regulations, Part 3 of the annexed regulations of ADN contains 3 dangerous goods lists which are also central to the use of the ADN regulations. This was done to be able to divide the provisions in regulations for dry cargo vessels and tank vessels.

The dangerous goods lists are:

Table A:	List of dangerous goods in UN numerical order
Table B:	List of dangerous goods in alphabetical order
Table C:	List of dangerous goods accepted for carriage in tank vessels in UN numerical order.

Table A

This dangerous goods list is divided into 13 columns and is mainly used for the carriage of dangerous goods in dry cargo ships.

Table B

If the UN number is not known you can find it through table B, the alphabetical index. The use of the alphabetical index is limited because it does not comprise every existing substance or substance to be produced. Therefore a substance or article which cannot be found in the alphabetical index may not simply be considered harmless.

Table C

Table C comprises the list of dangerous goods accepted for carriage in tank vessels in UN numerical order. This table is divided into 20 columns.

Test Questions

1. True or false?

- What governs inland waterway transport now are national legislations and some conventions on certain rivers like Rhine and Danube (T)
- The European agreement concerning dangerous goods transport ADN is not effective yet (T)
- The ADN has exactly the same structure of dangerous goods list as the UN Model Regulations (F)

11.3.7 EN12798 (Supplement to ISO 9000 Series) and national legislations

Learning objectives

The student should understand what EN12798 is about, and that apart from international agreement, national legislations form an important part of regulations in relation to dangerous goods transport.

EN12798

EN12798 is the European standard, which specifies quality management system requirements, supplementary to those of EN ISO 9001:2000, for the management of safety in the field of the transport of dangerous goods by road, rail and inland navigation.

The application of EN 12798 covers, and is limited by, the range of transport related services that the company claims to provide in compliance with this European Standard.

The key components of EN 12798 include explosion and fire safety precautions, transportation safety of hazardous substances, and training of employees.

National legislation

National legislation may provide additional rules depending on specific circumstances in the country concerned. However, this national legislation will always elaborate on the principles as set out by the UN and international conventions and ruls & reglations, such as IMDG, RID, ADR and others.

Test Questions

1. True or false?

- EN12798 applies to the range of transport related services a company provides (T)
- EN12798 is European standards specifying quality management system requirements in a company for general issues (F)
- EN12798 applies to companies in dangerous goods transport by either road, rail or inland waterway transport (T)
- National legislations are important complements to the international regulations geared to the country specific situations and therefore is as important as international regulations in terms of effectivenss and applications (T)

2. The key components of EN12798 include

a. Explosion and fire safety precautious
b. Transport safety of hazardous substances
c. Training of employees
d. All of the above
(d)

Test Questions for the whole chapter

3. Which regulation applies to which type of transport? Please indicate.

Road	Drag to	ADR
Rail	Drag to	RID
Air	Drag to	ICAO
Sea	Drag to	IMDG
Inland waterway	Drag to	ADN

11.4 Classification

Learning objectives
The student should have knowledge of the 9 Classes and to which dangerous goods they apply.
The student should have knowledge about the UN number and Proper Shipping Name identifying dangerous goods.

11.4.1 Main classes (1 – 9)

Learning objectives
The student should have knowledge of the 9 Classes and to which dangerous goods they apply.
The student should further have some knowledge about the procedures for classifying non-classified goods, and classification in some special cases.

In the case of transport, goods are considered as dangerous if a substance, material or article has been classified or can be classified in accordance with the definitions and criteria of one of the classes of the UN Model Regulations (Orange Book).

The UN Orange Book, Manual of Tests and Criteria present the UN schemes for the classification of certain types of dangerous goods and gives descriptions of the test methods and procedures to be used for proper classification.

Classes and divisions

The UN Model Regulations divides dangerous goods into 9 classes, including divisions:

Class 1 Explosives	1.1 Substances and articles which have a mass explosion hazard 1.2 Substances and articles which have a projection hazard but not a mass explosion hazard 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 1.4 Substances and articles which present no significant hazard 1.5 Very insensitive substances which have a mass explosion hazard 1.6 Extremely insensitive articles which do not have a mass explosion hazard
Class 2 Gases	2.1 Flammable gases 2.2 Non-flammable, non-toxic gases 2.3 Toxic gases
Class 3 Flammable liquids	
Class 4	4.1 Flammable solids, self-reactive substances and desensitized explosives 4.2 Substances liable to spontaneous combustion 4.3 Substances which, in contact with water, emit flammable gases
Class 5	5.1 Oxidizing substances 5.2 Organic peroxides
Class 6	6.1 Toxic substances 6.2 Infectious substances
Class 7 Radioactive material	
Class 8 Corrosive substances	
Class 9 Miscellaneous dangerous substances and articles	

For a detailed reading of different characteristics for each class, please refer to Annex 1 at the end of this module.

Classified dangerous goods

A great number of dangerous substances, materials and articles that have been classified already by the experts of the UN are also listed in alphabetical order in the alphabetical index.

The alphabetical index however, is not exhaustive because it is impossible to cover all substances, materials and articles that occur in traffic at present. Neither is it possible to index "new" substances, materials and articles that may be offered for shipment in the future. Therefore, it should not be assumed that when a particular substance, material or article does not appear in the list either its transport is forbidden or it is not dangerous.

Procedures for classifying non-classified dangerous goods

In order to cover substances, materials and articles not listed in the Dangerous Goods List in part 3, chapter 3.2 of the Orange Book, because shipments are infrequent or because a product is new in international trade, "Generic" and "N.O.S." (Not Otherwise Specified) entries are given, with the effect that all dangerous substances, materials and articles can then in fact, be included.

The classification of substances, materials or articles not listed in the Dangerous Goods List should be made by the shipper/consignor or by the appropriate competent authority where specified.

Once the class of the goods has been established, all applicable requirements for transport shall be complied with.

Cases may arise however, where certain substances, materials or articles not listed cannot be classified but are nevertheless regulated by the competent authority of a particular country. The consignor should ensure that such requirements are met when applicable.

Generic or Not Otherwise Specified (N.O.S.) Entries

Practical considerations prohibit the listing of all dangerous goods by name. Therefore many dangerous goods must be transported under one of the "GENERIC" or "NOT OTHERWISE SPECIFIED (N.O.S)" entries.

A "GENERIC" or "NOT OTHERWISE SPECIFIED (N.O.S)" entry may be used to offer for transport a substance, material or article which is not listed

by its name. Such a substance, material or article may be transported only after:

- its dangerous, hazardous and/or harmful properties have been determined;
- it has been classified in accordance with the class definitions and criteria; and
- the entry that most accurately describes the nature of the goods has been selected.

Any substance, material or article having, or suspected of having, explosive properties or characteristics should first be considered for classification in class 1.

EXAMPLES of "GENERIC" or "NOT OTHERWISE SPECIFIED (N.O.S)" entries:

1. GENERIC entry for well defined groups of substances or articles:
   UN 2757 CARBAMATE PESTICIDE, SOLID, TOXIC

2. SPECIFIC NOT OTHERWISE SPECIFIED (N.O.S) entry covering a group of substances or articles of a particular chemical or technical nature:
   UN 1477 NITRATES, INORGANIC, N.O.S.

3. GENERAL NOT OTHERWISE SPECIFIED (N.O.S) entry covering a group of substances or articles meeting the criteria of one or more classes:
   UN 1993FLAMMABLE LIQUID, N.O.S.

Solutions and mixtures containing a single dangerous substance listed by name in the Dangerous Goods List

A solution or mixture containing a single dangerous substance identified by name in the Dangerous Goods List and one or more substances not subject to the regulations shall be assigned a UN Number and Proper Shipping Name of the dangerous substance except when:

- the solution or mixture is specifically listed elsewhere in this Code; or
- the schedule for the dangerous substance specifically indicates that it applies only to the pure or technically pure substance; or
- the class, physical state or packing group of the solution or mixture is not the same as that of the dangerous substance; or
- There is a significant change in the measures to be taken in emergencies.

In those cases, except for solutions or mixtures specifically listed, the mixture or solution shall be treated as a dangerous substance not specifically listed by name in the Dangerous Goods List and shall be classified under a "GENERIC" or "NOT OTHERWISE SPECIFIED (N.O.S)" entry.

Substances, mixtures and solutions with multiple hazards

The table of precedence of hazard characteristics in volume 1, part 2, and subsection 2.0.3.6 shall be used to determine the class of a substance, mixture or solution having more than one hazard when it is not specifically listed by name.

For substances, mixtures or solutions having multiple hazards which are not specifically listed by name, the most stringent packing group of those assigned to the respective hazards of the goods takes precedence over other packing groups, irrespective of the precedence of hazard table.

The precedence of hazard table indicates which of the hazards shall be regarded as the primary hazard. The class which appears at the intersection of the horizontal line and the vertical column is the primary hazard and the remaining class is the subsidiary hazard. The packing groups for each of the hazards associated with the substance, mixture or solution shall be determined by reference to the appropriate criteria. The most stringent of the groups so indicated should then become the packaging group of the substance, mixture or solution.

(Note: For hazards not shown in the table of precedence reference is made to volume 1, part 2, subsection 2.0.3.4.)

Samples

When the hazard class of a substance is uncertain and it is being transported for further testing, a tentive hazard class, Proper Shipping Name and

identification number shall be assigned on the basis of the consignor's knowledge of the substances and application of:

- The classification criteria; and
- The precence of hazards given in volume 1, part 2, section 2.0.3.

The most severe packing group possible for the Proper Shipping Name chosen shall be used and the Proper Shipping Name shall be supplemented with the word "SAMPLE". For exceptions reference is made to volume 1, part 2, and subsection 2.0.4.2.

Test Questions:

1. What is the purpose of the UN number?

a. To identify the characteristics of a material
b. To identify the characteristics of a transport unit
c. To identify the characteristics of a packaging
d. To identify the characteristics of a transport vehicle

(a)

2. What describes best the meaning of a Dangerous Goods Class?

a. Group of dangerous goods which can cause different kinds of danger during transport
b. A class in which the most dangerous goods are classified
c. This is a group of dangerous goods which share a common danger
d. This is a group of dangerous goods which share the same main danger during transport

(d)

3. Which type of goods is classified in which Class? Please indicate.

Toxic substances	Drag to	6.1
Explosives with a mass explosion hazard	Drag to	1.1
Flammable gases	Drag to	2.1
Flammable liquids	Drag to	3
Flammable solids	Drag to	4.1
Oxidizing substances	Drag to	5.1
Radioactive materials	Drag to	7
Corrosive materials	Drag to	8
Miscellaneous dangerous goods	Drag to	9.1

4. Substances, materials and articles not listed in the Dangerous Goods List can be

a. Classified into "Generic" and "N.O.S" entries first for the purpose of transport

b. The shipper or the competent authority shall classify such materials

c. There may be national or local regulations governing such materials

d. All of the above

(d)

11.4.2 Identification: UN Number, Proper Shipping Name

Learning objectives

The student should have knowledge on the UN number and Proper Shipping Name identifying dangerous goods.

Identification

When dangerous goods are offered for transport it is essential that they can be identified as such in order to allow those in any way involved to take the necessary care and precautions.

Dangerous goods can be identified by the:

- proper shipping name;
- class;
- UN number; and
- hazard labels (placards), signs and marks

To ensure that the substance, material or article can be readily identified during transport, the proper shipping name, class and the UN number of a substance, material or article offered for transport and, in the case of a

marine pollutant, the addition of MARINE POLLUTANT shall be indicated on documentation accompanying the consignment.

For the same reason packages, intermediate bulk containers (IBC's), and if applicable cargo transport units containing the goods – containers, freight vehicles, portablable tanks (tankcontainers) and tankvehicles – shall be durably marked or affixed with the relevant proper shipping name, UN Number, hazard label(s) or placard(s), signs and marks.

This ready identification is particularly important in the case of an incident involving these goods, in order to determine what emergency procedures are necessary to deal properly with the situation.

Proper shipping name

The names of dangerous goods vary greatly, because there are so many different synonyms, initials and abbreviations used for the same substance, material or article throughout the world.

To prevent confusion the UN has recommended the use of only one name, which is called the "Proper Shipping Name".

The "Proper Shipping Name" as recommended by the UN is implemented in international conventions governing different modes of transport. As an example, Annex 2 shows the detailed regulation and explanation about "proper shipping name" in sea transport, as contained in the IMDG Code.

UN number

In order to facilitate the identificaton of dangerous goods the UN has assigned a specific number to each substance, material or article and generic or not otherwise specified (n.o.s.) entry which has been classified as dangerous during transport.

These identification numbers which are called UN numbers are four-digit figures. Only the UN numbers below 1000 can be related to substances or articles of a particular class being class 1 (explosives).

International conventions governing different modes of transport have adopted the UN number into their specific indexes for dangerous cargo.

Labels (placards), signs and marks

Another method of identification of the specific hazard(s) of a dangerous substance, material or article is the use of specific labels (placards), signs and marks on packages, intermediate bulk containers (IBC's), and cargo transport units (containers, freight vehicles, portablable tanks/tankcontainers and tankvehicles). This will be explained in Chapter 11.5.

Test Questions

1. Dangerous goods can be identified by

a. Proper Shipping Name
b. UN number
c. Hazard label, marks and signs
d. All of the above

(d)

2. Identification shall be made in:

a. Transport document accompanying the consignment
b. Packages and intermidiate bulk containers
c. Cargo transport units if applicable
d. All of the above

(d)

3. Proper Shipping Name is

a. Recommended by the UN and implemented in international conventions governing different modes of transport
b. The name of the cargo given by the shipper
c. The name of the cargo as indicated in the transport document filled in by the shipper
d. Synonyms, initial or abbreviations used for the cargo in daily life

(a)

11.5 Marking and Handling of Hazardous Cargo

Learning objectives
The student should have knowledge on the dangerous goods labels and signs and how to apply them to packaging and means of transport.
The student should have knowledge of the safe handling of dangerous goods, how to cope with accidents and where to find reference material.

11.5.1 Hazard labels and labelling

Learning objectives
The student should have general knowledge about labelling, signs and marks on dangerous goods.
The student shall be able to recognize the labels intended for different classes.

Labels, signs and marks

Use of specific labels, signs and marks is another method of identification of the specific hazard(s) of a dangerous substance, material or article. Such labels, signs and marks are placed on packages and intermediate bulk containers (IBC's), indicating the hazard(s) through colours and symbols of the enclosed substances, materials or articles.

Packages containing dangerous goods must have marks and labels that alert persons physically handling the packages of the contents. Emergency response personnel may use the marks and labels to identify the contents too.

Labelling
Hazard labels and placards (enlarged labels) indicating the primary or subsidiary hazard shall bear the class number in the bottom corner.

Descriptive text on the labels is optional with the exception of the labels for class 7 (radioactive materials).

Hazard labels should be used on packages and IBC's and hazard placards on cargo transport units.

Illustrations of class labels

Class 1 - Explosives*

1.1 Explosives with a mass explosion hazard

1.2 Explosives with a projection hazard

1.3 Explosives with predominantly a fire hazard

1.4 Explosives with no significant blast hazard

1.5 Very insensitive explosives blasting agents

1.6 Extremely insensitive detonating articles

*Compatibility Groups A, B, C, D, E, F, G, H, J, K, L, N, or S for mixed shipments

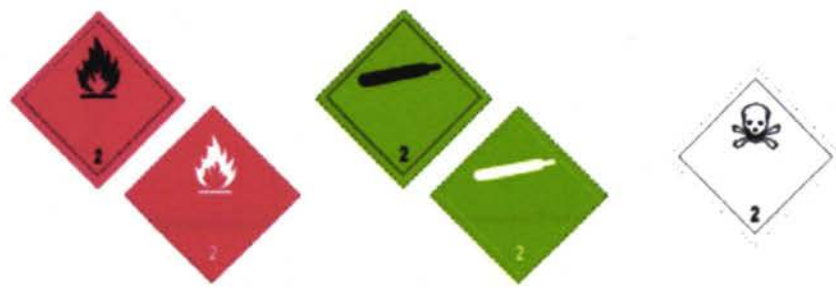
* * Place for division – to be left blank if explosive is the subsidiary risk.
* Place for compatibility group – to be left blank if explosive is the subsidiary risk

Class 2 - Gases

2.1 Flammable gases

2.2 Non-flammable, non-toxic* compressed gases

2.3 Gases toxic* by inhalation



Class 3 - Flammable Liquids

Flammable liquids (and Combustible liquids in the U.S.A.)

Class 4 - Flammable Solids, Combustible Materials, Dangerous When Wet

4.1 Flammable solids

4.2 Spontaneously combustible materials

4.3 Dangerous when wet materials

Class 5 - Oxidizers and Organic Peroxides

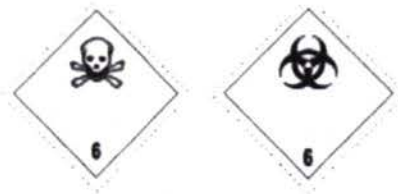
5.1 Oxidizers

5.2 Organic Peroxides

Class 6 - Toxic* materials and Infectious substances

6.1 Toxic materials

6.2 Infectious substances



Class 7 - Radioactive Materials

Class 8 - Corrosive Materials

Class 9 - Miscellaneous Dangerous Goods
9.1 Miscellaneous dangerous goods
9.2 Environmentally hazardous substances
9.3 Dangerous wastes

In sea transport, the IMDG further defines three more labels, marks and signs:

Marine pollutant sign

Elevated temperature sign

Fumigation warning sign

Test Questions

1. Which type of commodity applies to which hazard label? Please indicate.

Explosives Drag to

Flammable gases Drag to

Flammable liquids Drag to

Flammable solids Drag to

Oxidizing materials Drag to

Toxic materials Drag to

Radio- active substances Drag to

Corrosive materials Drag to

Miscellaneous materials Drag to

2. The Marine Pollutant label is used at

a. Sea transport of materials dangerous to the environment

b. Land transport of gases

c. Sea transport of flammable goods

d. Land transport of corrosive goods

(a)

11.5.2 Packaging and packing groups

Learning objectives
The student should understand the importance of packaging, the responsible party for packaging, and the three UN packing groups.
The student shall further be able to interpret the UN packing mark.

Packaging

In general one of the most important preventive safety measures within the regulations for the safe transport of dangerous goods is the requirements with regard to the packaging of dangerous substances, materials and articles.

The manufacturer of the packaging must apply the design and testing requirements, but it is the responsibility of the shipper and/or consignee to make sure that the packages are in proper condition for the transport of the specific dangerous goods, and that the marks on the package are correct for the shipment. The freight forwarder and carrier shall verify that correct packaging is used.

Requirements on packaging
In general, the packaging design and specifications must meet UN's standards, or for radioactive materials, the International Atomic Energy Agency's standards. Additionally, the compeotent authority of the national government may also set standards for some packages.

The general requirements for the packagings of dangerous goods are:

- Well made and in good condition;
- Of such a character that any interior surface with which the contents may come in contact is not dangerously affected by the substance being conveyed; and
- Capable of withstanding the ordinary risks of handling and carriage in transit.

Types of packaging

- Packagings
- Large packagings
- Pressure receptacles
- Unit loads
- Overpacks
- Salvage packagings

Construction and testing of packagings

In the vast majority of cases, packaging carrying dangerous goods must meet stringent design and testing requirements. The UN recommends taking performace tests with regard to certain packagings destined to contain dangerous substances, materials or articles.

The detailed specifications and a number of performance tests applicable to these packagings are to be found in respective international conventions in relation to different modes of transport.

The design type of each packaging should be tested in accordance with procedures established by the competent authority. Tests should be successfully performed on each packaging design type before such packaging is used. Suitable evidence must be established and kept to enable the fact that the tests have been passed successfully to be verified.

UN tests and test report

Examples of UN packaging performance tests are:

- Drop test
- Leakproofness test
- Internal pressure (hydraulic) test
- Stacking test

A test report containing at least the required particulars should be drawn up and should be available to the users of the packaging. A copy of the test report should be available to the competent authority.

UN packaging mark

Packages that meet UN's standard are called UN Specification packages, and have certain UN Specificiation markings displayed on the package itself.

The UN packaging mark indicates a successfully tested design type and compliance with the provisions of relevant international convention, if

applicable, which are related to the manufacturing (but not to the use) of the packaging. In itself, therefore, the mark does not necessarily confirm that the packaging may be used for any substance.

The marking is intended to be of assistance to packaging manufacturers, reconditioners, packaging users, carriers and regulatory authorities. In relation to the use of a new packaging, the original marking is a means for its manufacturer to identify the type and to indicate those performance test requirements that have been met.

Each packaging intended for use should bear markings which are durable, legible and placed in such a location and of such a size relative to the packaging as to be readily visible.

The first part of the marking shows:

- The United Nations packaging symbol or the capital letters "UN" on embossed metal packagings.
- The code designating the type of packaging
- A letter designating the packaging group or groups for which the design type has been successfully tested:
- X for packing groups I, II and III
- Y for packing groups II and III

  Z for packing group III only;

Examples of Marking for a new Packing

1A1/Y1.4/150/98/NL/VL824

1A1	=	type of packaging (steel drum)
Y	=	tested for packaging groups II and III
1.4	=	maximum relative density
150	=	hydraulic test pressure in kilopascals (kPa)
98	=	year of manufacturing
NL	=	State authorizing the allocation of the mark (Netherlands)
VL	=	Name of the manufacturer (Van Leer)
824	=	Identification number of the packaging specified by the competent authority

NOTE: Plastics drums and jerricans should also be appropriately marked with the month of manufacture, because unless otherwise approved by the competent authority, the period of use permitted for the transport of dangerous substances should be five years from the date of manufacture of the packaging, except where a shorter period of use is prescribed because of the nature of the substance to be transported.

UN packing groups

Dangerous goods of all classes other than classes 1, 2, 4.1 (self-reactive substances), 5.2, 6.2 and 7 have, for packing purposes, been divided among three groups according to the degree of danger they present:

- High danger - packing group I;
- Medium danger - packing group II;
- Low danger - packing group III.

For generic entries and not otherwise specified (n.o.s.) entries the relevant packaging group should be determined according to the grouping criteria of the relevant class.

Test Questions

1. True or false?

Which general demands apply to packaging for dangerous goods?

- Well closed (T)
- Water resistant (F)
- Resistant to the contents or causing no reaction with the contents (T)
- Light weight (F)
- Able to withstand transport actions (T)

2. A packaging intended for dangerous goods has been provided with the following UN mark: UN-4G/Z/S/98/NL/SL823. Which materials are allowed to be packed into this packaging?

a. Materials in Group I
b. Materials in Group II
c. Materials in Group III
d. Poisonous liquids in Group I

(c)

3. Which packaging group covers which dangerous goods? Please indicate.

Highly dangerous goods	Drag to	I
Medium dangerous goods	Drag to	II
Less dangerous goods	Drag to	III

4. Who is responsible for packaging and labelling of dangerous goods?

a. The carrier
b. The consignee
c. The shipper
d. The forwarder

(c)

Reference Reading

Note: All definitions and explanations below are drawn from the IMDG Code, which follows the UN Recommendations and therefore is deemed to be able to serve as a reference to other modes of transport as well.

Packagings

- Packagings are receptacles and any other components or materials necessary for the receptacle to perform its containment functions with a maximum net mass of 400 kg or a maximum capacitiy of 450 litres.
- Receptacles are containment vessels for receiving and holding substances or articles, including any means of closing.
- Combination packagings are packagings consisting of one or more inner packagings secured in an outer packaging.
- Composite packagings are packagings consisting of a outer packaging and an inner receptacle so constructed that the inner receptacle and the outer packaging form an integral packaging. Once assembled, it remains thereafter an integrated single unit, which is filled, stored, transported and emptied as such.

NOTE: Packages are the complete product of the packing operation, consisting of the packaging and its contents prepared for transport.

Examples of packagings: drums, barrels, jerricans, boxes, bags, etc.

Large packagings

These are packagings consisting of an outer packaging which contains articles or inner packagings and which:

- are designed for mechanical handling; and
- exceed 400 kg net mass or 450 litres capacity but have a volume of not more than 3m3.

Pressure receptacles

Pressure receptacles are packagings for the transport of gasses and are a collective term for:

- cylinders (water capacity $\leq$ 150 litres)
- tubes (watercapacity > 150 - $\leq$ 3000 litres)
- pressure drums (watercapacity > 150 - $\leq$ 1000 litres)
- closed cryogenic receptacles (watercapacity $\leq$ 1000 litres)
- bundles of cylinders (watercapacity $\leq$ 3000 litres and for toxic gases $\leq$ 1000 litres)

Unit loads

A unit load means a number of packages, which are either:

- placed or stacked on and secured by strapping, shrink-wrapping or other suitable means to a load board such as a pallet;
- placed in a protective outer enclosure such as a pallet box;
- permanently secured together in a sling.

Overpacks

An overpack is defined as an enclosure used by a single consignor to contain one or more packages and to form one unit for convenience of handling and stowage during transport.

Examples of overpacks are a number of packages either:

- placed or stacked on to a load board such as a pallet and secured by strapping, shrink-wrapping, stretch-wrapping, or other suitable means; or
- placed in a protective outer packaging such as a box or crate.

Each package of dangerous goods contained in the overpack should comply with all applicable provisions of the IMDG Code. The intended function of each package should not be impaired by the overpack

An overpack should not contain dangerous goods which react dangerously with one another.

The individual packages comprising an overpack and the overpack itself should be marked and labelled in accordance with the IMDG Code, volume 1, part 5, chapters 5.1 and 5.2.

Salvage packagings

Salvage packagings are special packagings into which damaged, defective, leaking or non-conforming dangerous goods packages, or dangerous goods that have spilled or leaked are placed, for purposes of transport for recovery or disposal.

Appropriate measures should be taken to prevent excessive movement of the damaged or leaking packages within a salvage packaging. When the salvage packaging contains liquids, sufficient inert absorbent material shall be added to eliminate the presence of free liquid.

Salvage packagings should be tested and marked in accordance with the provisions applicable to packaging group II packagings intended for the transport of solids or inner packagings.

The letter "T" should follow the packaging code. This letter signifies a salvage packaging conforming to the provisions of part 6 of the IMDG Code.

NOTE:

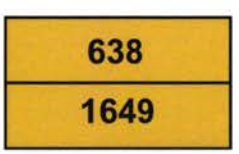
- Salvage packagings should not be used as packagings for shipment from premises where the substances or materials are produced.
- The use of salvage packagings for other than emergency purposes during transport (land or sea) requires approval by the competent authority.

11.5.3 Vehicle plates and placarding of vehicles

Learning objectives
The student should understand how to placard a vehicle carrying dangerous goods, and some knowledge about placarding of other cargo units.
The student shall be able to interpret the orange Kemler plate.

International Kemler Code

European road vehicles driving under ADR must carry an orange, reflecting plate (Kemler plate). The Kemler plate contains the UN product number (bottom) and a numerical hazard code (top).



The hazard code is a three-digit code, which indicates the hazards involved in dealing with the material.

The first digit indicates the primary hazard:

2: Gas
3: Flammable liquid
4: Flammable solid
5: Oxidizing material or organic peroxide
6: toxic substance
8: corrosive material

The second + third digits indicate secondary hazards:

0: the first character already adequately describes the total hazard
2: gas may be given off
3: fire risk
5: oxidizing risk
6: toxic risk
8: corrosive risk
9: risk of violent reaction from spontaneous combustion or self polymerisation
X: prohibition of water

If the first and second digits are identical, an intensification of the primary hazard is indicated.

Orange plates without any numbers indicate that the vehicle is transporting either dangerous goods or a multi load.

Some examples of Hazard Identification Numbers (or Kemler Codes), indicating a particular hazard or combination of hazards, are listed below:

22	refrigerated liquefied gas, asphyxiant
323	flammable liquid which reacts with water, emitting flammable gases
X323	flammable liquid which reacts dangerously with water, emitting flammable gases
333	spontaneously combustible liquid
X333	spontaneously combustible liquid which reacts dangerously with water
362	flammable liquid, toxic, which reacts with water, emitting flammable gases
X362	flammable liquid toxic, which reacts with water, emitting flammable gases
382	flammable liquid, corrosive, which reacts with water, emitting flammable gases
X382	flammable liquid, corrosive, reacts with water, emitting flammable gases
423	solid which reacts with water, emitting flammable gases
X423	flammable solid which reacts dangerously with water, emitting flammable gases
44	flammable solid, in the molten state at an elevated temperature
446	flammable solid, toxic, in the molten state, at an elevated temperature
462	toxic solid which reacts with water, emitting flammable gases

X462	solid, which reacts dangerously with water, emitting toxic gases
482	corrosive solid, which reacts with water, emitting flammable gases
X482	solid, which reacts dangerously with water, emitting corrosive gases
539	flammable organic peroxide
606	infectious substances
623	toxic liquid, which reacts with water, emitting flammable gases
642	toxic solid, which reacts with water, emitting flammable gases
823	corrosive liquid which reacts with water, emitting flammable gases
842	corrosive solid which reacts with water, emitting flammable gases
90	environmentally hazardous substance; miscellaneous dangerous substances
99	miscellaneous dangerous substances carried at an elevated temperature.

Placarding of vehicles

Placards

A placard looks very similar to the dangerous goods labels, like an enlarged label. Placards are applied to the outside of a cargo transport unit, indicating dangerous goods inside. Such cargo transport unit includes containers, trucks and trailers, portablable tanks/tankcontainers and tankvehicles. Placarding of an aircraft cargo container or the aircraft itself is not required.

Placarding of vehicles

Subject to exemptions, a freight vehicle containing dangerous goods or residues of dangerous goods shall clearly display the primary risk placard and, if applicable, the subsidiary risk placard(s), as follows:

- A semi-trailer, one on each side and one on each end of the unit;
- Any other freight vehicle, at least on both sides and on the back of the unit.

On freight vehicles carrying explosive substances and articles of more than one division in class 1 only placards indicating the highest risk need be affixed.

Exemptions

Placards are not required on freight vehicles carrying any quantity of:

- Explosives of division 1.4, compatibility group S;
- Excepted packages of radioactive material ;

- Dangerous goods in only limited quantities. They shall, however, be suitably marked on the exterior as "LIMITED QUANTITIES" or "LTD QTY" not less than 65 mm high.

Placarding of other transport unit or cargo unit

Similar to the placarding of vehicles, the other transport unit or cargo unit shall also clearly display the primary risk placard and if applicable the subsidiary risk placard(s) when containing dangerous goods or residues of dangerous goods.

Freight container:

- One on each side and one on each end of the unit.
- Portable tank:
- One on each side and one on each end of the unit; and
- A multiple-compartment tank containing more than one dangerous substance or their residues, along each side at the positions of the relevant compartments
- Road tank vehicle:
- A semi-trailer, one on each side and one on each end of the unit; and
- A multiple-compartment tank containing more than one dangerous substance or their residues, along each side at the positions of the relevant compartments.
- Bulk container:
- One on each side and one on each end of a freight container or a semi-trailer of a freight vehicle; or
- At least on both sides and on the back of other freight vehicles.

Test Questions

1. How should a semi-trailer show that it carries dangerous goods?

a. By an orange reflecting plate at the front side

b. By an orange reflecting plate at the rear side

c. By an orange reflecting plate at the left- and right hand sides

d. By an orange reflecting plate on each side and one on each end of the unit

(d)

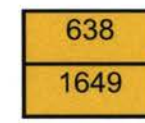
2. What does number 638 on this Kemler plate indicate?

a. The UN number of the goods
b. The ADR permit number of the vehicle
c. The hazard code of the goods
d. The ADR license number of the carrier

(c)

3. What does number 1649 on this Kemler plate reflect?

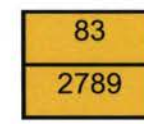
a. The UN number of the goods
b. The ADR permit number of the vehicle
c. The hazard code of the goods
d. The ADR license number of the carrier



(a)

4. What does number 83 on this Kemler plate mean?

a. A highly flammable liquid, also corrosive
b. A highly corrosive liquid, also poisonous
c. A flammable liquid, also corrosive
d. A corrosive material, also flammable



(d)

5. How should a general cargo container which is loaded with one type of dangerous goods, for sea transport as well as road transport be labelled?

a. The required danger label at one side
b. The required danger label at two sides
c. The required label at two sides and the rear side
d. The required danger label at 4 sides

(d)

11.5.4 Handling of dangerous goods

Learning objectives
The student should have knowledge on the safe handling of dangerous goods, including stowage, securing, and segregation in different situations.

Stowage and securing of cargo

- Before being packed, the freight container/vehicle shall be examined visually for damage and shall not be packed if there is evidence of material damage.

- Irrelevant markings, labels, placards, orange panels, signs and marine pollutant marks shall be removed or masked before packing a freight container/vehicle.
- Packages shall be examined and any found to be damaged, leaking or sifting shall not be packed into a freight container/vehicle.
- Care shall be taken to see that excessive water, snow, ice or foreign matter adhering to packages is removed before packing into a freight container/vehicle.
- Packaged dangerous goods and any other goods shall be tightly packed within the freight container/vehicle or adequately braced and secured for the voyage.
- The packages shall be packed in such a way that there will be a minimum likelihood of damage to fittings during transport. Such fittings on packages shall be adequately protected.
- When a dangerous goods consignment forms only part of the load of a freight container, it shall preferably be packed so as to be accessible such as near the doors of the freight container/vehicle.
- If container/vehicle doors are locked, the means of locking shall be such that, in cases of emergency, the doors can be opened without delay.

Segregation of dangerous goods/packaging

General

Incompatible goods shall be segregated from one another. Two substances or articles are considered mutually incompatible when their stowage together may result in undue hazards in case of leakage or spillage, or any other accident.

The extent of the hazard arising from possible reactions between incompatible dangerous goods may vary and so the segregation arrangements required shall also vary as appropriate.

For the purpose of segregation, dangerous goods having certain similar chemical properties have been grouped together in segregation groups.

Segregation from other dangerous goods

Dangerous goods which have to be segregated from each other shall not be carried in the same freight container/vehicle.

However, dangerous goods which shall be segregated "away from" each other may be carried in the same freight container/vehicle with the approval of the competent authority. In such cases an equivalent standard of safety must be maintained.

Segregation from non-dangerous goods

Attentionis particularly paid to foodstuffs, when it comes to stowage and handling. Substances, materials and articles shall not be stowed in the same freight container/vehicle with foodstuffs if such substances, materials and articles fall into one of the following:

- Toxic substances and gases: Substances, materials and articles for which toxicity is indicated by a label of class 6.1, packing groups I and II, or a label of class 2.3 (toxic gases)
- Class 6.2 (infectious substances): All infectious substances
- Class 7 (radioactive materials): Materials for which radioactivity is indicated by a label of class 7

On the other hand, substances for which toxicity is indicated by a label of class 6.1, packaging group III, as well as those for which corrosivity is indicated by a label of class 8, may be carried in the same freight container/vehicle with foodstuffs with the approval of the competent authority.

Test Questions

1. Which segregation terms include which stowage requirements? Please indicate.

May be carried in the same freight container / vehicle with the approval of the competent authority	Drag to	Away from
Shall not be carried in the same freight container / vehicle	Drag to	Separated from

2. When are dangerous goods incompatible?

a. When their stowage together may result in undue hazards in case of leakage or spillage, or any other accident.
b. When they have certain similar chemical properties and have been grouped together in segregation groups
c. When their stowage together is restricted to approval of the competent authority
d. When their chemical properties prevent them from stowage into freight container / vehicle

(a)

11.5.6 Data Banks / Reference Points / Local Expertise (Civil Defence, Port Authority etc.)

Learning objectives
The student should have knowledge on where to find reference materials concerning dangerous goods transport.

Large companies such as Shell and Philips provide databases to their staff (and custmers) giving information on the dangerous goods occurring in their organisation, how they should be treated and what to do in case of emergencies.

Local authorities such as the Fire Brigades should be consulted upon local regulations for warehousing of dangerous goods.

Also other public authorities such as port authorities, customs and inspection bodies operate websites giving useful information in proper treatment of dangerous goods.

Test Questions

1. The following organisations may serve as a source to find reference materials for the transport of dangerous goods

a. Local Fire Brigades
b. Public authorities such as port authorities, Customs and inspection bodies
c. Large companies involved in dangerous goods transport such as Shell
d. All of the above

(d)

Reference reading:

Use of packagings

Exemptions for limited quantities

Certain dangerous goods of classes 3, 4.1, 4.3, 5.1, 6.1, 8 and 9 packed in limited quantities are subject to exemptions with regard to the requirements for:

- the construction and testing of the packagings;
- stowage on board the ship;
- segregation; and
- marking and labelling.

The quantity limitations for inner packagings or articles are specified in column 7 of the Dangerous Goods List in volume 2, part 3, chapter 3.2 of the IMDG Code.

NOTE: If the word "None" has been indicated the substance or article should be transported under the full provisions of the Code.

Dangerous goods transported according to these exemptions:

- shall be packaged only in inner packagings placed in a suitable outer packaging;
- shall meet the provisions of subsections 4.1.1.1., 4.1.1.2 and 4.1.1.4 to 4.1.1.8;
- shall be so designed that they meet the construction provisions of section 6.1.4; and
- the total gross mass of a package shall not exceed 30 kg; and

Shrink or stretch wrapped trays meeting the conditions of subsections 4.1.1.1., 4.1.1.2 and 4.1.1.4 to 4.1.1.8 are acceptable as outer packagings for articles or inner packagings containing dangerous goods transported according to these exemptions, except that:

- inner packagings that are liable to break or be easily punctured, such as those made of glass, porcelain, stoneware or certain plastics, materials, etc, shall not be transported in such packagings; and
- the total gross mass of the package does not exceed 20 kg.

Substances allowed

As it is not allowed to use every type of packaging for each dangerous substance, material or article a shipper should first determine whether a certain type of packaging may be used for maritime transport.

In order to determine the relevant requirements one should use the following steps:

1. Look for the UN No. of the substance, material or article in column 1 of the Dangerous Goods List in volume 2, part 3, chapter 3.2 of the IMDG Code;
2. Determine the packing instructions in column 8 ("P" refers to packaging and "LP" to large packaging) and the special packing provisions in

column 9 ("PP" refers tot packaging and "L" to large packaging) of the Dangerous Goods List;

3. Determine the type of packaging allowed and if applicable the special provisions in volume 1, part 4, subsections 4.1.4.1 (packagings) and 4.1.4.3 (large packagings);
4. Determine the relevant general provisions in volume 1, part 4, sections 4.1.0 to 4.1.3; and
5. If applicable determine the relevant special provisions of the classes 1, 2, 4.1 (self-reactive substances), 5.2, 6.2 and 7 in volume 1, part 4, sections 4.1.5 to 4.1.9.

Equivalent packagings

The requirements for packagings are based on packagings currently used. In order to take into account progress in science and technology, there is no objection to the use of packagings having specifications different from those requirements, provided that they are equally effective, acceptable to the competent authority and able successfully to withstand the tests described in part 6 of the IMDG Code. Methods of testing other than those described in this part are acceptable, provided they are equivalent.

In this case the letter "W" should follow the packaging code. This letter signifies that the packaging, although of the same kind as that indicated by the code, is manufactured to a specification different to that in section 6.1.4 of the IMDG Code but is considered equivalent under the provisions of section 6.1.1.2.

Reconditioned packagings

Reconditioned packagings include

a) Metal drums that:

- are cleaned to original materials of construction, with all former contents, internal and external corrosion, and external; coatings and labels removed;
- are restored to original shape and contour, with chimes (if any) straightened and sealed, and all non-integral gaskets replaced; and
- are inspected after cleaning but before painting, with rejection of packagings with visible pitting, significant reduction in material thickness, metal fatigue, damaged threads or closures, or other significant defects.
- b) Plastics drums and jerricans that:
- are cleaned to original materials of construction, with all former contents, external coating and labels removed;
- have all non-integral gaskets replaced; and
- are inspected after cleaning with rejection of packagings with visible damage such as tears, creases or cracks, or damaged threads or closures.
- After reconditioning a packaging, the reconditioner should apply to it, in the following sequence, a durable marking showing:

- The State in which the reconditioning was carried out, indicated by the distinguishing sign for motor vehicles in international traffic.
- The name or authorized symbol of the reconditioner.
- The year of reconditioning;
- the letter "R";
- and for every packaging successfully passing the leakproofness test, the additional letter "L".

Remanufactured packagings

Remanufactured packagings include:

a) Metal drums that:

- are produced as a UN type from a non-UN type;
- are converted from one UN type to another UN type; or
- undergo the replacement of integral structural components (such as non-removable heads).
- b) Plastics drums that:
- are converted from one UN type to another UN type (e.g. 1H1 to 1H2); or
- undergo the replacement of integral structural components.

Remanufactured drums are subject to the same requirements of part 6 of the IMDG Code as those that apply to a new drum of the same type.

Re-used packagings

Reused packagings are packagings to be refilled which have been examined and found free of defects affecting their ability to withstand the performance tests: the term includes those which are refilled with the same or similar compatible contents and are transported within distribution chains controlled by the consignor of the product.

Packagings for classes 1, 2, 4.1 (solid desensitized explosives and self-reactive substances), 5.2, 6.2 and 7

Class 1

Packagings used for goods of class 1 should comply with the requirements of part 6 of the IMDG Code for packing group II. Packagings other than than metal packagings meeting the test criteria of packing group I may be used.

In addition class 1 goods should be packed in accordance with:

- the appropriate packing instruction shown in column 8 of the Dangerous Goods List;
- the special packing provision shown in column 9 of the Dangerous Goods List;
- any relevant additional provision which are given in the packing instruction tables in section 4.1.4.

Class 2

A. Types of pressure receptacles

This class includes gases carried in the compressed state, liquefied state or dissolved under pressure which are under pressure and require special containment systems, called pressure receptacles.

Presure receptacles is a collective term for:

- cylinders (water capacity ≤ 150 litres)
- tubes (watercapacity > 150 - ≤ 3000 litres)
- pressure drums (watercapacity > 150 - ≤ 1000 litres)
- closed cryogenic receptacles (watercapacity ≤ 1000 litres)
- bundles of cylinders (watercapacity ≤ 3000 litres and for toxic gases ≤ 1000 litres)

B. Use of pressure receptacles

The packing instructions are given in the columns 8 and 9 of the Dangerous Goods List and section 4.1.4 of the IMDG Code. The IMDG Code distinguishes between UN and non-UN pressure receptacles.

C. Marking

C.1 Refillable UN pressure receptacles

Refillable UN pressure receptacles shall be marked clearly and legibly with certification, operational and manufacturing marks. These marks shall be permanently affixed (e.g. stamped, engraved, or etched) on the pressure receptacle.

The following certification marks shall be applied:

- the UN packaging symbol;
- the technical standard used for design, construction an testing;
- the characters identifying the country of approval;
- the identity mark or stamp of the inspection body;
- the date of the initial inspection, the year (four digits) followed by the month (two digits) separated by a slash;

The following operational marks shall be applied:

- the test pressure in bar, preceded by the letters "PH" and followed by the letters "BAR";
- the empty mass of the pressure receptacle including all permanently attached integral parts in kilograms, followed by the letters "KG";
- the minimum quaranteed wall thickness in millimetres followed by the letters "MM";
- the working pressure in bar, preceded by the letters "PW" for UN 1001 and UN 3374;
- the water capacity in litres, followed by the letter "L" for liquefied gases;
- the total mass of the empty receptacle in kg, followed by the letters "KG" for UN 1001 and UN 3374;
-

- The following manufacturing marks shall be applied:
- identification of the cylinder thread;
- the manufacturer's mark;
- the serial number assigned by the manufacturer;
- the letter "H" showing compatibility of the steel in the case of receptacles intended for the transport of gases with a risk of hydrogen embrittlement.

NOTE: For marking of non-refillable UN-pressure receptacles see volume 1, part 6, and section 6.2.2.8 of the IMDG Code.

C.2 Non-UN pressure receptacles

Marking of non-UN pressure receptacles shall be in accordance with the requirements of the competent authority of country of use.

D. Testing and inspection

D.1 UN pressure receptacles

An inspection body or its delegate shall carry out the inspection and certification of each pressure receptacle. The inspection body shall verify that the inspections by the manufacturer and tests performed on those pressure receptacles fully conform to the standard and the provisions of the IMDG Code. The interval between the periodic tests for each gas can be found in packing instruction P200 in voume 1, part 4, and section 4.1.4 of the IMDG Code

D.2 Non-UN pressure receptacles

Non-UN pressure receptacles shall be designed, constructed, inspected, tested and approved in accordance with a technical code recognized by the competent authority and the general provisions of volume 1, part 6, section 6.2.1.

Class 4.1 (solid desensitized explosives and self-reactive substances)

A. Solid desensitized explosives

The packing instructions are given in the columns 8 and 9 of the Dangerous Goods List and section 4.1.4 of the IMDG Code.

B. Self-reactive substances

- The packagings used for self-reactive substances shall meet the requirements of chapter 6.1 or 6.6 at the packing group II performance level;
- To avoid unnecessary confinement, metal packagings meeting the test criteria of packing group I shall not be used;
- The packaging specifications are given in packing instruction P520 and are designated packing methods OP1 tot OP8. A packing method corresponding to a smaller package size (i.e. with a lower OP number) may be used but a packing method corresponding to a larger package size (i.e. with a higher OP number) shall not be used;
- The packing methods appropriate for the individual currently assigned self-reactive substances are listed in volume 1, part 2, subsection 2.4.2.3.2.3.
- The packagings of a self-reactive substance required to bear a subsidiary risk label of class 1 shall also comply with the provisions given in the subsections 4.1.5.10 and 4.1.5.11 of class 1.

Class 5.2

- The packagings used for organic peroxides shall meet the requirements of chapter 6.1 or 6.6 at the packing group II performace level;
- To avoid unnecessary confinement, metal packagings meeting the test criteria of packaging group I shall not be used.
- The packaging specifications are given in packing instruction P520 and are designated packing methods OP1 tot OP8. A packing method corresponding to a smaller package size (i.e. with a lower OP number) may be used but a packing method corresponding to a larger package size (i.e. with a higher OP number) shall not be used;
- The packing methods appropriate for the individual currently assigned organic peroxides are listed in subsection 2.5.3.2.4.
- The packagings of organic peroxides required to bear a subsidiary risk label of class 1 shall also comply with the provisions given in the subsections 4.1.5.10 and 4.1.5.11 of class 1.

Class 6.2

Requirements for the use of packagings shall be established by

- the columns 8 and 9 of the Dangerous Goods List in volume 2, part 3, section 3.2;
- the relevant packing instructions P620, P621 and P650 of part 4, subsection 4.1.4.1
- the general provisions of part 4, section 4.1.1; and
- the special provisions of part 4, section 4.1.8.

Provisions for construction and testing of packagings for infectious substances are given in volume 1, part 6, and chapter 6.3 of the IMDG Code.

Example of required UN mark on packagings containing substances of class 6.2

CLASS 6.2/01
S/SP-9989-ERIKSSON

Class 7

Packagings are designed, as necessary, to:

- retain the material;
- serve as shield to reduce radiation to an acceptable level;
- prevent criticality; and
- promote heat dissipation.

Ullage requirements

Liquids

When filling packagings with liquids, sufficient ullage (outage) shall be left to ensure that neither leakage nor permanent distortion of the packaging occurs as a result of an expansion of the liquid caused by temperatures likely to occur during transport. Unless specific provisions are prescribed, liquids shall not completely fill a packaging at a temperature of 55°C.

Gases

The filling ratio for gases can be found in the relevant packing instruction P200, P201 or P203.

11.6 Training

Learning objectives

The student should have knowledge on the main training issues concerning dangerous goods for staff in general and for staff in specific functions.

The student shall also be aware of the specific positions placed in a company in relation to dangerous goods handling, and that a company may develop guidelines and checklists for better safety management.

11.6.1 Training plan

Learning objectives
The student should learn that different training programms are required for the training of staff concerning dangerous goods.
The student shall have knowledge of the main training subjects in the respective tranining programms.

The successful application of regulations concerning the transport of dangerous goods and the achievement of their objectives are greatly dependent on the appreciation by all individuals concerned of the risks involved and on a detailed understanding of the regulations. This can only be achieved by properly planned and maintained initial and recurrent training programmes for all persons concerned in the transport of dangerous goods.

International and most national regulations require that people who deal with dangerous goods are properly trained, and this training must be "mode" specific, and "function" specific. Mode specific training means the training must be carried out according to the mode of transport used: air, road, rail or ocean. Function specific means that the training shall be according to the person's specific job functions, such as classification, packing, marketing and labelling, documenting, acceptance, loading and etc.

Training programmes

Initial and recurrent dangerous goods training programmes must be established and maintained by or on behalf of:

- Shippers (manufacturers, traders, forwarders, consignees)
- Packers
- Shipping agents
- Carriers
- Cargo handlers (stevedores)
- Distributors
- Inspectors

Personnel must receive training in the requirements commensurate with their responsibilities. Such training must include:

General awareness / familiarization training

This must be designed to provide familiarity with the general provisions of dangerous goods transport requirements and must include a description of:

- The classes of dangerous goods;
- Marks, labels and placards (enlarged labels);
- General packaging requirements;
- Stowage, segregation and compatibility requirements;
- Purpose and contents of the dangerous goods transport document;
- Available emergency response documents.

Function-specific training

This must provide detailed training concerning specific dangerous goods transport requirements which are applicable to the function that person performs or for which that person is responsible.

Safety training

Commensurate with the risk of exposure in the event of a release and the function performed, each person shall receive training on:

- Methods and procedures for accident avoidance, such as proper use of package handling equipment and appropriate methods of stowage and securing of dangerous goods;
- Available emergency response information and how to use it;
- General dangers presented by the various classes of dangerous goods and how to prevent exposure to those hazards, including if appropriate the use of personal protective clothing and equipment; and immediate procedures to be followed in the event of an unintentional release of dangerous goods, including any emergency response procedures for which the person is responsible and personal protection procedures to be followed.

Guidelines and in-house policy

As pointed out in Chapter 11.1, in-house policy can help establish the standards among employees by assigning responsibilities and providing basic rules, guidelines, and definitions for everyone in the organisation. The guidelines identify the rules and procedures that all persons, at different levels of functions in an organisation, shall adhere to, in order to ensure the safety and security of the handling and transport of dangerous goods. Generally, the guidelines often describe and assign functions and responsibilities, grant authority to certain staff members, and identify the incident response processes and procedures.

It is very important to have a clear, comprehensive and documented in-house policy and guidelines. Once the policy or guidelines are developed, it is vital to document them so that it can be easily referred to, and its effect, lasting.

Below shows an example of guidelines for a company, according to the USA rule CFR-49:

(a) Hazardous materials (hazmat) employee training shall include the following:

(1) General awareness/familiarization training. Each hazmat employee shall be provided general awareness/familiarization training designed to provide familiarity with the requirements of this subchapter, and to enable the employee to recognize and identify hazardous materials consistent with the hazard communication standards of this subchapter.

(2) Function-specific training.
(i) Each hazmat employee shall be provided function-specific training concerning requirements of this subchapter, or exemptions issued under subchapter A of this chapter, which are specifically applicable to the functions the employee performs.
(ii) As an alternative to function-specific training on the requirements of this subchapter, training relating to the requirements of the ICAO Technical Instructions and the IMDG Code may be provided to the extent such training addresses functions authorized by Secs. 171.11 and 171.12 of this subchapter.

(3) Safety training.
Each hazmat employee shall receive safety training concerning--
(i) Emergency response information required by subpart G of part 172;
(ii) Measures to protect the employee from the hazards associated with hazardous materials to which they may be exposed in the work place, including specific measures the hazmat employer has implemented to protect employees from exposure; and
(iii) Methods and procedures for avoiding accidents, such as the proper procedures for handling packages containing hazardous materials.

(b) OSHA or EPA Training
Training conducted by employers to comply with the hazard communication programs required by the Occupational Safety and Health Administration (OSHA) of the Department of Labor (29 CFR 1910.120) or the Environmental Protection Agency (EPA) (40 CFR 311.1), to the extent that training addresses the training specified in paragraph (a) of this section, may be used to satisfy the training requirements in paragraph (a) of this section, in order to avoid unnecessary duplication of training.

(c) Initial and recurrent training

(1) Initial training. A new hazmat employee or a hazmat employee who changes job functions may perform those functions prior to the completion of training provided--
(i) The employee performs those functions under the direct supervision of a properly trained and knowledgeable hazmat employee; and
(ii) The training is completed within 90 days after employment or a change in job function.

(2) Recurrent training. A hazmat employee shall receive the training required by this subpart at least once every three years.

(3) Relevant Training. Relevant training received from a previous employer or other source may be used to satisfy the requirements of this subpart provided a current record of training is obtained from hazmat employees' previous employer.

(4) Compliance. Each hazmat employer is responsible for compliance with the requirements of this subchapter regardless of whether the training required by this subpart has been completed.

(d) Record keeping

A record of current training, inclusive of the preceding three years, in accordance with this section shall be created and retained by each hazmat employer for as long as that employee is employed by that employer as a hazmat employee and for 90 days thereafter. The record shall include:

(1) The hazmat employee's name;

(2) The most recent training completion date of the hazmat employee's training;

(3) A description, copy, or the location of the training materials used to meet the requirements in paragraph (a) of this section;

(4) The name and address of the person providing the training; and

(5) Certification that the hazmat employee has been trained and tested, as required by this subpart.

(e) Limitation

A hazmat employee who repairs, modifies, reconditions, or tests packagings as qualified for use in the transportation of hazardous materials, and who does not perform any other function subject to the requirements of this subchapter, is not subject to the safety training requirement of paragraph (a)(3) of this section.

Test Questions

1. Which subjects would be addressed in which part of a dangerous goods training plan? Please indicate.

(A) General awareness / familiarization training
(B) Function-specific training
(C) Safety training

Description of the classes of dangerous goods	Drag to	A
General packaging requirements	Drag to	A
Storage guideline for the warehouse	Drag to	B
(Dis)charge procedure for dangerous goods	Drag to	B
Procedures for accident avoidance	Drag to	C
Use of personal protective clothing and equipment	Drag to	C

11.6.2 Company's personnel in relation to dangerous goods training

Learning objectives
The student should have knowledge on the specific positions placed in a company in relation to dangerous goods handling, as well as the functions of such specific personnel.

Dangerous goods safety advisor

According to E.C. Directive 96/35, a company which (un)loads or transports dangerous goods is requested to appoint a fully qualified Dangerous Goods Safety Advisor (DGSA). The Directive also provides guidelines for his training and examination.

The general duty of the DGSA is to advise the head of the undertaking on how to achieve the safe transport and handling of these goods, in compliance with national and international regulations, in particular:

- Observance of the rules governing the classification and identification of the dangerous goods
- Checking the adequacy between goods and the type of vehicle used to transport those goods
- Checking the adequacy between goods and the type of containment systems
- Checking the equipment used in connection with the transport, loading and unloading of dangerous goods
- Checking that all personnel involved in transport, loading or unloading of dangerous goods have detailed operational procedures and instructions and are aware of the risks during these operations
- Ensuring employees have proper training (which is up-to-date) according to their responsibilities and records are kept
- Ensuring that procedures dealing with incidents or accidents involving dangerous goods are in place
- Ensuring sub-contractors comply with necessary legal requirements
- Ensuring procedures exist to check the presence of documents and safety equipment on board the vehicle.

Person in charge of dangerous goods

Port and/or Customs authorities request the timely notification of dangerous goods at least 2 days prior to entrance into the port or other point of discharge. This notification should be done by a person in charge of dangerous goods. Depending on the situation this may be (a person on behalf of) the master or his agent, the forwarder, or the shipper.

This person in charge must be trained in the appropriate application of the related (electronic) documents and the related information and procedures.

Checklists

It is recommended that a company which is dealing with the handling, transport or storage of dangerous goods develops and implements checklists.

The checklists could serve as a tool for the instruction of the staff.

The checklists should contain detailed information on e.g.

- Process steps to be executed
- Checking issues to be observed at each process step
- Packaging, labelling requirements, management information
- Communication and other actions to be taken in case of emergency (spill, accident, fire etc.)

Test Questions

1. Which task description best fits the function of Dangerous Goods Safety Advisor?

a. Timely notification to the authorities of dangerous goods prior to arriving into the port or other point of discharge

b. To advise management on how to achieve safe transport and handling of dangerous goods in compliance with national and international regulations:

c. Checking the adequacy between dangerous goods and the type of vehicle used to transport those goods

d. None of the above

(b)

2. The checklist, like company in-house policy or guidelines, serves as a tool for the instructions of the staff. The following information is recommended to be included in the checklist:

a. Process steps to be executed

b. Packaging, labelling requirements, management information

c. Communication and other actions to be taken in case of emergency (spill, accident, fire etc.)

d. All of the above

(d)

11.6.3 FIATA publication: "A FIATA Introduction to the Regulations for the Safe Handling and Transport of Dangerous Goods"

Learning objectives
The student should have some knowledge about the FIATA publication with regard to the regulations for the safe handling and transport of dangerous goods.

These guidelines have been prepared specifically for freight forwarders. Their objective is not to provide detailed training material, but rather to set out the basic principles that apply to the carriage of dangerous goods in the various modes of transport and to act as a source of reference to those who have been trained.

These guidelines can help to create awareness within the forwarding industry, as well as an understanding that forwarders have an obligation to uphold the law.

They have been prepared in a format which is both concise and understandable so that they can be used in a practical way in the workplace by employees of all levels. They are not however a substitute for training, which should be of foremost importance to all international freight forwarders.

It is recommended and hoped that FIATA members promote the use of this document and make it readily available to all their member companies.

The guidelines can be obtained from FIATA via www.fiata.org.

Test Questions

1. The understandings of FIATA publication "A FIATA Introduction to the Regulations for the Safe Handling and Transport of Dangerous Goods" are correct except

a. The publication is detailed training materials so that it can be used as substitute for training
b. The publication is concise and understandable so as to be used in a practical way in the workplace
c. The guidelines are prepared specifically for freight forwarders in order to create awareness as well as to enhance the understanding
d. The publication is available at FIATA website www.fiata.org

(a)

11.7 Documentation

Learning objectives
The student should understand when and how to apply the Shippers Declaration, the Multimodal Dangerous Goods Form and the FIATA SDT.

11.7.1 Shippers declaration

Learning objectives
The student should understand when and how to apply the Shippers Declaration, and the FIATA SDT.

It is the responsibility of the shipper to complete the transport document. In case of dangerous goods, the shipper must further declare their shipment as dangerous goods on such transport documents.

The shipper shall declare in the transport document, or alternatively enclose a certificate and declare, that the shipment offered can be accepted for shipment and that the goods are properly packaged, marked and labelled, and in proper condition for transport in accordance with the applicable regulations.

In general, the form for this declaration looks like this:

"I hereby declare that the contents of this consignment are fully and accurately described above by the Proper Shipping Names, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations".

The declaration shall be signed and dated by the consignor.

FIATA SDT (Shippers Declaration for the Transport of Dangerous Goods)

In air transportation, the IATA requires the use of IATA's form of Shipper's Declaration for Dangerous Goods, which is identified by red and white hatchings printed vertically in the left and right margins. But in road and rail transportation, there is no specific form, but the bill of lading, is used as the dangerous goods transport document.

FIATA develops the FIATA SDT for its members, which can be used for many multimodal shipments. The SDT allows the freight forwarder to identify the goods and to clarify the question of responsibility in case of an accident or damage.

As it's the shipper's responsibility to fill in the declaration form, the freight forwarder shall bear in mind that the FIATA SDT shall be also completed and signed by the shipper and then handed over to the freight forwarder.

Test Questions

1. What is the "shipper's declaration"?

a. Document signed by the consignor that a dangerous goods consignment in all respects is in proper condition for transport according to applicable international and national governmental regulations

b. Document completed by those responsible for packing specifying the container identification numbers and certifying that the packing and stowage has been carried out in accordance with the required conditions

c. Document drafted by the carrier

d. None of the above

(a)

2. True or false?

- FIATA SDT is developed for freight forwarders (T)
- FIATA SDT can be used for many multimodal shipments (T)
- FIATA SDT allows the freight forwarder to identify the goods and to clarify the responsibility in case of an accident (T)
- Since FIATA is designed for the freight forwarders, the freight forwarder shall complete the form (F)

11.7.2 Multimodal dangerous goods form

Learning objectives
The student should understand what Multimodal Dangerous Goods Form is, and when as well as how to use it.

When dangerous goods are offered for shipment, similar transport documents to those required for other categories of goods have to be prepared. The form of these documents, the particulars to be entered on them and the obligations they entail may be fixed by international conventions applying to the specific modes of transport and by national legislations.

One of the primary requirements of a transport (shipping) document for dangerous goods is to convey the fundamental information relative to the hazards of the goods. It is, therefore, necessary to include certain basic information on the document for a consignment of dangerous goods unless otherwise exempted or regulated in the relevant regulations.

Unlike in air transport, since there is no specific form of transport document required for dangerous goods, or, when an existing transport document or cargo handling form cannot be used for multimodal transport, the UN recommended the Multimodal Dangerous Goods Form. The form is reflected in the sea traffic in IMDG, and ADR for road, as well as RID for rail transport.

Below is a sample of the multimodal dangerous goods form.

MULTI MODAL DANGEROUS GOODS FORM

This form may be used as a dangerous goods declaration as it meets the requirements of SOLAS 74, Chapter VII, regulation 5; MARPOL 73/78, Annex III, regulation 4

1 Shipper/Consignor/Sender		2 Transport document number		
		3 Page 1 of pages	4 Shipper's reference	
			5 Freight Forwarder's reference	
6 Consignee		7 Carrier (to be completed by the carrier)		
		SHIPPER'S DECLARATION I hereby declare that the contents of this consignment are fully and accurately des cribed 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 prescribed for: (Delete non-applicable)		9 Additional handling information		
PASSENGER AND CARGO AIRCRAFT	CARGO AIRCRAFT ONLY			
10 Vessel / flight no. and date	11 Port/place of loading			
12 Port/place of discharge	13 Destinati on			
14 Shipping marks	* Number and kind of packages; description of goods	Gross mass (kg)	Net mass	Cube (m^3)
15 Container identification no./ vehicle registration No.	16 Seal number(s)	17 Container/vehicle size & type	18 Tare mass (kg)	19 Total gross (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 ORGANISATION RECEIPT Received the above number of packages/containers /trailers in apparent good order and condition unless stated hereon: RECEIVING ORGANISATION REMARKS:		
20 Name of company		Hauler's name		22 Name of company (OF SHIPPER PREPARING THIS NOTE)
Name/Status of declarant		Vehicle reg. no.		Name/Status of declarant
		Signature and date		Place and date
Signature of declarant		DRIVER'S SIGNATURE		Signature of declarant

* 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 purposes of the IMDG Code see 5.4.1.1.

** For the purposes of the IMDG Code see 5.4.2

1 Shipper/Consignor/Sender	2 Transport document number	
	3 Page of Pages	4 Shipper's reference
		5 Freight Forwarder's reference

14 Shipping marks	* Number and kind of packages; description of goods	Gross mass (kg)	Net mass	Cube (m^3)

For a detailed explanation of the multimodal dangerous goods form, please refer to the reference reading at the end of this chapter where the example from sea transport is used.

Test Questions

1. Which description(s) below about the Multimodal Dangerous Goods Form is (are) correct?

a. A document equivalent to Shipper's Declaration used in multimodal transport of dangerous goods

b. A document specifying quantities and loading units drafted by the carrier and used for mostly international transport of dangerous goods performed by more than one transport modality

c. The form is recommended by UN and reflected in IMDG, ADR and RID

d. The multimodal dangerous goods form is used in air transport

(b & c)

Reference reading:

IMDG Example – Dangerous Goods Description on Transport Document

Dangerous goods description on the transport document

The transport document shall contain the following information for each dangerous substance, material or article offered for transport:

- the UN number preceded by the letters "UN";
- the Proper Shipping Name;
- the class or, when assigned, the division of the goods, which may be preceded by the words "Class" or "Division"; for substances and articles of class 1, the division should be followed immediately by the compatibility group letter;
- any assigned subsidiary hazard class or division number(s) enclosed in parenthesis
- the packing group, where assigned, which may be predeced by "PG"

The dangerous goods description shall be shown in one of the following sequences, with no additional information interspersed, i.e.:
"UN 1098 Allyl alcohol 6.1 (3), I "or "Allylalcohol 6.1 (3) UN 1098, I"

Information which supplements the Proper Shipping Name

- The Proper Shipping Name shall be supplemented as follows:
- technical names for "n.o.s." and other generic descriptions, when assigned to special provision 274 in column 6 of the Dangerous Goods List;
- empty means of containment (including packagings, IBCs, portable tanks, road transport tanks and railway transport tanks), which contain the residue of dangerous goods of other than class 7 shall be described as such by, for example, placing the words "EMPTY UNCLEANED" or "RESIDUE - LAST CONTAINED" before or after the Proper Shipping Name;
- for waste dangerous goods (other than radioactive wastes) which are being transported for disposal, or for processing for disposal, the Proper Shipping Name shall be preceded by the word "WASTE";
- for elevated temperature materials the word "HOT" shall immediately precede the Proper Shipping Name if the term "MOLTEN" or "ELEVATED TEMPERATURE" is not used in the Proper Shipping Name;
- the identification of the goods as "MARINE POLLUTANT ";
- minimum flashpoint if 61°C or below in °C closed cup (c.c).

Information required in addition to the dangerous goods description

In addition to the dangerous goods description the following information shall be included after the dangerous goods description on the transport document:

- the number and kind of packages and the total quantity of dangerous goods covered by the description (by volume or mass, and in the case of goods of class 1 by the net explosives mass of the contents);
- the words "LIMITED QUANTITY" or "LTD QTY", when transported according to the exceptions for dangerous goods packed in limited quantities;
- if dangerous goods are transported in salvage packagings, the words "SALVAGE PACKAGING" shall be included;
- if the word "STABILIZED" is part of the Proper Shipping Name the control and emergency temperatures shall be indicated;
- if the capacity of an aerosol is above 1000 ml, this shall be declared;
- when viscous substances are transported in accordance with 2.3.2.5 the following statement shall be included: "Transport in accordance with the provisions of paragraph 2.3.2.5 of the IMDG Code"
- transport documents associated with the carriage of cargo transport units under fumigation shall show the date of fumigation and the type and amount of the fumigant used. In addition, instructions for disposal of a residual fumigant, including fumigation devices (if used), shall be provided.

and for

A. Explosives of class 1:

1. Not otherwise specified (n.o.s.) entries

Entries have been included for "SUBSTANCES, EXPLOSIVE, N.O.S.", "ARTICLES, EXPLOSIVE, N.O.S." and "COMPONENTS, EXPLOSIVE TRAIN, N.O.S.".

When a specific entry does not exist, the competent authority of the country of origin should use the entry appropriate to the hazard division and compatibility group. The shipping document should contain the statement:

"Shipment under this entry approved by the competent authority of.....*

2. Phlegmatized explosive substances

Transport of explosive substances for which a minimum water or phlegmatizer content is specified in the individual entry is prohibited when containing less water or phlegmatizer than the specified minimum. Such substances should only be transported with special authorization granted by the competent authority of the country of origin. The shipping document should contain the statement:

"Shipment under this entry approved by the competent authority of.....*

3. Approved packaging
When explosive substances or articles are packaged "as approved by the competent authority", the shipping document should be provided with the statement:
"Packaging approved by the competent authority of .....*

4. Hazards not indicated by the hazard division and compatibility group
The shipper should provide an indication of any such hazards on the transport document.

* *followed by the State's distinguishing sign for motor vehicles in international traffic of the country for which the authority acts.*

B. Self-reactive substances of class 4.1

- the control and emergency temperatures;
- when the competent authority has permitted the "EXPLOSIVE" subsidiary risk label to be dispensed with, a statement to this effect;
- when approval of the competent authority is required, a statement to this effect;
- when a sample is transported, a statement to this effect;

C. Organic peroxides of class 5.2

- the control and emergency temperatures;
- when the competent authority has permitted the "EXPLOSIVE" subsidiary risk label to be dispensed with, a statement to this effect should be included in the transport document;
- when approval of the competent authority is required, a statement to this effect;
- when a sample is transported, a statement to this effect;

D. Infectious substances of class 6.2

The full address of the consignee, together with the name of a responsible person and his telephone number shall be shown on the transport document.

E. Radioactive materials of class 7

1. The following information shall be included for each consignment, as applicable, in the order given:

- the name or symbol of each radionuclide or, for mixtures of radionuclides, an appropriate general description or a list of the most restrictive nuclides;
- a description of the physical and chemical form of the material, or a notation that the material is special form radioactive material or low dispersable radioactive material. A generic chemical description is acceptable for chemical form;
- the maximum activity of the radioactive contents during transport, expressed in units of becquerels (Bq) with an appropriate SI prefix. For fissile material the total mass of fissile material in units of grams (g) or appropriate multiples thereof may be used in place of activity;
- the category of the package, i.e. I – WHITE, II – YELLOW or III – YELLOW;
- the transport index (TI) (categories II – YELLOW and III – YELLOW only);
- for consignments, including fissile materials other than consignments excepted under subsection 6.4.11.2, the criticality safety index;
- the identification mark for each competent authority approval certificate, (special form radioactive material, low dispersible radioactive material, special arrangement, package design or shipment) applicable to the consignment;
- for consignments of packages in an overpack or freight container, a detailed statement of the contents of each package within the overpack or freight container and, where appropriate, of each overpack or freight container in the consignment. If packages are to be removed from the overpack or freight container at a point of intermediate unloading, appropriate transport documents should be made available;
- where a consignment is required to be shipped under exclusive use, the statement "EXCLUSIVE USE SHIPMENT" ;
- for LSA-II ,LSA-III, SCO-I and SCO-II, the total activity of the consignment as a multiple of A2;

2. The transport document shall include a statement regarding actions, if any, that are required to be taken by the carrier with at least the following points:

- supplementary requirements for loading, stowage, transport, handling and unloading of the package, overpack or freight container, including any special stowage provisions for the safe dissipation of heat or a statement that no such requirements are necessary;
- restrictions on the mode of transport of conveyance and any necessary routeing instructions; and
- emergency arrangements appropriate to the consignment.

Examples of dangerous goods descriptions:

- UN 17779, FORMIC ACID, class 8, P.G. II;
- ACROLEIN, INHIBITED, class 6.1 (3), UN 1092, P.G. I, MARINE POLLUTANT;
- FLAMMABLE, LIQUID, N.O.S. (Ethanol and dodecylphenol), class 3.2, UN 1993, P.G. II,
- (-18°C c.c.), MARINE POLLUTANT;
- UN 2761 ORGANOCHLORINE PESTICIDE, SOLID, TOXIC, (Aldrin 19%), class 6.1, P.G. III, MARINE POLLUTANT.

Annex 1

Hazard characteristics, properties and classification criteria for each class

Class 1 Explosives

This class comprises explosive substances, pyrotechnic substances, explosive articles and mass explosion.

Explosive substances are a solid or liquid substance, or a mixture of substances, which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic substances are included even when they do not evolve gases.

Pyrotechnic substances are a substance, or a mixture of substances, designed to produce an effect by heat, light, sound, gas or smoke, or a combination of these, as the result of non-detonative, self-sustaining, exothermic chemical reactions.

Explosive articles are the article containing one or more explosive substances.

Mass explosion is an explosion which affects almost the entire load virtually instantaneously.

Class 2 Gases

This class comprises:

- Compressed gases;
- Liquefied gases;
- Refrigerated liquefied gases;
- Dissolved gases;
- Articles charged with a gas; and
- Aerosols.

Gases are normally carried under pressure varying from high pressure in the case of compressed gases to low pressure in the case of refrigerated gases.

According to their chemical properties or physiological effects, which may vary widely, gases may be:

- flammable;
- non-flammable, non-toxic;
- toxic;
- supporters of combustion;
- corrosive;
- or may possess two or more of these properties simultaneously.

Class 3 Flammable liquids

This class comprises:

- Flammable liquids; and
- Liquid desensitized explosives

Flammable liquids are the Liquids, or mixtures of liquids, or liquids containing solids in solution or suspension (e.g. paints, varnishes, lacquers, etc., but not including substances which, on account of their other dangerous characteristics, have been included in other classes) which:

- give off a flammable vapour at or below 61°C (141°F) closed cup test (corresponding to 65.6°C (150°F) open cup test), normally referred to as the flashpoint;
- are offered for transport at temperatures at or above their flashpoint;
- are transported or offered for transport at elevated temperatures in a liquid state, which give off a flammable vapour at temperatures equal to or below the maximum transport temperature;
- Vapours have a narcotic effect. Prolonged inhalation may result in unconsciousness and deep or prolonged narcosis may lead to death;
- can have specific toxic or corrosive effects;

Liquid desensitized explosives are explosive substances which are dissolved or suspended in water or other liquid substances, to form a honogeneous liquid mixture to suppress their explosive properties.

Note: Some substances in this class, under conditions incident to transport, are liable to polymerize (combine or react with themselves) so as to cause dangerous liberation of heat or gas, possibly resulting in rupture of the receptacle. These substances should not be transported unless they are properly inhibited.

Class 4.1 Flammable solids

This class comprises:

- Flammable solids;
- Self-reactive substances; and
- Solid desensitized explosives.

Flammable solids refer to those readily combustable solids and solids which may cause fire through friction.

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

Solid desensitized explosives mean substances, which may explode if not diluted sufficiently. Where a subsidiary risk label of class 1 is shown in the individual schedule, it indicates that the substance, as tested, exhibits explosive properties

- Some substances, e.g. celluloid, may evolve toxic and flammable gases when heated or if involved in a fire.

Class 4.2 Substances liable to spontaneous combustion

This class comprises:

- Pyrophoric substances; and
- Self-heating substances.

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

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

Self-heating of substances, leading to spontaneous combustion, is caused by reaction of the substance with oxygen (in the air) and the heat developed not being conducted away rapidly enough to the surroundings. Spontaneous combustion occurs when the rate of heat production exceeds the rate of heat loss and the autoignition temperature is reached.

Class 4.3 Substances which, in contact with water, emit flammable gasses

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

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

Note: Where the term "water-reactive" is used, it refers to a substance which in contact with water emits flammable gas.

Class 5.1 Oxidizing substances (agents)

Substances which, while themselves not necessarily combustible, may in certain circumstances directly or indirectly evolve oxygen. For this reason oxidizing substances increase the risk and intensity of fire in combustible material with which they come into contact.

Mixtures of oxidizing substances with combustible material and even with material such as sugar, flour, edible oils, mineral oils, etc., are dangerous. These mixtures are readily ignited, in some cases by friction or impact. They may burn violently and may lead to explosion.

There will be a violent reaction between most oxidizing substances and liquid acids, evolving toxic gases. Toxic gases may also be evolved when certain oxidizing substances are involved in a fire.

Class 5.2 Organic peroxides

Organic peroxides are thermally unstable substances, which may undergo exothermic self-accelerating decomposition. In addition, they may have one or more of the following properties:

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

Organic peroxides are liable to exothermic decomposition at normal or elevated temperatures. The decomposition can be initiated by heat, contact with impurities (e.g. acids, heavy-metal compounds, amines), friction or impact. The rate of decomposition increases with temperature and varies with the organic peroxide formulation.

Decomposition may result in the evolution of harmful, or flammable gases or vapours. For certain organic peroxides the transport temperature shall be controlled during transport. Some organic peroxides may decompose explosively, particularly if confined. This characteristic may be modified by the addition of diluents or by the use of appropriate packagings. Many organic peroxides burn vigorously.

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

Class 6.1 Toxic substances

The substances in this class possess the common property of being liable to cause death or serious injury or to harm human health if swallowed or inhaled, or by skin contact.

The dangers of poisoning which are inherent in these substances depend upon contact with the human body, which is by inhalation of vapours by unsuspecting persons at some distance from the cargo or the immediate dangers of physical contact with the substance. These have been considered in the context of the probability of accident occurring during transport by sea.

Nearly all toxic substances evolve toxic gases when involved in a fire or when heated to decomposition. Some toxic substances also possess other hazards, such as flammability.

Class 6.2 Infectious substances

This class comprises:

- Infectious substances;
- Biological products;
- Cultures;
- Genetically modified micro-organisms and organisms; or
- Medical or clinical wastes.

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

Biological products are Products derived from living organisms which are manufactured and distributed in accordance with the requirements of appropriate national authorities, which may have special licensing requirements, and are used either for prevention, treatment, or dagnosis of disease in humans or animals, or for development, experimental or investigation purposes related thereto. They include, but are not limited to finished or unfinished products such as vaccines.

Cultures (laboratory stocks) are the results of a process by which pathogens are amplified or propagated in order to generate high concentrations, thereby increasing the risk of infection when exposure to them occurs. This definition refers to cultures prepared for the intentional generation of pathogens and does not include cultures intended for diagnostic and clinical purposes.

Genetically modified micro-organisms and organisms are Micro-organisms en organisms in which genetic material has been purposely altered through genetic engineering in a way that does not occur naturally.

Medical or clinical wastes are the wastes derived from the medical treatment of animals or humans or from bio-research.

Class 7 Radioactive materials

All radioactive materials are dangerous to a greater or a lesser degree because they emit invisible radiation which may damage body tissue. This damage arises either from external irradiation or from internal irradiation following the intake of radioactive material into the body.

Two other properties of radioactive materials are heat emission and liability to criticality. The former is significant only with large activities, whereas the latter is peculiar to fissile radioactive materials of significant quantity, form and configuration.

In addition to the radioactive properties, any other dangerous properties of the contents of a package, such as explosiveness, flammability, pyrophoricity, chemical toxicity and corrosiveness, shall be taken into account in the documentation, packing, labelling, marking, placarding, stowage, segregation and transport, in order to be in compliance with all relevant provisions for dangerous goods of this Code.

Account shall be taken of the formation of other dangerous substances that may result from the reaction between the contents of a consignment and the atmosphere or water in the event of breaking of the containment system caused by an accident, e.g. uranium hexafluoride (UF6) decomposition in a humid atmosphere.

Class 8 Corrosives

The substances in this class are solids or liquids which, by chemical action will cause severe damage when in contact with living tissue or, in the case of leakage, wil materially damage, or even destroy, other goods or the means of transport.

In cases where particularly severe personal damage is to be expected, a note to that effect can be made in the wording: "Causes (severe) burns to skin, eyes and mucous membranes".

Many substances are sufficiently volatile to evolve vapour irritating to the nose and eyes. If so, this fact can be mentioned in the wording: "Vapour irritates mucous membranes".

A few substances may produce toxic gases when decomposed by very high temperatures. In these cases the statement "When involved in a fire, evolves toxic gases" may appear.

In addition to a direct destructive action in contact with skin or mucous membranes, some substances in this class are toxic or harmful. Poisoning may result if they are swallowed, or if their vapour is inhaled; some of them even may penetrate the skin. Where appropriate, a statement to that effect can be made.

Class 9 Miscellaneous dangerous substances and articles

This class comprises substances and articles not covered by other classes which during transport present a danger not covered by other classes.

These include:

- substances that are transported or offered for transport at temperatures equal to or exceeding 100°C and in a liquid state, and solids that are transported or offered for transport at temperatures equal to or exceeding 240°C; and
- genetically modified micro-organisms an genetically modified organisms which do not meet the definition of infectious substances but which are capable of altering animals, plants or microbiological substances in a way not normally the result of natural reproduction.

Annex 2

Proper Shipping Name in Sea Trasnport

General requirements

According to the IMDG Code only the proper shipping name should be used in documents and on packages, Intermediate Bulk Containers (IBC's), and if applicable cargo transport units [containers, freight vehicles, portablable tanks (tankcontainers) and tankvehicles] containing the goods.

Initials or trade names alone shall not be used to describe a substance unless they are abbreviations or names approved by the International Organisation for Standardization (ISO). Trade names may be utilized on documents and packages in addition to the proper shipping name.

In the IMDG Code the proper shipping name of a dangerous substance, material or article is shown in capital letters in:

- The alphabetical index; and
- Column 2 of the the Dangerous Goods List.

A. Alphabetical Index

In the alphabetical index of the IMDG Code synonyms, initials, abbreviations of names, etc. have been included only to facilitate the search for the proper shipping name.

The proper shipping names are shown in capital letters in the column headed by Substance, material or article.

The word "see" after a name in small letters indicates that the name is a synonym. The proper shipping name for a synonym can be found in column 2 of the Dangerous Goods List via the UN No. indicated in the last column of the alphabetical index. For example: Acetoin, see, UN No. 2621.

For entries which are designated as proper shipping names, the proper shipping name is considered to be that portion of the entry most accurately describing the goods that is shown in capital letters, except for "GENERIC" or "NOT OTHERWISE SPECIFIED (N.O.S)" entries for which additional information shall be provided if special provision 274 in column 6 of the Dangerous Goods List has been assigned.

In such cases, the proper shipping name is a combination of that part of the entry shown in capital letters supplemented by the additional information as required.

Note: Numbers, Greek letters, and prefixes such as 'N-'; 'n-'; 'normal-'; 'sec-'; 'secondary-'; 'tert-'; tertiary-'; 'm-'; 'meta-'; 'p-'; 'para-'; 'o-'; 'ortho-'; 'uns-'; 'sym-'; 'cis-'; `trans-' form also an integral part of the name.

B. The Dangerous Goods List

The proper shipping names are shown in capital letters in colomn 2 of the Dangerous Goods List in chapter 3.2

For entries which are designated as proper shipping names, the proper shipping name is considered to be that portion of the entry most accurately describing the goods that is shown in capital letters, except for "GENERIC" or "NOT OTHERWISE SPECIFIED (N.O.S)" entries for which additional information shall be provided if special provision 274 in column 6 of the Dangerous Goods List has been assigned.

In such cases, the proper shipping name is a combination of that part of the entry shown in capital letters supplemented by the additional information as required.

Note: Numbers, Greek letters, and prefixes such as 'N-'; 'n-'; 'normal-'; 'sec-'; 'secondary-'; 'tert-'; tertiary-'; 'm-'; 'meta-'; 'p-'; 'para-'; 'o-'; 'ortho-'; 'uns-'; 'sym-'; 'cis-'; `trans-' form also an integral part of the name.

(Source: IMDG Code, volume 2, index and chapters 3.1 and 3.2.)

This publication has been produced with the assistance of the European Union.
The contents of this publication is the sole responsibility of NEA and its partners and can in no way be taken to reflect the views of the European Union.