



MARITIME SAFETY COMMITTEE  
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Agenda item 24

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**REPORT OF THE MARITIME SAFETY COMMITTEE ON ITS  
EIGHTY-FOURTH SESSION**

Attached are annexes 1 to 8 to the report of the Maritime Safety Committee on its eighty-fourth session (MSC 84/24).

For reasons of economy, this document is printed in a limited number. Delegates are kindly asked to bring their copies to meetings and not to request additional copies.

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- ANNEX 1 RESOLUTION MSC.255(84) – ADOPTION OF THE CODE OF THE INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES FOR A SAFETY INVESTIGATION INTO A MARINE CASUALTY OR MARINE INCIDENT (CASUALTY INVESTIGATION CODE)
- ANNEX 2 RESOLUTION MSC.256(84) – ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED
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- ANNEX 7 RESOLUTION MSC.261(84) – ADOPTION OF AMENDMENTS TO THE GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS AND OIL TANKERS (RESOLUTION A.744(18), AS AMENDED)
- ANNEX 8 RESOLUTION MSC.262(84) – ADOPTION OF AMENDMENTS TO THE INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG) CODE

**(See document MSC 84/24/Add.2 for annexes 9 to 11 and 13 to 23 and document MSC 84/24/Add.3 for annex 12)**

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**ANNEX 1**

**RESOLUTION MSC.255(84)  
(adopted on 16 May 2008)**

**ADOPTION OF THE CODE OF THE INTERNATIONAL STANDARDS AND  
RECOMMENDED PRACTICES FOR A SAFETY INVESTIGATION  
INTO A MARINE CASUALTY OR MARINE INCIDENT  
(CASUALTY INVESTIGATION CODE)**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the function of the Committee,

NOTING with concern that, despite the best endeavours of the Organization, casualties and incidents resulting in loss of life, loss of ships and pollution of the marine environment continue to occur,

NOTING ALSO that the safety of seafarers and passengers and the protection of the marine environment can be enhanced by timely and accurate reports identifying the circumstances and causes of marine casualties and incidents,

NOTING FURTHER the importance of the United Nations Convention on the Law of the Sea, done at Montego Bay on 10 December 1982, and of the customary international law of the sea,

NOTING IN ADDITION the responsibilities of flag States under the provisions of the International Convention for the Safety of Life at Sea, 1974 (regulation I/21) (hereinafter referred to as "the Convention"), the International Convention on Load Lines, 1966 (article 23) and the International Convention for the Prevention of Pollution from Ships, 1973 (article 12), to conduct casualty investigations and to supply the Organization with relevant findings,

CONSIDERING the need to ensure that all very serious marine casualties are investigated,

CONSIDERING ALSO the Guidelines on fair treatment of seafarers in the event of a maritime accident (resolution A.987(24)),

ACKNOWLEDGING that the investigation and proper analysis of marine casualties and incidents can lead to greater awareness of casualty causation and result in remedial measures, including better training, for the purpose of enhancing safety of life at sea and protection of the marine environment,

RECOGNIZING the need for a code to provide, as far as national laws allow, a standard approach to marine casualty and incident investigation with the objective of preventing marine casualties and incidents in the future,

RECOGNIZING ALSO the international nature of shipping and the need for co-operation between Governments having a substantial interest in a marine casualty or incident for the purpose of determining the circumstances and causes thereof,

NOTING resolution MSC.257(84) by which it adopted amendments to chapter XI-1 of the Convention to make parts I and II of the Code of the International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident mandatory under the Convention,

HAVING CONSIDERED, at its eighty-fourth session, the text of the proposed Casualty Investigation Code,

1. ADOPTS the Code of the International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident (Casualty Investigation Code), set out in the Annex to the present resolution;
2. INVITES Contracting Governments to the Convention to note that the Code will take effect on 1 January 2010 upon entry into force of the amendments to regulation XI-1/6 of the Convention;
3. REQUESTS the Secretary-General of the Organization to transmit certified copies of the present resolution and the text of the Code contained in the Annex to all Contracting Governments to the Convention;
4. FURTHER REQUESTS the Secretary-General of the Organization to transmit copies of the present resolution and the text of the Code contained in the Annex to all Members of the Organization which are not Contracting Governments to the Convention.

ANNEX

**CODE OF THE INTERNATIONAL STANDARDS AND RECOMMENDED  
PRACTICES FOR A SAFETY INVESTIGATION INTO A MARINE CASUALTY  
OR MARINE INCIDENT (CASUALTY INVESTIGATION CODE)**

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## Foreword

1 This Code incorporates and builds on the best practices in marine casualty and marine incident investigation that were established by the Code for the Investigation of Marine Casualties and Incidents, adopted in November 1997 by the International Maritime Organization (the Organization), by resolution A.849(20). The Code for the Investigation of Marine Casualties and Incidents sought to promote co-operation and a common approach to marine casualty and marine incident investigations between States.

### *Background*

2 The Organization has encouraged co-operation and recognition of mutual interest through a number of resolutions. The first was resolution A.173(ES.IV) (Participation in Official Inquiries into Maritime Casualties) adopted in November 1968. Other resolutions followed including: resolution A.322(IX) (The Conduct of Investigations into Casualties) adopted in November 1975; resolution A.440(XI) (Exchange of Information for Investigations into Marine Casualties) and resolution A.442(XI) (Personnel and Material Resource Needs of Administrations for the Investigation of Casualties and the Contravention of Conventions), both adopted in November 1979; resolution A.637(16) (Co-operation in Maritime Casualty Investigations) adopted in 1989.

3 These individual resolutions were amalgamated and expanded by the Organization with the adoption of the Code for the Investigation of Marine Casualties and Incidents. Resolution A.884(21) (Amendments to the Code for the Investigation of Marine Casualties and Incidents resolution A.849(20)), adopted in November 1999, enhanced the Code by providing guidelines for the investigation of human factors.

4 The International Convention for the Safety of Life at Sea (SOLAS), 1948, included a provision requiring flag State Administrations to conduct investigations into any casualty suffered by a ship of its flag if an investigation may assist in identifying regulatory issues as a contributing factor. This provision was retained in the 1960 and 1974 SOLAS Conventions. It was also included in the International Convention on Load Lines, 1966. Further, flag States are required to inquire into certain marine casualties and marine incidents occurring on the high seas\*.

5 The sovereignty of a coastal State extends beyond its land and inland waters to the extent of its territorial sea\*\*. This jurisdiction gives the coastal State an inherent right to investigate marine casualties and marine incidents connected with its territory. Most national Administrations have legal provisions to cover the investigation of a shipping incident within its inland waters and territorial sea, regardless of the flag.

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\* Reference is made to the United Nations Convention on the Law of the Sea (UNCLOS), article 94(7) or requirements of international and customary laws.

\*\* Reference is made to the United Nations Convention on the Law of the Sea (UNCLOS), article 2 or requirements of international and customary laws.

### *Treatment of Seafarers*

6 Most recently, the International Labour Organization's Maritime Labour Convention, 2006 (which has not yet come into force), provides a provision for the investigation of some serious marine casualties as well as setting out working conditions for seafarers. Recognizing the need for special protection for seafarers during an investigation, the Organization adopted, in December 2005, the "Guidelines on Fair Treatment of Seafarers in the Event of a Maritime Accident" through resolution A.987(24). The Guidelines were promulgated by the IMO and the ILO on 1 July 2006.

### *Adoption of the Code*

7 Since the adoption of the first SOLAS Convention, there have been extensive changes in the structure of the international maritime industry and changes in international law. These changes have potentially increased the number of States with an interest in the process and outcomes of marine safety investigations, in the event of a marine casualty or marine incident, increasing the potential for jurisdictional and other procedural differences between affected States.

8 This Code, while it specifies some mandatory requirements, recognizes the variations in international and national laws in relation to the investigation of marine casualties and marine incidents. The Code is designed to facilitate objective marine safety investigations for the benefit of flag States, coastal States, the Organization and the shipping industry in general.

## PART I

### GENERAL PROVISIONS

#### Chapter 1

#### PURPOSE

1.1 The objective of this Code is to provide a common approach for States to adopt in the conduct of marine safety investigations into marine casualties and marine incidents. Marine safety investigations do not seek to apportion blame or determine liability. Instead a marine safety investigation, as defined in this Code, is an investigation conducted with the objective of preventing marine casualties and marine incidents in the future. The Code envisages that this aim will be achieved through States:

- .1 applying consistent methodology and approach, to enable and encourage a broad ranging investigation, where necessary, in the interests of uncovering the causal factors and other safety risks; and
- .2 providing reports to the Organization to enable a wide dissemination of information to assist the international marine industry to address safety issues.

1.2 A marine safety investigation should be separate from, and independent of, any other form of investigation. However, it is not the purpose of this Code to preclude any other form of investigation, including investigations for action in civil, criminal and administrative proceedings. Further, it is not the intent of the Code for a State or States conducting a marine safety investigation to refrain from fully reporting on the causal factors of a marine casualty or marine incident because blame or liability, may be inferred from the findings.

1.3 This Code recognizes that under the Organization's instruments, each flag State has a duty to conduct an investigation into any casualty occurring to any of its ships, when it judges that such an investigation may assist in determining what changes in the present regulations may be desirable, or if such a casualty has produced a major deleterious effect upon the environment. The Code also takes into account that a flag State shall\* cause an inquiry to be held, by or before a suitably qualified person or persons into certain marine casualties or marine incidents of navigation on the high seas. However, the Code also recognizes that where a marine casualty or marine incident occurs within the territory, including the territorial sea, of a State, that State has a right\*\* to investigate the cause of any such marine casualty or marine incident which might pose a risk to life or to the environment, involve the coastal State's search and rescue authorities, or otherwise affect the coastal State.

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\* Reference is made to the United Nations Convention on the Law of the Sea (UNCLOS), article 94 or requirements of international and customary laws.

\*\* Reference is made to the United Nations Convention on the Law of the Sea (UNCLOS), article 2 or requirements of international and customary laws.

## Chapter 2

### DEFINITIONS

When the following terms are used in the mandatory standards and recommended practices for marine safety investigations they have the following meaning.

- 2.1 An *agent* means any person, natural or legal, engaged on behalf of the owner, charterer or operator of a ship, or the owner of the cargo, in providing shipping services, including managing arrangements for the ship being the subject of a marine safety investigation.
- 2.2 A *causal factor* means actions, omissions, events or conditions, without which:
- .1 the marine casualty or marine incident would not have occurred; or
  - .2 adverse consequences associated with the marine casualty or marine incident would probably not have occurred or have been as serious;
  - .3 another action, omission, event or condition, associated with an outcome in .1 or .2, would probably not have occurred.
- 2.3 A *coastal State* means a State in whose territory, including its territorial sea, a marine casualty or marine incident occurs.
- 2.4 *Exclusive economic zone* means the exclusive economic zone as defined by article 55 of the United Nations Convention on the Law of the Sea.
- 2.5 *Flag State* means a State whose flag a ship is entitled to fly.
- 2.6 *High seas* means the high seas as defined in article 86 of the United Nations Convention on the Law of the Sea.
- 2.7 *Interested party* means an organization, or individual, who, as determined by the marine safety investigating State(s), has significant interests, rights or legitimate expectations with respect to the outcome of a marine safety investigation.
- 2.8 *International Safety Management (ISM) Code* means the International Management Code for the Safe Operation of Ships and for Pollution Prevention as adopted by the Organization by resolution A.741(18), as amended.
- 2.9 A *marine casualty* means an event, or a sequence of events, that has resulted in any of the following which has occurred directly in connection with the operations of a ship:
- .1 the death of, or serious injury to, a person;
  - .2 the loss of a person from a ship;
  - .3 the loss, presumed loss or abandonment of a ship;

- .4 material damage to a ship;
- .5 the stranding or disabling of a ship, or the involvement of a ship in a collision;
- .6 material damage to marine infrastructure external to a ship, that could seriously endanger the safety of the ship, another ship or an individual; or
- .7 severe damage to the environment, or the potential for severe damage to the environment, brought about by the damage of a ship or ships.

However, a marine casualty does not include a deliberate act or omission, with the intention to cause harm to the safety of a ship, an individual or the environment.

2.10 A *marine incident* means an event, or sequence of events, other than a marine casualty, which has occurred directly in connection with the operations of a ship that endangered, or, if not corrected, would endanger the safety of the ship, its occupants or any other person or the environment.

However, a marine incident does not include a deliberate act or omission, with the intention to cause harm to the safety of a ship, an individual or the environment.

2.11 A *marine safety investigation* means an investigation or inquiry (however referred to by a State), into a marine casualty or marine incident, conducted with the objective of preventing marine casualties and marine incidents in the future. The investigation includes the collection of, and analysis of, evidence, the identification of causal factors and the making of safety recommendations as necessary.

2.12 A *marine safety investigation report* means a report that contains:

- .1 a summary outlining the basic facts of the marine casualty or marine incident and stating whether any deaths, injuries or pollution occurred as a result;
- .2 the identity of the flag State, owners, operators, the company as identified in the safety management certificate, and the classification society (subject to any national laws concerning privacy);
- .3 where relevant the details of the dimensions and engines of any ship involved, together with a description of the crew, work routine and other matters, such as time served on the ship;
- .4 a narrative detailing the circumstances of the marine casualty or marine incident;
- .5 analysis and comment on the causal factors including any mechanical, human and organizational factors;
- .6 a discussion of the marine safety investigation's findings, including the identification of safety issues, and the marine safety investigation's conclusions; and

- .7 where appropriate, recommendations with a view to preventing future marine casualties and marine incidents.

2.13 *Marine safety investigation Authority* means an Authority in a State, responsible for conducting investigations in accordance with this Code.

2.14 *Marine safety investigating State(s)* means the flag State or, where relevant, the State or States that take the responsibility for the conduct of the marine safety investigation as mutually agreed in accordance with this Code.

2.15 *A marine safety record* means the following types of records collected for a marine safety investigation:

- .1 all statements taken for the purpose of a marine safety investigation;
- .2 all communications between persons pertaining to the operation of the ship;
- .3 all medical or private information regarding persons involved in the marine casualty or marine incident;
- .4 all records of the analysis of information or evidential material acquired in the course of a marine safety investigation;
- .5 information from the voyage data recorder.

2.16 *A material damage* in relation to a marine casualty means:

- .1 damage that:
  - .1.1 significantly affects the structural integrity, performance or operational characteristics of marine infrastructure or a ship; and
  - .1.2 requires major repair or replacement of a major component or components;  
or
- .2 destruction of the marine infrastructure or ship.

2.17 *A seafarer* means any person who is employed or engaged or works in any capacity on board a ship.

2.18 *A serious injury* means an injury which is sustained by a person, resulting in incapacitation where the person is unable to function normally for more than 72 hours, commencing within seven days from the date when the injury was suffered.

2.19 *A severe damage to the environment* means damage to the environment which, as evaluated by the State(s) affected, or the flag State, as appropriate, produces a major deleterious effect upon the environment.

2.20 *Substantially interested State* means a State:

- .1 which is the flag State of a ship involved in a marine casualty or marine incident;  
or
- .2 which is the coastal State involved in a marine casualty or marine incident; or
- .3 whose environment was severely or significantly damaged by a marine casualty (including the environment of its waters and territories recognized under international law); or
- .4 where the consequences of a marine casualty or marine incident caused, or threatened, serious harm to that State or to artificial islands, installations, or structures over which it is entitled to exercise jurisdiction; or
- .5 where, as a result of a marine casualty, nationals of that State lost their lives or received serious injuries; or
- .6 that has important information at its disposal that the marine safety investigating State(s) consider useful to the investigation; or
- .7 that for some other reason establishes an interest that is considered significant by the marine safety investigating State(s).

2.21 *Territorial sea* means territorial sea as defined by Section 2 of Part II of the United Nations Convention on the Law of the Sea.

2.22 *A very serious marine casualty* means a marine casualty involving the total loss of the ship or a death or severe damage to the environment.

### **Chapter 3**

#### **APPLICATION OF CHAPTERS IN PARTS II AND III**

3.1 Part II of this Code contains mandatory standards for marine safety investigations. Some clauses apply only in relation to certain categories of marine casualties and are mandatory only for marine safety investigations into those marine casualties.

3.2 Clauses in Part III of this Code may refer to clauses in this part that apply only to certain marine casualties. The clauses in Part III may recommend that such clauses be applied in marine safety investigations into other marine casualties or marine incidents.

## PART II

### MANDATORY STANDARDS

#### Chapter 4

#### MARINE SAFETY INVESTIGATION AUTHORITY

4.1 The Government of each State shall provide the Organization with detailed contact information of the marine safety investigation Authority(ies) carrying out marine safety investigations within their State.

#### Chapter 5

#### NOTIFICATION

5.1 When a marine casualty occurs on the high seas or in an exclusive economic zone, the flag State of a ship, or ships, involved, shall notify other substantially interested States as soon as is reasonably practicable.

5.2 When a marine casualty occurs within the territory, including the territorial sea, of a coastal State, the flag State, and the coastal State, shall notify each other and between them notify other substantially interested States as soon as is reasonably practicable.

5.3 Notification shall not be delayed due to the lack of complete information.

5.4 **Format and content:** The notification shall contain as much of the following information as is readily available:

- .1 the name of the ship and its flag State;
- .2 the IMO ship identification number;
- .3 the nature of the marine casualty;
- .4 the location of the marine casualty;
- .5 time and date of the marine casualty;
- .6 the number of any seriously injured or killed persons;
- .7 consequences of the marine casualty to individuals, property and the environment;  
and
- .8 the identification of any other ship involved.

## **Chapter 6**

### **REQUIREMENT TO INVESTIGATE VERY SERIOUS MARINE CASUALTIES**

- 6.1 A marine safety investigation shall be conducted into every very serious marine casualty.
- 6.2 Subject to any agreement in accordance with chapter 7, the flag State of a ship involved in a very serious marine casualty is responsible for ensuring that a marine safety investigation is conducted and completed in accordance with this Code.

## **Chapter 7**

### **FLAG STATE'S AGREEMENT WITH ANOTHER SUBSTANTIALLY INTERESTED STATE TO CONDUCT A MARINE SAFETY INVESTIGATION**

- 7.1 Without limiting the rights of States to conduct their own separate marine safety investigation, where a marine casualty occurs within the territory, including territorial sea, of a State, the flag State(s) involved in the marine casualty and the coastal State shall consult to seek agreement on which State or States will be the marine safety investigating State(s) in accordance with a requirement, or a recommendation acted upon, to investigate under this Code.
- 7.2 Without limiting the rights of States to conduct their own separate marine safety investigation, if a marine casualty occurs on the high seas or in the exclusive economic zone of a State, and involves more than one flag State, then the States shall consult to seek agreement on which State or States will be the marine safety investigating State(s) in accordance with a requirement, or a recommendation acted upon, to investigate under this Code.
- 7.3 For a marine casualty referred to in paragraph 7.1 or 7.2, agreement may be reached by the relevant States with another substantially interested State for that State or States to be the marine safety investigating State(s).
- 7.4 Prior to reaching an agreement, or if an agreement is not reached, in accordance with paragraph 7.1, 7.2 or 7.3, then the existing obligations and rights of States under this Code, and under other international laws, to conduct a marine safety investigation, remain with the respective parties to conduct their own investigation.
- 7.5 By fully participating in a marine safety investigation conducted by another substantially interested State, the flag State shall be considered to fulfil its obligations under this Code, SOLAS regulation I/21 and article 94, section 7 of the United Nations Convention on the Law of the Sea.

## **Chapter 8**

### **POWERS OF AN INVESTIGATION**

8.1 All States shall ensure that their national laws provide investigator(s) carrying out a marine safety investigation with the ability to board a ship, interview the master and crew and any other person involved, and acquire evidential material for the purposes of a marine safety investigation.

## **Chapter 9**

### **PARALLEL INVESTIGATIONS**

9.1 Where the marine safety investigating State(s) is conducting a marine safety investigation under this Code, nothing prejudices the right of another substantially interested State to conduct its own separate marine safety investigation.

9.2 While recognizing that the marine safety investigating State(s) shall be able to fulfil obligations under this Code, the marine safety investigating State(s) and any other substantially interested State conducting a marine safety investigation shall seek to co-ordinate the timing of their investigations, to avoid conflicting demands upon witnesses and access to evidence, where possible.

## **Chapter 10**

### **CO-OPERATION**

10.1 All substantially interested States shall co-operate with the marine safety investigating State(s) to the extent practicable. The marine safety investigating State(s) shall provide for the participation of the substantially interested States to the extent practicable\*.

## **Chapter 11**

### **INVESTIGATION NOT TO BE SUBJECT TO EXTERNAL DIRECTION**

11.1 Marine safety investigating State(s) shall ensure that investigator(s) carrying out a marine safety investigation are impartial and objective. The marine safety investigation shall be able to report on the results of a marine safety investigation without direction or interference from any persons or organizations who may be affected by its outcome.

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\* The reference to “extent practicable” may be taken to mean, as an example, that co-operation or participation is limited because national laws make it impracticable to fully co-operate or participate.

## **Chapter 12**

### **OBTAINING EVIDENCE FROM SEAFARERS**

12.1 Where a marine safety investigation requires a seafarer to provide evidence to it, the evidence shall be taken at the earliest practical opportunity. The seafarer shall be allowed to return to his/her ship, or be repatriated at the earliest possible opportunity. The seafarers human rights shall, at all times, be upheld.

12.2 All seafarers from whom evidence is sought shall be informed of the nature and basis of the marine safety investigation. Further, a seafarer from whom evidence is sought shall be informed, and allowed access to legal advice, regarding:

- .1 any potential risk that they may incriminate themselves in any proceedings subsequent to the marine safety investigation;
- .2 any right not to self-incriminate or to remain silent;
- .3 any protections afforded to the seafarer to prevent the evidence being used against them if they provide the evidence to the marine safety investigation.

## **Chapter 13**

### **DRAFT MARINE SAFETY INVESTIGATION REPORTS**

13.1 Subject to paragraphs 13.2 and 13.3, where it is requested, the marine safety investigating State(s) shall send a copy of a draft report to a substantially interested State to allow the substantially interested State to make comment on the draft report.

13.2 Marine safety investigating State(s) are only bound to comply with paragraph 13.1 where the substantially interested State receiving the report guarantees not to circulate, nor cause to circulate, publish or give access to the draft report, or any part thereof, without the express consent of the marine safety investigating State(s) or unless such reports or documents have already been published by the marine safety investigating State(s).

13.3 The marine safety investigating State(s) are not bound to comply with paragraph 13.1 if:

- .1 the marine safety investigating State(s) request that the substantially interested State receiving the report to affirm that evidence included in the draft report will not be admitted in civil or criminal proceedings against a person who gave the evidence; and
- .2 the substantially interested State refuses to provide such an affirmation.

13.4 The marine safety investigating State(s) shall invite the substantially interested States to submit their comments on the draft report within 30 days or some other mutually agreed period. The marine safety investigating State(s) shall consider the comments before preparing the final report and where the acceptance or rejection of the comments will have direct

impact on the interests of the State that submitted them, the marine safety investigating State(s) shall notify the substantially interested State of the manner in which the comments were addressed. If the marine safety investigating State(s) receives no comments after the 30 days or the mutually agreed period has expired, then it may proceed to finalize the report.

13.5 The marine safety investigating State(s) shall seek to fully verify the accuracy and completeness of the draft report by the most practical means.

## **Chapter 14**

### **MARINE SAFETY INVESTIGATION REPORTS**

14.1 The marine safety investigating State(s) shall submit the final version of a marine safety investigation report to the Organization for every marine safety investigation conducted into a very serious marine casualty.

14.2 Where a marine safety investigation is conducted into a marine casualty or marine incident, other than a very serious marine casualty, and a marine safety investigation report is produced which contains information which may prevent or lessen the seriousness of marine casualties or marine incidents in the future, the final version shall be submitted to the Organization.

14.3 The marine safety investigation report referred in paragraphs 14.1 and 14.2 shall utilize all the information obtained during a marine safety investigation, taking into account its scope, required to ensure that all the relevant safety issues are included and understood so that safety action can be taken as necessary.

14.4 The final marine safety investigation report shall be made available to the public and the shipping industry by the marine safety investigating State(s), or the marine safety investigating State(s) shall undertake to assist the public and the shipping industry with details, necessary to access the report, where it is published by another State or the Organization.

## **PART III**

### **RECOMMENDED PRACTICES**

## **Chapter 15**

### **ADMINISTRATIVE RESPONSIBILITIES**

15.1 States should ensure that marine safety investigating Authorities have available to them sufficient material and financial resources and suitably qualified personnel to enable them to facilitate the State's obligations to undertake marine safety investigations into marine casualties and marine incidents under this Code.

15.2 Any investigator forming part of a marine safety investigation should be appointed on the basis of the skills outlined in resolution A.996(25) for investigators.

15.3 However, paragraph 15.2 does not preclude the appropriate appointment of investigators with necessary specialist skills to form part of a marine safety investigation on a temporary basis, neither does it preclude the use of consultants to provide expert advice on any aspect of a marine safety investigation.

15.4 Any person who is an investigator, in a marine safety investigation, or assisting a marine safety investigation, should be bound to operate in accordance with this Code.

## Chapter 16

### PRINCIPLES OF INVESTIGATION

16.1 **Independence:** A marine safety investigation should be unbiased to ensure the free flow of information to it.

16.1.1 In order to achieve the outcome in paragraph 16.1, the investigator(s) carrying out a marine safety investigation should have functional independence from:

- .1 the parties involved in the marine casualty or marine incident;
- .2 anyone who may make a decision to take administrative or disciplinary action against an individual or organization involved in a marine casualty or marine incident; and
- .3 judicial proceedings.

16.1.2 The investigator(s) carrying out a marine safety investigation should be free of interference from the parties in .1, .2 and .3 of paragraph 16.1.1 with respect to:

- .1 the gathering of all available information relevant to the marine casualty or marine incident, including voyage data recordings and vessel traffic services recordings;
- .2 analysis of evidence and the determination of causal factors;
- .3 drawing conclusions relevant to the causal factors;
- .4 distributing a draft report for comment and preparation of the final report; and
- .5 if appropriate, the making of safety recommendations.

16.2 **Safety focused:** It is not the objective of a marine safety investigation to determine liability, or apportion blame. However, the investigator(s) carrying out a marine safety investigation should not refrain from fully reporting on the causal factors because fault or liability may be inferred from the findings.

16.3 **Co-operation:** Where it is practicable and consistent with the requirements and recommendations of this Code, in particular chapter 10 on Co-operation, the marine safety investigating State(s) should seek to facilitate maximum co-operation between substantially interested States and other persons or organizations conducting an investigation into a marine casualty or marine incident.

16.4 **Priority:** A marine safety investigation should, as far as possible, be afforded the same priority as any other investigation, including investigations by a State for criminal purposes being conducted into the marine casualty or marine incident.

16.4.1 In accordance with paragraph 16.4 investigator(s) carrying out a marine safety investigation should not be prevented from having access to evidence in circumstances where another person or organization is carrying out a separate investigation into a marine casualty or marine incident.

16.4.2 The evidence for which ready access should be provided should include:

- .1 survey and other records held by the flag State, the owners, and classification societies;
- .2 all recorded data, including voyage data recorders; and
- .3 evidence that may be provided by government surveyors, coastguard officers, vessel traffic service operators, pilots or other marine personnel.

16.5 **Scope of a marine safety investigation:** Proper identification of causal factors requires timely and methodical investigation, going far beyond the immediate evidence and looking for underlying conditions, which may be remote from the site of the marine casualty or marine incident, and which may cause other future marine casualties and marine incidents. Marine safety investigations should therefore be seen as a means of identifying not only immediate causal factors but also failures that may be present in the whole chain of responsibility.

## **Chapter 17**

### **INVESTIGATION OF MARINE CASUALTIES (OTHER THAN VERY SERIOUS CASUALTIES) AND MARINE INCIDENTS**

17.1 A marine safety investigation should be conducted into marine casualties (other than very serious marine casualties – which are addressed in chapter 6 of this Code) and marine incidents, by the flag State of a ship involved, if it is considered likely that a marine safety investigation will provide information that can be used to prevent marine casualties and marine incidents in the future.

17.2 Chapter 7 contains the mandatory requirements for determining who the marine safety investigating State(s) are for a marine casualty. Where the occurrence being investigated in accordance with this chapter is a marine incident, chapter 7 should be followed as a recommended practice as if it referred to marine incidents.

## Chapter 18

### FACTORS THAT SHOULD BE TAKEN INTO ACCOUNT WHEN SEEKING AGREEMENT UNDER CHAPTER 7 OF PART II

18.1 When the flag State(s), a coastal State (if involved) or other substantially interested States are seeking to reach agreement, in accordance with chapter 7 of Part II on which State or State(s) will be the marine safety investigating State(s) under this Code, the following factors should be taken into account:

- .1 whether the marine casualty or marine incident occurred in the territory, including territorial sea, of a State;
- .2 whether the ship or ships involved in a marine casualty or marine incident occurring on the high seas, or in the exclusive economic zone, subsequently sail into the territorial sea of a State;
- .3 the resources and commitment required of the flag State and other substantially interested States;
- .4 the potential scope of the marine safety investigation and the ability of the flag State or another substantially interested State to accommodate that scope;
- .5 the need of the investigator(s) carrying out a marine safety investigation to access evidence and consideration of the State or States best placed to facilitate that access to evidence;
- .6 any perceived or actual adverse effects of the marine casualty or marine incident on other States;
- .7 the nationality of the crew, passengers and other persons affected by the marine casualty or marine incident.

## Chapter 19

### ACTS OF UNLAWFUL INTERFERENCE

19.1 If in the course of a marine safety investigation it becomes known or is suspected that an offence is committed under article 3, *3bis*, *3ter* or *3quarter* of the Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation, 1988, the marine safety investigation Authority should immediately seek to ensure that the maritime security Authorities of the State(s) concerned are informed.

## **Chapter 20**

### **NOTIFICATION TO PARTIES INVOLVED AND COMMENCEMENT OF AN INVESTIGATION**

20.1 When a marine safety investigation is commenced under this Code, the master, the owner and agent of a ship involved in the marine casualty or marine incident being investigated, should be informed as soon as practicable of:

- .1 the marine casualty or marine incident under investigation;
- .2 the time and place at which the marine safety investigation will commence;
- .3 the name and contact details of the marine safety investigation Authority(ies);
- .4 the relevant details of the legislation under which the marine safety investigation is being conducted;
- .5 the rights and obligations of the parties subject to the marine safety investigation;  
and
- .6 the rights and obligations of the State or States conducting the marine safety investigation.

20.2 Each State should develop a standard document detailing the information in paragraph 20.1 that can be transmitted electronically to the master, the agent and the owner of the ship.

20.3 Recognizing that any ship involved in a marine casualty or marine incident may continue in service, and that a ship should not be delayed more than is absolutely necessary, the marine safety investigating State(s) conducting the marine safety investigation should start the marine safety investigation as soon as is reasonably practicable, without delaying the ship unnecessarily.

## **Chapter 21**

### **CO-ORDINATING AN INVESTIGATION**

21.1 The recommendations in this chapter should be applied in accordance with the principles in chapters 10 and 11 of this Code.

21.2 The marine safety investigating State(s) should ensure that there is an appropriate framework within the State for:

- .1 the designation of investigators to the marine safety investigation including an investigator to lead the marine safety investigation;
- .2 the provision of a reasonable level of support to members of the marine safety investigation;

- .3 the development of a strategy for the marine safety investigation in liaison with other substantially interested States;
- .4 ensuring the methodology followed during the marine safety investigation is consistent with that recommended in resolution A.884(21), as amended;
- .5 ensuring the marine safety investigation takes into account any recommendations or instruments published by the Organization or International Labour Organization, relevant to conducting a marine safety investigation; and
- .6 ensuring the marine safety investigation takes into account the safety management procedures and the safety policy of the operator of a ship in terms of the ISM Code.

21.3 The marine safety investigating State(s) should allow a substantially interested State to participate in aspects of the marine safety investigation relevant to it, to the extent practicable.

21.3.1 Participation should include allowing representatives of the substantially interested State to:

- .1 interview witnesses;
- .2 view and examine evidence and make copies of documents;
- .3 make submissions in respect of the evidence, comment on and have their views properly reflected in the final report; and
- .4 be provided with the draft and final reports relating to the marine safety investigation\*.

21.4 To the extent practical, substantially interested States should assist the marine safety investigating State(s) with access to relevant information for the marine safety investigation. To the extent practical, the investigator(s) carrying out a marine safety investigation should also be afforded access to Government surveyors, coastguard officers, ship traffic service operators, pilots and other marine personnel of a substantially interested State.

21.5 The flag State of a ship involved in a marine casualty or marine incident should help to facilitate the availability of the crew to the investigator(s) carrying out the marine safety investigation.

## **Chapter 22**

### **COLLECTION OF EVIDENCE**

22.1 A marine safety investigating State(s) should not unnecessarily detain a ship for the collection of evidence from it or have original documents or equipment removed unless this is

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\* The reference to 'extent practical' may be taken to mean, as an example, that co-operation or participation is limited because national laws make it impractical to fully co-operate or participate.

essential for the purposes of the marine safety investigation. Investigators should make copies of documents where practicable.

22.2 Investigator(s) carrying out a marine safety investigation should secure records of interviews and other evidence collected during a marine safety investigation in a manner which prevents access by persons who do not require it for the purpose of the investigation.

22.3 Investigator(s) carrying out the marine safety investigation should make effective use of all recorded data including voyage data recorders if fitted. Voyage data recorders should be made available for downloading by the investigator(s) carrying out a marine safety investigation or an appointed representative.

22.3.1 In the event that the marine safety investigating State(s) do not have adequate facilities to read a voyage data recorder, States with such a capability should offer their services having due regard to the:

- .1 available resources;
- .2 capabilities of the readout facility;
- .3 timeliness of the readout; and
- .4 location of the facility.

## **Chapter 23**

### **CONFIDENTIALITY OF INFORMATION**

23.1 States should ensure that investigator(s) carrying out a marine safety investigation only disclose information from a marine safety record where:

- .1 it is necessary or desirable to do so for transport safety purposes and any impact on the future availability of safety information to a marine safety investigation is taken into account; or
- .2 as otherwise permitted in accordance with this Code\*.

23.2 States involved in marine safety investigation under this Code should ensure that any marine safety record in its possession is not disclosed in criminal, civil, disciplinary or administrative proceedings unless:

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\* States recognize that there are merits in keeping information from a marine safety record confidential where it needs to be shared with people outside the marine safety investigation for the purpose of conducting the marine safety investigation. An example is where information from a marine safety record needs to be provided to an external expert for their analysis or second opinion. Confidentiality would seek to ensure that sensitive information is not inappropriately disclosed for purposes other than the marine safety investigation, at a time when it has not been determined how the information will assist in determining the contributing factors in a marine casualty or marine incident. Inappropriate disclosure may infer blame or liability on the parties involved in the marine casualty or marine incident.

- .1 the appropriate authority for the administration of justice in the State determines that any adverse domestic or international impact that the disclosure of the information might have on any current or future marine safety investigations is outweighed by the public interest in the administration of justice; and\*
- .2 where appropriate in the circumstances, the State which provided the marine safety record to the marine safety investigation authorizes its disclosure.

23.3 Marine safety records should be included in the final report, or its appendices, only when pertinent to the analysis of the marine casualty or marine incident. Parts of the record not pertinent, and not included in the final report, should not be disclosed.

23.4 States need only supply information from a marine safety record to a substantially interested State where doing so will not undermine the integrity and credibility of any marine safety investigation being conducted by the State or States providing the information.

23.4.1 The State supplying the information from a marine safety record may require that the State receiving the information undertake to keep it confidential.

## **Chapter 24**

### **PROTECTION FOR WITNESSES AND INVOLVED PARTIES**

24.1 If a person is required by law to provide evidence that may incriminate them, for the purposes of a marine safety investigation, the evidence should, so far as national laws allow, be prevented from admission into evidence in civil or criminal proceedings against the individual.

24.2 A person from whom evidence is sought should be informed about the nature and basis of the investigation. A person from whom evidence is sought should be informed, and allowed access to legal advice, regarding:

- .1 any potential risk that they may incriminate themselves in any proceedings subsequent to the marine safety investigation;
- .2 any right not to self-incriminate or to remain silent;
- .3 any protections afforded to the person to prevent the evidence being used against them if they provide the evidence to the marine safety investigation.

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\* Examples of where it may be appropriate to disclose information from a marine safety record in criminal, civil, disciplinary or administrative proceedings may include:

- 1 where a person the subject of the proceedings has engaged in conduct with the intention to cause a destructive result; or
- 2 where a person the subject of the proceedings has been aware of a substantial risk that a destructive result will occur and having regard to the circumstances known to him or her it is unjustifiable to take the risk.

## **Chapter 25**

### **DRAFT AND FINAL REPORT**

25.1 Marine safety investigation reports from a marine safety investigation should be completed as quickly as practicable.

25.2 Where it is requested, and where practicable, the marine safety investigating State(s) should send a copy of a draft marine safety investigation report for comment to interested parties. However, this recommendation does not apply where there is no guarantee that the interested party will not circulate, nor cause to circulate, publish or give access to the draft marine safety investigation report, or any part thereof, without the express consent of the marine safety investigating State(s).

25.3 The marine safety investigating State(s) should allow the interested party 30 days or some other mutually agreed time to submit their comments on the marine safety investigation report. The marine safety investigating State(s) should consider the comments before preparing the final marine safety investigation report and where the acceptance or rejection of the comments will have direct impact on the interests of the interested party that submitted them, the marine safety investigating State(s) should notify the interested party of the manner in which the comments were addressed. If the marine safety investigating State(s) receives no comments after the 30 days or the mutually agreed period has expired, then it may proceed to finalize the marine safety investigation report\* .

25.4 Where it is permitted by the national laws of the State preparing the marine safety investigation report, the draft and final report should be prevented from being admissible in evidence in proceedings related to the marine casualty or marine incident that may lead to disciplinary measures, criminal conviction or the determination of civil liability.

25.5 At any stage during a marine safety investigation interim safety measures may be recommended.

25.6 Where a substantially interested State disagrees with the whole or a part of a final marine safety investigation report, it may submit its own report to the Organization.

## **Chapter 26**

### **RE-OPENING AN INVESTIGATION**

26.1 Marine safety investigating State(s) which have completed a marine safety investigation, should reconsider their findings and consider re-opening the investigation when new evidence is presented which may materially alter the analysis and conclusions reached.

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\* See chapter 13 where provisions with respect to providing interested parties with reports on request may alternatively be included as a mandatory provision.

26.2 When significant new evidence relating to any marine casualty or marine incident is presented to the marine safety investigating State(s) that have completed a marine safety investigation, the evidence should be fully assessed and referred to other substantially interested States for appropriate input.

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**ANNEX 2**

**RESOLUTION MSC.256(84)  
(adopted on 16 May 2008)**

**ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR  
THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as “the Convention”), concerning the amendment procedure applicable to the Annex to the Convention, other than to the provisions of chapter I thereof,

HAVING CONSIDERED, at its eighty-fourth session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the Annex to the present resolution;
2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2009, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world’s merchant fleet, have notified their objections to the amendments;
3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2010 upon their acceptance in accordance with paragraph 2 above;
4. RECOMMENDS the Contracting Governments concerned to issue certificates complying with the annexed amendments at the first renewal survey on or after 1 January 2010;
5. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Contracting Governments to the Convention;
6. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

**AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF  
LIFE AT SEA, 1974, AS AMENDED**

**CHAPTER II-1  
CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY,  
MACHINERY AND ELECTRICAL INSTALLATIONS**

**Regulation 3-4 – Emergency towing arrangements on tankers**

1 The existing regulation 3-4 is replaced by the following:

**“Regulation 3-4  
Emergency towing arrangements and procedures**

**1 Emergency towing arrangements on tankers**

1.1 Emergency towing arrangements shall be fitted at both ends on board every tanker of not less than 20,000 tonnes deadweight.

1.2 For tankers constructed on or after 1 July 2002:

- .1 the arrangements shall, at all times, be capable of rapid deployment in the absence of main power on the ship to be towed and easy connection to the towing ship. At least one of the emergency towing arrangements shall be pre-rigged ready for rapid deployment; and
- .2 emergency towing arrangements at both ends shall be of adequate strength taking into account the size and deadweight of the ship, and the expected forces during bad weather conditions. The design and construction and prototype testing of emergency towing arrangements shall be approved by the Administration, based on the Guidelines developed by the Organization\*.

1.3 For tankers constructed before 1 July 2002, the design and construction of emergency towing arrangements shall be approved by the Administration, based on the Guidelines developed by the Organization\*.

**2 Emergency towing procedures on ships**

2.1 This paragraph applies to:

- .1 all passenger ships, not later than 1 January 2010;
- .2 cargo ships constructed on or after 1 January 2010; and
- .3 cargo ships constructed before 1 January 2010, not later than 1 January 2012.

2.2 Ships shall be provided with a ship-specific emergency towing procedure. Such a procedure shall be carried aboard the ship for use in emergency situations and shall be based on existing arrangements and equipment available on board the ship.

2.3 The procedure<sup>\*\*</sup> shall include:

- .1 drawings of fore and aft deck showing possible emergency towing arrangements;
- .2 inventory of equipment on board that can be used for emergency towing;
- .3 means and methods of communication; and
- .4 sample procedures to facilitate the preparation for and conducting of emergency towing operations.”

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\* Refer to the Guidelines on emergency towing arrangements for tankers, adopted by the Maritime Safety Committee by resolution MSC.35(63), as amended.

\*\* Refer to the Guidelines for owners/operators on preparing emergency towing procedures (MSC.1/Circ.1255).

2 The following new regulation 3-9 is added after the existing regulation 3-8:

**“Regulation 3-9  
Means of embarkation on and disembarkation from ships**

1 Ships constructed on or after 1 January 2010 shall be provided with means of embarkation on and disembarkation from ships for use in port and in port related operations, such as gangways and accommodation ladders, in accordance with paragraph 2, unless the Administration deems that compliance with a particular provision is unreasonable or impractical\*.

2 The means of embarkation and disembarkation required in paragraph 1 shall be constructed and installed based on the guidelines developed by the Organization\*\*.

3 For all ships the means of embarkation and disembarkation shall be inspected and maintained\*\* in suitable condition for their intended purpose, taking into account any restrictions related to safe loading. All wires used to support the means of embarkation and disembarkation shall be maintained as specified in regulation III/20.4.”

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\* Circumstances where compliance may be deemed unreasonable or impractical may include where the ship:

- .1 has small freeboards and is provided with boarding ramps; or
- .2 is engaged in voyages between designated ports where appropriate shore accommodation/embarkation ladders (platforms) are provided.

\*\* Refer to the Guidelines for construction, installation, maintenance and inspection/survey of accommodation ladders and gangways, to be developed by the Organization.

**CHAPTER II-2**  
**CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND**  
**FIRE EXTINCTION**

**Regulation 10 – Fire fighting**

3 The following new paragraph 4.1.5 is added after the existing paragraph 4.1.4:

“4.1.5 By the first scheduled dry-docking after 1 January 2010, fixed carbon dioxide fire-extinguishing systems for the protection of machinery spaces and cargo pump-rooms on ships constructed before 1 July 2002 shall comply with the provisions of paragraph 2.2.2 of chapter 5 of the Fire Safety Systems Code.”

**Regulation 19 – Carriage of dangerous goods**

4 In paragraph 4, the words “, as defined in regulation VII/2,” are deleted.

**Regulation 20 – Protection of vehicle, special category and ro-ro spaces**

5 The existing paragraph 6.1.4 is replaced by the following paragraph 6.1.4 and new paragraph 6.1.5 is added after paragraph 6.1.4 as follows:

“6.1.4 The requirement of this paragraph shall apply to ships constructed on or after 1 January 2010. Ships constructed on or after 1 July 2002 and before 1 January 2010 shall comply with the previously applicable requirements of paragraph 6.1.4, as amended by resolution MSC.99(73). When fixed pressure water-spraying systems are fitted, in view of the serious loss of stability which could arise due to large quantities of water accumulating on the deck or decks during the operation of the fixed pressure water-spraying system, the following arrangements shall be provided:

- .1 in passenger ships:
  - .1.1 in the spaces above the bulkhead deck, scuppers shall be fitted so as to ensure that such water is rapidly discharged directly overboard, taking into account the guidelines developed by the Organization\* ;
  - .1.2.1 in ro-ro passenger ships, discharge valves for scuppers, fitted with positive means of closing operable from a position above the bulkhead deck in accordance with the requirements of the International Convention on Load Lines in force, shall be kept open while the ships are at sea;
  - .1.2.2 any operation of valves referred to in paragraph 6.1.4.1.2.1 shall be recorded in the log-book;
  - .1.3 in the spaces below the bulkhead deck, the Administration may require pumping and drainage facilities to be provided additional to the requirements of regulation II-1/35-1. In such case, the drainage system shall be sized to remove no less than 125% of the combined capacity

of both the water-spraying system pumps and the required number of fire hose nozzles, taking into account the guidelines developed by the Organization\*. The drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls. Bilge wells shall be of sufficient holding capacity and shall be arranged at the side shell of the ship at a distance from each other of not more than 40 m in each watertight compartment;

- .2 in cargo ships, the drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. In such case, the drainage system shall be sized to remove no less than 125% of the combined capacity of both the water-spraying system pumps and the required number of fire hose nozzles, taking into account the guidelines developed by the Organization\*. The drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls. Bilge wells shall be of sufficient holding capacity and shall be arranged at the side shell of the ship at a distance from each other of not more than 40 m in each watertight compartment. If this is not possible, the adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Administration in its approval of the stability information\*\*. Such information shall be included in the stability information supplied to the master as required by regulation II-1/5-1.

6.1.5 On all ships, for closed vehicles and ro-ro spaces and special category spaces, where fixed pressure water-spraying systems are fitted, means shall be provided to prevent the blockage of drainage arrangements, taking into account the guidelines developed by the Organization\*. Ships constructed before 1 January 2010 shall comply with the requirements of this paragraph by the first survey after 1 January 2010.”

\* Refer to the Guidelines for drainage systems in closed vehicle and ro-ro spaces and special category spaces, to be developed by the Organization.

\*\* Refer to the Recommendation on fixed fire-extinguishing systems for special category spaces, adopted by the Organization by resolution A.123(V).

### CHAPTER III LIFE-SAVING APPLIANCES AND ARRANGEMENTS

#### Regulation 6 – Communications

6 The existing paragraph 2.2 is replaced by the following:

#### “2.2 Search and rescue locating devices

At least one search and rescue locating device shall be carried on each side of every passenger ship and of every cargo ship of 500 gross tonnage and upwards. At least one search and rescue locating device shall be carried on every cargo ship of 300 gross

tonnage and upwards but less than 500 gross tonnage. Such search and rescue locating devices shall conform to the applicable performance standards not inferior to those adopted by the Organization\*. The search and rescue locating devices\*\* shall be stowed in such location that they can be rapidly placed in any survival craft other than the liferaft or liferafts required by regulation 31.1.4. Alternatively one search and rescue locating device shall be stowed in each survival craft other than those required by regulation 31.1.4. On ships carrying at least two search and rescue locating devices and equipped with free-fall lifeboats one of the search and rescue locating devices shall be stowed in a free-fall lifeboat and the other located in the immediate vicinity of the navigation bridge so that it can be utilized on board and ready for transfer to any of the other survival craft.”

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\* Refer to the Recommendation on performance standards for survival craft radar transponders for use in search and rescue operations, adopted by the Organization by resolution MSC.247(83) (A.802(19)), as amended) and the Recommendation on performance standards for survival craft AIS Search and Rescue transmitter (AIS SART), adopted by the Organization by resolution MSC.246(83).

\*\* One of these search and rescue locating devices may be the search and rescue locating device required by regulation IV/7.1.3.

## **Regulation 26 – Additional requirements for ro-ro passenger ships**

7 The existing paragraph 2.5 is replaced by the following:

“2.5 Liferafts carried on ro-ro passenger ships shall be fitted with a search and rescue locating device in the ratio of one search and rescue locating device for every four liferafts. The search and rescue locating device shall be mounted inside the liferaft so its antenna is more than one metre above the sea level when the liferaft is deployed, except that for canopied reversible liferafts the search and rescue locating device shall be so arranged as to be readily accessed and erected by survivors. Each search and rescue locating device shall be arranged to be manually erected when the liferaft is deployed. Containers of liferafts fitted with search and rescue locating devices shall be clearly marked.”

## **CHAPTER IV RADIOCOMMUNICATIONS**

### **Regulation 7 – Radio equipment: General**

8 In paragraph 1, subparagraph .3 is replaced by the following:

“.3 a search and rescue locating device capable of operating either in the 9 GHz band or on frequencies dedicated for AIS, which:”

## **APPENDIX CERTIFICATES**

### **Record of Equipment for Passenger Ship Safety Certificate (Form P)**

9 In the Record of Equipment for Passenger Ship Safety Certificate (Form P), in section 2, the existing item 11.1 is replaced by the following:

- “11.1 Number of search and rescue locating devices
- 11.1.1 Radar search and rescue transponders (SART)
- 11.1.2 AIS search and rescue transmitters (AIS-SART)”

and in section 3, the existing item 6 is replaced by the following:

- “6 Ship’s search and rescue locating device
- 6.1 Radar search and rescue transponder (SART)
- 6.2 AIS search and rescue transmitter (AIS-SART)”

### **Record of Equipment for Cargo Ship Safety Equipment Certificate (Form E)**

10 In the Record of Equipment for Cargo Ship Safety Equipment Certificate (Form E), in section 2, the existing item 9.1 is replaced by the following:

- “9.1 Number of search and rescue locating devices
- 9.1.1 Radar search and rescue transponders (SART)
- 9.1.2 AIS search and rescue transmitters (AIS-SART)”

### **Record of Equipment for Cargo Ship Radio Certificate (Form R)**

11 In the Record of Equipment for Cargo Ship Safety Radio Certificate (Form R), in section 2, the existing item 6 is replaced by the following:

- “6 Ship’s search and rescue locating device
- 6.1 Radar search and rescue transponder (SART)
- 6.2 AIS search and rescue transmitter (AIS-SART)”

### **Record of Equipment for the Nuclear Passenger Ship Safety Certificate (Form PNUC)**

12 In the Record of Equipment for Nuclear Passenger Ship Safety Certificate (Form PNUC), in section 2, the existing item 11.1 is replaced by the following:

- “11.1 Number of search and rescue locating devices
- 11.1.1 Radar search and rescue transponders (SART)
- 11.1.2 AIS search and rescue transmitters (AIS-SART)”

and in section 3, the existing item 6 is replaced by the following:

- “6 Ship’s search and rescue locating device
- 6.1 Radar search and rescue transponder (SART)
- 6.2 AIS search and rescue transmitter (AIS-SART)”

### **Record of Equipment for the Nuclear Cargo Ship Safety Certificate (Form CNUC)**

13 In the Record of Equipment for Nuclear Cargo Ship Safety Certificate (Form CNUC), in section 2, item 9 is deleted and items 10, 10.1 and 10.2 are renumbered as items 9, 9.1 and 9.2 respectively; and the renumbered item 9.1 is replaced by the following:

- “9.1 Number of search and rescue locating devices
- 9.1.1 Radar search and rescue transponders (SART)
- 9.1.2 AIS search and rescue transmitters (AIS-SART)”

and in section 3, the existing item 6 is replaced by the following:

- “6 Ship’s search and rescue locating device
- 6.1 Radar search and rescue transponder (SART)
- 6.2 AIS search and rescue transmitter (AIS-SART)”

\*\*\*

**ANNEX 3**

**RESOLUTION MSC.257(84)  
(adopted on 16 May 2008)**

**ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR  
THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as “the Convention”), concerning the amendment procedure applicable to the Annex to the Convention, other than to the provisions of chapter I thereof,

HAVING CONSIDERED, at its eighty-fourth session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the Annex to the present resolution;
2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2009, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world’s merchant fleet, have notified their objections to the amendments;
3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2010 upon their acceptance in accordance with paragraph 2 above;
4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Contracting Governments to the Convention;
5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

**AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY  
OF LIFE AT SEA, 1974, AS AMENDED**

**CHAPTER XI-1  
SPECIAL MEASURES TO ENHANCE MARITIME SAFETY**

- 1 The following new regulation 6 is added after the existing regulation 5:

**“Regulation 6**

**Additional requirements for the investigation of marine casualties and incidents**

Taking into account regulation I/21, each Administration shall conduct investigations of marine casualties and incidents, in accordance with the provisions of the present Convention, as supplemented by the provisions of the Code of the International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident (Casualty Investigation Code) adopted by resolution MSC.255(84), and:

- .1 the provisions of parts I and II of the Casualty Investigation Code shall be fully complied with;
- .2 the related guidance and explanatory material contained in part III of the Casualty Investigation Code should be taken into account to the greatest possible extent in order to achieve a more uniform implementation of the Casualty Investigation Code;
- .3 amendments to parts I and II of the Casualty Investigation Code shall be adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the annex other than chapter I; and
- .4 part III of the Casualty Investigation Code shall be amended by the Maritime Safety Committee in accordance with its rules of procedure.”

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**ANNEX 4**

**RESOLUTION MSC.258(84)  
(adopted on 16 May 2008)**

**ADOPTION OF AMENDMENTS TO THE PROTOCOL OF 1988 RELATING TO  
THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as “the Convention”) and article VI of the Protocol of 1988 relating to the Convention (hereinafter referred to as “the 1988 SOLAS Protocol”) concerning the procedure for amending the 1988 SOLAS Protocol,

HAVING CONSIDERED, at its eighty-fourth session, amendments to the 1988 SOLAS Protocol proposed and circulated in accordance with article VIII(b)(i) of the Convention and article VI of the 1988 SOLAS Protocol,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention and article VI of the 1988 SOLAS Protocol, amendments to the appendix to the Annex to the 1988 SOLAS Protocol, the text of which is set out in the Annex to the present resolution;
2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention and article VI of the 1988 SOLAS Protocol, that the said amendments shall be deemed to have been accepted on 1 July 2009, unless, prior to that date, more than one third of the Parties to the 1988 SOLAS Protocol or Parties the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world’s merchant fleet, have notified their objections to the amendments;
3. INVITES the Parties concerned to note that, in accordance with article VIII(b)(vii)(2) of the Convention and article VI of the 1988 SOLAS Protocol, the amendments shall enter into force on 1 January 2010, upon their acceptance in accordance with paragraph 2 above;
4. RECOMMENDS the Parties concerned to issue certificates complying with the annexed amendments at the first renewal survey on or after 1 January 2010;
5. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention and article VI of the 1988 SOLAS Protocol, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Parties to the 1988 SOLAS Protocol;
6. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Parties to the 1988 SOLAS Protocol.

ANNEX

**AMENDMENTS TO THE PROTOCOL OF 1988 RELATING TO THE  
INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974,  
AS AMENDED**

ANNEX

**MODIFICATIONS AND ADDITIONS TO THE ANNEX TO THE INTERNATIONAL  
CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974**

APPENDIX

**MODIFICATIONS AND ADDITIONS TO THE APPENDIX TO THE ANNEX TO THE  
INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974**

**Record of Equipment for Passenger Ship Safety Certificate (Form P)**

1 In the Record of Equipment for Passenger Ship Safety Certificate (Form P), in section 2, the existing item 11.1 is replaced by the following:

- “11.1 Number of search and rescue locating devices
- 11.1.1 Radar search and rescue transponders (SART)
- 11.1.2 AIS search and rescue transmitters (AIS-SART)”

and in section 3, the existing item 6 is replaced by the following:

- “6 Ship’s search and rescue locating device
- 6.1 Radar search and rescue transponder (SART)
- 6.2 AIS search and rescue transmitter (AIS-SART)”

**Record of Equipment for Cargo Ship Safety Equipment Certificate (Form E)**

2 In the Record of Equipment for Cargo Ship Safety Equipment Certificate (Form E), in section 2, the existing item 9.1 is replaced by the following:

- “9.1 Number of search and rescue locating devices
- 9.1.1 Radar search and rescue transponders (SART)
- 9.1.2 AIS search and rescue transmitters (AIS-SART)”

**Record of Equipment for Cargo Ship Radio Certificate (Form R)**

3 In the Record of Equipment for Cargo Ship Safety Radio Certificate (Form R), in section 2, the existing item 6 is replaced by the following:

- “6 Ship’s search and rescue locating device
- 6.1 Radar search and rescue transponder (SART)
- 6.2 AIS search and rescue transmitter (AIS-SART)”

### **Record of Equipment for the Cargo Ship Safety Certificate (Form C)**

4 In the Record of Equipment for Cargo Ship Safety Certificate (Form C), in section 2, the existing item 9.1 is replaced by the following:

- “9.1 Number of search and rescue locating devices
- 9.1.1 Radar search and rescue transponders (SART)
- 9.1.2 AIS search and rescue transmitters (AIS-SART)”,

and in section 3, the existing item 6 is replaced by the following:

- “6 Ship’s search and rescue locating device
- 6.1 Radar search and rescue transponder (SART)
- 6.2 AIS search and rescue transmitter (AIS-SART)”.

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**ANNEX 5**

**RESOLUTION MSC.259(84)  
(adopted on 16 May 2008)**

**ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CODE OF SAFETY  
FOR HIGH-SPEED CRAFT, 1994 (1994 HSC CODE)**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MSC.36(63), by which it adopted the International Code of Safety for High-Speed Craft, 1994 (hereinafter referred to as “the 1994 HSC Code”), which has become mandatory under chapter X of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as “the Convention”),

NOTING ALSO article VIII(b) and regulation X/1.1 of the Convention concerning the procedure for amending the 1994 HSC Code,

HAVING CONSIDERED, at its eighty-fourth session, amendments to the 1994 HSC Code proposed and circulated in accordance with article VIII(b)(i) of the Convention,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the 1994 HSC Code, the text of which is set out in the Annex to the present resolution;
2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 July 2009 unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world’s merchant fleet, have notified their objections to the amendments;
3. INVITES Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2010 upon their acceptance in accordance with paragraph 2 above;
4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;
5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

**AMENDMENTS TO THE INTERNATIONAL CODE OF SAFETY FOR  
HIGH-SPEED CRAFT, 1994 (1994 HSC CODE)**

**CHAPTER 8  
LIFE-SAVING APPLIANCES AND ARRANGEMENTS**

**8.2 Communications**

1 In paragraph 8.2.1, subparagraph .2 is replaced by the following:

“.2 at least one search and rescue locating device shall be carried on each side of every passenger high-speed craft and every cargo high-speed craft of 500 gross tonnage and upwards. Such search and rescue locating device should conform to the applicable performance standards not inferior to those adopted by the Organization\*. The search and rescue locating device should be stowed in such locations that they can be rapidly placed in any one of the liferafts. Alternatively, one search and rescue locating device should be stowed in each survival craft.”

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\* Refer to the Recommendation on performance standards for survival craft radar transponders for use in search and rescue operations, adopted by the Organization by resolution MSC.247(83) (A.802(19)), as amended) and the Recommendation on performance standards for survival craft AIS search and rescue transmitter (AIS SART), adopted by the Organization by resolution MSC.246(83).

**CHAPTER 14  
RADIOCOMMUNICATIONS**

**14.6 Radio equipment: General**

2 In paragraph 14.6.1, subparagraph .3 is replaced by the following:

“.3 a search and rescue locating device which:”

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**ANNEX 6****RESOLUTION MSC.260(84)  
(adopted on 16 May 2008)****ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CODE OF SAFETY  
FOR HIGH-SPEED CRAFT, 2000 (2000 HSC CODE)**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MSC.97(73), by which it adopted the International Code of Safety for High-Speed Craft, 2000 (hereinafter referred to as “the 2000 HSC Code”), which has become mandatory under chapter X of the International Convention for the Safety of Life at Sea (SOLAS), 1974, (hereinafter referred to as “the Convention”),

NOTING ALSO article VIII(b) and regulation X/1.2 of the Convention concerning the procedure for amending the 2000 HSC Code,

HAVING CONSIDERED, at its eighty-fourth session, amendments to the 2000 HSC Code proposed and circulated in accordance with article VIII(b)(i) of the Convention,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the 2000 HSC Code, the text of which is set out in the Annex to the present resolution;
2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 July 2009 unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world’s merchant fleet, have notified their objections to the amendments;
3. INVITES Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2010 upon their acceptance in accordance with paragraph 2 above;
4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;
5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

**AMENDMENTS TO THE INTERNATIONAL CODE OF SAFETY FOR  
HIGH-SPEED CRAFT, 2000 (2000 HSC CODE)**

**CHAPTER 8  
LIFE-SAVING APPLIANCES AND ARRANGEMENTS**

**8.2 Communications**

1 In paragraph 8.2.1, subparagraph .2 is replaced by the following:

“2 at least one search and rescue locating device shall be carried on each side of every passenger high-speed craft and every cargo high-speed craft of 500 gross tonnage and upwards. Such search and rescue locating device shall conform to the applicable performance standards not inferior to those adopted by the Organization\*. The search and rescue locating device shall be stowed in such locations that they can be rapidly placed in any one of the liferafts. Alternatively, one search and rescue locating device shall be stowed in each survival craft.”

---

\* Refer to the Recommendation on performance standards for survival craft radar transponders for use in search and rescue operations, adopted by the Organization by resolution MSC.247(83) (A.802(19)), as amended) and the Recommendation on performance standards for survival craft AIS search and rescue transmitter (AIS SART), adopted by the Organization by resolution MSC.246(83).

**CHAPTER 14  
RADIOCOMMUNICATIONS**

**14.7 Radio equipment: General**

2 In paragraph 14.7.1, subparagraph .3 is replaced by the following:

“3 a search and rescue locating device which:”

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**ANNEX 7**

**RESOLUTION MSC.261(84)  
(adopted on 16 May 2008)**

**ADOPTION OF AMENDMENTS TO THE GUIDELINES ON THE ENHANCED  
PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS  
AND OIL TANKERS (RESOLUTION A.744(18), AS AMENDED)**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolution A.744(18) by which the Assembly adopted the Guidelines on the enhanced programme of inspections during surveys of bulk carriers and oil tankers (the Guidelines),

RECALLING FURTHER article VIII(b) and regulation XI-1/2 of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as “the Convention”) concerning the procedure for amending the Guidelines,

NOTING that the Assembly, when adopting resolution A.744(18), requested the Maritime Safety Committee and the Marine Environment Protection Committee to keep the Guidelines under review and update them as necessary, in the light of experience gained in their application,

NOTING ALSO resolutions MSC.49(66), MSC.105(73), MSC.125(75), MSC.144(77), MSC.197(80) and resolution 2 of the 1997 Conference of Contracting Governments to the Convention, by which amendments to the Guidelines were adopted by the Maritime Safety Committee and the Conference of Contracting Governments to the Convention, in accordance with article VIII(b) and regulation XI/2 of the Convention,

HAVING CONSIDERED, at its eighty-fourth session, amendments to the Guidelines proposed and circulated in accordance with article VIII(b)(i) of the Convention,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Guidelines on the enhanced programme of inspections during surveys of bulk carriers and oil tankers, the text of which is set out in the Annex to the present resolution;
2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 July 2009, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world’s merchant fleet, have notified their objections to the amendments;
3. INVITES Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2010 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

**AMENDMENTS TO THE GUIDELINES ON THE ENHANCED PROGRAMME OF  
INSPECTIONS DURING SURVEYS OF BULK CARRIERS AND OIL TANKERS  
(RESOLUTION A.744(18)), AS AMENDED**

**Contents**

- 1 After the existing title of “ANNEX A” the following new title is inserted:

**“Part A**

**GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS  
DURING SURVEYS OF BULK CARRIERS HAVING SINGLE-SIDE SKIN  
CONSTRUCTION”**

- 2 After the existing list of contents for “ANNEX A”, the following is inserted:

**“Part B**

**GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS  
DURING SURVEYS OF BULK CARRIERS HAVING DOUBLE-SIDE SKIN  
CONSTRUCTION**

**1 General**

- 1.1 Application
- 1.2 Definitions
- 1.3 Repairs
- 1.4 Surveyors

**2 Renewal survey**

- 2.1 General
- 2.2 Dry-dock survey
- 2.3 Space protection
- 2.4 Hatch covers and coamings
- 2.5 Extent of overall and close-up surveys
- 2.6 Extent of thickness measurements
- 2.7 Extent of tank pressure testing

**3 Annual survey**

- 3.1 General
- 3.2 Examination of the hull
- 3.3 Examination of hatch covers and coamings
- 3.4 Examination of cargo holds
- 3.5 Examination of ballast tanks

**4 Intermediate survey**

- 4.1 General
- 4.2 Bulk carriers 5 to 10 years of age
- 4.3 Bulk carriers 10 to 15 years of age
- 4.4 Bulk carriers exceeding 15 years of age

**5 Preparations for survey**

- 5.1 Survey programme
- 5.2 Conditions for survey
- 5.3 Access to structures
- 5.4 Equipment for survey
- 5.5 Survey at sea or at anchorage
- 5.6 Survey planning meeting

**6 Documentation on board**

- 6.1 General
- 6.2 Survey report file
- 6.3 Supporting documents
- 6.4 Review of documentation on board

**7 Procedures for thickness measurements**

- 7.1 General
- 7.2 Certification of thickness measurement company
- 7.3 Reporting

**8 Reporting and evaluation of survey**

- 8.1 Evaluation of survey report
- 8.2 Reporting

Annex 1 Requirements for close-up survey at renewal surveys

Annex 2 Requirements for thickness measurements at renewal surveys

Annex 3 Owner's inspection report

Annex 4A Survey programme

Annex 4B Survey planning questionnaire

Annex 5 Procedures for certification of a company engaged in thickness measurement of hull structures

Annex 6 Survey reporting principles

- Annex 7 Condition evaluation report
- Annex 8 Recommended procedures for thickness measurements
- Annex 9 Guidelines for technical assessment in conjunction with planning for enhanced surveys of bulk carriers relevant survey
- Annex 10 Requirements for extent of thickness measurements at those areas of substantial corrosion of bulk carriers with double-side skin construction within the cargo length area
- Annex 11 Strength of cargo hatch cover securing arrangements for bulk carriers
- Annex 12 Procedural requirements for thickness measurements”

## ANNEX A

### **GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS**

- 3 After the above title, the following is inserted:

#### **“Part A**

#### **GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS HAVING SINGLE-SIDE SKIN CONSTRUCTION”**

##### **1.1 Application**

- 4 The existing text of paragraph 1.1.1 is replaced by the following:

“1.1.1 The Guidelines should apply to all self-propelled bulk carriers of 500 gross tonnage and above having single-side skin construction. Where a bulk carrier has a combination of single- and double-side skin construction, the relevant requirements of parts A and B should apply to that construction, as applicable.”

- 5 The following new part B is inserted after part A:

## “Part B

### GUIDELINES ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS HAVING DOUBLE-SIDE SKIN CONSTRUCTION

#### 1 General

##### 1.1 Application \*

**1.1.1** The Guidelines should apply to all self-propelled bulk carriers of 500 gross tonnage and above having double-side skin construction. Where a bulk carrier has a combination of single- and double-side skin construction, the relevant requirements of parts A and B should apply to that construction, as applicable.

**1.1.2** The Guidelines should apply to surveys of hull structure and piping systems in way of cargo holds, cofferdams, pipe tunnels, void spaces within the cargo length area and all ballast tanks. The surveys should be carried out during the surveys prescribed by regulation I/10 of the Convention.

**1.1.3** The Guidelines contain the extent of examination, thickness measurements and tank testing. The survey should be extended when substantial corrosion and/or structural defects are found and include additional close-up survey when necessary.

##### 1.2 Definitions

**1.2.1** *Bulk carrier* is a ship which is constructed generally with single deck, topside tanks and hopper side tanks in cargo spaces, and is intended primarily to carry dry cargo in bulk and includes such types as ore carriers and combination carriers.\*\*

**1.2.2** *Ballast tank* is a tank which is used for water ballast and includes side ballast tanks, ballast double bottom spaces, topside tanks, hopper side tanks and peak tanks. A double-side tank should be considered, for survey purposes, as a separate tank even if it is in connection to either the topside tank or the hopper side tank.

**1.2.3** *Spaces* are separate compartments including holds and tanks.

**1.2.4** *Overall survey* is a survey intended to report on the overall condition of the hull structure and determine the extent of additional close-up surveys.

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\* The intention of these Guidelines is to ensure that an appropriate level of review of plans and documents is conducted and consistency in application is attained. Such evaluation of survey reports, survey programmes, planning documents, etc., should be carried out at the managerial level of the Administration or organization recognized by the Administration.

\*\* For combination carriers, additional requirements are specified in the Guidelines on the enhanced programme of inspections during surveys for oil tankers, set out in Annex B.

**1.2.5** *Close-up survey* is a survey where the details of structural components are within the close visual inspection range of the surveyor, i.e., preferably within reach of hand.

**1.2.6** *Transverse section* includes all longitudinal members such as plating, longitudinals and girders at the deck, sides, bottom, inner bottom, hopper sides, inner sides, top wing inner sides and longitudinal bulkheads.

**1.2.7** *Representative spaces* are those which are expected to reflect the condition of other spaces of similar type and service and with similar corrosion prevention systems. When selecting representative spaces, account should be taken of the service and repair history on board and identifiable critical and/or suspect areas.

**1.2.8** *Suspect areas* are locations showing substantial corrosion and/or are considered by the surveyor to be prone to rapid wastage.

**1.2.9** *Substantial corrosion* is an extent of corrosion such that assessment of corrosion pattern indicates a wastage in excess of 75% of allowable margins, but within acceptable limits.

**1.2.10** A *corrosion prevention system* is normally considered a full hard coating.

Protective coating should usually be epoxy coating or equivalent. Other coating systems may be considered acceptable as alternatives provided that they are applied and maintained in compliance with the manufacturer's specifications.

Where soft coatings have been applied, safe access should be provided for the surveyor to verify the effectiveness of the coating and to carry out an assessment of the conditions of internal structures which may include spot removal of the coating. When safe access cannot be provided, the soft coating should be removed.

**1.2.11** *Coating condition* is defined as follows:

GOOD condition with only minor spot rusting;

FAIR condition with local breakdown of coating at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition;

POOR condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.

**1.2.12** *Critical structural areas* are locations which have been identified from calculations to require monitoring or from the service history of the subject ship or from similar or sister ships to be sensitive to cracking, buckling or corrosion which would impair the structural integrity of the ship.

**1.2.13** *Cargo length area* is that part of the ship which includes all cargo holds and adjacent areas including fuel tanks, cofferdams, ballast tanks and void spaces.

**1.2.14** *Intermediate survey* is a survey carried out either at the second or third annual survey or between these surveys.

**1.2.15** A *prompt and thorough repair* is a permanent repair completed at the time of survey to the satisfaction of the surveyor, therein removing the need for the imposition of any associated condition of classification or recommendation.

**1.2.16** *Convention* means the International Convention for the Safety of Life at Sea, 1974, as amended.

**1.2.17** *Specially considered* means sufficient close-up inspection and thickness measurements are taken to confirm the actual average condition of the structure under coating.

### **1.3 Repairs**

**1.3.1** Any damage in association with wastage over the allowable limits (including buckling, grooving, detachment or fracture), or extensive areas of wastage over the allowable limits, which affects or, in the opinion of the Administration, will affect the ship's structural, watertight or weathertight integrity, should be promptly and thoroughly repaired. Areas which should be considered include:

- .1 side shell frames, their end attachments or adjacent shell plating;
- .2 deck structure and deck plating;
- .3 bottom structure and bottom plating;
- .4 watertight or oiltight bulkheads; and
- .5 hatch covers or hatch coamings.

Where adequate repair facilities are not available, the Administration may allow the ship to proceed directly to a repair facility. This may require discharging the cargo and/or temporary repairs for the intended voyage.

**1.3.2** Additionally, when a survey results in the identification of corrosion or structural defects, either of which, in the opinion of the Administration, will impair the ship's fitness for continued service, remedial measures should be implemented before the ship continues in service.

### **1.4 Surveyors**

For bulk carriers of 20,000 tons deadweight and above, two surveyors should jointly carry out the first scheduled renewal survey after the bulk carrier passes 10 years of age, and all subsequent renewal surveys and intermediate surveys. If the surveys are carried out by a recognized organization, the surveyors should be exclusively employed by such recognized organizations.

## **2 Renewal survey**

### **2.1 General**

**2.1.1** The renewal survey may be commenced at the fourth annual survey and be progressed during the succeeding year with a view to completion by the fifth anniversary date.

**2.1.2** As part of the preparation for the renewal survey, the survey programme should be dealt with in advance of the survey. The thickness measurement should not be held before the fourth annual survey.

**2.1.3** The survey should include, in addition to the requirements of the annual survey, examination, tests and checks of sufficient extent to ensure that the hull and related piping is in a satisfactory condition and is fit for its intended purpose for the new period of validity of the Cargo Ship Safety Construction Certificate, subject to proper maintenance and operation and to renewal surveys being carried out.

**2.1.4** All cargo holds, ballast tanks, including double bottom and double-side tanks, pipe tunnels, cofferdams and void spaces bounding cargo holds, decks and outer hull should be examined, and this examination should be supplemented by thickness measurement and testing, as required by 2.6 and 2.7, to ensure that the structural integrity remains effective. The examination should be sufficient to discover substantial corrosion, significant deformation, fractures, damages or other structural deterioration.

**2.1.5** All piping systems within the above spaces should be examined and operationally tested under working conditions to ensure that the condition remains satisfactory.

**2.1.6** The survey extent of ballast tanks converted to void spaces should be specially considered in relation to the requirements for ballast tanks.

### **2.2 Dry-dock survey**

**2.2.1** A survey in dry dock should be a part of the renewal survey. There should be a minimum of two inspections of the outside of the ship's bottom during the five-year period of the certificate. In all cases, the maximum interval between bottom inspections should not exceed 36 months.

**2.2.2** For ships of 15 years of age and over, inspection of the outside of the ship's bottom should be carried out with the ship in dry dock. For ships of less than 15 years of age, alternate inspections of the ship's bottom not conducted in conjunction with the renewal survey may be carried out with the ship afloat. Inspection of the ship afloat should only be carried out when the conditions are satisfactory and the proper equipment and suitably qualified staff are available.

**2.2.3** If a survey in dry-dock is not completed in conjunction with the enhanced survey during renewal survey or if the 36 month maximum interval referred to in 2.2.1 is not complied with, the Cargo Ship Safety Construction Certificate should cease to be valid until a survey in dry-dock is completed.

## **2.3 Space protection**

Where provided, the condition of the corrosion prevention system of ballast tanks should be examined. For ballast tanks, excluding double bottom tanks, where a coating is found in POOR condition as defined in 1.2.11, and it is not renewed, or where a soft coating has been applied, or where a coating has not been applied, the tanks in question should be examined at annual intervals. When such breakdown of coating is found in ballast double bottom tanks, or where a soft coating has been applied or where a coating has not been applied, the tanks in question may be examined at annual intervals. When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurement should be carried out. Where a protective coating is provided in cargo holds and is found in good condition, the extent of close-up surveys and thickness measurements may be specially considered.

## **2.4 Hatch covers and coamings**

**2.4.1** A thorough inspection of the items listed in 3.3 should be carried out.

**2.4.2** Checking of the satisfactory operation of all mechanically operated hatch covers should be made, including:

- .1** stowage and securing in open condition;
- .2** proper fit and efficiency of sealing in closed condition;
- .3** operational testing of hydraulic and power components, wires, chains and link drives.

**2.4.3** The effectiveness of sealing arrangements of all hatch covers by hose testing or equivalent should be checked.

**2.4.4** Thickness measurement of the hatch cover and coaming plating and stiffeners should be carried out as given in annex 2.

## **2.5 Extent of overall and close-up surveys**

**2.5.1** An overall survey of all spaces excluding fuel oil tanks should be carried out at the renewal survey. Fuel oil tanks in way of cargo holds should be sufficiently examined to ensure that their condition is satisfactory.

**2.5.2** Each renewal survey should include a close-up examination of sufficient extent to establish the condition of the cargo holds and ballast tanks as indicated in annex 1.

## **2.6 Extent of thickness measurements**

**2.6.1** The requirements for thickness measurements at the renewal survey are given in annex 2.

**2.6.2** Representative thickness measurements to determine both general and local levels of corrosion in the transverse web frames in all water ballast tanks should be carried out. Thickness measurements should also be carried out to determine the corrosion levels on the transverse bulkhead plating. The thickness measurements may be dispensed with provided the surveyor is satisfied by the close-up examination that there is no structural diminution, and the coating where applied remains efficient.

**2.6.3** The surveyor may extend the thickness measurements as deemed necessary. Provisions for extended measurements for areas with substantial corrosion as defined in 1.2.9 are given in annex 10.

**2.6.4** For areas in spaces where coatings are found to be in GOOD condition as defined in 1.2.11, the extent of thickness measurements according to annex 2 may be specially considered by the Administration. Where a protective coating is provided in cargo holds and is found in good condition, the extent of close-up surveys and thickness measurements may be specially considered.

**2.6.5** Transverse sections should be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements.

## **2.7 Extent of tank pressure testing**

**2.7.1** All boundaries of ballast tanks, deep tanks and cargo holds used for ballast within the cargo hold length should be pressure tested. Representative tanks for fresh water, fuel oil and lubrication oil should also be pressure tested.

**2.7.2** Generally, the hydrostatic pressure should correspond to a water level to the top of hatches for ballast/cargo holds, or top of air pipes for ballast tanks or fuel tanks.

## **3 Annual survey**

### **3.1 General**

The annual survey should consist of an examination for the purpose of ensuring, as far as practicable, that the hull hatch covers, coamings and piping are maintained in a satisfactory condition and should take into account the service history, condition and extent of the corrosion prevention system of ballast tanks and areas identified in the survey report file.

### **3.2 Examination of the hull**

**3.2.1** Examination of the hull plating and its closing appliances should be carried out as far as can be seen.

**3.2.2** Examination of watertight penetrations should be carried out as far as practicable.

### **3.3 Examination of hatch covers and coamings**

**3.3.1** It should be confirmed that no unapproved changes have been made to the hatch covers, hatch coamings and their securing and sealing devices since the last survey.

**3.3.2** A thorough survey of cargo hatch covers and coamings is only possible by examination in the open as well as closed positions and should include verification of proper opening and closing operation. As a result, at least the hatch covers sets within the forward 25% of the ship's length and at least one additional set, such that all the sets on the ship are assessed at least once in every 5-year period, should be surveyed open, closed and in operation to the full extent in each direction at each annual survey, including:

- .1** stowage and securing in open condition;
- .2** proper fit and efficiency of sealing in closed condition; and
- .3** operational testing of hydraulic and power components, wires, chains and link drives.

The closing of the covers should include the fastening of all peripheral, and cross joint cleats or other securing devices. Particular attention should be paid to the condition of hatch covers in the forward 25% of the ship's length, where sea loads are normally greatest.

**3.3.3** If there are indications of difficulty in operating and securing hatch covers, additional sets above those required by 3.3.2, at the discretion of the surveyor, should be tested in operation.

**3.3.4** Where the cargo hatch securing system does not function properly, repairs should be carried out under the supervision of the Administration. Where hatch covers or coamings undergo substantial repairs, the strength of securing devices should be upgraded to comply with annex 13.

**3.3.5** For each cargo hatch cover set, at each annual survey, the following items should be surveyed:

- .1** cover panels, including side plates, and stiffener attachments that may be accessible in the open position by close-up survey (for corrosion, cracks, deformation);
- .2** sealing arrangements of perimeter and cross joints (gaskets for condition and permanent deformation, flexible seals on combination carriers, gasket lips, compression bars, drainage channels and non-return valves);
- .3** clamping devices, retaining bars, cleating (for wastage, adjustment, and condition of rubber components);
- .4** closed cover locating devices (for distortion and attachment);

- .5 chain or rope pulleys;
- .6 guides;
- .7 guide rails and track wheels;
- .8 stoppers;
- .9 wires, chains, tensioners and gypsies;
- .10 hydraulic system, electrical safety devices and interlocks; and
- .11 end and interpanel hinges, pins and stools where fitted.

**3.3.6** At each hatchway, at each annual survey, the coamings, with plating, stiffeners and brackets should be checked for corrosion, cracks and deformation, especially of the coaming tops.

**3.3.7** Where considered necessary, the effectiveness of sealing arrangements may be proved by hose or chalk testing supplemented by dimensional measurements of seal compressing components.

**3.3.8** Where portable covers, wooden or steel pontoons are fitted, the satisfactory condition of the following should be confirmed:

- .1 wooden covers and portable beams, carriers or sockets for the portable beam, and their securing devices;
- .2 steel pontoons, including close-up survey of hatch cover plating;
- .3 tarpaulins;
- .4 cleats, battens and wedges;
- .5 hatch securing bars and their securing devices;
- .6 loading pads/bars and the side plate edge;
- .7 guide plates and chocks;
- .8 compression bars, drainage channels and drain pipes (if any).

#### **3.4 Examination of cargo holds**

**3.4.1** For bulk carriers over 10 years of age, the following should be carried out:

- .1 overall survey of two selected cargo holds. Where a protective coating is provided in cargo holds and is found in GOOD condition, the extent of

close-up surveys and thickness measurements may be specially considered; and

- .2 when considered necessary by the surveyor, thickness measurement should be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements should be increased in accordance with annex 10.

**3.4.2** For bulk carriers over 15 years of age, the following should be carried out:

- .1 overall survey of all cargo holds. Where a protective coating is provided in cargo holds and is found in GOOD condition, the extent of close-up surveys and thickness measurements may be specially considered; and
- .2 when considered necessary by the surveyor, thickness measurement should be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements should be increased in accordance with annex 10.

**3.4.3** All piping and penetrations in cargo holds, including overboard piping, should be examined for bulk carriers over 10 years of age.

### **3.5 Examination of ballast tanks**

Examination of ballast tanks should be carried out when required as a consequence of the results of the renewal survey and intermediate survey. When considered necessary by the surveyor, thickness measurement should be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements should be increased in accordance with annex 10.

## **4 Intermediate survey**

### **4.1 General**

**4.1.1** Notwithstanding the provisions of 1.1.2, items that are additional to the requirements of the annual survey may be surveyed either at the second or third annual survey or between these surveys.

**4.1.2** The extent of survey is dependent upon the age of the ship as specified in 4.2, 4.3 and 4.4.

### **4.2 Bulk carriers 5 to 10 years of age**

#### **4.2.1 Ballast tanks**

**4.2.1.1** For spaces used for salt water ballast, an overall survey of representative spaces selected by the surveyor should be carried out. If such inspections reveal no visible structural defects, the examination may be limited to a verification that the protective coating remains efficient.

**4.2.1.2** Where POOR coating condition, corrosion or other defects are found in salt water ballast spaces or where protective coating was not applied from the time of construction, the examination should be extended to other ballast spaces of the same type.

**4.2.1.3** In salt water ballast spaces other than double bottom tanks, where a protective coating is found in POOR condition and it is not renewed, or where soft coating has been applied, or where a protective coating was not applied from the time of construction, the tanks in question should be examined and thickness measurements carried out as considered necessary at annual intervals. When such breakdown of coating is found in salt water ballast double bottom tanks, where a soft coating has been applied, or where a coating has not been applied, the tanks in question should be examined at annual intervals. When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurements should be carried out.

**4.2.1.4** In addition to the above requirements, areas found to be suspect areas at the previous renewal survey should be overall and close-up surveyed.

## **4.2.2 Cargo holds**

**4.2.2.1** An overall survey of all cargo holds should be carried out.

**4.2.2.2** Where considered necessary by the surveyor as a result of the overall survey of any one cargo hold as described in 4.2.2.1, the survey should be extended to include a close-up survey of that cargo hold as well as a close-up survey of sufficient extent of those areas of the structure as deemed necessary.

## **4.2.3 Extent of thickness measurement**

**4.2.3.1** Thickness measurement should be carried out to an extent sufficient to determine both general and local corrosion levels at areas subject to close-up survey as described in 4.2.2.1. The minimum requirement for thickness measurements at the intermediate survey are areas found to be suspect areas at the previous renewal survey.

**4.2.3.2** Where substantial corrosion is found, the extent of thickness measurements should be increased in accordance with the requirements of annex 10.

**4.2.3.3** The thickness measurement may be dispensed with provided the surveyor is satisfied by the close-up survey, that there is no structural diminution and the protective coating, where applied, remains effective.

## **4.3 Bulk carriers 10 to 15 years of age**

### **4.3.1 Ballast tanks**

**4.3.1.1** For bulk carriers:

All salt water ballast tanks should be examined. If such inspections reveal no visible structural defects, the examination may be limited to a verification that the protective coating remains efficient.

**4.3.1.2** For ore carriers:

- .1 all web frame rings – in one ballast wing tank;
- .2 one deck transverse – in each of the remaining ballast wing tanks;
- .3 both transverse bulkheads – in one ballast wing tank; and
- .4 one transverse bulkhead – in each remaining ballast wing tank.

**4.3.1.3** In addition, the requirements described in 4.2.1.2 to 4.2.1.4 apply.

**4.3.2 Cargo holds**

**4.3.2.1** An overall survey of all cargo holds should be carried out.

**4.3.2.2** Where considered necessary by the surveyor as a result of the overall survey of any one cargo hold as described in 4.3.2.1, the survey should be extended to include a close-up survey of that cargo hold as well as a close-up survey of sufficient extent of those areas of the structure as deemed necessary.

**4.3.3 Extent of thickness measurement**

**4.3.3.1** Thickness measurement should be carried out to an extent sufficient to determine both general and local corrosion levels at areas subject to close-up survey as described in 4.3.2.1. The minimum requirement for thickness measurements at the intermediate survey are areas found to be suspect areas at the previous renewal survey.

**4.3.3.2** In addition, the requirements described in 4.2.3.2 and 4.2.3.3 apply.

**4.4 Bulk carriers exceeding 15 years of age**

**4.4.1** The requirements of the intermediate survey should be to the same extent as the previous renewal survey required in 2 and 5.1. However, pressure testing of tanks and cargo holds used for ballast is not required unless deemed necessary by the attending surveyor.

**4.4.2** In application of 4.4.1, the intermediate survey may be commenced at the second annual survey and be progressed during the succeeding year with a view to completion at the third annual survey in lieu of the application of 2.1.1.

**5 Preparations for survey**

**5.1 Survey programme**

**5.1.1** A specific survey programme should be worked out in advance of the renewal survey by the owner in co-operation with the Administration. The survey programme should be in a written format based on the information in annex 4A. The survey should not commence until the survey programme has been agreed.

**5.1.2** Prior to the development of the survey programme, the survey planning questionnaire should be completed by the owner based on the information set out in annex 4B, and forwarded to the Administration.

**5.1.3** In developing the survey programme, the following documentation should be collected and consulted with a view to selecting tanks, holds, areas and structural elements to be examined:

- .1 survey status and basic ship information;
- .2 documentation on board, as described in 7.2 and 7.3;
- .3 main structural plans (scantlings drawings), including information regarding use of high-tensile steels (HTS);
- .4 relevant previous survey and inspection reports from both the classification society and the owner;
- .5 information regarding the use of ship's holds and tanks, typical cargoes and other relevant data;
- .6 information regarding corrosion protection level on the new building; and
- .7 information regarding the relevant maintenance level during operation.

**5.1.4** The submitted survey programme should account for, and comply, as a minimum, with the provisions of annexes 1 and 2 and paragraph 2.7 for close-up survey, thickness measurement and tank testing, respectively, and should include relevant information, including at least:

- .1 basic ship information and particulars;
- .2 main structural plans (scantling drawings), including information regarding use of high-tensile steels (HTS);
- .3 plan of holds and tanks;
- .4 list of holds and tanks with information on use, protection and condition of coating;
- .5 conditions for survey (e.g., information regarding tank cleaning, gas-freeing, ventilation, lighting, etc.);
- .6 provisions and methods for access to structures;
- .7 equipment for surveys;
- .8 nomination of holds and tanks and areas for close-up survey (per annex 1);

- .9 nomination of sections for thickness measurement (per annex 2);
- .10 nomination of tanks for testing (per 2.7); and
- .11 damage experience related to ship in question.

**5.1.5** The Administration should advise the owner of the maximum acceptable structural corrosion diminution levels applicable to the ship.

**5.1.6** Use may also be made of the Guidelines for technical assessment in conjunction with the planning of enhanced surveys for bulk carriers, contained in annex 9. These Guidelines are a recommended tool which may be invoked at the discretion of the Administration, when considered necessary and appropriate, in conjunction with the preparation of the required survey programme.

## **5.2 Conditions for survey**

**5.2.1** The owner should provide the necessary facilities for a safe execution of the survey.

**5.2.2** In order to enable the attending surveyors to carry out the survey, provisions for proper and safe access, should be agreed between the owner and the Administration.

**5.2.3** Details of the means of access should be provided in the survey planning questionnaire.

**5.2.4** In cases where the provisions of safety and required access are judged by the attending surveyors not to be adequate, the survey of the spaces involved should not proceed.

**5.2.5** Cargo holds, tanks and spaces should be safe for access. Cargo holds, tanks and spaces should be gas free and properly ventilated. Prior to entering a tank, void or enclosed space, it should be verified that the atmosphere in the tank is free from hazardous gas and contains sufficient oxygen.

**5.2.6** Cargo holds, tanks and spaces should be sufficiently clean and free from water, scale, dirt, oil residues, sediments, etc., to reveal corrosion, deformation, fractures, damages or other structural deterioration as well as the condition of the coating. In particular, this applies to areas which are subject to thickness measurement.

**5.2.7** Sufficient illumination should be provided to reveal corrosion, deformation, fractures, damages or other structural deterioration as well as the condition of the coating.

**5.2.8** The surveyor(s) should always be accompanied by, at least, one responsible person, assigned by the owner, experienced in tank and enclosed spaces inspection. In addition, a back-up team of at least two experienced persons should be stationed at the hatch opening of the tank or space that is being surveyed. The back-up team should continuously observe the work in the tank or space and should keep life-saving and evacuation equipment ready for use.

**5.2.9** A communication system should be arranged between the survey party in the cargo hold, tank or space being examined, the responsible officer on deck and, as the case may be, the navigation bridge. The communication arrangements should be maintained throughout the survey.

### **5.3 Access to structures\***

**5.3.1** For overall survey, means should be provided to enable the surveyor to examine the structure in a safe and practical way.

**5.3.2** For close-up survey, one or more of the following means for access, acceptable to the surveyor, should be provided:

- .1 permanent staging and passages through structures;
- .2 temporary staging and passages through structures;
- .3 lifts and moveable platforms;
- .4 portable ladders;
- .5 other equivalent means.

### **5.4 Equipment for survey**

**5.4.1** Thickness measurements should normally be carried out by means of ultrasonic test equipment. The accuracy of the equipment should be proven to the surveyor as required.

**5.4.2** One or more of the following fracture detection procedures may be required if deemed necessary by the surveyor:

- .1 radiographic equipment;
- .2 ultrasonic equipment;
- .3 magnetic particle equipment;
- .4 dye penetrant;
- .5 other equivalent means.

**5.4.3** Explosimeter, oxygen-meter, breathing apparatus, lifelines, riding belts with rope and hook and whistles together with instructions and guidance on their use should be made available during the survey. A safety check-list should be provided.

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\* Refer to the Guidelines on the means of access to structures for inspection and maintenance of oil tankers and bulk carriers (MSC/Circ.686).

**5.4.4** Adequate and safe lighting should be provided for the safe and efficient conduct of the survey.

**5.4.5** Adequate protective clothing should be made available and used (e.g., safety helmet, gloves, safety shoes, etc.) during the survey.

## **5.5 Survey at sea or at anchorage**

**5.5.1** Survey at sea or at anchorage may be accepted provided the surveyor is given the necessary assistance from the personnel on board. Necessary precautions and procedures for carrying out the survey should be in accordance with 5.1, 5.2, 5.3 and 5.4.

**5.5.2** A communication system should be arranged between the survey party in the spaces and the responsible officer on deck.

**5.5.3** When rafts or boats will be used for close-up survey, the following conditions should be observed:

- .1** only rough duty, inflatable rafts or boats, having satisfactory residual buoyancy and stability even if one chamber is ruptured, should be used;
- .2** the boat or raft should be tethered to the access ladder and an additional person should be stationed down the access ladder with a clear view of the boat or raft;
- .3** appropriate lifejackets should be available for all participants;
- .4** the surface of water in the tank or hold should be calm (under all foreseeable conditions the expected rise of water within the tank should not exceed 0.25 m) and the water level either stationary or falling. On no account should the level of the water be rising while the boat or raft is in use;
- .5** the tank, hold or space should contain clean ballast water only. Even a thin sheen of oil on the water is not acceptable; and
- .6** at no time should the water level be allowed to be within 1 m of the deepest under deck web face flat so that the survey team is not isolated from a direct escape route to the tank hatch. Filling to levels above the deck transverses should only be contemplated if a deck access manhole is fitted and open in the bay being examined, so that an escape route for the survey party is available at all times. Other effective means of escape to the deck may be considered.

**5.5.4** Rafts or boats alone may be allowed for inspection of the under deck areas for tanks or spaces, if the depth of the webs is 1.5 m or less.

**5.5.5** If the depth of the webs is more than 1.5 m, rafts or boats alone may be allowed only:

- .1** when the coating of the under deck structure is in GOOD condition and there is no evidence of wastage; or
- .2** if a permanent means of access is provided in each bay to allow safe entry and exit. This means of access should be direct from the deck via a vertical ladder with a small platform fitted approximately 2 m below the deck. Other effective means of escape to the deck may be considered.

If neither of the above conditions are met, then staging or other equivalent means should be provided for the survey of the under deck areas.

**5.5.6** The use of rafts or boats alone in 5.5.4 and 5.5.5 does not preclude the use of boats or rafts to move about within a tank during a survey.

## **5.6 Survey planning meeting**

**5.6.1** The establishment of proper preparation and the close co-operation between the attending surveyor(s) and the owner's representatives onboard prior to and during the survey are an essential part in the safe and efficient conduct of the survey. During the survey on board safety meetings should be held regularly.

**5.6.2** Prior to commencement of any part of the renewal and intermediate survey, a survey planning meeting should be held between the attending surveyor(s), the owner's representative in attendance, the thickness measurement company operator (as applicable) and the master of the ship or an appropriately qualified representative appointed by the master or Company for the purpose to ascertain that all the arrangements envisaged in the survey programme are in place, so as to ensure the safe and efficient conduct of the survey work to be carried out.

**5.6.3** The following is an indicative list of items that should be addressed in the meeting:

- .1** schedule of the ship (i.e., the voyage, docking and undocking manoeuvres, periods alongside, cargo and ballast operations, etc.);
- .2** provisions and arrangements for thickness measurements (i.e., access, cleaning/de-scaling, illumination, ventilation, personal safety);
- .3** extent of the thickness measurements;
- .4** acceptance criteria (refer to the list of minimum thicknesses);
- .5** extent of close-up survey and thickness measurement considering the coating condition and suspect areas/areas of substantial corrosion;
- .6** execution of thickness measurements;

- .7 taking representative readings in general and where uneven corrosion/pitting is found;
- .8 mapping of areas of substantial corrosion; and
- .9 communication between attending surveyor(s) the thickness measurement company operator(s) and owner's representative(s) concerning findings.

## **6 Documentation on board**

### **6.1 General**

**6.1.1** The owner should obtain, supply and maintain on board the ship documentation as specified in 6.2 and 6.3, which should be readily available for the surveyor. The condition evaluation report referred to in 6.2 should include a translation into English.

**6.1.2** The documentation should be kept on board for the lifetime of the ship.

### **6.2 Survey report file**

**6.2.1** A survey report file should be a part of the documentation on board consisting of:

- .1 reports of structural surveys (annex 6);
- .2 condition evaluation report (annex 7); and
- .3 thickness measurement reports (annex 8).

**6.2.2** The survey report file should be available also in the owner's and the Administration offices.

### **6.3 Supporting documents**

**6.3.1** The following additional documentation should be available on board:

- .1 main structural plans of holds and ballast tanks;
- .2 previous repair history;
- .3 cargo and ballast history;
- .4 inspections by ship's personnel with reference to:
  - .4.1 structural deterioration in general;
  - .4.2 leakages in bulkheads and piping;
  - .4.3 condition of coating or corrosion prevention system, if any. A guidance for reporting is shown in annex 3;

- .5 survey programme as required by 5.1 until such time as the renewal survey has been completed,

and any other information that would help to identify critical structural areas and/or suspect areas requiring inspection.

#### **6.4 Review of documentation on board**

Prior to survey, the surveyor should examine the completeness of the documentation on board, and its contents as a basis for the survey.

### **7 Procedures for thickness measurements**

#### **7.1 General**

**7.1.1** The required thickness measurements, if not carried out by the recognized organization acting on behalf of the Administration, should be witnessed by a surveyor of the recognized organization. The surveyor should be on board to the extent necessary to control the process.

**7.1.2** The thickness measurement company should be part of the survey planning meeting to be held prior to commencing the survey.

**7.1.3** In all cases the extent of the thickness measurements should be sufficient as to represent the actual average condition.

**7.1.4** Procedural requirements for thickness measurements are set out in annex 12.

#### **7.2 Certification of thickness measurement company**

The thickness measurements should be carried out by a qualified company certified by an organization recognized by the Administration according to principles stated in annex 5.

#### **7.3 Reporting**

**7.3.1** A thickness measurement report should be prepared and submitted to the Administration. The report should give the location of measurements, the thickness measured as well as corresponding original thickness. Furthermore, the report should give the date when the measurements were carried out, type of measuring equipment, names of personnel and their qualifications and be signed by the operator. The thickness measurement report should follow the principles as specified in the recommended procedures for thickness measurements set out in annex 8.

**7.3.2** The surveyor should verify and countersign the thickness measurement reports.

## **8 Reporting and evaluation of survey**

### **8.1 Evaluation of survey report**

**8.1.1** The data and information on the structural condition of the ship collected during the survey should be evaluated for acceptability and continued structural integrity of the ship.

**8.1.2** The analysis of data should be carried out and endorsed by the Administration and the conclusions of the analysis should form a part of the condition evaluation report.

### **8.2 Reporting**

**8.2.1** Principles for survey reporting are shown in annex 6.

**8.2.2** When a survey is split between different survey stations, a report should be made for each portion of the survey. A list of items examined and/or tested (pressure testing, thickness measurements etc.) and an indication of whether the item has been credited, should be made available to the next attending surveyor(s), prior to continuing or completing the survey.

**8.2.3** A condition evaluation report of the survey and results should be issued to the owner as shown in annex 7 and placed on board the ship for reference at future surveys. The condition evaluation report should be endorsed by the Administration.

ANNEX 1

**REQUIREMENTS FOR CLOSE-UP SURVEY AT RENEWAL SURVEYS**

<b>AGE ≤ 5 years</b>	<b>5 &lt; AGE ≤ 10 years</b>	<b>10 &lt; AGE ≤ 15 years</b>	<b>AGE &gt; 15 years</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<p>One transverse web with associated plating and longitudinals in two representative water ballast tanks of each type. This is to include the foremost topside and double-side water ballast tanks on either side. (A)</p> <p>Two selected cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted. (C)</p> <p>All cargo hold hatch covers and coaming. (D)</p>	<p>One transverse web with associated plating and longitudinals as applicable in each water ballast tank. (A)</p> <p>Forward and aft transverse bulkhead including stiffening system in a transverse section including topside, hopper side and double-side ballast tanks. (A)</p> <p>25% of ordinary transverse frames in the foremost double-side tanks. (B)</p> <p>One transverse bulkhead in each cargo hold, including internal structure of upper and lower stools, where fitted. (C)</p> <p>All cargo hold hatch covers and coamings. (D)</p> <p>All deck plating and under deck structures inside line of hatch openings between cargo hold hatches. (E)</p>	<p>All transverse webs with associated plating and longitudinals as applicable in each water ballast tank. (A)</p> <p>All transverse bulkheads including stiffening system in each water ballast tank. (A)</p> <p>25% of ordinary transverse frames in the foremost double-side tanks. (B)</p> <p>All cargo hold transverse bulkheads including internal structure of upper and lower stools, where fitted. (C)</p> <p>All cargo hold hatch covers and coamings. (D)</p> <p>All deck plating and under deck structures inside line of hatch openings between cargo hold hatches. (E)</p>	<p>All transverse webs with associated plating and longitudinals as applicable in each water ballast tank. (A)</p> <p>All transverse bulkheads including stiffening system in each water ballast tank. (A)</p> <p>All ordinary transverse frames in all double-side tanks. (B)</p> <p>Areas (C) – (E) as for column 3</p>

- (A) Transverse web or watertight transverse bulkhead in topside, hopper side and double-side ballast tanks. In fore and aft peak tanks transverse web means a complete transverse web frame ring including adjacent structural members.
- (B) Ordinary transverse frame in double-side tanks.
- (C) Cargo hold transverse bulkheads, platings, stiffeners and girders.
- (D) Cargo hold hatch covers and coamings.
- (E) Deck plating and under deck structure inside line of hatch openings between cargo hold hatches.

**Note:** Close-up survey of transverse bulkheads to be carried out at four levels:

- Level (a) Immediately above the inner bottom and immediately above the line of gussets (if fitted) and shedders for ships without lower stool.
- Level (b) Immediately above and below the lower stool shelf plate (for those ships fitted with lower stools), and immediately above the line of the shedder plates.
- Level (c) About mid-height of the bulkhead.
- Level (d) Immediately below the upper deck plating and immediately adjacent to the upper wing tank, and immediately below the upper stool shelf plate for those ships fitted with upper stools, or immediately below the topside tanks.

ANNEX 2

**REQUIREMENTS FOR THICKNESS MEASUREMENTS AT RENEWAL SURVEYS**

AGE ≤ 5 years	5 < AGE ≤ 10 years	10 < AGE ≤ 15 years	AGE > 15 years
1	2	3	4
<p><b>1</b> Suspect areas</p>	<p><b>1</b> Suspect areas</p> <p><b>2</b> Within the cargo length area: two transverse sections of deck plating outside line of cargo hatch openings</p> <p><b>3</b> Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to annex 1</p> <p><b>4</b> All cargo holds hatch covers and coamings (plating and stiffeners)</p> <p><b>5</b> All deck plating inside line of openings between cargo hold hatches</p> <p><b>6</b> Wind and water strakes in way of transverse sections considered under point 2 above</p>	<p><b>1</b> Suspect areas</p> <p><b>2</b> Within the cargo length area:</p> <p>.1 each deck plate outside line of cargo hatch openings</p> <p>.2 two transverse sections, one of which should be in the amidship area, outside line of cargo hatch openings</p> <p><b>3</b> Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to annex 1</p> <p><b>4</b> All cargo hold hatch covers and coamings (plating and stiffeners)</p> <p><b>5</b> All deck plating inside line of openings between cargo hold hatches</p> <p><b>6</b> All wind and water strakes within the cargo length area</p> <p><b>7</b> Selected wind and water strakes outside the cargo length area</p>	<p><b>1</b> Suspect areas</p> <p><b>2</b> Within the cargo length area:</p> <p>.1 each deck plate outside line of cargo hatch openings</p> <p>.2 three transverse sections, one of which should be in the amidship area, outside line of cargo hatch openings</p> <p>.3 each bottom plate</p> <p><b>3</b> Points 3 to 7 referred to in column 3</p>

ANNEX 3

**OWNER'S INSPECTION REPORT**

**Structural condition**

Ship's name: .....  <i>OWNER'S INSPECTION REPORT – Structural condition</i>  For tank/hold no.: ..... Grade of steel:      deck: .....      side: ..... bottom: .....      longitudinal bulkhead: .....						
Elements	Cracks	Buckles	Corrosion	Coating condition	Pitting	Modification/ Other repair
Deck:  Bottom:  Side:  Side framing:  Longitudinal bulkheads:  Transverse bulkheads:						
Repairs carried out due to:  Thickness measurements carried out (dates):  Results in general:  Overdue surveys:  Outstanding conditions of class:  Comments:						
Date of inspection: ..... Inspected by: ..... Signature: .....						

ANNEX 4A

**SURVEY PROGRAMME**

**Basic information and particulars**

Name of ship:
IMO number:
Flag State:
Port of registry:
Gross tonnage:
Deadweight (metric tonnes):
Length between perpendiculars (m):
Shipbuilder:
Hull number:
Recognized organization (RO):
RO ship identity:
Date of delivery of the ship:
Owner:
Thickness measurement company:

**1 Preamble**

**1.1 Scope**

**1.1.1** The present survey programme covers the minimum extent of overall surveys, close-up surveys, thickness measurements and pressure testing within the cargo length area, cargo holds, ballast tanks, including fore and aft peak tanks, required by the Guidelines.

**1.1.2** The arrangements and safety aspects of the survey should be acceptable to the attending surveyor(s).

**1.2 Documentation**

All documents used in the development of the survey programme should be available onboard during the survey as required by section 6.

**2 Arrangement of cargo holds, tanks and spaces**

This section of the survey programme should provide information (either in the form of plans or text) on the arrangement of cargo holds, tanks and spaces that fall within the scope of the survey.

**3 List of cargo holds, tanks and spaces with information on their use, extent of coatings and corrosion protection system**

This section of the survey programme should indicate any changes relating to (and should update) the information on the use of the holds and tanks of the ship, the extent of coatings and the corrosion protective system provided in the Survey Planning Questionnaire.

#### **4 Conditions for survey**

This section of the survey programme should provide information on the conditions for survey, e.g., information regarding cargo hold and tank cleaning, gas freeing, ventilation, lighting, etc.

#### **5 Provisions and method of access to structures**

This section of the survey programme should indicate any changes relating to (and should update) the information on the provisions and methods of access to structures provided in the Survey Planning Questionnaire.

#### **6 List of equipment for survey**

This section of the survey programme should identify and list the equipment that will be made available for carrying out the survey and the required thickness measurements.

#### **7 Survey requirements**

##### **7.1 Overall survey**

This section of the survey programme should identify and list the spaces that should undergo an overall survey for this ship in accordance with 2.4.1 and 2.5.1.

##### **7.2 Close-up survey**

This section of the survey programme should identify and list the hull structures that should undergo a close-up survey for this ship in accordance with 2.5.2.

#### **8 Identification of tanks for tank testing**

This section of the survey programme should identify and list the cargo holds and tanks that should undergo tank testing for this ship in accordance with 2.7.

#### **9 Identification of areas and sections for thickness measurements**

This section of the survey programme should identify and list the areas and sections where thickness measurements should be taken in accordance with 2.6.1.

#### **10 Minimum thickness of hull structures**

This section of the survey programme should specify the minimum thickness for hull structures of this ship that are subject to survey, according to .1 or .2:

- .1  Determined from the attached wastage allowance table and the original thickness to the hull structure plans of the ship;
- .2  Given in the following table(s):

Area or location	Original thickness (mm)	as-built	Minimum thickness (mm)	Substantial thickness (mm)	corrosion
<b>Deck</b>					
Plating					
Longitudinals					
Longitudinal girders					
Cross deck plating					
Cross deck stiffeners					
<b>Bottom</b>					
Plating					
Longitudinals					
Longitudinal girders					
<b>Inner bottom</b>					
Plating					
Longitudinals					
Longitudinal girders					
Floors					
<b>Ship side in way of topside tanks</b>					
Plating					
Longitudinals					
<b>Ship side in way of hopper side tanks</b>					
Plating					
Longitudinals					
<b>Ship side in way of double-side tanks (if applicable)</b>					
Plating					
Longitudinals or ordinary transverse frames					
Longitudinal stringers					
<b>Longitudinal bulkhead (if applicable)</b>					
Plating					
Longitudinals (if applicable)					
Longitudinal girders (if applicable)					
<b>Transverse bulkheads</b>					
Plating					
Stiffeners (if applicable)					
Upper stool plating					
Upper stool stiffeners					
Lower stool plating					
Lower stool stiffeners					
<b>Transverse web in topside tanks</b>					
Plating					
Flanges					
Stiffeners					

<b>Transverse web in hopper tanks</b>			
Plating			
Flanges			
Stiffeners			
<b>Transverse web in double-side tanks</b>			
Plating			
Flanges			
Stiffeners			
<b>Hatch covers</b>			
Plating			
Stiffeners			
<b>Hatch coamings</b>			
Plating			
Stiffeners			

*Note:* The wastage allowance tables should be attached to the survey programme.

## 11 Thickness measurement company

This section of the survey programme should identify changes, if any, relating to the information on the thickness measurement company provided in the Survey Planning Questionnaire.

## 12 Damage experience related to the ship

This section of the survey programme should, using the tables provided below, provide details of the hull damages for at least the last three years in way of the cargo holds, ballast tanks and void spaces within the cargo length area. These damages are subject to survey.

### Hull damages sorted by location for this ship

Cargo hold, tank or space number or area	Possible cause, if known	Description of the damages	Location	Repair	Date of repair

### Hull damages for sister or similar ships (if available) in the case of design related damage

Cargo hold, tank or space number or area	Possible cause, if known	Description of the damages	Location	Repair	Date of repair

#### 13 Areas identified with substantial corrosion from previous surveys

This section of the survey programme should identify and list the areas of substantial corrosion from previous surveys.

#### 14 Critical structural areas and suspect areas

This section of the survey programme should identify and list the critical structural areas and the suspect areas, when such information is available.

#### 15 Other relevant comments and information

This section of the survey programme should provide any other comments and information relevant to the survey.

### Appendices

#### Appendix 1 – List of plans

The provisions of 5.1.4.2 require that the main structural plans of cargo holds and ballast tanks (scantling drawings), including information regarding the use of high-tensile steel (HTS), should be available. This appendix of the survey programme should identify and list the main structural plans which form part of the survey programme.

#### Appendix 2 – Survey Planning Questionnaire

The Survey Planning Questionnaire (annex 4B), which has been submitted by the owner, should be appended to the survey programme.

#### Appendix 3 – Other documentation

This part of the survey programme should identify and list any other documentation that forms part of the plan.

Prepared by the owner in co-operation with the Administration for compliance with 5.1.4.

Date: ..... (name and signature of authorized owner's representative)

Date: ..... (name and signature of authorized representative of the Administration)

## ANNEX 4B

### **SURVEY PLANNING QUESTIONNAIRE**

1 The following information will enable the owner, in co-operation with the Administration, to develop a Survey Plan complying with the requirements of the Guidelines. It is essential that the owner provides, when completing the present questionnaire, up-to-date information. The present questionnaire, when completed, should provide all information and material required by the Guidelines.

#### **Particulars**

Ship's name:

IMO number:

Flag State:

Port of registry:

Owner:

Recognized organization:

Gross tonnage:

Deadweight (metric tonnes):

Date of delivery:

#### **Information on access provision for close-up surveys and thickness measurement**

2 The owner should indicate, in the table below, the means of access to the structures subject to close-up survey and thickness measurement. A close-up survey is an examination where the details of structural components are within the close visual inspection range of the attending surveyor, i.e., preferably within reach of hand.

Hold/Tank No.	Structure	Temporary staging	Rafts	Ladders	Direct access	Other means (please specify)
F.P.	Fore peak					
A.P.	Aft peak					
Cargo holds	Hatch side coamings					
	Topside sloping plate					
	Upper stool plating					
	Cross deck					
	Double-side tank plating					
	Transverse bulkhead					
	Hopper tank plating					
	Lower stool					
	Tank top					
Topside tanks	Under deck structure					
	Side shell and structure					
	Sloping plate and structure					
	Webs and bulkheads					
Hopper tanks	Hopper sloping plate and structure					
	Side shell and structure					
	Bottom structure					
	Webs and bulkheads					
Double-side tanks	Side shell and structure					
	Inner skin and structure					
	Webs and bulkheads					
	Double bottom structure					
	Upper stool internal structure					
	Lower stool internal structure					
Wing tanks of double ore carriers	Under deck and structure					
	Side shell and structure					
	Side shell vertical web and structure					
	Longitudinal bulkhead and structure					
	Longitudinal bulkhead web and structure					
	Bottom plating and structure					
	Cross ties/stringers					

History of bulk cargoes of a corrosive nature (e.g., high sulphur content)

### Owner's inspections

3 Using a format similar to that of the table below (which is given as an example), the owner should provide details of the results of their inspections, for the last 3 years – in accordance with the Guidelines – on all CARGO holds and BALLAST tanks and VOID spaces within the cargo area.

Tank/Hold No.	Corrosion protection (1)	Coating extent (2)	Coating condition (3)	Structural deterioration (4)	Hold and tank history (5)
Cargo holds					
Topside tanks					
Hopper tanks					
Double-side skin tanks					
Double bottom tanks					
Upper stools					
Lower stools					
Wing tanks (ore carriers)					
Fore peak					
Aft peak					
Miscellaneous other spaces:					

**Note:** Indicate tanks which are used for oil/ballast.

- 1) HC = hard coating; SC = soft coating; A = anodes; NP = no protection
- 2) U = upper part; M = middle part; L = lower part; C = complete
- 3) G = good; F = fair; P = poor; RC = recoated (during the last 3 years)
- 4) N = no findings recorded; Y = findings recorded, description of findings should be attached to this questionnaire
- 5) DR = damage and repair; L = leakages; CV = conversion (description to be attached to this questionnaire)

Name of owner's representative:

.....

Signature: .....

Date: .....

**Reports of port State control inspections**

List the reports of port State control inspections containing hull structural related deficiencies, relevant information on rectification of the deficiencies:

**Safety management system**

List non-conformities related to hull maintenance, including the associated corrective actions:

**Name and address of the approved thickness measurement company:**


## ANNEX 5

### **PROCEDURES FOR CERTIFICATION OF A COMPANY ENGAGED IN THICKNESS MEASUREMENT OF HULL STRUCTURES**

#### **1 Application**

This guidance applies for certification of the company which intends to engage in the thickness measurement of hull structures of ships.

#### **2 Procedures for certification**

##### *Submission of documents*

**2.1** The following documents should be submitted to an organization recognized by the Administration for approval:

- .1** outline of the company, e.g., organization and management structure;
- .2** experience of the company on thickness measurement of hull structures of ships;
- .3** technicians' careers, i.e., experience of technicians as thickness measurement operators, technical knowledge and experience of hull structure, etc. Operators should be qualified according to a recognized industrial NDT Standard;
- .4** equipment used for thickness measurement such as ultrasonic testing machines and their maintenance/calibration procedures;
- .5** a guide for thickness measurement operators;
- .6** training programmes for technicians for thickness measurement;
- .7** measurement record format in accordance with recommended procedures for thickness measurements (see annex 8).

##### *Auditing of the company*

**2.2** Upon reviewing the documents submitted with satisfactory results, the company should be audited in order to ascertain that the company is duly organized and managed in accordance with the documents submitted, and eventually is capable of conducting thickness measurement of the hull structure of ships.

**2.3** Certification is conditional upon an on-board demonstration of thickness measurement as well as satisfactory reporting.

### **3 Certification**

**3.1** Upon satisfactory results of both the audit of the company referred to in 2.2 and the demonstration tests referred to in 2.3, the Administration or organization recognized by the Administration should issue a certificate of approval as well as a notice to the effect that the thickness measurement operation system of the company has been certified.

**3.2** Renewal/endorsement of the certificate should be made at intervals not exceeding three years by verification that original conditions are maintained.

### **4 Report of any alteration to the certified thickness measurement operation system**

In cases where any alteration to the certified thickness measurement operation system of the company is made, such an alteration should be immediately reported to the organization recognized by the Administration. Re-audit should be made where deemed necessary by the organization recognized by the Administration.

### **5 Withdrawal of the certification**

The certification may be withdrawn in the following cases:

- .1** where the measurements were improperly carried out or the results were improperly reported;
- .2** where the surveyor found any deficiencies in the approved thickness measurement operation systems of the company; and
- .3** where the company failed to report any alteration referred to in 4 to the organization recognized by the Administration as required.

## ANNEX 6

### SURVEY REPORTING PRINCIPLES

As a principle, for bulk carriers subject to the Guidelines, the surveyor should include the following contents in his report for survey of hull structure and piping systems, as relevant for the survey.

#### **1 General**

**1.1** A survey report should be generated in the following cases:

- .1 in connection with commencement, continuation and/or completion of periodical hull surveys, i.e., annual, intermediate and renewal surveys, as relevant;
- .2 when structural damages/defects have been found;
- .3 when repairs, renewals or modifications have been carried out; and
- .4 when condition of class (recommendation) has been imposed or has been deleted.

**1.2** The reporting should provide:

- .1 evidence that prescribed surveys have been carried out in accordance with applicable requirements;
- .2 documentation of surveys carried out with findings, repairs carried out and condition of class (recommendation) imposed or deleted;
- .3 survey records, including actions taken, which should form an auditable documentary trail. Survey reports should be kept in the survey report file required to be on board;
- .4 information for planning of future surveys; and
- .5 information which may be used as input for maintenance of classification rules and instructions.

**1.3** When a survey is split between different survey stations, a report should be made for each portion of the survey. A list of items surveyed, relevant findings and an indication of whether the item has been credited, are to be made available to the next attending surveyor, prior to continuing or completing the survey. Thickness measurement and tank testing carried out is also to be listed for the next surveyor.

#### **2 Extent of the survey**

**2.1** Identification of compartments where an overall survey has been carried out.

**2.2** Identification of locations, in each ballast tank and cargo hold including hatch covers and coamings, where a close-up survey has been carried out, together with information on the means of access used.

**2.3** Identification of locations, in each ballast tank and cargo hold including hatch covers and coamings, where thickness measurement has been carried out.

*Note:* As a minimum, the identification of location of close-up survey and thickness measurement should include a confirmation with description of individual structural members corresponding to the extent of requirements stipulated in Annex A based on type of periodical survey and the ship's age.

Where only partial survey is required, e.g., one transverse web, two selected cargo hold transverse bulkheads, the identification should include location within each ballast tank and cargo hold by reference to frame numbers.

**2.4** For areas in ballast tanks and cargo holds where protective coating is found to be in good condition and the extent of close-up survey and/or thickness measurement has been specially considered, structures subject to special consideration should be identified.

**2.5** Identification of tanks subject to tank testing.

**2.6** Identification of piping systems on deck and within cargo holds, ballast tanks, pipe tunnels, cofferdams and void spaces where:

**.1** examination including internal examination of piping with valves and fittings and thickness measurement, as relevant, has been carried out; and

**.2** operational test to working pressure has been carried out.

### **3 Result of the survey**

**3.1** Type, extent and condition of protective coating in each tank, as relevant (rated GOOD, FAIR or POOR) including identification of tanks fitted with anodes.

**3.2** Structural condition of each compartment with information on the following, as relevant:

**.1** identification of findings, such as:

**.1.1** corrosion with description of location, type and extent;

**.1.2** areas with substantial corrosion;

**.1.3** cracks/fractures with description of location and extent;

**.1.4** buckling with description of location and extent; and

**.1.5** indents with description of location and extent;

- .2 identification of compartments where no structural damages/defects are found. The report may be supplemented by sketches/photos; and
- .3 thickness measurement report should be verified and signed by the surveyor controlling the measurements on board.

#### **4 Actions taken with respect to findings**

**4.1** Whenever the attending surveyor is of the opinion that repairs are required, each item to be repaired should be identified in a numbered list. Whenever repairs are carried out, details of the repairs effected should be reported by making specific reference to relevant items in the numbered list.

**4.2** Repairs carried out should be reported with identification of:

- .1 compartment;
- .2 structural member;
- .3 repair method (i.e., renewal or modification), including:
  - .3.1 steel grades and scantlings (if different from the original); and
  - .3.2 sketches/photos, as appropriate;
- .4 repair extent; and
- .5 non-destructive test (NDT)/tests.

**4.3** For repairs not completed at the time of survey, condition of class/recommendation should be imposed with a specific time limit for the repairs. In order to provide correct and proper information to the surveyor attending for survey of the repairs, condition of class/recommendation should be sufficiently detailed with identification of each item to be repaired. For identification of extensive repairs, reference may be made to the survey report.

ANNEX 7

**CONDITION EVALUATION REPORT**  
**Issued upon completion of renewal survey**

***General particulars***

Ship's name: \_\_\_\_\_ Class/Administration identity number: \_\_\_\_\_  
 Previous class/Administration identity number(s): \_\_\_\_\_  
 IMO number: \_\_\_\_\_

Port of registry: \_\_\_\_\_ National flag: \_\_\_\_\_  
 Previous national flag(s): \_\_\_\_\_

Deadweight (metric tonnes): \_\_\_\_\_ Gross tonnage: \_\_\_\_\_  
 National: \_\_\_\_\_  
 ITC (1969): \_\_\_\_\_

Date of build: \_\_\_\_\_ Classification notation: \_\_\_\_\_

Date of major conversion: \_\_\_\_\_

Type of conversion: \_\_\_\_\_ Owner: \_\_\_\_\_  
 Previous owner(s) \_\_\_\_\_

- 1 The survey reports and documents listed below have been reviewed by the undersigned and found to be satisfactory
- 2 The renewal survey has been completed in accordance with the present Guidelines on (date) .....

Condition evaluation report completed by	Name Signature	Title
Office	Date	
Condition evaluation report verified by	Name Signature	Title
Office	Date	

Attached reports and documents:

- 1)
- 2)
- 3)
- 4)
- 5)
- 6)

***Contents of condition evaluation report***

- Part 1 – General particulars: – *See front page*
- Part 2 – Report review: – Where and how survey was done
- Part 3 – Close-up survey: – Extent (which tanks/holds)
- Part 4 – Thickness measurements:
  - Reference to thickness measurement report
  - Summary of where measured
  - Separate form indicating the spaces with substantial corrosion, and corresponding:
    - thickness diminution
    - corrosion pattern
- Part 5 – Tank corrosion prevention system:
  - Separate form indicating:
    - location of coating/anodes
    - condition of coating (if applicable)
- Part 6 – Repairs: – Identification of spaces/areas
- Part 7 – Condition of class/flag State requirements:
- Part 8 – Memoranda:
  - Acceptable defects
  - Any points of attention for future surveys, e.g., for suspect areas
  - Extended annual/intermediate survey due to coating breakdown
- Part 9 – Conclusion: – Statement on evaluation/verification of survey report

***Extract of thickness measurements***

Reference is made to the thickness measurement report:

<b>Position of substantially corroded tanks/areas<sup>1</sup> or areas with deep pitting<sup>3</sup></b>	<b>Thickness diminution [%]</b>	<b>Corrosion pattern<sup>2</sup></b>	<b>Remarks: e.g. (e.g., ref. attached sketches)</b>

**Notes:**

- 1 Substantial corrosion, i.e., 75% – 100% of acceptable margins wasted.
- 2 P = Pitting  
C = Corrosion in general
- 3 Any bottom plating with a pitting intensity of 20% or more, with wastage in the substantial corrosion range or having an average depth of pitting of 1/3 or more of actual plate thickness should be noted.

**Tank/hold corrosion prevention system**

Tank/hold Nos. <sup>1</sup>	Tank/hold corrosion prevention system <sup>2</sup>	Coating condition <sup>3</sup>	Remarks

**Notes:**

- 1 All ballast tanks and cargo holds should be listed.
- 2 C = Coating                      A = Anodes                      NP = No protection
- 3 Coating condition according to the following standard:
  - GOOD                      condition with only minor spot rusting.
  - FAIR                      condition with local breakdown of coating at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition.
  - POOR                      condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.

If coating condition POOR is given, extended annual surveys should be introduced. This should be noted in part 7 of the Contents of condition evaluation report.

## ANNEX 8

### **RECOMMENDED PROCEDURES FOR THICKNESS MEASUREMENTS**

- 1 This annex should be used for recording thickness measurements as required by part B of Annex A.
- 2 Thickness measurement sheet forms TM1-DSBC, TM2-DSBC, TM3-DSBC, TM4-DSBC, TM5-DSBC and TM6-DSBC (appendices 2 to 5) should be used, as appropriate, for recording thickness measurements and these sheets should be bound with the cover sheet of the report of GENERAL PARTICULARS in appendix 1. The maximum allowable diminution should be stated. The maximum allowable diminution could be stated in an attached document.
- 3 Appendices 3 to 5 are guidance diagrams and notes relating to the reporting forms and the procedure for the thickness measurements.

**APPENDIX 1**  
**THICKNESS MEASUREMENT REPORT**  
**GENERAL PARTICULARS**

Ship's name:  
IMO Number:  
Administration Identification Number:  
Port of registry:  
Gross tonnage:  
Deadweight:  
Date of build:  
Classification society:

---

Name of Company performing the thickness measurement:  
Thickness measurement company certified by:  
Certificate No.:  
Certificate valid from: ..... to .....  
Place of measurement:  
First date of measurement:  
Last date of measurement:  
Renewal survey/intermediate survey\* due:  
Details of measurement equipment:  
Qualification of operator:

---

Report Number:  
Consisting of ..... Forms

---

Name of operator: ..... Name of surveyor: .....  
Signature of operator: ..... Signature of surveyor: .....  
Company official stamp: ..... Administration official stamp: .....

---

\* Delete as appropriate.

APPENDIX 2

TMI-DSBC Report on THICKNESS MEASUREMENT OF ALL DECK PLATING, ALL BOTTOM SHEEL PLATING AND SIDE SHELL PLATING\*  
(\* - delete as appropriate)

Ship's name ..... Class Identity No. .... Report No. .... IMO No. ....

STRAKE POSITION	No. or Letter	Org. Thk. mm	Forward Reading				Aft Reading				Mean Diminution		
			Gauged	Diminution P	Diminution S	%	Gauged	Diminution P	Diminution S	%	P	S	mm
12th forward			P	S	mm	%	P	S	mm	%			
11th													
10th													
9th													
8th													
7th													
6th													
5th													
4th													
3rd													
2nd													
1st													
Amidships													
1st aft													
2nd													
3rd													
4th													
5th													
6th													
7th													
8th													
9th													
10th													
11th													
12th													

Operator's Signature ..... NOTES - See Reverse

### NOTES TO REPORT TM1-DSBC

- 1 This report should be used for recording the thickness measurement of:
  - .1 all strength deck plating within cargo length area;
  - .2 all keel, bottom shell plating and bilge plating within the cargo length area;
  - .3 side shell plating including selected wind and water strakes outside cargo length area; and
  - .4 all wind and water strakes within cargo length area.
- 2 The strake position should be cleared as follows:
  - .1 for strength deck indicate the number of the strake of plating inboard from the stringer plate;
  - .2 for bottom plating indicate the number of the strake of plating outboard from the keel plate; and
  - .3 for side shell plating give number of the strake of plating sheerstrake and letter as shown on shell expansion.
- 3 Only the deck plating strakes outside line of openings are to be recorded.
- 4 Measurements should be taken at the forward and aft areas of all plates and where plates cross ballast/cargo tank boundaries separate measurements for the area of plating in way of each type of tank should be recorded.
- 5 The single measurements recorded are to represent the average of multiple measurements.
- 6 The maximum allowable diminution could be stated in an attached document.

**TM2-DSBC(i) Report on THICKNESS MEASUREMENT OF SHELL AND DECK PLATING at transverse sections (one, two or three transverse sections)**

Ship's name ..... Class Identity No. .... Report No. .... IMO No. ....

STRAKE POSITION	STRENGTH DECK AND SHEERSTRAKE PLATING																	
	FIRST TRANSVERSE SECTION AT FRAME NUMBER				SECOND TRANSVERSE SECTION AT FRAME NUMBER				THIRD TRANSVERSE SECTION AT FRAME NUMBER									
	No. or Letter	Org. Thk. mm	Max. Alwb. Dim. mm	Gauged P S	Diminution P mm	Diminution S mm	No. or Letter	Org. Thk. mm	Max. Alwb. Dim. mm	Gauged P S	Diminution P mm	Diminution S mm	No. or Letter	Org. Thk. mm	Max. Alwb. Dim. mm	Gauged P S	Diminution P mm	Diminution S mm
Stringer Plate																		
1st strake inboard																		
2nd																		
3rd																		
4th																		
5th																		
6th																		
7th																		
8th																		
9th																		
10th																		
11th																		
12th																		
13th																		
14th																		
centre strake																		
sheer strake																		
TOPSIDE TOTAL																		

Operator's Signature ..... NOTES – See Reverse

### **NOTES TO REPORT TM2-DSBC(i)**

- 1 This report should be used for recording the thickness measurement of:  
  
Strength deck plating and sheerstrake plating transverse sections:  
  
One, two or three sections within the cargo length area, comprising the structural items (0), (1) and (2) as shown on the diagrams of typical transverse sections (Appendices 3 and 4).
- 2 Only the deck plating strakes outside line of hatch openings should be recorded.
- 3 The top side area comprises deck plating, stringer plate and sheerstrake (including rounded gunwales).
- 4 The exact frame station of measurement should be stated.
- 5 The single measurements recorded should represent the average of multiple measurements.
- 6 The maximum allowable diminution could be stated in an attached document.

TM2-DSBC(ii) Report on THICKNESS MEASUREMENT OF SHELL AND DECK PLATING at transverse sections (one, two or three transverse sections)

Ship's name ..... Class Identity No. .... Report No. .... IMO No. ....

STRAKE POSITION	SHELL PLATING																		
	FIRST TRANSVERSE SECTION AT FRAME NUMBER				SECOND TRANSVERSE SECTION AT FRAME NUMBER				THIRD TRANSVERSE SECTION AT FRAME NUMBER										
	No. or Letter	Org. Thk. mm	Max. Alwb. Dim. mm	Gauged P S	Diminution P mm %	Diminution S mm %	No. or Letter	Org. Thk. mm	Max. Alwb. Dim. mm	Gauged P S	Diminution P mm %	Diminution S mm %	No. or Letter	Org. Thk. mm	Max. Alwb. Dim. mm	Gauged P S	Diminution P mm %	Diminution S mm %	
1st below sheer strake																			
2nd																			
3rd																			
4th																			
5th																			
6th																			
7th																			
8th																			
9th																			
10th																			
11th																			
12th																			
13th																			
14th																			
15th																			
16th																			
17th																			
18th																			
19th																			
20th																			
keel strake																			
BOTTOM TOTAL																			

Operator's Signature ..... NOTES - See Reverse

**NOTES TO REPORT TM2-DSBC(ii)**

- 1 This report should be used for recording the thickness measurement of:  
  
Shell plating at transverse sections:  
  
One, two or three sections within the cargo length area, comprising the structural items (3), (4), (5) and (6) as shown on the diagrams of typical transverse sections in appendices 3 and 4.
- 2 The bottom area comprises keel, bottom and bilge plating.
- 3 The exact frame station of measurement should be stated.
- 4 The single measurements recorded should represent the average of multiple measurements.
- 5 The maximum allowable diminution could be stated in an attached document.



### NOTES TO REPORT TM3-DSBC

- 1 This report should be used for recording the thickness measurement of:  
  
Longitudinal members at transverse sections:  
  
Two, or three sections within the cargo length area comprising the appropriate structural items (10) to (25) as shown on diagrams of typical transverse sections in appendices 3 and 4.
- 2 The exact frame station of measurement should be stated.
- 3 The single measurements recorded should represent the average of multiple measurements.
- 4 The maximum allowable diminution could be stated in an attached document.



### **NOTES TO REPORT TM4-DSBC**

- 1 This report should be used for recording the thickness measurement:  
  
Transverse structural members, comprising the appropriate structural items (30) to (34) as shown on diagrams of typical transverse sections illustrated in appendices 3 and 4.
- 2 Guidance for areas of measurements is indicated in appendix 5.
- 3 The single measurements recorded should represent the average of multiple measurements.
- 4 The maximum allowable diminution could be stated in an attached document.



### **NOTES TO REPORT TM5-DSBC**

- 1 This report should be used for recording the thickness measurement of:  
Watertight transverse bulkheads in cargo holds.
- 2 Guidance for areas of measurements is indicated in appendix 3.
- 3 The single measurements recorded should represent the average of multiple measurements.
- 4 The maximum allowable diminution could be stated in an attached document.



### **NOTES TO REPORT TM6-DSBC**

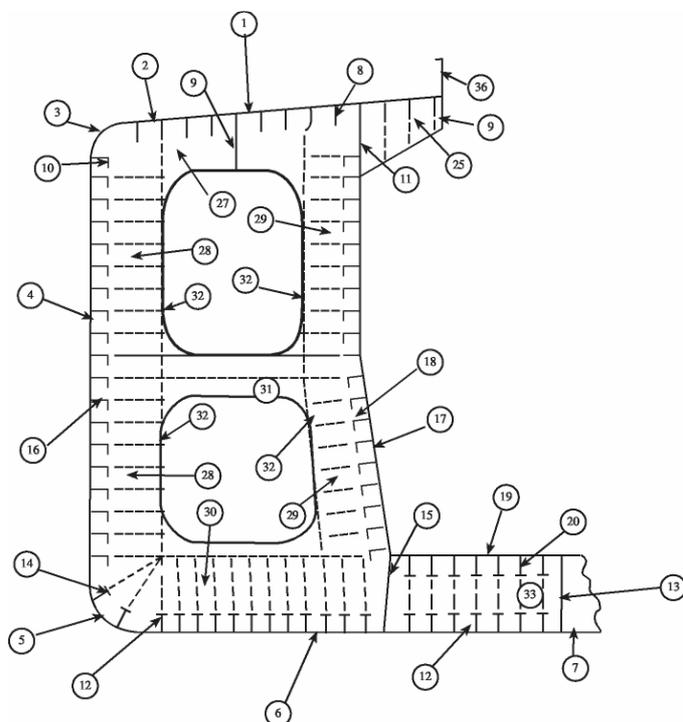
- 1 This report should be used for recording the thickness measurement of:  
  
Miscellaneous structural members including the structural items (40), (41) and (42) as shown on diagrams of typical transverse sections illustrated in Appendix 3.
- 2 Guidance for areas of measurements is indicated in appendix 5.
- 3 The single measurements recorded should represent the average of multiple measurements.
- 4 The maximum allowable diminution could be stated in an attached document.



## APPENDIX 4

### THICKNESS MEASUREMENT – ORE CARRIERS

Typical transverse section of an ore carrier with indication of longitudinal and transverse members.



Report on TM2-DSBC(i) and (ii)	
1	Strength deck plating
2	Stringer plate
3	Sheerstrake
4	Side shell plating
5	Bilge plating
6	Bottom shell plating
7	Keel plate

Report on TM6-DSBC	
36	Hatch coamings
37	Deck plating between hatches
38	Hatch covers
39	
40	

Report on TM3-DSBC	
8	Deck longitudinals
9	Deck girders
10	Sheerstrake longitudinals
11	Longitudinal bulkhead top strake
12	Bottom longitudinals
13	Bottom girders
14	Bilge longitudinals
15	Longitudinal bulkhead lower strake
16	Side shell longitudinals
17	Longitudinal bulkhead plating (remainder)
18	Longitudinal bulkhead longitudinals
19	Inner bottom plating
20	Inner bottom longitudinals
21	
22	
23	
24	

Report on TM4-DSBC	
25	Deck transverse centre tank
26	Bottom transverse centre tank
27	Deck transverse wing tank
28	Side shell vertical web
29	Longitudinal bulkhead vertical web
30	Bottom transverse wing tank
31	Struts
32	Transverse web face plate
33	Double bottom floors
34	
35	



## ANNEX 9

# **GUIDELINES FOR TECHNICAL ASSESSMENT IN CONJUNCTION WITH PLANNING FOR ENHANCED SURVEYS OF BULK CARRIERS\***

## **1 INTRODUCTION**

These guidelines contain information and suggestions concerning technical assessments, which may be of use in conjunction with the planning of enhanced surveys of double skin bulk carriers. As indicated in 5.1.6, the guidelines are a recommended tool which may be invoked at the discretion of the Administration, when considered necessary and appropriate, in conjunction with the preparation of the required survey programme.

## **2 PURPOSE AND PRINCIPLES**

### **2.1 Purpose**

**2.1.1** The purpose of the technical assessments described in these guidelines is to assist in identifying critical structural areas, nominating suspect areas and in focusing attention on structural elements or areas of structural elements which may be particularly susceptible to, or evidence a history of, wastage or damage. This information may be useful in nominating locations, areas holds and tanks for thickness measurement, close-up survey and tank testing.

**2.1.2** Critical structural areas are locations which have been identified from calculations to require monitoring or from the service history of the subject ship or from similar or sister ships (if available) to be sensitive to cracking, buckling or corrosion which would impair the structural integrity of the ship.

### **2.2 Minimum requirements**

However, these guidelines may not be used to reduce the requirements pertaining to thickness measurement, close-up survey and tank testing contained in annexes 1 and 2 of part B and in paragraph 2.7, respectively, which, in all cases, should be complied with as a minimum.

### **2.3 Timing**

As with other aspects of survey planning, the technical assessments described in these guidelines should be worked out by the owner or operator in co-operation with the Administration well in advance of the commencement of the renewal survey, i.e., prior to commencing the survey and normally at least 12 to 15 months before the survey's completion due date.

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\* References:

- 1 IACS, "Unified Requirement Z10.5, "Hull Surveys of Double Skin Bulk Carriers""
- 2 IACS, "Bulk Carriers: Guidelines for Surveys, Assessment and Repair of Hull Structures, January 2002"
- 3 TSCF, "Guidelines for the Inspection and Maintenance of Double Hull Tanker Structures, 1995"
- 4 TSCF, "Guidance Manual for Tanker Structures, 1997"

## **2.4 Aspects to be considered**

**2.4.1** Technical assessments, which may include quantitative or qualitative evaluation of relative risks of possible deterioration, of the following aspects of a particular ship may be used as a basis for the nomination of holds, tanks and areas for survey:

- .1** design features such as stress levels on various structural elements, design details and extent of use of high-tensile steel;
- .2** former history with respect to corrosion, cracking, buckling, indents and repairs for the particular ship as well as similar vessels, where available; and
- .3** information with respect to types of cargo carried, use of different holds/tanks for cargo/ballast, protection of holds and tanks and condition of coating, if any.

**2.4.2** Technical assessments of the relative risks of susceptibility to damage or deterioration of various structural elements and areas are to be judged and decided on the basis of recognized principles and practices, such as may be found in references 2, 3 and 4.

## **3 TECHNICAL ASSESSMENT**

### **3.1 General**

**3.1.1** There are three basic types of possible failure, which may be the subject of technical assessment in connection with planning of surveys; corrosion, cracks and buckling. Contact damages are not normally covered by the survey planning since indents are usually noted in memoranda and assumed to be dealt with as a normal routine by surveyors.

**3.1.2** Technical assessments performed in conjunction with the survey planning process should, in principle, be as shown schematically in figure 1. The approach is basically an evaluation of the risk in the following aspects based on the knowledge and experience related to:

- .1** design; and
- .2** corrosion.

**3.1.3** The design should be considered with respect to structural details, which may be susceptible to buckling or cracking as a result of vibration, high stress levels or fatigue.

**3.1.4** Corrosion is related to the ageing process, and is closely connected with the quality of corrosion prevention systems fitted at new building, and subsequent maintenance during the service life. Corrosion may also lead to cracking and/or buckling.

### **3.2 Methods**

#### **3.2.1 Design details**

**3.2.1.1** Damage experience related to the ship in question and sister and/or similar ships, where available, is the main source of information to be used in the process of planning. In addition, a selection of structural details from the design drawings is to be included.

**3.2.1.2** Typical damage experience to be considered will consist of:

- .1 number, extent, location and frequency of cracks; and
- .2 location of buckles.

**3.2.1.3** This information may be found in the survey reports and/or the owner's files, including the results of the owner's own inspections. The defects should be analysed, noted and marked on sketches.

**3.2.1.4** In addition, general experience should be utilized. Also, reference should be made to reference 2, which contains a catalogue of typical damages and proposed repair methods for various structural details on single skin bulk carriers. Reference should also be made to reference 3, which contains catalogues of typical damages and proposed repair methods for double hull oil tanker structural details which may to some extent be similar to structural details in double skin bulk carriers. Such figures should be used together with a review of the main drawings, in order to compare with the actual structure and search for similar details that may be susceptible to damage. In particular, chapter 3 of reference 3 deals with various aspects specific to double hull tankers, such as stress concentration locations, misalignment during construction, corrosion trends, fatigue considerations and areas requiring special attention, while chapter 4 of reference 3 addresses experience gained on structural defects in double hulls (chemical tankers, OBO carriers, ore/oil carriers, gas carriers), which should also be considered in working out the survey planning.

**3.2.1.5** The review of the main structural drawings, in addition to using the above-mentioned figures, should include checking for typical design details where cracking has been experienced. The factors contributing to damage should be carefully considered.

**3.2.1.6** The use of high-tensile steel (HTS) is an important factor. Details showing good service experience where ordinary, mild steel has been used may be more susceptible to damage when HTS, and its higher associated stresses, are utilized. There is extensive and, in general, good experience, with the use of HTS for longitudinal material in deck and bottom structures. Experience in other locations, where the dynamic stresses may be higher, is less favourable, e.g., side structures.

**3.2.1.7** In this respect, stress calculations of typical and important components and details, in accordance with relevant methods, may prove useful and should be considered.

**3.2.1.8** The selected areas of the structure identified during this process should be recorded and marked on the structural drawings to be included in the Survey Programme.

## **3.2.2** Corrosion

**3.2.2.1** In order to evaluate relative corrosion risks, the following information should generally be considered:

- .1 usage of tanks, holds and spaces;
- .2 condition of coatings;

- .3 cleaning procedures;
- .4 previous corrosion damage;
- .5 ballast use and time for cargo holds;
- .6 risk of corrosion in cargo holds and ballast tanks; and
- .7 location of ballast tanks adjacent to heated fuel oil tanks.

**3.2.2.2** Reference 4 gives definitive examples which can be used for judging and describing coating condition, using typical pictures of conditions.

**3.2.2.3** The evaluation of corrosion risks should be based on information in both reference 2 and reference 4, as far as applicable to double-side skin construction, together with relevant information on the anticipated condition of the ship as derived from the information collected in order to prepare the Survey Programme and the age of the ship. The various holds, tanks and spaces should be listed with the corrosion risks nominated accordingly.

### **3.2.3** Locations for close-up survey and thickness measurement

**3.2.3.1** On the basis of the table of corrosion risks and the evaluation of design experience, the locations for initial close-up survey and thickness measurement (areas and sections) may be nominated.

**3.2.3.2** The sections subject to thickness measurement should normally be nominated in tanks, holds and spaces where corrosion risk is judged to be the highest.

**3.2.3.3** The nomination of tanks, holds and spaces for close-up survey should initially be based on highest corrosion risk, and should always include ballast tanks. The principle for the selection should be that the extent is increased by age or where information is insufficient or unreliable.

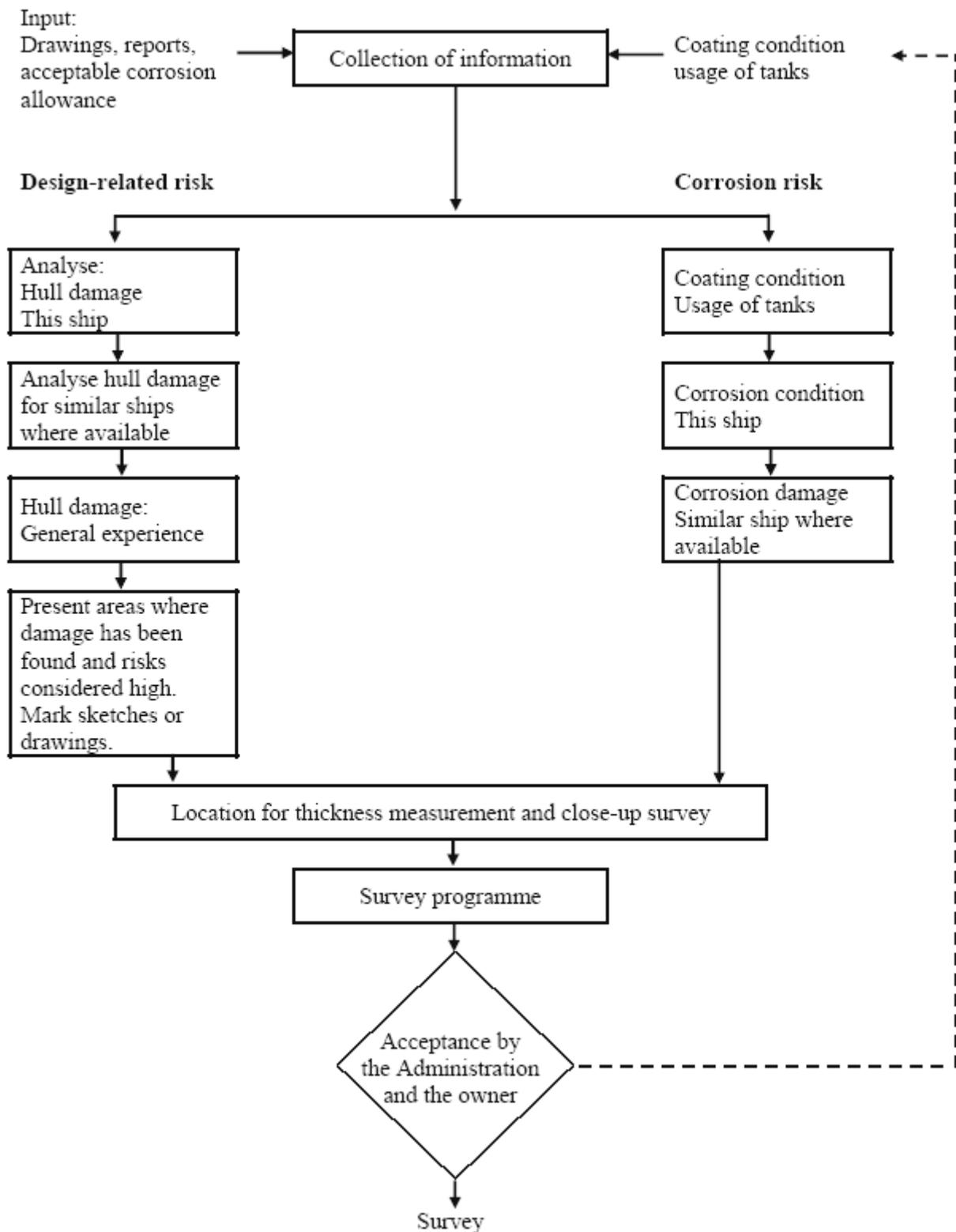


Figure 1 – Technical assessment and the survey planning process

ANNEX 10

**REQUIREMENTS FOR EXTENT OF THICKNESS MEASUREMENTS AT THOSE AREAS OF SUBSTANTIAL CORROSION OF BULK CARRIERS WITH DOUBLE-SIDE SKIN CONSTRUCTION WITHIN THE CARGO LENGTH AREA**

<b>TABLE 1 – BOTTOM, INNER BOTTOM AND HOPPER STRUCTURE</b>		
<b>Structural member</b>	<b>Extent of measurement</b>	<b>Pattern of measurement</b>
Bottom, inner bottom and hopper structure plating	Minimum of three bays across double bottom tank, including aft bay Measurements around and under all suction bell mouths	Five-point pattern for each panel between longitudinals and floors
Bottom, inner bottom and hopper structure longitudinals	Minimum of three longitudinals in each bay where bottom plating measured	Three measurements in line across flange and three measurements on the vertical web
Bottom girders, including the watertight ones	At fore and aft watertight floors and in centre of tanks	Vertical line of single measurements on girder plating with one measurement between each panel stiffener, or a minimum of three measurements
Bottom floors, including the watertight ones	Three floors in the bays where bottom plating measured, with measurements at both ends and middle	Five-point pattern over two square metre area
Hopper structure web frame ring	Three floors in bays where bottom plating measured	Five-point pattern over one square metre of plating Single measurements on flange
Hopper structure transverse watertight bulkhead or swash bulkhead	– lower 1/3 of bulkhead	– five-point pattern over one square metre of plating
	– upper 2/3 of bulkhead	– five-point pattern over two square metre of plating
	– stiffeners (minimum of three)	– For web, five-point pattern over span (two measurements across web at each end and one at centre of span). For flange, single measurements at each end and centre of span
Panel stiffening	Where applicable	Single measurements

<b>TABLE 2 – DECK STRUCTURE INCLUDING CROSS STRIPS, MAIN CARGO HATCHWAYS, HATCH COVERS, COAMINGS AND TOPSIDE TANKS</b>		
<b>Structural member</b>	<b>Extent of measurement</b>	<b>Pattern of measurement</b>
Cross deck strip plating	Suspect cross deck strip plating	Five-point pattern between under deck stiffeners over 1 metre length
Under deck stiffeners	Transverse members Longitudinal member	Five-point pattern at each end and mid span Five-point pattern on both web and flange
Hatch covers	Side and end skirts, each three locations Three longitudinal bands, outboard strakes (2) and centreline strake (1)	Five-point pattern at each location  Five-point measurement each band
Hatch coamings	Each side and end of coaming, one band lower 1/3, one band upper 2/3 of coaming	Five-point measurement each band i.e., end or side coaming
Topside ballast tanks	a) watertight transverse bulkheads: - Lower 1/3 of bulkhead - Upper 2/3 of bulkhead - Stiffeners	Five-point pattern over 1 sq. metre of plating Five-point pattern over 1 sq. metre of plating Five-point pattern over 1 metre length
Topside ballast tanks	b) two representative swash transverse bulkheads: - Lower 1/3 of bulkhead - Upper 2/3 of bulkhead - Stiffeners	Five-point pattern over 1 sq. metre of plating Five-point pattern over 1 sq. metre of plating Five-point pattern over 1 metre length
Topside ballast tanks	c) three representative bays of slope plating: - Lower 1/3 of tank - Upper 2/3 of tank	Five-point pattern over 1 sq. metre of plating Five point pattern over 1 sq. metre of plating
Topside ballast tanks	d) Longitudinals, suspect and adjacent	Five point pattern on both web and flange over 1 metre length
Main deck plating	Suspect plates and adjacent (4)	Five-point pattern over 1 sq. metre of plating
Main deck longitudinals	Suspect plates	Five point pattern on both web and flange over 1 metre length
Web frames/transverses	Suspect plates	Five-point pattern over 1 sq. metre

**TABLE 3 – STRUCTURE IN DOUBLE-SIDE BALLAST TANKS**

<b>Structural member</b>	<b>Extent of measurement</b>	<b>Pattern of measurement</b>
Side shell and inner plating: – Upper strake and strakes in way of horizontal girders – All other strakes	– Plating between each pair of transverse frames/longitudinals in a minimum of three bays (along the tank) – Plating between every third pair of longitudinals in same three bays	– Single measurement – Single measurement
Side shell and inner side transverse frames/longitudinals on: – upper strake – all other strakes	– Each transverse frame/longitudinal in same three bays – Every third transverse frame/longitudinal in same three bays	– Three measurements across web and 1 measurement on flange – Three measurements across web and 1 measurement on flange
Transverse frames/longitudinals: – brackets	Minimum of three at top, middle and bottom of tank in same three bays	Five-point pattern over area of bracket
Vertical web and transverse bulkheads: – strakes in a way of horizontal girders – other strakes	– Minimum of two webs and both transverse bulkheads – Minimum of two webs and both transverse bulkheads	– Five-point pattern over approx. two square metre area – Two measurements between each pair of vertical stiffeners
Horizontal girders	Plating on each girder in a minimum of three bays	Two measurements between each pair of longitudinal girder stiffeners
Panel stiffening	Where applicable	Single measurements

**TABLE 4 – TRANSVERSE BULKHEADS IN CARGO HOLDS**

<b>Structural member</b>	<b>Extent of measurement</b>	<b>Pattern of measurement</b>
Lower stool, where fitted	<ul style="list-style-type: none"> <li>– Transverse band within 25 mm of welded connection to inner bottom</li> <li>– Transverse bands within 25 mm of welded connection to shelf plate</li> </ul>	<ul style="list-style-type: none"> <li>– Five-point pattern between stiffeners over one metre length</li> <li>– Five-point pattern between stiffeners over one metre length</li> </ul>
Transverse bulkheads	<ul style="list-style-type: none"> <li>– Transverse band at approximately mid height</li> <li>– Transverse band at part of bulkhead adjacent to upper deck or below upper stool shelf plate (for those ships fitted with upper stools)</li> </ul>	<ul style="list-style-type: none"> <li>– Five-point pattern over one square metre of plating</li> <li>– Five-point pattern over one square metre of plating</li> </ul>

ANNEX 11

**STRENGTH OF CARGO HATCH COVER SECURING ARRANGEMENTS  
FOR BULK CARRIERS**

**1 Securing devices**

The strength of securing devices should comply with the following requirements:

- .1 Panel hatch covers should be secured by appropriate devices (bolts, wedges or similar) suitably spaced alongside the coamings and between cover elements. Arrangement and spacing should be determined with due attention to the effectiveness for weather-tightness, depending upon the type and the size of the hatch cover, as well as on the stiffness of the cover edges between the securing devices.

- .2 The net sectional area of each securing device is not to be less than:

$$A = 1.4 a / f (\text{cm}^2)$$

where:

- a = spacing between securing devices not to be taken less than 2 metres  
f =  $(\sigma_Y/235)^e$   
 $\sigma_Y$  = specified minimum upper yield stress in  $\text{N/mm}^2$  of the steel used for fabrication, not to be taken greater than 70% of the ultimate tensile strength  
e = 0.75 for  $\sigma_Y > 235$   
= 1.0 for  $\sigma_Y \leq 235$

Rods or bolts should have a net diameter not less than 19 mm for hatchways exceeding  $5 \text{ m}^2$  in area.

- .3 Between cover and coaming and at cross-joints, a packing line pressure sufficient to obtain weathertightness should be maintained by the securing devices. For packing line pressures exceeding 5 N/mm, the cross section area should be increased in direct proportion. The packing line pressure should be specified.

- .4 The cover edge stiffness should be sufficient to maintain adequate sealing pressure between securing devices. The moment of inertia, I, of edge elements be less than:

$$I = 6 p a^4 (\text{cm}^4)$$

where:

- p = packing line pressure in N/mm, minimum 5 N/mm  
a = spacing in m of securing devices

- .5 Securing devices should be of reliable construction and securely attached to the hatchway coamings, decks or covers. Individual securing devices on each cover are to have approximately the same stiffness characteristics.
- .6 Where rod cleats are fitted, resilient washers or cushions should be incorporated.
- .7 Where hydraulic cleating is adopted, a positive means should be provided to ensure that it remains mechanically locked in the closed position in the event of failure of the hydraulic system.

## **2 Stoppers**

**2.1** Nos.1 and 2 hatch covers should be effectively secured, by means of stoppers, against the transverse forces arising from a pressure of  $175 \text{ kN/m}^2$ .

**2.2** No.2 hatch covers should be effectively secured, by means of stoppers, against the longitudinal forces acting on the forward end arising from a pressure of  $175 \text{ kN/m}^2$ .

**2.3** No.1 hatch cover should be effectively secured, by means of stoppers, against the longitudinal forces acting on the forward end arising from a pressure of  $230 \text{ kN/m}^2$ . This pressure may be reduced to  $175 \text{ kN/m}^2$  if a forecastle is fitted.

**2.4** The equivalent stress in stoppers and their supporting structures and calculated in the throat of the stopper welds is not to exceed the allowable value of  $0.8 \sigma_Y$ .

## **3 Materials and welding**

Where stoppers or securing devices are fitted to comply with this annex, they should be manufactured of materials, including welding electrodes, to the satisfaction of the Administration.

## ANNEX 12

### **PROCEDURAL REQUIREMENTS FOR THICKNESS MEASUREMENTS**

#### **1 General**

Thickness measurements required in the context of hull structural surveys, if not carried out by the society itself should be witnessed by a surveyor. The attendance of the surveyor should be recorded. This also applies to thickness measurements taken during voyages.

#### **2 Survey meeting**

**2.1** Prior to commencement of the renewal or intermediate survey, a meeting should be held between the attending surveyor(s), the owner's representative(s) in attendance and the thickness measurement firm's representative(s) so as to ensure the safe and efficient execution of the surveys and thickness measurements to be carried out on board.

**2.2** Communication with the thickness measurement operator(s) and owner's representative(s) should be agreed during the meeting, with respect to the following:

- .1** reporting of thickness measurements on regular basis;
- .2** prompt notification to the surveyor in case of findings such as:
  - .2.1** excessive and/or extensive corrosion or pitting/grooving of any significance;
  - .2.2** structural defects like buckling, fractures and deformed structures;
  - .2.3** detached and/or holed structure; and
  - .2.4** corrosion of welds.

**2.3** The survey report should indicate where and when the meeting took place and who attended (the name of the surveyor(s), the owner's representative(s) and the thickness measurement firm's representative(s)).

#### **3 Monitoring of the thickness measurement process onboard**

**3.1** The surveyor should decide final extent and location of thickness measurements after overall survey of representative spaces onboard.

**3.2** In case the owner prefers to commence the thickness measurements prior to the overall survey, then the surveyor should advise that the planned extent and locations of thickness measurements are subject to confirmation during the overall survey. Based on findings, the surveyor may require additional thickness measurements to be taken.

**3.3** The surveyor should direct the gauging operation by selecting locations such that readings taken represent, on average, the condition of the structure for that area.

**3.4** Thickness measurements taken mainly to evaluate the extent of corrosion, which may affect the hull girder strength, should be carried out in a systematic manner such that all longitudinal structural members are gauged, as required.

**3.5** Where thickness measurements indicate substantial corrosion or wastage in excess of allowable diminution, the surveyor should direct locations for additional thickness measurements in order to delineate areas of substantial corrosion and to identify structural members for repairs/renewals.

**3.6** Thickness measurements of structures in areas where close-up surveys are required should be carried out simultaneously with close-up survey.

#### **4 Review and verification**

**4.1** Upon completion of the thickness measurements, the surveyor should confirm that no further gaugings are needed, or specify additional gaugings.

**4.2** Where these guidelines allow the extent of thickness measurements to be reduced after special considerations by the surveyor, these special considerations should be reported, where appropriate.

**4.3** In case thickness measurements are partly carried out, the extent of remaining thickness measurements should be reported for the use of the next surveyor.”

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**ANNEX 8**

**RESOLUTION MSC.262(84)  
(adopted on 16 May 2008)**

**ADOPTION OF AMENDMENTS TO THE INTERNATIONAL MARITIME  
DANGEROUS GOODS (IMDG) CODE**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MSC.122(75) by which it adopted the International Maritime Dangerous Goods Code (hereinafter referred to as “the IMDG Code”), which has become mandatory under chapter VII of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended (hereinafter referred to as “the Convention”),

NOTING ALSO article VIII(b) and regulation VII/1.1 of the Convention concerning amendment procedure for amending the IMDG Code,

HAVING CONSIDERED, at its eighty-fourth session, amendments to the IMDG Code, proposed and circulated in accordance with article VIII(b)(i) of the Convention,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the IMDG Code, the text of which is set out in the Annex to the present resolution;
2. DETERMINES, in accordance with article VIII(b)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2009, unless prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world’s merchant fleet, have notified their objections to the amendments;
3. INVITES Contracting Governments to the Convention to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2010 upon their acceptance in accordance with paragraph 2 above;
4. AGREES that Contracting Governments to the Convention may apply the aforementioned amendments in whole or in part on a voluntary basis as from 1 January 2009;
5. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;
6. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

**AMENDMENTS TO THE INTERNATIONAL MARITIME  
DANGEROUS GOODS (IMDG) CODE**

<b>Contents</b>	Delete the comma after the word “goods” in 4.1.1
<b>Preamble</b>	Paragraph 9 Add “MEPC adopted resolution MEPC.156(55), a revised text to take into account the GHS criteria” after “... entered into force in 1994, 1996 and 2002”

**PART 1**

**Chapter 1.1**

- 1.1.1.5.1** Replace “chapter 1.3” with “paragraphs 1.3.1.4 to 1.3.1.7”
- 1.1.1.5.2** Replace “will be” with “is”
- 1.1.1.5.8** Replace “(Contact information of competent authorities)” with “(Contact information for the main designated national competent authorities)”
- 1.1.2.2.1** Replace **Footnote** with “The revised text of Annex III was adopted by resolution MEPC.156(55) and will enter into force on 1 January 2010, which is the mandatory entry into force date of amendment 34-08 to the IMDG Code”
- 1.1.2.2.1** Replace the text of MARPOL Annex III with:
- “**Annex III**
- Regulations for the Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form*
- Regulation 1**  
*Application*
- 1 Unless expressly provided otherwise, the regulations of this annex apply to all ships carrying harmful substances in packaged form.
- .1 For the purpose of this annex, “harmful substances” are those substances which are identified as marine pollutants in the International Maritime Dangerous Goods Code (IMDG Code)\* or which meet the criteria in the Appendix of this annex.

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\* Refer to the IMDG Code adopted by the Organization by resolution MSC.122(75), as amended.

- .2 For the purposes of this annex, “packaged form” is defined as the forms of containment specified for harmful substances in the IMDG Code.
- 2 The carriage of harmful substances is prohibited, except in accordance with the provisions of this annex.
- 3 To supplement the provisions of this Annex, the Government of each Party to the Convention shall issue, or cause to be issued, detailed requirements on packing, marking, labelling, documentation, stowage, quantity limitations and exceptions for preventing or minimizing pollution of the marine environment by harmful substances.\*
- 4 For the purposes of this Annex, empty packagings which have been used previously for the carriage of harmful substances shall themselves be treated as harmful substances unless adequate precautions have been taken to ensure that they contain no residue that is harmful to the marine environment.
- 5 The requirements of this annex do not apply to ship’s stores and equipment.

## **Regulation 2**

### *Packing*

Packages shall be adequate to minimize the hazard to the marine environment, having regard to their specific contents.

## **Regulation 3**

### *Marking and labelling*

- 1 Packages containing a harmful substance shall be durably marked with the correct technical name (trade names alone shall not be used) and, further, shall be durably marked or labelled to indicate that the substance is a marine pollutant. Such identification shall be supplemented where possible by any other means, for example, by use of the relevant United Nations number.
- 2 The method of marking the correct technical name and of affixing labels on packages containing a harmful substance shall be such that this information will still be identifiable on packages surviving at least three months’ immersion in the sea. In considering suitable marking and labelling, account shall be taken of the durability of the materials used and of the surface of the package.

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\* Refer to the specific exemptions provided for in the IMDG Code adopted by resolution MSC.122(75), as amended.

- 3 Packages containing small quantities of harmful substances may be exempted from the marking requirements.\*

**Regulation 4\*\***

*Documentation*

- 1 In all documents relating to the carriage of harmful substances by sea where such substances are named, the correct technical name of each such substance shall be used (trade names alone shall not be used) and the substance further identified by the addition of the words “MARINE POLLUTANT”.
- 2 The shipping documents supplied by the shipper shall include, or be accompanied by; a signed certificate or declaration that the shipment offered for carriage is properly packaged and marked, labelled or placarded as appropriate and in proper condition for carriage to minimize the hazard to the marine environment.
- 3 Each ship carrying harmful substances shall have a special list or manifest setting forth the harmful substances on board and the location thereof. A detailed stowage plan which sets out the location of the harmful substances on board may be used in place of such special list or manifest. Copies of such documents shall also be retained on shore by the owner of the ship or his representative until the harmful substances are unloaded. A copy of one of these documents shall be made available before departure to the person or organization designated by the port State authority.
- 4 At any stopover, where any loading or unloading operations, even partial, are carried out, a revision of the documents listing the harmful substances taken on board, indicating their location on board or showing a detailed stowage plan, shall be made available before departure to the person or organization designated by the port State authority.
- 5 When the ship carries a special list or manifest or a detailed stowage plan, required for the carriage of dangerous goods by the International Convention for the Safety of Life at Sea, 1974, as amended, the documents required by this regulation may be combined with those for dangerous goods. Where documents are combined, a clear distinction shall be made between dangerous goods and harmful substances covered by this annex.

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\* Refer to the specific exemptions provided for in the IMDG Code adopted by resolution MSC.122(75), as amended.

\*\* Reference to “documents” in this regulation does not preclude the use of electronic data processing (EDP) and electronic data interchange (EDI) transmission techniques as an aid to paper documentation.

### **Regulation 5**

#### *Stowage*

Harmful substances shall be properly stowed and secured so as to minimize the hazards to the marine environment without impairing the safety of the ship and persons on board.

### **Regulation 6**

#### *Quantity limitations*

Certain harmful substances may, for sound scientific and technical reasons, need to be prohibited for carriage or be limited as to the quantity which may be carried aboard any one ship. In limiting the quantity, due consideration shall be given to size, construction and equipment of the ship, as well as the packaging and the inherent nature of the substances.

### **Regulation 7**

#### *Exceptions*

- 1 Jettisoning of harmful substances carried in packaged form shall be prohibited, except where necessary for the purpose of securing the safety of the ship or saving life at sea.
- 2 Subject to the provisions of the present Convention, appropriate measures based on the physical, chemical and biological properties of harmful substances shall be taken to regulate the washing of leakages overboard, provided that compliance with such measures would not impair the safety of the ship and persons on board.

### **Regulation 8**

#### *Port State control on operational requirements\**

- 1 A ship when in a port or an offshore terminal of another Party is subject to inspection by officers duly authorized by such Party concerning operational requirements under this annex, where there are clear grounds for believing that the master or crew are not familiar with essential shipboard procedures relating to the prevention of pollution by harmful substances.
- 2 In the circumstances given in paragraph 1 of this regulation, the Party shall take such steps as will ensure that the ship shall not sail until the situation has been brought to order in accordance with the requirements of this annex.
- 3 Procedures relating to the port State control prescribed in article 5 of the present Convention shall apply to this regulation.

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\* Refer to the Procedures for port State control adopted by the Organization by resolution A.787(19) and amended by resolution A.882(21).

- 4 Nothing in this regulation shall be construed to limit the rights and obligations of a Party carrying out control over operational requirements specifically provided for in the present Convention.

### Appendix to Annex III

#### CRITERIA FOR THE IDENTIFICATION OF HARMFUL SUBSTANCES IN PACKAGED FORM

For the purposes of this annex, substances identified by any one of the following criteria are harmful substances\*:

<b>Category: Acute 1</b>	
96 hr LC <sub>50</sub> (for fish)	≤ 1 mg/l
	and/or
48 hr EC <sub>50</sub> (for crustacea)	≤ 1 mg/l
	and/or
72 or 96 hr ErC <sub>50</sub> (for algae or other aquatic plants)	≤ 1 mg/l

<b>Category: Chronic 1</b>	
96 hr LC <sub>50</sub> (for fish)	≤ 1 mg/l
	and/or
48 hr EC <sub>50</sub> (for crustacea)	≤ 1 mg/l
	and/or
72 or 96 hr ErC <sub>50</sub> (for algae or other aquatic plants)	≤ 1 mg/l
and the substance is not rapidly degradable and/or the log K <sub>ow</sub> ≥ 4 (unless the experimentally determined BCF < 500).	

<b>Category: Chronic 2</b>	
96 hr LC <sub>50</sub> (for fish)	>1 to ≤ 10 mg/l and/or
48 hr EC <sub>50</sub> (for crustacea)	>1 to ≤ 10 mg/l and/or
72 or 96 hr ErC <sub>50</sub> (for algae or other aquatic plants)	>1 to ≤ 10 mg/l
and the substance is not rapidly degradable and/or the log K <sub>ow</sub> ≥ 4 (unless the experimentally determined BCF < 500), unless the chronic toxicity NOECs are > 1 mg/l.	

”

\* The criteria are based on those developed by the United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS), as amended.

For definitions of acronyms or terms used in this appendix, refer to the relevant paragraphs of the IMDG Code.

**1.1.3** Delete section

Renumber “**1.1.4**” as “**1.1.3**”

Renumber “**1.1.4.1**” as “**1.1.3.1**”

**Consequential amendments:**

**1.1.3** Replace “Transport of radioactive material” with “Dangerous goods forbidden from transport”

**1.1.4** Delete

**2.0.4.2** Replace “1.1.4” with “1.1.3”

**3.1.2.6** Replace “1.1.4” with “1.1.3”

**5.1.5.2.3** Replace “1.1.3.4” with “1.5.4”

**6.4.23.6** Replace “1.1.3.1” with “1.5.3.1”

**6.4.23.7** Replace “1.1.3.1” with “1.5.3.1”

**6.4.23.8(d)** Replace “1.1.3.1” with “1.5.3.1”

**6.4.23.11(i)** Replace “1.1.3.1” with “1.5.3.1”

**6.4.23.12(r)** Replace “1.1.3.1” with “1.5.3.1”

**6.4.23.13(l)** Replace “1.1.3.1” with “1.5.3.1”

**6.4.23.14(t)** Replace “1.1.3.1” with “1.5.3.1”

**6.4.23.24(1)** Replace “1.1.3.1” with “1.5.3.1”

**6.4.23.24(2)** Replace “1.1.3.1” with “1.5.3.1”

**6.4.23.24(3)** Replace “1.1.3.1” with “1.5.3.1”

**6.4.23.24(4)** Replace “1.1.3.1” with “1.5.3.1”

## Chapter 1.2

### 1.2.1

#### *“Competent authority”*

Replace the definition with “*Competent authority* means any body or authority designated or otherwise recognized as such for any purpose in connection with this Code.”

#### *“Compliance assurance”*

Replace “concerning the transport of radioactive material are met in practice; see paragraph 1.1.3.3.2.” with “are met in practice.”

#### *“Freight container”*

Delete “For freight containers for the transport of radioactive material, see 2.7.2.”  
Insert new paragraph “For freight containers for the transport of radioactive material a freight container may be used as a packaging. A small freight container is that which has either any overall outer dimension less than 1.5 m, or an internal volume of not more than 3 m<sup>3</sup>. Any other freight container is considered to be a large freight container.”

#### *“GHS”*

Replace “first” with “second revised”

Replace “ST/SG/AC.10/30/Rev.1” with “ST/SG/AC.10/30/Rev.2”

#### *“Liquids”*

Replace “ECE/TRANS/175” in the footnote with “ECE/TRANS/185 (Sales No. E.06.VIII.1)”

#### *“Packages”*

Replace “*Packages*” with “*Package*” in the title

Delete “For packages for radioactive material, see 2.7.2.” after “... prepared for transport”

#### *“Packaging”*

Replace the definition with “*Packaging* means one or more receptacles and any other components or materials necessary for the receptacles to perform their containment and other safety functions.”

#### *“Quality assurance”*

Delete “For radioactive material, see 1.1.3.3.1”

#### *“Recycled plastics material”*

Insert after the definition “**Note:** ISO 16103:2005 “Packaging – Transport packages for dangerous goods - Recycled plastics material”, provides additional guidance on procedures to be followed in approving the use of recycled plastics material.”

Insert new definition “*Animal material* means animal carcasses, animal body parts, or animal foodstuffs;”

Insert new definition “*Approval*”

*Multilateral approval*, for the transport of class 7 material, means approval by the relevant competent authority of the country of origin of the design or shipment, as applicable, and also, where the consignment is to be transported through or into any other country, approval by the competent authority of that country. The term “through or into” specifically excludes “over”, i.e. the approval and notification requirements shall not apply to a country over which radioactive material is carried in an aircraft, provided that there is no scheduled stop in that country.

*Unilateral approval*, for the transport of class 7 material, means an approval of a design which is required to be given by the competent authority of the country of origin of the design only.

Insert new definition “*Confinement system*, for the transport of class 7 material, means the assembly of fissile material and packaging components specified by the designer and agreed to by the competent authority as intended to preserve criticality safety.”

Insert new definition “*Containment system*, for the transport of class 7 material, means the assembly of components of the packaging specified by the designer as intended to retain the radioactive material during transport.”

Insert new definition “*Criticality safety index (CSI) assigned to a package, overpack or freight container containing fissile material*, for the transport of class 7 material, means a number which is used to provide control over the accumulation of packages, overpacks or freight containers containing fissile material.”

Insert new definition “*Design*, for the transport of class 7 material, means the description of special form radioactive material, low dispersible radioactive material, package or packaging which enables such an item to be fully identified. The description may include specifications, engineering drawings, reports demonstrating compliance with regulatory requirements, and other relevant documentation.”

Insert new definition “*Exclusive use*, for the transport of class 7 material, means the sole use, by a single consignor, of a conveyance or of a large freight container, in respect of which all initial, intermediate and final loading and unloading is carried out in accordance with the directions of the consignor or consignee.”

Insert new definition “*Maximum normal operating pressure*, for the transport of class 7 material, means the maximum pressure above atmospheric pressure at mean sea-level that would develop in the containment system in a period of one year under the conditions of temperature and solar radiation corresponding to environmental conditions in the absence of venting, external cooling by an ancillary system, or operational controls during transport.”

Insert new definition “*Radiation level*, for the transport of class 7 material, means the corresponding dose rate expressed in millisieverts per hour.”

Insert new definition “*Radioactive contents*, for the transport of class 7 material, mean the radioactive material together with any contaminated or activated solids, liquids, and gases within the packaging.”

Insert new definition “*Transport index (TI) assigned to a package, overpack or freight container, or to unpacked LSA-I or SCO-I*, for the transport of class 7 material, means a number which is used to provide control over radiation exposure.”

**1.2.2.2** Replace “Whenever the word “weight” is used, it means “mass”.” with “(Reserved)”.

**1.2.3** Delete “GESAMP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (IMO/FAO/UNESCO/IOC/WMO/WHO/IAEA/UN/UNEP)”.

### **Chapter 1.3**

**1.3.0** Replace “this chapter remain recommendatory.” with “paragraphs 1.3.1.4 to 1.3.1.7 remain recommendatory.”

**1.3.1.1** Replace “should” with “shall”

Insert second paragraph “Entities engaging shore-based personnel in such activities shall determine which staff will be trained, what levels of training they require and the training methods used to enable them to comply with the provisions of the IMDG Code. This training shall be provided or verified upon employment in a position involving dangerous goods transport. For personnel who have not yet received the required training, the entities shall ensure that those personnel may only perform functions under the direct supervision of a trained person. The training shall be periodically supplemented with refresher training to take account of changes in regulations and practice. The competent authority, or its authorized body, may audit the entity to verify the effectiveness of the system in place, in providing training of staff commensurate with their role and responsibilities in the transport chain.”

**1.3.1.2** Replace “pack dangerous goods in packages” with “pack dangerous goods”

Replace “pack/unpack CTUs” with “load/unload Cargo Transport Units”

Replace “should” with “shall”

**1.3.1.2.1.1** Replace “should” with “shall”

**1.3.1.2.1.2** Replace “should” with “shall”

**1.3.1.2.2** Replace “should” with “shall”

Insert “An indicative list for guidance purposes only of some of the functions typically found in dangerous goods transport operations by sea and training requirements is given in paragraph 1.3.1.6.”

**1.3.1.2.3** Delete paragraph

**1.3.1.3** Replace paragraph with “Details of all the training undertaken shall be kept by both the employer and the employee. Training records shall be made available to the competent authority if requested.”

**1.3.1.4** Replace paragraph with “*Safety training*: Commensurate with the risk of exposure in the event of a release and the functions performed, each person should receive training on:

- .1 methods and procedures for accident avoidance, such as proper use of package-handling equipment and appropriate methods of stowage of dangerous goods;
- .2 available emergency response information and how to use it;
- .3 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
- .4 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.”

**1.3.1.5** Insert new paragraph before the table “The following indicative table is for information purposes only as every entity is arranged differently and may have varied roles and responsibilities within that entity.”

Delete “in packages” in line 2 – Function

Insert “and excepted quantities” after “limited quantities” in line 2 – Specific training requirements

Insert “and excepted quantities” after “limited quantities” in line 3 – Specific training requirements

Replace “Pack/unpack” with “Load/unload” in line 4 – Function

**1.3.1.6** Replace title with “Indicative table describing sections of the IMDG Code or other relevant instruments that may be appropriate to be considered in any training for the transport of dangerous goods”

Replace “Guidelines for Packing Cargo Transport Units” with “Guidelines for Packing of Cargo Transport Units”

Replace “Pack/unpack” with “Load/unload” in line 4 – Function

**Remarks:** Insert “.” after “apply”

**1.3.1.7** Insert “which may be appropriate” after “publications”

**1.3.1.7.10** Replace “The Recommendations on the Safe Use of Pesticides in Ships, as amended” with “MSC/Circ. [...] Recommendations on the safe use of pesticides in ships applicable to the fumigation of cargo transport units”

### **Chapter 1.4**

**1.4.3.1** Insert “Class 1 Division 1.4. UN Nos. 0104, 0237, 0255, 0267, 0289, 0361, 0365, 0366, 0440, 0441, 0455, 0456 and 0500” after “Class 1 Division 1.3 compatibility group C explosives”

**Class 5.1** Replace “and ammonium nitrate fertilizers” with “, ammonium nitrate fertilizers and ammonium nitrate emulsions or suspensions or gels”

### **Chapter 1.5**

Insert new **Chapter 1.5:**

#### **“Chapter 1.5**

#### **General provisions concerning class 7**

##### **1.5.1 Scope and application**

**1.5.1.1** The provisions of this Code establish standards of safety which provide an acceptable level of control of the radiation, criticality and thermal hazards to persons, property and the environment that are associated with the transport of radioactive material. These provisions are based on the IAEA Regulations for the Safe Transport of Radioactive Material (2005 Edition), Safety Standards Series No. TS-R-1, IAEA, Vienna (2005). Explanatory material on the 1996 edition of TS-R-1 can be found in “Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material<sup>1</sup>”, Safety Standard Series No. TS-G-1.1 (ST-2), IAEA, Vienna (2002).

**1.5.1.2** The objective of the provisions of this Code is to protect persons, property and the environment from the effects of radiation during the transport of radioactive material. This protection is achieved by requiring:

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<sup>1</sup> A revised edition containing explanatory material on the 2005 edition of TS-R-1 is likely to be published by IAEA in 2008.

- .1 containment of the radioactive contents;
- .2 control of external radiation levels;
- .3 prevention of criticality; and
- .4 prevention of damage caused by heat.

These provisions are satisfied firstly by applying a graded approach to contents limits for packages and conveyances and to performance standards applied to package designs depending upon the hazard of the radioactive contents. Secondly, they are satisfied by imposing requirements on the design and operation of packages and on the maintenance of packagings, including a consideration of the nature of the radioactive contents. Finally, they are satisfied by requiring administrative controls including, where appropriate, approval by competent authorities.

#### **1.5.1.3**

The provisions of this Code apply to the transport of radioactive material by sea including transport which is incidental to the use of the radioactive material. Transport comprises all operations and conditions associated with and involved in the movement of radioactive material; these include the design, manufacture, maintenance and repair of packaging, and the preparation, consigning, loading, transport including in-transit storage, unloading and receipt at the final destination of loads of radioactive material and packages. A graded approach is applied to the performance standards in the provisions of this Code that is characterized by three general severity levels:

- .1 routine conditions of transport (incident free);
- .2 normal conditions of transport (minor mishaps); and
- .3 accident conditions of transport.

#### **1.5.1.4**

The provisions of this Code shall not apply to:

- .1 radioactive material that is an integral part of the means of transport;
- .2 radioactive material moved within an establishment which is subject to appropriate safety regulations in force in the establishment and where the movement does not involve public roads or railways;
- .3 radioactive material implanted or incorporated into a person or live animal for diagnosis or treatment;
- .4 radioactive material in consumer products which have received regulatory approval, following their sale to the end user;

- .5 natural material and ores containing naturally occurring radionuclides which are either in their natural state, or have only been processed for purposes other than for extraction of the radionuclides, and which are not intended to be processed for use of these radionuclides provided the activity concentration of the material does not exceed 10 times the values specified in 2.7.2.2.1.2, or calculated in accordance with 2.7.2.2.2 to 2.7.2.2.6; and
- .6 non-radioactive solid objects with radioactive substances present on any surfaces in quantities not in excess of the limit set out in the definition for “contamination” in 2.7.1.2.

#### **1.5.1.5** Specific provisions for the transport of excepted packages

##### **1.5.1.5.1** Excepted packages which may contain radioactive material in limited quantities, instruments, manufactured articles and empty packagings as specified in 2.7.2.4.1 may be transported under the following conditions:

- .1 the applicable provisions specified in 2.0.3.5, 2.7.2.4.1.2 to 2.7.2.4.1.6 (as applicable), 4.1.9.1.2, 5.2.1.1, 5.2.1.2, 5.2.1.5.1 to 5.2.1.5.3, 5.4.1.4.1.1 and 7.3.4.2;
- .2 the provisions for excepted packages specified in 6.4.4; and
- .3 if the excepted package contains fissile material, one of the fissile exceptions provided by 2.7.2.3.5 shall apply and the provision of 6.4.7.2 shall be met.

##### **1.5.1.5.2** The following provisions shall not apply to excepted packages and the controls for transport of excepted packages: 1.4.2, 1.4.3, 2.7.2.3.3.1.1, 2.7.2.3.3.2, 4.1.9.1.3, 4.1.9.1.4, 4.1.9.1.6, 4.1.9.1.7, 5.1.3.2, 5.2.2.1.12.1, 5.4.1.5.7.1, 5.4.1.5.7.2, 5.4.1.6, 6.4.6.1, 7.1.14.11 to 7.1.14.14, 7.2.9.1, 7.2.9.2, 7.2.1 and 7.3.4.1.

#### **1.5.2** **Radiation protection programme**

##### **1.5.2.1** The transport of radioactive material shall be subject to a radiation protection programme which shall consist of systematic arrangements aimed at providing adequate consideration of radiation protection measures.

##### **1.5.2.2** Doses to persons shall be below the relevant dose limits. Protection and safety shall be optimized in order that the magnitude of individual doses, the number of persons exposed, and the likelihood of incurring exposure shall be kept as low as reasonably achievable, economic and social factors being taken into account, within the restrictions that the doses to individual be subject to dose constraints. A structured and systematic approach shall be adopted and shall include consideration of the interfaces between transport and other activities.

**1.5.2.3** The nature and extent of the measures to be employed in the programme shall be related to the magnitude and likelihood of radiation exposures. The programme shall incorporate the provisions in 1.5.2.2, 1.5.2.4 to 1.5.2.7. Programme documents shall be available, on request, for inspection by the relevant competent authority.

**1.5.2.4** For occupational exposures arising from transport activities, where it is assessed that the effective dose:

- .1 is likely to be between 1 and 6 mSv in a year, a dose assessment programme via workplace monitoring or individual monitoring shall be conducted;
- .2 is likely to exceed 6 mSv in a year, individual monitoring shall be conducted.

When individual monitoring or workplace monitoring is conducted, appropriate records shall be kept.

**Note:** For occupational exposures arising from transport activities, where it is assessed that the effective dose is most unlikely to exceed 1 mSv in a year, no special work patterns, detailed monitoring, dose assessment programmes or individual record keeping need be required.

### **1.5.3 Quality assurance**

**1.5.3.1** Quality assurance programmes based on international, national or other standards acceptable to the competent authority shall be established and implemented for the design, manufacture, testing, documentation, use, maintenance and inspection of all special form radioactive material, low dispersible radioactive material and packages and for transport and in-transit storage operations to ensure compliance with the relevant provisions of this Code. Certification that the design specification has been fully implemented shall be available to the competent authority. The manufacturer, consignor or user shall be prepared to provide facilities for competent authority inspection during manufacture and use and to demonstrate to any cognizant competent authority that:

- .1 the manufacturing methods and materials used are in accordance with the approved design specifications; and
- .2 all packagings are periodically inspected and, as necessary, repaired and maintained in good condition so that they continue to comply with all relevant requirements and specifications, even after repeated use.

Where competent authority approval is required, such approval shall take into account and be contingent upon the adequacy of the quality assurance programme.

## **1.5.4 Special arrangement**

**1.5.4.1** Special arrangement shall mean those provisions, approved by the competent authority, under which consignments which do not satisfy all the provisions of this Code applicable to radioactive material may be transported.

**1.5.4.2** Consignments for which conformity with any provision applicable to class 7 is impracticable shall not be transported except under special arrangement. Provided the competent authority is satisfied that conformity with the class 7 provisions of this Code is impracticable and that the requisite standards of safety established by this Code have been demonstrated through alternative means the competent authority may approve special arrangement transport operations for single or a planned series of multiple consignments. The overall level of safety in transport shall be at least equivalent to that which would be provided if all the applicable provisions had been met. For international consignments of this type, multilateral approval shall be required.

## **1.5.5 Radioactive material possessing other dangerous properties**

**1.5.5.1** In addition to the radioactive and fissile properties, any subsidiary risk of the contents of a package, such as explosiveness, flammability, pyrophoricity, chemical toxicity and corrosiveness, shall also 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. (See also special provision 172 and, for excepted packages, special provision 290.)

## **1.5.6 Non-compliance**

**1.5.6.1** In the event of a non-compliance with any limit in the provisions of this Code applicable to radiation level or contamination,

- .1 The consignor shall be informed of the non-compliance
  - (i) by the carrier if the non-compliance is identified during transport; or
  - (ii) by the consignee if the non-compliance is identified at receipt;
- .2 The carrier, consignor or consignee, as appropriate, shall:
  - (i) take immediate steps to mitigate the consequences of the non-compliance;

- (ii) investigate the non-compliance and its causes, circumstances and consequences;
  - (iii) take appropriate action to remedy the causes and circumstances that led to the non-compliance and to prevent a recurrence of similar circumstances that led to the non-compliance; and
  - (iv) communicate to the relevant competent authority(ies) on the causes of the non-compliance and on corrective or preventive actions taken or to be taken; and
- .3 The communication of the non-compliance to the consignor and relevant competent authority(ies), respectively, shall be made as soon as practicable and it shall be immediate whenever an emergency exposure situation has developed or is developing.”

**Consequential amendments:**

**Contents Page:**

**Chapter 1.5** Insert “**Chapter 1.5 General provisions concerning class 7**

- 1.5.1 Scope and application
- 1.5.2 Radiation protection program
- 1.5.3 Quality assurance
- 1.5.4 Special arrangement
- 1.5.5 Radioactive material possessing other dangerous properties
- 1.5.6 Non-compliance”

**PART 2**

**Chapter 2.0**

- 2.0.1.1** Insert “solid” before “desensitized explosives” for Class 4.1
- 2.0.1.2.1** Replace paragraph with “Many of the substances assigned to classes 1 to 9 are deemed as being marine pollutants (see chapter 2.10).”
- 2.0.1.7** Replace paragraph with “Known marine pollutants are noted in the Dangerous Goods List and are indicated in the Index.”
- 2.0.4.1** Replace “GAS SAMPLE, NON-PRESSURIZED, FLAMMABLE, UN 3167” with “UN 3167, GAS SAMPLE, NON-PRESSURIZED, FLAMMABLE”

## Chapter 2.1

2.1.3.5.5 Replace “Division de risque” with “Classification” (French)

Replace **Note 2** with “**Note 2:** “Flash composition” in this table refers to pyrotechnic compositions in powder form or as pyrotechnic units as presented in the fireworks, that are used to produce an aural effect, or used as a bursting charge or lifting charge, unless the time taken for the pressure rise is demonstrated to be more than 8 ms for 0.5 g of pyrotechnic composition in Test Series 2(c) (i) “Time/pressure test” of the UN Manual of Tests and Criteria.”

In the table against “Shell, spherical or cylindrical/Preloaded mortar, shell in mortar” insert new third entry:

<i>Specification</i>	<i>Classification</i>
colour shell: > 25% flash composition as loose powder and/or report effects	1.1G

## Chapter 2.2

2.2.2.2.2 Insert “. The oxidizing ability shall be determined by tests or by calculation in accordance with methods adopted by ISO (see ISO 10156:1996 and ISO 10156-2:2005)” after “... more than air does”

2.2.2.5 Replace paragraph with “Gases of class 2.2 are not subject to the provisions of this Code if they are transported at a pressure of less than 200 kPa at 20°C and are not liquefied or refrigerated liquefied gases.”

2.2.3.4 Insert “(see ISO 10156:1996 and ISO 10156-2:2005)” after “... Organization for Standardization”

## Chapter 2.3

2.3.2.5 Replace “are not toxic or corrosive;” with “are not toxic, corrosive or environmentally hazardous;”

## Chapter 2.4

2.4.2.3.2.4 Insert “the United Nations” before “*Manual of Tests and Criteria*”

2.4.2.4.1.1 Replace “and UN 3380” with “, UN 3380 and UN 3474”

## Chapter 2.5

### 2.5.3.2.4 In the table amend the entries listed below as follows:

Number (generic entry)	Organic peroxide		Column	Amendment
Move this entry from UN 3101 to UN 3105	tert-AMYL PEROXY-3,5,5-TRIMETHYLHEXANOATE	As fourth entry	Packing method	Replace "OP5" with "OP7"
UN 3103	1,6-DI-( <i>tert</i> -BUTYLPEROXYCARBONYLOXY)-HEXANE		Concentration	Replace "<72" with "≤ 72"
UN 3107	<i>tert</i> -BUTYLHYDROPROXIDE	(English only)	Organic Peroxide	Insert a space between the words "BUTYL" and "HYDROPEROXIDE"
UN 3107	DI- <i>tert</i> -AMYLPEROXIDE	(English only)	Organic Peroxide	Insert a space between the words "AMYL" and "PEROXIDE"
UN 3108	" <i>n</i> -BUTYL-DI-(BUTYLPEROXY) VALERATE"	(English and French only)	Organic Peroxide	Insert " <i>tert</i> -" before "BUTYLPEROXY) VALERATE"

Number (generic entry)	Organic peroxide		Column	Amendment
UN 3109	2,5-DIMETHYL-2,5-DI( <i>tert</i> -BUTYLPEROXY)-HEXANE		Diluent type B	Move “≥48” from ‘Diluent type B’ to ‘Diluent type A’
UN 3110	DICUMYL PEROXIDE ( <i>Concentration &gt; 52-100</i> )		Inert solid	Delete “≤ 48”
UN 3115	DIACETYLPEROXIDE	(English only)	Organic Peroxide	Insert space between “DIACETYL” and “PEROXIDE”
Move this entry from UN 3117 to UN 3119	DI-(2-ETHYLHEXYL) PEROXYDICARBONATE ( <i>Concentration ≤ 62 as a stable dispersion in water</i> )		Number	
UN 3117	1,1-DIMETHYL-3-HYEROXYBUTYLPEROXYNEOHEPTANOATE	(English Only)	Organic Peroxide	Insert space between “HYEROXY BUTYL” and “PEROXYNE OHEPTANO ATE”
UN 3119	DI-(2-ETHYLHEXYL) PEROXYDICARBONATE ( <i>Concentration ≤ 52 as a stable dispersion in water</i> )			Delete the entry

**Note 8** Replace “≤ 0.7%” with “≤ 10.7%” (English only)

Insert new entries:

Number (generic entry)	Organic peroxide	Concentration (%)	Diluent type A (%)	Diluent type B (%)	Insert solid (%)	Water (%)	Packing method	Control temperature (°C)	Emergency temperature (°C)	Subsidiary risks and remarks
3119	tert-AMYL PEROXYNEODECANOATE	≤ 47	≥ 53				OP8	0	+ 10	
3106	tert-BUTYL PEROXY 3,5,5-TRIMETHYLHEXANOATE	≤ 42			≥ 58		OP7			
3115	CUMYL PEROXYNEO-DECANOATE	≤ 87	≥ 13				OP7	- 10	0	
3105	2,2-DI-(tert-AMYLPEROXY)-BUTANE	≤ 57	≥ 43				OP7			
3103	1,1-DI-(tert-BUTYLPEROXY)-CYCLOHEXANE	≤ 72		≥ 28			OP5			30)
3105	1,1-DI-(tert-BUTYLPEROXY)-CYCLOHEXANE + tert-BUTYL PEROXY-2-ETHYLHEXANOATE	≤ 43 + ≤ 16	≥ 41				OP 7			
3103	1,1-DI-(tert-BUTYLPEROXY)-3,3,5-TRIMETHYLCYCLOHEXANE	≤ 90		≥ 10			OP5			30)
3118	DI-2,4-DICHLOROBENZOYL PEROXIDE	≤ 52 as a paste					OP8	+ 20	+ 25	
3115	3-HYDROXY-1,1-DIMETHYLBUTYL PEROXYNEODECANOATE	≤ 77	≥ 23				OP 7	- 5	+ 5	

Number (generic entry)	Organic peroxide	Concentration (%)	Diluent type A (%)	Diluent type B (%)	Insert solid (%)	Water (%)	Packing method	Control temperature (°C)	Emergency temperature (°C)	Subsidiary risks and remarks
3119	3-HYDROXY-1,1-DIMETHYLBUTYL PEROXYNEODECANOATE	≤ 52 as a stable dispersion in water					OP 8	- 5	+ 5	
3117	3-HYDROXY-1,1-DIMETHYLBUTYL PEROXYNEODECANOATE	≤ 52	≥ 48				OP 8	- 5	+ 5	
3109	METHYL ISOPROPYL KETONE PEROXIDE(S)	See remark 31)	≥ 70				OP8			31)
3107	3,3,5,7,7-PENTAMETHYL-1,2,4-TRIOXEPANE	≤ 100					OP8			

After the table:

Insert “(30) Diluent type B with boiling point > 130°C”

Insert “(31) Active oxygen ≤ 6.7%.”

## Chapter 2.6

**2.6.2.1.1** Replace “...for acute oral toxicity...” with “...*for acute oral toxicity*...” (English only)

**2.6.2.2.3.1** In the second sentence, replace “exhibit” with “exhibits” (English only)

**2.6.3.2.3.6**

**Note:** Renumber as **Note 1**

Insert “in the absence of any concern for infection (e.g., evaluation of vaccine induced immunity, diagnosis of autoimmune disease, etc.)” after “antibody detection in humans or animals”

**2.6.3.5.2** Insert “For the assignment, international, regional or national waste catalogues may be taken into account.” after “... substances shall be assigned to UN 3291”

**2.6.3.6.2** Replace “Animal carcasses affected by pathogens of category A” with “Animal material affected by pathogens of Category A. Animal material affected by pathogens of Category B other than those which would be assigned to Category A if they were in cultures shall be assigned to UN 3373.”

Delete “Other animal carcasses affected by pathogens included in Category B shall be transported in accordance with provisions determined by the competent authority.”

## Chapter 2.7

Replace chapter 2.7 with:

## “Chapter 2.7

### *Class 7 – Radioactive material*

**Note:** For class 7, the type of packaging may have a decisive effect on classification.

#### **2.7.1 Definitions**

**2.7.1.1** *Radioactive material* means any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed the values specified in 2.7.2.2.1 to 2.7.2.2.6.

#### **2.7.1.2 Contamination**

*Contamination* means the presence of a radioactive substance on a surface in quantities in excess of 0.4 Bq/cm<sup>2</sup> for beta and gamma emitters and low toxicity alpha emitters, or 0.04 Bq/cm<sup>2</sup> for all other alpha emitters.

*Non-fixed contamination* means contamination that can be removed from a surface during routine conditions of transport.

*Fixed contamination* means contamination other than non-fixed contamination.

#### **2.7.1.3 Definitions of specific terms**

$A_1$  and  $A_2$

$A_1$  means the activity value of special form radioactive material which is listed in the Table in 2.7.2.2.1 or derived in 2.7.2.2.2 and is used to determine the activity limits for the provisions of this Code.

$A_2$  means the activity value of radioactive material, other than special form radioactive material, which is listed in the Table in 2.7.2.2.1 or derived in 2.7.2.2.2 and is used to determine the activity limits for the provisions of this Code.

*Fissile material* means uranium-233, uranium-235, plutonium-239, plutonium-241, or any combination of these radionuclides. Excepted from this definition is:

- .1 Natural uranium or depleted uranium which is unirradiated; and
- .2 Natural uranium or depleted uranium which has been irradiated in thermal reactors only.

*Low dispersible radioactive material* means either a solid radioactive material or a solid radioactive material in a sealed capsule, that has limited dispersibility and is not in powder form.

*Low specific activity (LSA) material* means radioactive material which by its nature has a limited specific activity, or radioactive material for which limits of estimated average specific activity apply. External shielding materials surrounding the LSA material shall not be considered in determining the estimated average specific activity.

*Low toxicity alpha emitters* are: natural uranium; depleted uranium; natural thorium; uranium-235 or uranium-238; thorium-232; thorium-228 and thorium-230 when contained in ores or physical and chemical concentrates; or alpha emitters with a half-life of less than 10 days.

*Specific activity of a radionuclide* means the activity per unit mass of that nuclide. The specific activity of a material shall mean the activity per unit mass of the material in which the radionuclides are essentially uniformly distributed.

*Special form radioactive material* means either:

- .1 An indispersible solid radioactive material; or
- .2 A sealed capsule containing radioactive material.

*Surface contaminated object (SCO)* means a solid object which is not itself radioactive but which has radioactive material distributed on its surfaces.

*Unirradiated thorium* means thorium containing not more than  $10^{-7}$  g of uranium-233 per gram of thorium-232.

*Unirradiated uranium* means uranium containing not more than  $2 \times 10^3$  Bq of plutonium per gram of uranium-235, not more than  $9 \times 10^6$  Bq of fission products per gram of uranium-235 and not more than  $5 \times 10^{-3}$  g of uranium-236 per gram of uranium-235.

*Uranium – natural, depleted, enriched* means the following:

*Natural uranium* means uranium (which may be chemically separated) containing the naturally occurring distribution of uranium isotopes (approximately 99.28% uranium-238, and 0.72% uranium-235 by mass).

*Depleted uranium* means uranium containing a lesser mass percentage of uranium-235 than in natural uranium.

*Enriched uranium* means uranium containing a greater mass percentage of uranium-235 than 0.72%.

In all cases, a very small mass percentage of uranium-234 is present.

**2.7.2 Classification****2.7.2.1 General provisions**

**2.7.2.1.1** Radioactive material shall be assigned to one of the UN number specified in Table 2.7.2.1.1 depending on the activity level of the radionuclides contained in a package, the fissile or non-fissile properties of these radionuclides, the type of package to be presented for transport, and the nature or form of the contents of the package, or special arrangements governing the transport operation, in accordance with the provisions laid down in 2.7.2.2 to 2.7.2.5.

<b>Table 2.7.2.1.1 Assignment of UN numbers</b>	
<b>Excepted packages</b> (1.5.1.5)	
<b>UN 2908</b>	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – EMPTY PACKAGING
<b>UN 2909</b>	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM
<b>UN 2910</b>	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – LIMITED QUANTITY OF MATERIAL
<b>UN 2911</b>	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – INSTRUMENTS or ARTICLES
<b>Low specific activity radioactive material</b> (2.7.2.3.1)	
<b>UN 2912</b>	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I), non-fissile or fissile-excepted
<b>UN 3321</b>	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), non fissile or fissile-excepted
<b>UN 3322</b>	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-III), non fissile or fissile-excepted
<b>UN 3324</b>	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), FISSILE
<b>UN 3325</b>	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY, (LSA-III), FISSILE
<b>Surface contaminated objects</b> (2.7.2.3.2)	
<b>UN 2913</b>	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), non-fissile or fissile-excepted
<b>UN 3326</b>	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), FISSILE
<b>Type A packages</b> (2.7.2.4.4)	
<b>UN 2915</b>	RADIOACTIVE MATERIAL, TYPE A PACKAGE, non-special form, non-fissile or fissile-excepted
<b>UN 3327</b>	RADIOACTIVE MATERIAL, TYPE A PACKAGE, FISSILE, non-special form
<b>UN 3332</b>	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, non fissile or fissile-excepted
<b>UN 3333</b>	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, FISSILE

<b>Table 2.7.2.1.1 Assignment of UN numbers</b>	
<b>Type B(U) package</b> (2.7.2.4.6)	<b>UN 2916</b> RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, non-fissile or fissile-excepted <b>UN 3328</b> RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, FISSILE
<b>Type B(M) package</b> (2.7.2.4.6)	<b>UN 2917</b> RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, non-fissile or fissile-excepted <b>UN 3329</b> RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, FISSILE
<b>Type C package</b> (2.7.2.4.6)	<b>UN 3323</b> RADIOACTIVE MATERIAL, TYPE C PACKAGE, non fissile or fissile-excepted <b>UN 3330</b> RADIOACTIVE MATERIAL, TYPE C PACKAGE, FISSILE
Special arrangement (2.7.2.5)	<b>UN 2919</b> RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, non-fissile or fissile-excepted <b>UN 3331</b> RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, FISSILE
Uranium hexafluoride (2.7.2.4.5)	<b>UN 2977</b> RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE <b>UN 2978</b> RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non-fissile or fissile-excepted

**2.7.2.2** *Determination of activity level*

**2.7.2.2.1** The following basic values for individual radionuclides are given in Table 2.7.2.2.1:

- .1  $A_1$  and  $A_2$  in TBq;
- .2 Activity concentration for exempt material in Bq/g; and
- .3 Activity limits for exempt consignments in Bq.

**Table 2.7.2.2.1: Basic radionuclides values for individual radionuclides**

Insert existing Table 2.7.7.2.1 with footnotes (a) – (g)

**2.7.2.2.2** For individual radionuclides which are not listed in Table 2.7.2.2.1 the determination of the basic radionuclide values referred to in 2.7.2.2.1 shall require multilateral approval. It is permissible to use an  $A_2$  value calculated using a dose coefficient for the appropriate lung absorption type as recommended by the International Commission on Radiological Protection, if the chemical forms of each radionuclide under both normal and accident conditions of transport are taken into consideration. Alternatively, the radionuclide values in Table 2.7.2.2.2 may be used without obtaining competent authority approval.

**Table 2.7.2.2.2: Basic radionuclide values for unknown radionuclides or mixtures**

Radioactive contents	A <sub>1</sub>	A <sub>2</sub>	Activity concentration for exempt material	Activity limit for exempt consignments
	(TBq)	(TBq)	(Bq/g)	(Bq)
Only beta or gamma emitting nuclides are known to be present	0.1	0.02	1 × 10 <sup>1</sup>	1 × 10 <sup>4</sup>
Alpha emitting nuclides but no neutron emitters are known to be present	0.2	9 × 10 <sup>-5</sup>	1 × 10 <sup>-1</sup>	1 × 10 <sup>3</sup>
Neutron emitting nuclides are known to be present or no relevant data are available	0.001	9 × 10 <sup>-5</sup>	1 × 10 <sup>-1</sup>	1 × 10 <sup>3</sup>

**2.7.2.2.3** In the calculations of A<sub>1</sub> and A<sub>2</sub> for a radionuclide not in Table 2.7.2.2.1, a single radioactive decay chain in which the radionuclides are present in their naturally occurring proportions, and in which no daughter nuclide has a half-life either longer than 10 days or longer than that of the parent nuclide, shall be considered as a single radionuclide; and the activity to be taken into account and the A<sub>1</sub> or A<sub>2</sub> value to be applied shall be those corresponding to the parent nuclide of that chain. In the case of radioactive decay chains in which any daughter nuclide has a half-life either longer than 10 days or greater than that of the parent nuclide, the parent and such daughter nuclides shall be considered as mixtures of different nuclides.

**2.7.2.2.4** For mixtures of radionuclides, the determination of the basic radionuclide values referred to in 2.7.2.2.1 may be determined as follows:

$$X_m = \frac{I}{\sum_i \frac{f(i)}{X(i)}}$$

where:

- f(i) is the fraction of activity or activity concentration of radionuclide i in the mixture;
- X(i) is the appropriate value of A<sub>1</sub> or A<sub>2</sub>, or the activity concentration for exempt material or the activity limit for an exempt consignment as appropriate for the radionuclide i; and
- X<sub>m</sub> is the derived value of A<sub>1</sub> or A<sub>2</sub>, or the activity concentration for exempt material or the activity limit for an exempt consignment in the case of a mixture.

**2.7.2.2.5** When the identity of each radionuclide is known but the individual activities of some of the radionuclides are not known, the radionuclides may be grouped and the lowest radionuclide value, as appropriate, for the radionuclides in each group may be used in applying the formulae in 2.7.2.2.4 and 2.7.2.4.4. Groups may be based on the total alpha activity and the total beta/gamma activity when these are known, using the lowest radionuclide values for the alpha emitters or beta/gamma emitters, respectively.

**2.7.2.2.6** For individual radionuclides or for mixtures of radionuclides for which relevant data are not available, the values shown in Table 2.7.2.2.2 shall be used.

**2.7.2.3 Determination of other material characteristics**

**2.7.2.3.1 *Low specific activity (LSA) material***

**2.7.2.3.1.1** (Reserved)

**2.7.2.3.1.2** LSA material shall be in one of three groups:

.1 LSA-I

- (i) uranium and thorium ores and concentrates of such ores, and other ores containing naturally occurring radionuclides which are intended to be processed for the use of these radionuclides;
- (ii) Natural uranium, depleted uranium, natural thorium or their compounds or mixtures, providing they are unirradiated and in solid or liquid form;
- (iii) radioactive material for which the  $A_2$  value is unlimited, excluding material classified as fissile according to 2.7.2.3.5; or
- (iv) other radioactive material in which the activity is distributed throughout and the estimated average specific activity does not exceed 30 times the values for activity concentration specified in 2.7.2.2.1 to 2.7.2.2.6, excluding material classified as fissile according to 2.7.2.3.5;

.2 LSA-II

- (i) water with tritium concentration up to 0.8 TBq/l; or
- (ii) other material in which the activity is distributed throughout and the estimated average specific activity

does not exceed  $10^{-4}$  A<sub>2</sub>/g for solids and gases, and  $10^{-5}$  A<sub>2</sub>/g for liquids;

- .3 LSA-III – Solids (e.g., consolidated wastes, activated materials), excluding powders, in which:
- (i) the radioactive material is distributed throughout a solid or a collection of solid objects, or is essentially uniformly distributed in a solid compact binding agent (such as concrete, bitumen, ceramic, etc.);
  - (ii) the radioactive material is relatively insoluble, or it is intrinsically contained in a relatively insoluble matrix, so that, even under loss of packaging, the loss of radioactive material per package by leaching when placed in water for seven days would not exceed 0.1 A<sub>2</sub>; and
  - (iii) the estimated average specific activity of the solid, excluding any shielding material, does not exceed  $2 \times 10^{-3}$  A<sub>2</sub>/g.

**2.7.2.3.1.3** LSA-III material shall be a solid of such a nature that if the entire contents of a package were subjected to the test specified in 2.7.2.3.1.4 the activity in the water would not exceed 0.1 A<sub>2</sub>.

**2.7.2.3.1.4** LSA-III material shall be tested as follows:

A solid material sample representing the entire contents of the package shall be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the 7-day test period the free volume of the unabsorbed and unreacted water remaining shall be at least 10% of the volume of the solid test sample itself. The water shall have an initial pH of 6 - 8 and a maximum conductivity of 1 mS/m at 20°C. The total activity of the free volume of water shall be measured following the 7-day immersion of the test sample.

**2.7.2.3.1.5** Demonstration of compliance with the performance standards in 2.7.2.3.1.4 shall be in accordance with 6.4.12.1 and 6.4.12.2.

**2.7.2.3.2** *Surface contaminated object (SCO)*

SCO is classified in one of two groups:

- .1 SCO-I: A solid object on which:
- (i) the non-fixed contamination on the accessible surface averaged over 300 cm<sup>2</sup> (or the area of the surface if less than 300 cm<sup>2</sup>) does not exceed 4 Bq/cm<sup>2</sup> for beta and gamma emitters and low toxicity alpha emitters, or 0.4 Bq/cm<sup>2</sup> for all other alpha emitters;

- (ii) the fixed contamination on the accessible surface averaged over  $300 \text{ cm}^2$  (or the area of the surface if less than  $300 \text{ cm}^2$ ) does not exceed  $4 \times 10^4 \text{ Bq/cm}^2$  for beta and gamma emitters and low toxicity alpha emitters, or  $4 \times 10^3 \text{ Bq/cm}^2$  for all other alpha emitters; and
  - (iii) the non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over  $300 \text{ cm}^2$  (or the area of the surface if less than  $300 \text{ cm}^2$ ) does not exceed  $4 \times 10^4 \text{ Bq/cm}^2$  for beta and gamma emitters and low toxicity alpha emitters, or  $4 \times 10^3 \text{ Bq/cm}^2$  for all other alpha emitters;
- .2 SCO-II: A solid object on which either the fixed or non-fixed contamination on the surface exceeds the applicable limits specified for SCO-I in 2.7.2.3.2.1 above and on which:
- (i) the non-fixed contamination on the accessible surface averaged over  $300 \text{ cm}^2$  (or the area of the surface if less than  $300 \text{ cm}^2$ ) does not exceed  $400 \text{ Bq/cm}^2$  for beta and gamma emitters and low toxicity alpha emitters, or  $40 \text{ Bq/cm}^2$  for all other alpha emitters;
  - (ii) the fixed contamination on the accessible surface, averaged over  $300 \text{ cm}^2$  (or the area of the surface if less than  $300 \text{ cm}^2$ ) does not exceed  $8 \times 10^5 \text{ Bq/cm}^2$  for beta and gamma emitters and low toxicity alpha emitters, or  $8 \times 10^4 \text{ Bq/cm}^2$  for all other alpha emitters; and
  - (iii) the non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over  $300 \text{ cm}^2$  (or the area of the surface if less than  $300 \text{ cm}^2$ ) does not exceed  $8 \times 10^5 \text{ Bq/cm}^2$  for beta and gamma emitters and low toxicity alpha emitters, or  $8 \times 10^4 \text{ Bq/cm}^2$  for all other alpha emitters.

### 2.7.2.3.3 *Special form radioactive material*

#### 2.7.2.3.3.1

- .1 Special form radioactive material shall have at least one dimension not less than 5 mm.
- .2 When a sealed capsule constitutes part of the special form radioactive material, the capsule shall be so manufactured that it can be opened only by destroying it.
- .3 The design for special form radioactive material requires unilateral approval.

- 2.7.2.3.3.2** Special form radioactive material shall be of such a nature or shall be so designed that if it is subjected to the tests specified in 2.7.2.3.3.4 to 2.7.2.3.3.8, it shall meet the following requirements:
- .1 It would not break or shatter under the impact, percussion and bending tests 2.7.2.3.3.5.1, 2.7.2.3.3.5.2, 2.7.2.3.3.5.3, or 2.7.2.3.3.6.1 as applicable;
  - .2 It would not melt or disperse in the applicable heat test 2.7.2.3.3.5.4 or 2.7.2.3.3.6.2 as applicable; and
  - .3 The activity in the water from the leaching tests specified in 2.7.2.3.3.7 and 2.7.2.3.3.8 would not exceed 2 kBq; or alternatively for sealed sources, the leakage rate for the volumetric leakage assessment test specified in ISO 9978:1992 “Radiation Protection – Sealed Radioactive Sources – Leakage Test Methods”, would not exceed the applicable acceptance threshold acceptable to the competent authority.
- 2.7.2.3.3.3** Demonstration of compliance with the performance standards in 2.7.2.3.3.2 shall be in accordance with 6.4.12.1 and 6.4.12.2.
- 2.7.2.3.3.4** Specimens that comprise or simulate special form radioactive material shall be subjected to the impact test, the percussion test, the bending test, and the heat test specified in 2.7.2.3.3.5 or alternative tests as authorized in 2.7.2.3.3.6. A different specimen may be used for each of the tests. Following each test, a leaching assessment or volumetric leakage test shall be performed on the specimen by a method no less sensitive than the methods given in 2.7.2.3.3.7 for indispersible solid material or 2.7.2.3.3.8 for encapsulated material.
- 2.7.2.3.3.5** The relevant test methods are:
- .1 Impact test: The specimen shall drop onto the target from a height of 9 m. The target shall be as defined in 6.4.14;
  - .2 Percussion test: The specimen shall be placed on a sheet of lead which is supported by a smooth solid surface and struck by the flat face of a mild steel bar so as to cause an impact equivalent to that resulting from a free drop of 1.4 kg through 1 m. The lower part of the bar shall be 25 mm in diameter with the edges rounded off to a radius of  $(3.0 \pm 0.3)$  mm. The lead, of hardness number 3.5 to 4.5 on the Vickers scale and not more than 25 mm thick, shall cover an area greater than that covered by the specimen. A fresh surface of lead shall be used for each impact. The bar shall strike the specimen so as to cause maximum damage;

- .3 Bending test: The test shall apply only to long, slender sources with both a minimum length of 10 cm and a length to minimum width ratio of not less than 10. The specimen shall be rigidly clamped in a horizontal position so that one half of its length protrudes from the face of the clamp. The orientation of the specimen shall be such that the specimen will suffer maximum damage when its free end is struck by the flat face of a steel bar. The bar shall strike the specimen so as to cause an impact equivalent to that resulting from a free vertical drop of 1.4 kg through 1 m. The lower part of the bar shall be 25 mm in diameter with the edges rounded off to a radius of  $(3.0 \pm 0.3)$  mm;
- .4 Heat test: The specimen shall be heated in air to a temperature of 800°C and held at that temperature for a period of 10 minutes and shall then be allowed to cool.

**2.7.2.3.3.6** Specimens that comprise or simulate radioactive material enclosed in a sealed capsule may be excepted from:

- .1 The tests prescribed in 2.7.2.3.3.5.1 and 2.7.2.3.3.5.2 provided the mass of the special form radioactive material:
  - (i) is less than 200 g and they are alternatively subjected to the class 4 impact test prescribed in ISO 2919:1999 “Radiation protection – Sealed radioactive sources – General requirements and classification”; or
  - (ii) is less than 500 g and they are alternatively subjected to the class 5 impact test prescribed in ISO 2919:1999 “Radiation protection – Sealed radioactive sources – General requirements and classification”; and
- .2 The test prescribed in 2.7.2.3.3.5.4 provided they are alternatively subjected to the class 6 temperature test specified in ISO 2919:1999 “Radiation protection – Sealed radioactive sources – General requirements and classification”.

**2.7.2.3.3.7** For specimens which comprise or simulate indispersible solid material, a leaching assessment shall be performed as follows:

- .1 The specimen shall be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the 7 day test period the free volume of the unabsorbed and unreacted water remaining shall be at least 10% of the volume of the solid test sample itself. The water shall have an initial pH of 6 - 8 and a maximum conductivity of 1 mS/m at 20°C;

- .2 The water with specimen shall then be heated to a temperature of  $(50 \pm 5)$  °C and maintained at this temperature for 4 hours;
- .3 The activity of the water shall then be determined;
- .4 The specimen shall then be kept for at least 7 days in still air at not less than 30°C and relative humidity not less than 90%;
- .5 The specimen shall then be immersed in water of the same specification as in 2.7.2.3.3.7.1 above and the water with the specimen heated to  $(50 \pm 5)$  °C and maintained at this temperature for 4 hours;
- .6 The activity of the water shall then be determined.

**2.7.2.3.3.8** For specimens which comprise or simulate radioactive material enclosed in a sealed capsule, either a leaching assessment or a volumetric leakage assessment shall be performed as follows:

- .1 The leaching assessment shall consist of the following steps:
  - (i) the specimen shall be immersed in water at ambient temperature. The water shall have an initial pH of 6 – 8 with a maximum conductivity of 1 mS/m at 20°C;
  - (ii) the water and specimen shall be heated to a temperature of  $(50 \pm 5)$  °C and maintained at this temperature for 4 hours;
  - (iii) the activity of the water shall then be determined;
  - (iv) the specimen shall then be kept for at least 7 days in still air at not less than 30°C and relative humidity of not less than 90%;
  - (v) the process in (i), (ii) and (iii) shall be repeated.
- .2 The alternative volumetric leakage assessment shall comprise any of the tests prescribed in ISO 9978:1992 “Radiation Protection – Sealed radioactive sources – Leakage test methods”, which are acceptable to the competent authority.

#### **2.7.2.3.4** *Low dispersible material*

**2.7.2.3.4.1** The design for low dispersible radioactive material shall require multilateral approval. Low dispersible radioactive material shall be such that the total amount of this radioactive material in a package shall meet the following provisions:

- .1 The radiation level at 3 m from the unshielded radioactive material does not exceed 10 mSv/h;
- .2 If subjected to the tests specified in 6.4.20.3 and 6.4.20.4, the airborne release in gaseous and particulate forms of up to 100 µm aerodynamic equivalent diameter would not exceed 100 A<sub>2</sub>. A separate specimen may be used for each test; and
- .3 If subjected to the test specified in 2.7.2.3.1.4 the activity in the water would not exceed 100 A<sub>2</sub>. In the application of this test, the damaging effects of the tests specified in 2.7.2.3.4.1.2 above shall be taken into account.

**2.7.2.3.4.2** Low dispersible material shall be tested as follows:

A specimen that comprises or simulates low dispersible radioactive material shall be subjected to the enhanced thermal test specified in 6.4.20.3 and the impact test specified in 6.4.20.4. A different specimen may be used for each of the tests. Following each test, the specimen shall be subjected to the leach test specified in 2.7.2.3.1.4. After each test it shall be determined if the applicable provisions of 2.7.2.3.4.1 have been met.

**2.7.2.3.4.3** Demonstration of compliance with the performance standards in 2.7.2.3.4.1 and 2.7.2.3.4.2 shall be in accordance with 6.4.12.1 and 6.4.12.2.

**2.7.2.3.5** *Fissile material*

Packages containing fissile radionuclides shall be classified under the relevant entry of table 2.7.2.1.1 for fissile material unless one of the conditions .1 to .4 of this paragraph is met. Only one type of exception is allowed per consignment.

- .1 A mass limit per consignment such that:

$$\frac{\text{mass of uranium - 235 (g)}}{X} + \frac{\text{mass of other fissile material (g)}}{Y} < 1$$

where X and Y are the mass limits defined in Table 2.7.2.3.5, provided that the smallest external dimension of each package is not less than 10 cm and that either:

- (i) each individual package contains not more than 15 g of fissile material; for unpackaged material, this quantity limitation shall apply to the consignment being carried in or on the conveyance; or
- (ii) the fissile material is a homogeneous hydrogenous solution or mixture where the ratio of fissile nuclides to hydrogen is less than 5% by mass; or
- (iii) there are not more than 5 g of fissile material in any 10 litre volume of material.

Neither beryllium nor deuterium shall be present in quantities exceeding 1% of the applicable consignment mass limits provided in Table 2.7.2.3.5, except for deuterium in natural concentration in hydrogen.

- .2 Uranium enriched in uranium-235 to a maximum of 1% by mass, and with a total plutonium and uranium-233 content not exceeding 1% of the mass of uranium-235, provided that the fissile material is distributed essentially homogeneously throughout the material. In addition, if uranium-235 is present in metallic, oxide or carbide forms, it shall not form a lattice arrangement;
- .3 Liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2% by mass, with a total plutonium and uranium-233 content not exceeding 0.002% of the mass of uranium, and with a minimum nitrogen to uranium atomic ratio (N/U) of 2;
- .4 Packages containing, individually, a total plutonium mass not more than 1 kg, of which not more than 20% by mass may consist of plutonium-239, plutonium-241 or any combination of those radionuclides.

**Table 2.7.2.3.5: Consignment mass limits for exceptions from the requirements for packages containing fissile material**

<b>Fissile material</b>	<b>Fissile material mass (g) mixed with substances having an average hydrogen density less than or equal to water</b>	<b>Fissile material mass (g) mixed with substances having an average hydrogen density greater than water</b>
Uranium-235 (X)	400	290
Other fissile material (Y)	250	180

## 2.7.2.4 Classification of packages or unpacked material

The quantity of radioactive material in a package shall not exceed the relevant limits for the package type as specified below.

### 2.7.2.4.1 Classification as excepted package

2.7.2.4.1.1 Packages may be classified as excepted packages if:

- .1 They are empty packagings having contained radioactive material;
- .2 They contain instruments or articles in limited quantities;
- .3 They contain articles manufactured of natural uranium, depleted uranium or natural thorium; or
- .4 They contain radioactive material in limited quantities.

2.7.2.4.1.2 A package containing radioactive material may be classified as an excepted package provided that the radiation level at any point on its external surface does not exceed 5  $\mu\text{Sv/h}$ .

**Table 2.7.2.4.1.2: Activity limits for excepted packages**

Physical state of contents (1)	Instruments or article		Materials Package limits <sup>a</sup> (4)
	Item limits <sup>a</sup> (2)	Package limits <sup>a</sup> (3)	
<b>Solids</b>			
special form	$10^{-2} A_1$	$A_1$	$10^{-3} A_1$
other form	$10^{-2} A_2$	$A_2$	$10^{-3} A_2$
<b>Liquids</b>	$10^{-3} A_2$	$10^{-1} A_2$	$10^{-4} A_2$
<b>Gases</b>			
Tritium	$2 \times 10^{-2} A_2$	$2 \times 10^{-1} A_2$	$2 \times 10^{-2} A_2$
special form	$10^{-3} A_1$	$10^{-2} A_1$	$10^{-3} A_1$
other forms	$10^{-3} A_2$	$10^{-2} A_2$	$10^{-3} A_2$

<sup>a</sup> For mixtures of radionuclides, see 2.7.2.2.4 to 2.7.2.2.6.

2.7.2.4.1.3 Radioactive material which is enclosed in or is included as a component part of an instrument or other manufactured article may be classified under UN 2911, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – INSTRUMENTS or ARTICLES provided that:

- .1 the radiation level at 10 cm from any point on the external surface of any unpackaged instrument or article is not greater than 0.1 mSv/h; and
- .2 each instrument or manufactured article bears the marking “RADIOACTIVE” except:

- (i) radioluminescent time-pieces or devices;
  - (ii) consumer products that either have received regulatory approval according to 1.5.1.4.4 or do not individually exceed the activity limit for an exempt consignment in Table 2.7.2.2.1 (column 5), provided such products are transported in a package that bears the marking “RADIOACTIVE” on an internal surface in such a manner that warning of the presence of radioactive material is visible on opening the package; and
- .3 the active material is completely enclosed by non-active components (a device performing the sole function of containing radioactive material shall not be considered to be an instrument or manufactured article); and
  - .4 the limits specified in columns 2 and 3 of Table 2.7.2.4.1.2 are met for each individual item and each package, respectively.

**2.7.2.4.1.4** Radioactive material with an activity not exceeding the limit specified in column 4 of Table 2.7.2.4.1.2, may be classified under UN 2910, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – LIMITED QUANTITY OF MATERIAL provided that:

- .1 the package retains its radioactive contents under routine conditions of transport; and
- .2 the package bears the marking “RADIOACTIVE” on an internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package.

**2.7.2.4.1.5** An empty packaging which had previously contained radioactive material with an activity not exceeding the limit specified in column 4 of Table 2.7.2.4.1.2 may be classified under UN 2908, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – EMPTY PACKAGING, provided that:

- .1 it is in a well-maintained condition and securely closed;
- .2 the outer surface of any uranium or thorium in its structure is covered with an inactive sheath made of metal or some other substantial material;
- .3 the level of internal non-fixed contamination, when averaged over any 300 cm<sup>2</sup>, does not exceed:
  - (i) 400 Bq/cm<sup>2</sup> for beta and gamma emitters and low toxicity alpha emitters; and

(ii) 40 Bq/cm<sup>2</sup> for all other alpha emitters; and

.4 any labels which may have been displayed on it in conformity with 5.2.2.1.12.1 are no longer visible.

**2.7.2.4.1.6** Articles manufactured of natural uranium, depleted uranium or natural thorium and articles in which the sole radioactive material is unirradiated natural uranium, unirradiated depleted uranium or unirradiated natural thorium may be classified under UN 2909, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM, provided that the outer surface of the uranium or thorium is enclosed in an inactive sheath made of metal or some other substantial material.

**2.7.2.4.2** *Classification as Low specific activity (LSA) material*

Radioactive material may only be classified as LSA material if the conditions of 2.7.2.3.1 and 4.1.9.2 are met.

**2.7.2.4.3** *Classification as Surface contaminated object (SCO)*

Radioactive material may be classified as SCO if the conditions of 2.7.2.3.2.1 and 4.1.9.2 are met.

**2.7.2.4.4** *Classification as Type A package*

Packages containing radioactive material may be classified as Type A packages provided that the following conditions are met:

Type A packages shall not contain activities greater than the following:

.1 For special form radioactive material – A<sub>1</sub>; or

.2 For all other radioactive material – A<sub>2</sub>.

For mixtures of radionuclides whose identities and respective activities are known, the following condition shall apply to the radioactive contents of a Type A package:

$$\sum_i \frac{B(i)}{A_1(i)} + \sum_j \frac{C(j)}{A_2(j)} \leq 1$$

where:

B(i) is the activity of radionuclide i as special form radioactive material;

A<sub>1</sub>(i) is the A<sub>1</sub> value for radionuclide i;

C (j) is the activity of radionuclide j as other than special form radioactive material; and

A<sub>2</sub> (j) is the A<sub>2</sub> value for radionuclide j.

#### **2.7.2.4.5 *Classification of Uranium hexafluoride***

Uranium hexafluoride shall only be assigned to UN No.2977, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE, or 2978, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non-fissile or fissile-excepted.

##### **2.7.2.4.5.1 Packages containing uranium hexafluoride shall not contain:**

- .1 a mass of uranium hexafluoride different from that authorized for the package design;
- .2 a mass of uranium hexafluoride greater than a value that would lead to an ullage smaller than 5% at the maximum temperature of the package as specified for the plant systems where the package shall be used; or
- .3 Uranium hexafluoride other than in solid form or at an internal pressure above atmospheric pressure when presented for transport.

#### **2.7.2.4.6 *Classification as Type B(U), Type B(M) or Type C packages***

**2.7.2.4.6.1** Packages not otherwise classified in 2.7.2.4 (2.7.2.4.1 to 2.7.2.4.5) shall be classified in accordance with the competent authority approval certificate for the package issued by the country of origin of design.

**2.7.2.4.6.2** A package may only be classified as a Type B(U) if it does not contain:

- .1 activities greater than those authorized for the package design;
- .2 Radionuclides different from those authorized for the package design; or
- .3 contents in a form, or a physical or chemical state different from those authorized for the package design;

as specified in the certificate of approval.

**2.7.2.4.6.3** A package may only be classified as a Type B(M) if it does not contain:

- .1 activities greater than those authorized for the package design;

- .2 Radionuclides different from those authorized for the package design; or
- .3 contents in a form, or a physical or chemical state different from those authorized for the package design,

as specified in the certificate of approval.

**2.7.2.4.6.4** A package may only be classified as a Type C if it does not contain:

- .1 activities greater than those authorized for the package design;
- .2 Radionuclides different from those authorized for the package design; or
- .3 contents in a form, or physical or chemical state different from those authorized for the package design,

as specified in the certificate of approval.

#### **2.7.2.5 Special arrangements**

Radioactive material shall be classified as transported under special arrangement when it is intended to be transported in accordance with 1.5.4.”

### **Consequential amendments**

#### **Contents page:**

2.7.1 to 2.7.10	Delete entries
2.7.1	Insert “2.7.1 Definitions”
2.7.2	Insert “2.7.2 Classification”

Amend all references to renumbered paragraphs of chapter 2.7:

<b>3.3.1 SP290</b>	Replace “2.7.9.1” with “1.5.1.5.1”
<b>4.1.9.2.3.2</b>	Replace “2.7.2” with “2.7.2.3.2”
<b>4.1.9.2.3.3</b>	Replace “2.7.5(a)(i)” with “2.7.2.3.2.1(i)”
<b>5.2.2.1.12.1</b>	Replace “2.7.8.4” with “5.1.5.3.4”
<b>5.2.2.1.12.2.1.1</b>	Replace “2.7.7.2.1” with “2.7.2.2.1”
<b>5.2.2.1.12.2.4</b>	Replace “2.7.6.1.1” with “5.1.5.3.1”
<b>5.2.2.1.12.2.4</b>	Replace “2.7.6.1.2” with “5.1.5.3.2”
<b>6.4.8.8</b>	Replace “2.7.7.2.4 – 2.7.7.2.6” with “2.7.2.2.4 – to 2.7.2.2.6”
<b>6.4.10.3</b>	Replace “2.7.7.2.4 – 2.7.7.2.6” with “2.7.2.2.4 – 2.7.2.2.6”
<b>6.4.12.1</b>	Replace “2.7.3.3, 2.7.3.4, 2.7.4.1, 2.7.4.2, 2.7.10.1 and 2.7.10.2” with “2.7.2.3.1.3, 2.7.2.3.1.4, 2.7.2.3.3.1, 2.7.2.3.3.2, 2.7.2.3.4.1 and 2.7.2.3.4.2”

- 6.4.12.2** Replace “2.7.3.3, 2.7.3.4, 2.7.4.1, 2.7.4.2, 2.7.10.1 and 2.7.10.2” with “2.7.2.3.1.3, 2.7.2.3.1.4, 2.7.2.3.3.1, 2.7.2.3.3.2, 2.7.2.3.4.1 and 2.7.2.3.4.2”
- 6.4.14** Replace “2.7.4.5” with “2.7.2.3.3.5”
- 6.4.24.1** Replace “2.7.7” with “2.7.2.2, 2.7.2.4.1, 2.7.2.4.4, 2.7.2.4.5, 2.7.2.4.6 and 4.1.9.3”
- 6.4.24.2** Replace “2.7.7” with “2.7.2.2, 2.7.2.4.1, 2.7.2.4.4, 2.7.2.4.5, 2.7.2.4.6 and 4.1.9.3”
- 6.4.24.3** Replace “2.7.7” with “2.7.2.2, 2.7.2.4.1, 2.7.2.4.4, 2.7.2.4.5, 2.7.2.4.6 and 4.1.9.3”

## Chapter 2.8

- 2.8.2.5.3.2** Replace “corrosion rate on steel” with “corrosion rate on either steel”

Insert “when tested on both materials” after “... test temperature of 55°C”

Insert “**Note:** Where an initial test on either steel or aluminium indicates the substance being tested is corrosive the follow up test on the other metal is not required.” after “... part III, Section 37.”

## Chapter 2.9

Replace the heading “**Class 9 – Miscellaneous dangerous substances and articles**” with “**Miscellaneous dangerous substances and articles (Class 9) and environmentally hazardous substances**”

Insert after title

“**Note 1:** For the purposes of this Code, the environmentally hazardous substances (aquatic environment) criteria contained in this chapter apply to the classification of marine pollutants (see 2.10).”

**Note 2:** Although the environmentally hazardous substances (aquatic environment) criteria apply to all hazard classes (see 2.10.2.3 and 2.10.2.5), the criteria have been included in this chapter.”

- 2.9.2.1.2** Delete “The properties or characteristics of each substance are given in the Dangerous Goods List in chapter 3.2 pertaining to the substance or article.”

Insert:

## **“2.9.3 Environmentally hazardous substances (aquatic environment)”**

### **2.9.3.1 General definitions**

**2.9.3.1.1** Environmentally hazardous substances include, *inter alia*, liquid or solid substances pollutant to the aquatic environment and solutions and mixtures of such substances (such as preparations and wastes).

For the purposes of this section,

“Substance” means chemical elements and their compounds in the natural state or obtained by any impurities deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.

**2.9.3.1.2** The aquatic environment may be considered in terms of the aquatic organisms that live in the water, and the aquatic ecosystem of which they are part<sup>1</sup>. The basis, therefore, of the identification of hazard is the aquatic toxicity of the substance or mixture, although this may be modified by further information on the degradation and bioaccumulation behaviour.

**2.9.3.1.3** While the following classification procedure is intended to apply to all substances and mixtures, it is recognized that in some cases, e.g., metals or poorly soluble inorganic compounds, special guidance will be necessary<sup>2</sup>.

**2.9.3.1.4** The following definitions apply for acronyms or terms used in this section:

BCF	Bioconcentration Factor;
BOD	Biochemical Oxygen Demand;
COD	Chemical Oxygen Demand;
GLP	Good Laboratory Practices;
EC <sub>50</sub>	the effective concentration of substance that causes 50% of the maximum response;
ErC <sub>50</sub>	EC <sub>50</sub> in terms of reduction of growth;
K <sub>ow</sub>	octanol/water partition coefficient;
LC <sub>50</sub>	(50% lethal concentration) the concentration of a substance in water which causes the death of 50% (one half) in a group of test animals;
L(E)C <sub>50</sub>	LC <sub>50</sub> or EC <sub>50</sub> ;
NOEC	No Observed Effect Concentration;
OECD	Test Guidelines Test guidelines published by the Organization for Economic Co-operation and Development (OECD).

<sup>1</sup> This does not address aquatic pollutants for which there may be a need to consider effects beyond the aquatic environment such as the impacts on human health, etc.

<sup>2</sup> This can be found in annex 10 of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

## 2.9.3.2 Definitions and data requirements

2.9.3.2.1 The basic elements for classification of environmentally hazardous substances (aquatic environment) are:

- acute aquatic toxicity;
- potential for or actual bioaccumulation;
- degradation (biotic or abiotic) for organic chemicals; and
- chronic aquatic toxicity.

2.9.3.2.2 While data from internationally harmonized test methods are preferred, in practice, data from national methods may also be used where they are considered as equivalent. In general, freshwater and marine species toxicity data can be considered as equivalent data and are preferably to be derived using OECD Test Guidelines or equivalent according to the principles of Good Laboratory Practices (GLP). Where such data are not available, classification shall be based on the best available data.

2.9.3.2.3 *Acute aquatic toxicity* shall normally be determined using a fish 96 hour LC<sub>50</sub> (OECD Test Guideline 203 or equivalent), a crustacea species 48 hour EC<sub>50</sub> (OECD Test Guideline 202 or equivalent) and/or an algal species 72 or 96 hour EC<sub>50</sub> (OECD Test Guideline 201 or equivalent). These species are considered as surrogates for all aquatic organisms. Data on other species such as Lemna may also be considered if the test methodology is suitable.

2.9.3.2.4 *Bioaccumulation* means net result of uptake, transformation and elimination of a substance in an organism due to all routes of exposure (i.e. air, water, sediment/soil and food). The potential for bioaccumulation shall normally be determined by using the octanol/water partition coefficient, usually reported as a log K<sub>ow</sub> determined according to OECD Test Guideline 107 or 117. While this represents a potential to bioaccumulate, an experimentally determined Bioconcentration Factor (BCF) provides a better measure and shall be used in preference when available. A BCF shall be determined according to OECD Test Guideline 305.

2.9.3.2.5 *Environmental degradation* may be biotic or abiotic (eg. hydrolysis) and the criteria used reflect this fact. Ready biodegradation is most easily defined using the OECD biodegradability tests (OECD Test Guideline 301 (A - F)). A pass level in these tests may be considered as indicative of rapid degradation in most aquatic environments. As these are freshwater tests, use of results from OECD Test Guideline 306, which is more suitable for the marine environment, is also included. Where such data are not available, a BOD (5 days)/COD ratio  $\geq 0.5$  is considered as indicative of rapid degradation. Abiotic degradation such as hydrolysis, primary degradation, both abiotic and biotic, degradation in non-aquatic media and proven rapid degradation in the environment may all be considered in defining rapid degradability<sup>3</sup>.

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<sup>3</sup> Special guidance on data interpretation is provided in chapter 4.1 and annex 9 of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

**2.9.3.2.5.1** Substances are considered rapidly degradable in the environment if the following criteria are met:

.1 In 28-day ready biodegradation studies, the following levels of degradation are achieved:

- (i) tests based on dissolved organic carbon: 70%;
- (ii) tests based on oxygen depletion or carbon dioxide generation: 60% of theoretical maxima;

These levels of biodegradation shall be achieved within 10 days of the start of degradation which point is taken as the time when 10% of the substance has been degraded; or

.2 In those cases where only BOD and COD data are available, when the ratio of BOD<sub>5</sub>/COD is  $\geq 0.5$ ; or

.3 If other convincing scientific evidence is available to demonstrate that the substance or mixture can be degraded (biotically and/or abiotically) in the aquatic environment to a level above 70% within a 28-day period.

**2.9.3.2.6** *Chronic toxicity* data are less available than acute data and the range of testing procedures less standardized. Data generated according to the OECD Test Guidelines 210 (Fish Early Life Stage) or 211 (Daphnia Reproduction) and 201 (Algal Growth Inhibition) may be accepted. Other validated and internationally accepted tests may also be used. The “No Observed Effect Concentrations” (NOECs) or other equivalent L(E)Cx shall be used.

**2.9.3.3 Substance classification categories and criteria**

**2.9.3.3.1** Substances shall be classified as “environmentally hazardous substances (aquatic environment)”, if they satisfy the criteria for Acute 1, Chronic 1 or Chronic 2, according to the following tables:

**Acute toxicity****Category: Acute 1**

96 hr LC <sub>50</sub> (for fish)	≤ 1 mg/l and/or
48 hr EC <sub>50</sub> (for crustacea)	≤ 1 mg/l and/or
72 or 96 hr ErC <sub>50</sub> (for algae or other aquatic plants)	≤ 1 mg/l

**Chronic toxicity****Category: Chronic 1**

96 hr LC <sub>50</sub> (for fish)	≤ 1 mg/l and/or
48 hr EC <sub>50</sub> (for crustacea)	≤ 1 mg/l and/or
72 or 96 hr ErC <sub>50</sub> (for algae or other aquatic plants)	≤ 1 mg/l

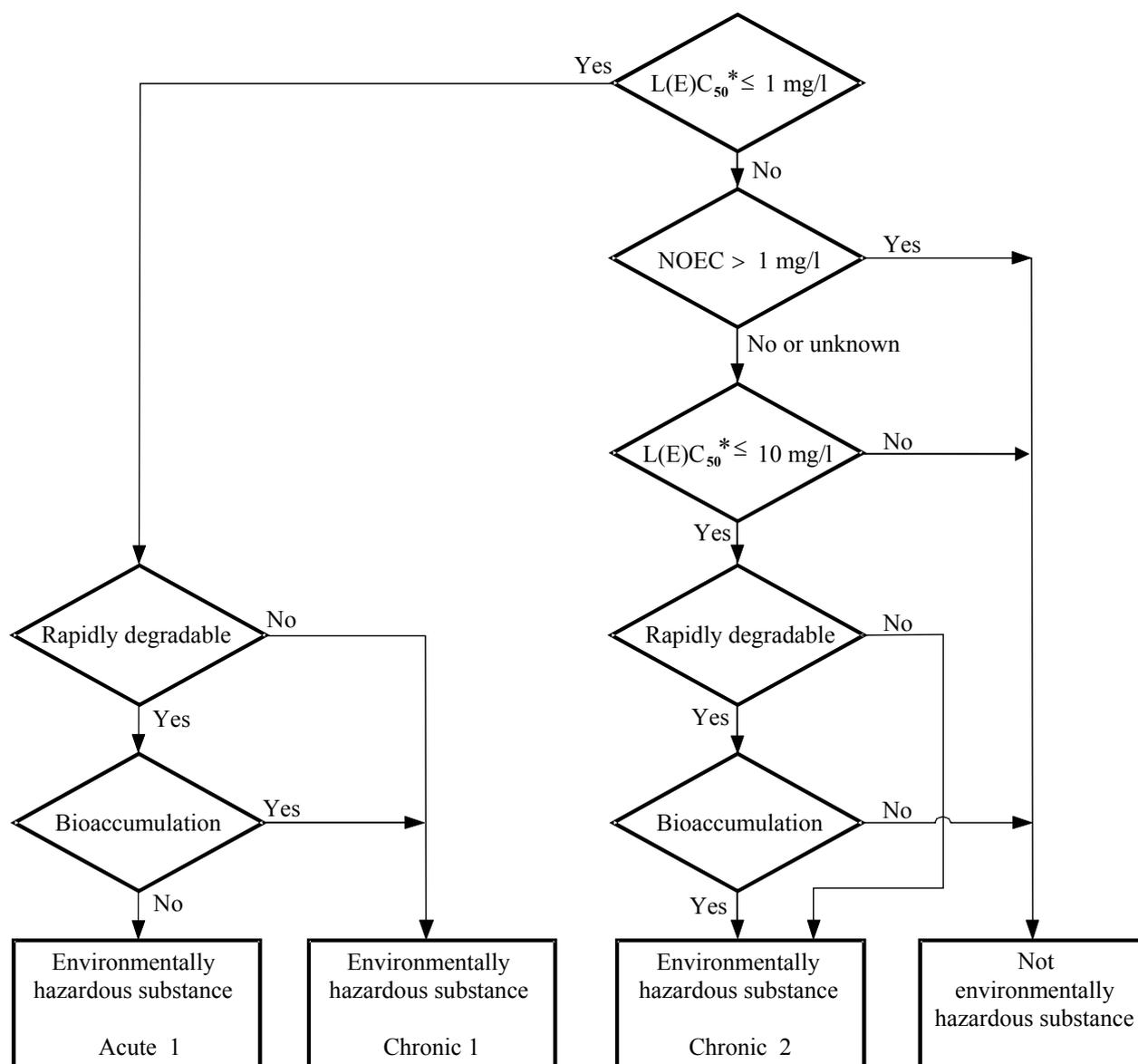
and the substance is not rapidly degradable and/or the log K<sub>ow</sub> ≥ 4 (unless the experimentally determined BCF < 500)

**Category: Chronic 2**

96 hr LC <sub>50</sub> (for fish)	>1 to ≤ 10 mg/l and/or
48 hr EC <sub>50</sub> (for crustacea)	>1 to ≤ 10 mg/l and/or
72 or 96 hr ErC <sub>50</sub> (for algae or other aquatic plants)	>1 to ≤ 10 mg/l

and the substance is not rapidly degradable and/or the log K<sub>ow</sub> ≥ 4 (unless the experimentally determined BCF < 500), unless the chronic toxicity NOECs are > 1 mg/l

The classification flowchart below outlines the process to be followed.



\* Lowest value of 96-hour LC<sub>50</sub>, 48-hour EC<sub>50</sub> or 72-hour ErC<sub>50</sub>, as appropriate.

### 2.9.3.4 Mixtures classification categories and criteria

**2.9.3.4.1** The classification system for mixtures covers the classification categories which are used for substances meaning acute category 1 and chronic categories 1 and 2. In order to make use of all available data for purposes of classifying the aquatic environmental hazards of the mixture, the following assumption is made and is applied, where appropriate:

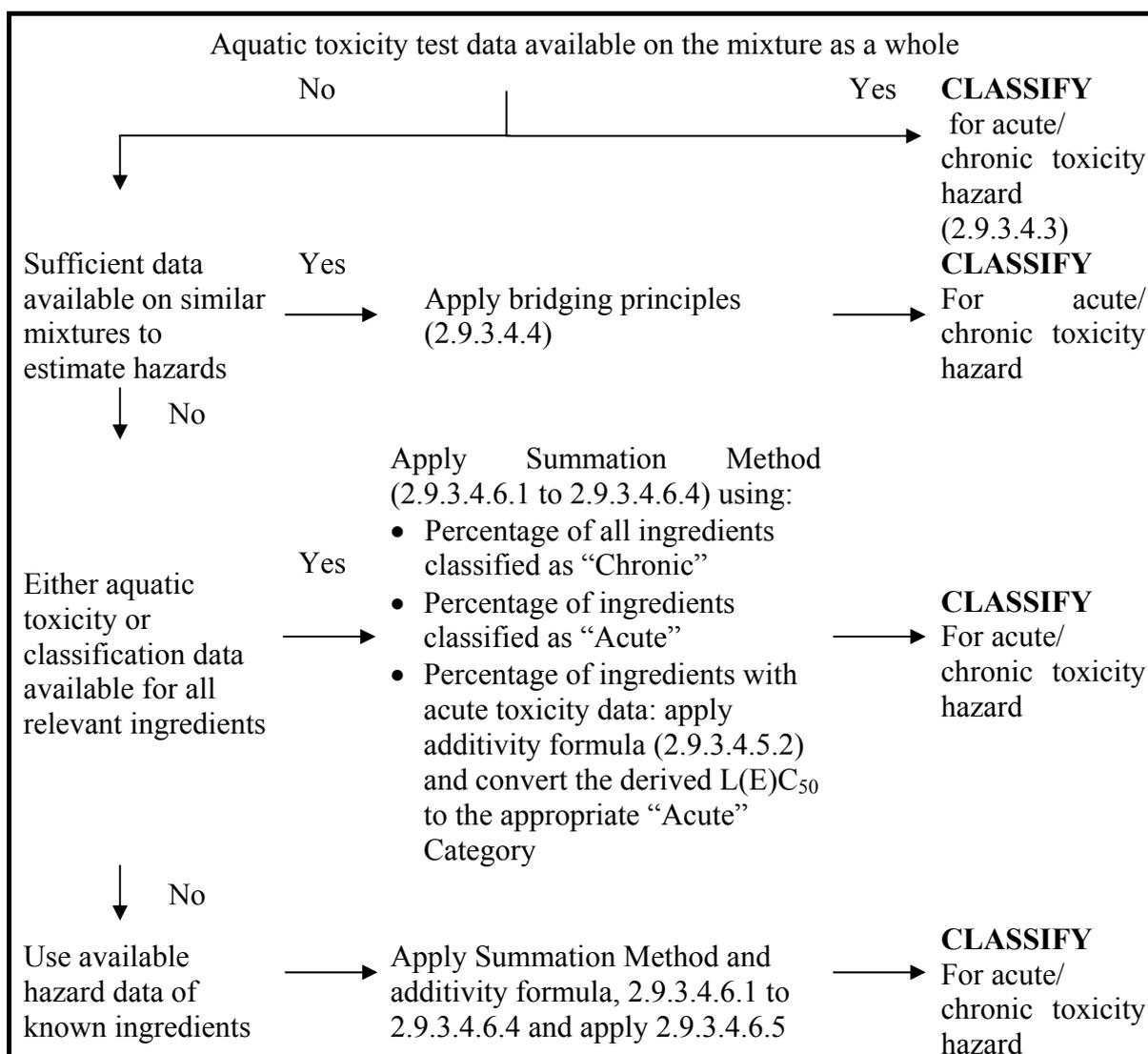
The “relevant ingredients” of a mixture are those which are present in a concentration of 1% by mass or greater, unless there is a presumption (e.g., in the case of highly toxic ingredients) that an ingredient present at less than 1% can still be relevant for classifying the mixture for aquatic environmental hazards.

**2.9.3.4.2** The approach for classification of aquatic environmental hazards is tiered and dependent upon the type of information available for the mixture itself and its ingredients. Elements of the tiered approach include:

- .1 classification based on tested mixtures;
- .2 classification based on bridging principles;
- .3 the use of “summation of classified ingredients” and/or an “additivity formula”.

Figure 2.9.1 below outlines the process to be followed.

**Figure 2.9.1: Tiered approach to classification of mixtures for acute and chronic aquatic environmental hazards**



### **2.9.3.4.3**      *Classification of mixtures when data are available for the complete mixture*

**2.9.3.4.3.1**      When the mixture as a whole has been tested to determine its aquatic toxicity, it shall be classified according to the criteria that have been agreed for substances, but only for acute toxicity. The classification is based on the data for fish, crustacea and algae/plants. Classification of mixtures by using LC<sub>50</sub> or EC<sub>50</sub> data for the mixture as a whole is not possible for chronic categories since both toxicity data and environmental fate data are needed, and there are no degradability and bioaccumulation data for mixtures as a whole. It is not possible to apply the criteria for chronic classification because the data from degradability and bio-accumulation tests of mixtures cannot be interpreted; they are meaningful only for single substances.

**2.9.3.4.3.2**      When there is acute toxicity test data (LC<sub>50</sub> or EC<sub>50</sub>) available for the mixture as a whole, this data as well as information with respect to the classification of ingredients for chronic toxicity shall be used to complete the classification for tested mixtures as follows. When chronic (long-term) toxicity data (NOEC) is also available, this shall be used in addition.

- .1      L(E)C<sub>50</sub> (LC<sub>50</sub> or EC<sub>50</sub>) of the tested mixture ≤ 1 mg/l and NOEC of the tested mixture ≤ 1.0 mg/l or unknown:
  - classify mixture as category acute 1;
  - apply summation of classified ingredients approach (see 2.9.3.4.6.3 and 2.9.3.4.6.4) for chronic classification (chronic 1, 2, or no need of chronic classification).
  
- .2      L(E)C<sub>50</sub> of the tested mixture ≤ 1 mg/l and NOEC of the tested mixture > 1.0 mg/l:
  - classify mixture as category acute 1;
  - apply summation of classified ingredients approach (see 2.9.3.4.6.3 and 2.9.3.4.6.4) for classification as Category Chronic 1. If the mixture is not classified as Category Chronic 1, then there is no need for chronic classification.
  
- .3      L(E)C<sub>50</sub> of the tested mixture > 1 mg/l, or above the water solubility, and NOEC of the tested mixture ≤ 1.0 mg/l or unknown:
  - no need to classify for acute toxicity;
  - apply summation of classified ingredients approach (see 2.9.3.4.6.3 and 2.9.3.4.6.4) for chronic classification or no need for chronic classification.

.4 L(E)C<sub>50</sub> of the tested mixture > 1 mg/l, or above the water solubility, and NOEC of the tested mixture > 1.0 mg/l:

- No need to classify for acute or chronic toxicity.

#### **2.9.3.4.4 *Bridging principles***

**2.9.3.4.4.1** Where the mixture itself has not been tested to determine its aquatic environmental hazard, but there are sufficient data on the individual ingredients and similar tested mixtures to adequately characterize the hazards of the mixture, this data shall be used in accordance with the following agreed bridging rules. This ensures that the classification process uses the available data to the greatest extent possible in characterizing the hazards of the mixture without the necessity for additional testing in animals.

##### **2.9.3.4.4.2 Dilution**

**2.9.3.4.4.2.1** If a mixture is formed by diluting another classified mixture or a substance with a diluent which has an equivalent or lower aquatic hazard classification than the least toxic original ingredient and which is not expected to affect the aquatic hazards of other ingredients, then the mixture shall be classified as equivalent to the original mixture or substance.

**2.9.3.4.4.2.2** If a mixture is formed by diluting another classified mixture or a substance with water or other totally non-toxic material, the toxicity of the mixture shall be calculated from the original mixture or substance.

##### **2.9.3.4.4.3 Batching**

**2.9.3.4.4.3.1** The aquatic hazard classification of one production batch of a complex mixture shall be assumed to be substantially equivalent to that of another production batch of the same commercial product and produced by or under the control of the same manufacturer, unless there is reason to believe there is significant variation such that the aquatic hazard classification of the batch has changed. If the latter occurs, new classification is necessary.

##### **2.9.3.4.4.4 Concentration of mixtures which are classified with the most severe classification categories (chronic 1 and acute 1)**

**2.9.3.4.4.4.1** If a mixture is classified as chronic 1 and/or acute 1, and ingredients of the mixture which are classified as chronic 1 and/or acute 1 are further concentrated, the more concentrated mixture shall be classified with the same classification category as the original mixture without additional testing.

##### **2.9.3.4.4.5 Interpolation within one toxicity category**

**2.9.3.4.4.5.1** If mixtures A and B are in the same classification category and mixture C is made in which the toxicologically active ingredients have concentrations intermediate to those in mixtures A and B, then mixture C shall be in the same category

as A and B. Note that the identity of the ingredients is the same in all three mixtures.

#### **2.9.3.4.4.6 Substantially similar mixtures**

##### **2.9.3.4.4.6.1** Given the following:

- .1 Two mixtures:
  - i) A + B
  - ii) C + B
- .2 The concentration of ingredient B is the same in both mixtures;
- .3 The concentration of ingredient A in mixture (i) equals that of component C in mixture (ii);
- .4 Classification for A and C are available and are the same, i.e. they are in the same hazard category and are not expected to affect the aquatic toxicity of B,

then there shall be no need to test mixture (ii) if mixture (i) is already characterized by testing and both mixtures are classified in the same category.

#### **2.9.3.4.5** *Classification of mixtures when data are available for all components or only for some components of the mixture*

**2.9.3.4.5.1** The classification of a mixture shall be based on summation of the classification of its ingredients. The percentage of ingredients classified as “Acute” or “Chronic” will feed straight into the summation method. Details of the summation method are described in 2.9.3.4.6.1 to 2.9.3.4.6.4.1.

**2.9.3.4.5.2** Mixtures are often made of a combination of both ingredients that are classified (as Acute 1 and/or Chronic 1, 2) and those for which adequate test data is available. When adequate toxicity data is available for more than one ingredient in the mixture, the combined toxicity of those [components] shall be calculated using the following additivity formula, and the calculated toxicity shall be used to assign that portion of the mixture an acute toxicity hazard which is then subsequently used in applying the summation method.

$$\frac{\sum C_i}{L(E)C_{50m}} = \sum_n \frac{C_i}{L(E)C_{50i}}$$

where:

$C_i$  = concentration of ingredient i (mass percentage);

$L(E)C_{50i}$  = (mg/l)  $LC_{50}$  or  $EC_{50}$  for ingredient i;

$n$  = number of ingredients, and  $i$  is running from 1 to  $n$ ; and

$L(E)C_m$  =  $L(E)C_{50}$  of the part of the mixture with test data

**2.9.3.4.5.3** When applying the additivity formula for part of the mixture, it is preferable to calculate the toxicity of this part of the mixture using for each substance toxicity values that relate to the same species (i.e. fish, daphnia or algae) and then to use the highest toxicity (lowest value) obtained (i.e. use the most sensitive of the three species). However, when toxicity data for each ingredient are not available in the same species, the toxicity value of each ingredient shall be selected in the same manner that toxicity values are selected for the classification of substances, i.e., the higher toxicity (from the most sensitive test organism) is used. The calculated acute toxicity shall then be used to classify this part of the mixture as Acute 1 using the same criteria described for substances.

**2.9.3.4.5.4** If a mixture is classified in more than one way, the method yielding the more conservative result shall be used.

#### **2.9.3.4.6** *Summation method*

##### **2.9.3.4.6.1** Classification procedure

**2.9.3.4.6.1.1** In general a more severe classification for mixtures overrides a less severe classification, e.g., a classification with chronic 1 overrides a classification with chronic 2. As a consequence the classification procedure is already completed if the results of the classification is chronic 1. A more severe classification than chronic 1 is not possible and it is not necessary therefore to undergo the further classification procedure.

##### **2.9.3.4.6.2** Classification for the acute category 1

**2.9.3.4.6.2.1** All ingredients classified as acute 1 shall be considered. If the sum of these ingredients is greater than or equal to 25% the whole mixture shall be classified as category acute 1. If the result of the calculation is a classification of the mixture as category acute 1, the classification process is completed.

**2.9.3.4.6.2.2** The classification of mixtures for acute hazards based on this summation of classified ingredients, is summarized in Table 2.9.1 below.

**Table 2.9.1: Classification of a mixture for acute hazards, based on summation of classified ingredients**

Sum of ingredients classified as:	Mixture is classified as:
Acute 1 $\times$ $M^1 \geq 25\%$	Acute 1

<sup>1</sup> For explanation of the M factor, see 2.9.3.4.6.4.

**2.9.3.4.6.3 Classification for the chronic categories 1, 2**

**2.9.3.4.6.3.1** First, all ingredients classified as chronic 1 are considered. If the sum of these ingredients is greater than or equal to 25% the mixture shall be classified as category chronic 1. If the result of the calculation is a classification of the mixture as category chronic 1 the classification procedure is completed.

**2.9.3.4.6.3.2** In cases where the mixture is not classified as chronic 1, classification of the mixture as chronic 2 is considered. A mixture shall be classified as chronic 2 if 10 times the sum of all ingredients classified as chronic 1 plus the sum of all ingredients classified as chronic 2 is greater than or equal to 25%. If the result of the calculation is classification of the mixture as chronic 2, the classification process is completed.

**2.9.3.4.6.3.3** The classification of mixtures for chronic hazards, based on this summation of classified ingredients, is summarized in Table 2.9.2 below.

**Table 2.9.2: Classification of a mixture for chronic hazards, based on summation of classified ingredients**

Sum of ingredients classified as:	Mixture is classified as:
Chronic 1 × M <sup>1</sup> ≥25%	Chronic 1
(M × 10 × Chronic 1)+Chronic 2 ≥25%	Chronic 2

<sup>1</sup> For explanation of the M factor, see 2.9.3.4.6.4.

**2.9.3.4.6.4 Mixtures with highly toxic ingredients**

**2.9.3.4.6.4.1** Acute category 1 ingredients with toxicities well below 1 mg/l may influence the toxicity of the mixture and are given increased weight in applying the summation of classification approach. When a mixture contains ingredients classified as acute or chronic category 1, the tiered approach described in 2.9.3.4.6.2 and 2.9.3.4.6.3 shall be applied using a weighted sum by multiplying the concentrations of acute category 1 ingredients by a factor, instead of merely adding up the percentages. This means that the concentration of “Acute 1” in the left column of Table 2.9.1 and the concentration of “Chronic 1” in the left column of Table 2.9.2 are multiplied by the appropriate multiplying factor. The multiplying factors to be applied to these ingredients are defined using the toxicity value, as summarized in Table 2.9.3 below. Therefore, in order to classify a mixture containing acute 1 and/or chronic 1 ingredients, the classifier needs to be informed of the value of the M factor in order to apply the summation method. Alternatively, the additivity formula (2.9.3.4.5.2) may be used when toxicity data are available for all highly toxic ingredients in the mixture and there is convincing evidence that all other ingredients, including those for which specific acute toxicity data are not available, are of low or no toxicity and do not significantly contribute to the environmental hazard of the mixture.

**Table 2.9.3: Multiplying factors for highly toxic ingredients of mixtures**

L(E)C <sub>50</sub> value	Multiplying factor (M)
$0.1 < L(E)C_{50} \leq 1$	1
$0.01 < L(E)C_{50} \leq 0.1$	10
$0.001 < L(E)C_{50} \leq 0.01$	100
$0.0001 < L(E)C_{50} \leq 0.001$	1000
$0.00001 < L(E)C_{50} \leq 0.0001$	10000
(continue in factor 10 intervals)	

**2.9.3.4.6.5** Classification of mixtures with ingredients without any useable information

**2.9.3.4.6.5.1** In the event that no useable information on acute and/or chronic aquatic hazard is available for one or more relevant ingredients, it is concluded that the mixture cannot be attributed (a) definitive hazard category(ies). In this event, the mixture shall be classified based on the known ingredients only with the additional statement that: “x percent of the mixture consists of ingredient(s) of unknown hazards to the aquatic environment.”

**2.9.3.5 Substances or mixtures dangerous to the aquatic environment not otherwise classified under the provisions of this Code**

**2.9.3.5.1** Substances or mixtures dangerous to the aquatic environment not otherwise classified under this Code shall be designated:

UN 3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.  
or  
UN 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.  
They shall be assigned to Packing Group III”.

**Consequential amendments:**

**Contents page:**

**Chapter 2.9** Replace “Class 9 – Miscellaneous dangerous substances and articles” with “Miscellaneous dangerous substances and articles (Class 9) and environmentally hazardous substances”.

2.9.3 Insert “2.9.3 Environmentally hazardous substances (aquatic environment)”

**Chapter 2.10**

**2.10.1** Replace definition with “*Marine pollutants* means substances which are subject to the provisions of Annex III of MARPOL 73/78, as amended.”

**2.10.2** Replace section with:

**“2.10.2 General provisions**

**2.10.2.1** Marine pollutants shall be transported under the provisions of Annex III of MARPOL 73/78, as amended.

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

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

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

**2.10.2.5** When a substance, material or article possesses properties that meet the criteria of a marine pollutant but is not identified in this Code, such substance, material or article shall be transported as a marine pollutant in accordance with the Code.

**2.10.2.6** With the approval of the competent authority (see 7.9.2), substances, materials or articles that are identified as marine pollutants in this Code but which no longer meet the criteria as a marine pollutant need not be transported in accordance with the provisions of this Code applicable to marine pollutants.”

**2.10.3** Replace section with:

**“2.10.3 Classification**

**2.10.3.1** Marine pollutants shall be classified in accordance with chapter 2.9.3.”

**2.10.4** Delete section

**Consequential amendments:**

**Contents page:**

2.10.2 Replace “Properties” with “General provisions”

2.10.3 Delete “of solutions, mixtures and isomers”

2.10.4 Delete “2.10.4 Guidelines for the identification of harmful substances in packaged form (marine pollutants)”

## PART 3

Replace “**and limited quantities exceptions**” with “**, special provisions and exceptions**” in the heading.

### Consequential amendment:

Contents page:

**PART 3** Replace “**AND LIMITED QUANTITIES EXCEPTIONS**” with “**, SPECIAL PROVISIONS AND EXCEPTIONS**”

### Chapter 3.1

**3.1.2** Delete “Where, in this Code, the term “Proper Shipping Name” is used, it is the “correct technical name” required by regulation 4 of Annex III of MARPOL 73/78, as amended.” in **Note 1**

**3.1.2.** Delete “3.4.5 and” in **Note 2**

**3.1.2.2.2** Amend the name to read: “ALKYLSULPHONIC ACIDS, SOLID or ARYLSULPHONIC ACIDS, SOLID” in UN 2583

**3.1.2.8.1.1** Resize printing to standard size (English only).

**3.1.2.8.1.3** Delete “If a package contains a marine pollutant, the recognized chemical name of the marine pollutant needs to be shown.”

**3.1.2.8.1.4** Renumber paragraph as 3.1.2.8.1.3

**3.1.2.9** Insert “Marine Pollutants”

**3.1.2.9.1** Insert “For generic or “not otherwise specified” (N.O.S.) entries, the proper shipping name shall be supplemented with the recognized chemical name of the marine pollutant.”

**3.1.2.9.2** Examples illustrating the selection of the Proper Shipping Name supplemented with the recognized technical name of goods for such entries are indicated below:

UN 1993, FLAMMABLE LIQUID, N.O.S. (propyl acetate, di-n-butyltin-di-2-ethylhexanoate), class 3, PG III, (50°C c.c.), MARINE POLLUTANT

UN 1263, PAINT (triethylbenzene), class 3, PG III, (27°C c.c.), MARINE POLLUTANT

**3.1.4.4.1**

**UN 1805** Replace “liquid” with “solution” (English and French only)

- UN 1811** Insert “, solid” after “hydrogendifluoride” (English and French only)
- UN 1848** Replace “90% by mas” with “less than 90% acid by mass” (English only)
- UN 2511** Replace “2-chloropropionic acid” with “2-Chloropropionic acid” (English only)
- UN 2531** Replace “inhibited” with “stabilized” (English only)
- UN 2740** Replace “*n*-Propyl” with “Propyl”
- UN 2794** Insert “2794 Batteries, wet filled with acid electric storage”
- 3.1.4.4.2**
- UN 2073** Replace “< 0.880 at 15°C in water” with “less than 0.880 at 15°C in water, with more than 35% but not more than 50% ammonia”
- 3.1.4.4.6**
- UN 2205** Replace “1,4-dicyanobutane” with “Adiponitryl”
- 3.1.4.4.7**
- UN 1794** Replace “> 3% free acid” with “more than 3% free acid”
- UN 2331** Replace “chlorate” with “choride” (English only)
- UN 2777** Replace “Mercury-based” with “Mercury based” (English only)
- UN 2778** Replace “Mercury-based” with “Mercury based” (English only)
- UN 2878** Insert a comma after the word “titanium” (twice) (English only)
- UN 3011** Replace “Mercury-based” with “Mercury based” (English and French only)
- UN 3012** Replace “Mercury-based” with “Mercury based” (English only)
- 3.1.4.4.8**
- UN 2208** Replace “>” with “more than” and “with not less” with “not more than”
- UN 2741** Replace “> 22%” with “more than 22%”
- 3.1.4.4.10**
- UN 1278** Replace “Propyl chloride” with “I-Chloropropane”
- UN 1702** Replace “Tetrachloroethane” with “1,1,2,2- Tetrachloroethane”

- UN 1991** Replace “inhibited” with “stabilized” (English only)
- UN 2339** Replace “2-bromobutane” with “2-Bromobutane” (English only)
- 3.1.4.4.11**
- UN 2777** Replace “Mercury-based” with “Mercury based” (English only)
- UN 2778** Replace “Mercury-based” with “Mercury based” (English only)
- UN 3011** Replace “Mercury-based” with “Mercury based” (English only)
- UN 3012** Replace “Mercury-based” with “Mercury based” (English only)
- 3.1.4.4.12**
- UN 1487** Replace “mixtures” with “mixture” (English only)
- 3.1.4.4.15**
- UN 1383** Insert “pyrophoric” before the word “metal” (English and French only)
- 3.1.4.4.18**
- UN 2672** Insert a comma before the words “by mass” (English only)
- UN 2073** Add “in water” after “at 15°C”

### **Consequential amendments**

- 5.4.1.4.3.5** Insert “and for generic or not otherwise specified” (N.O.S.) entries, the proper shipping name shall be supplemented with the recognized chemical name of the marine pollutant (see 3.1.2.9).”

## **Chapter 3.2**

- 3.2.1** Replace the running title “Dangerous goods list” with the title “Dangerous Goods List” (English only)
- Column 1** Replace “Committee” with “Sub-Committee”
- Column 4** Replace section with:
- “**Subsidiary risk(s)** – this column contains the class number(s) of any subsidiary risk(s) which have been identified by applying the classification system described in part 2. This column also identifies a dangerous good as a marine pollutant as follows:

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

**Column 7** Replace section with:

“Column 7a “Limited Quantities” – this column provides the maximum quantity per inner packaging or article for transporting dangerous goods as limited quantities in accordance with chapter 3.4.

Column 7b “Excepted Quantities” – this column provides an alpha numeric code described in sub-section 3.5.1.2 which indicates the maximum quantity per inner and outer packaging for transporting dangerous goods as excepted quantities in accordance with chapter 3.5.”

**Column 12** Replace paragraph with “(Reserved)”

**Column 13** Delete “UN”

### 3.2.2 Abbreviations and symbols

**Table** Delete lines 3 and 5

#### Dangerous goods list

**Column (7)** Renumber as column (7a)

**Column (7b)** Insert new column headed “Excepted quantities”

**Column (7a/b)** Insert common heading “Limited and Excepted quantity provisions”

**Column 12** Delete column

**Column 13** Replace “UN t” with “T”

Insert a new row below the headings with the corresponding reference paragraphs as follows:

	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
	3.1.2	2.0	2.0	2.0.1.3	3.3	3.4	3.5	4.1.4	4.1.4	4.1.4	4.1.4

Insert a new row below the headings with the corresponding reference paragraphs as follows:

(13)	(14)	(15)	(16)	(17)
4.2.5	4.2.5	5.4.3.2	7.1	
4.3		7.3	7.2	

Replace column (7) with split column (7a) and (7b)

<b>Limited and Excepted quantity provisions</b>	
<b>LQ (7a)</b>	<b>EQ (7b)</b>

UN 2031 PG II

Replace entry with:

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
<b>2031</b>	NITRIC ACID other than red fuming, with at least 65% but with not more than 70% nitric acid	8	5.1	II	-	1/	E2	P001	PP81	IBC02	B15 B20
<b>2031</b>	NITRIC ACID, other than red fuming, with less than 65% nitric acid	8	-	II	-	1/	E2	P001	PP81	IBC02	B15 B20

(13)	(14)	(15)	(16)	(17)	(18)
T8	TP2	F-A, S-Q	Category D. Segregation as for class 5.1 but “Separated from” classes 4.1, 5.1 and 7	Colourless liquid. Oxidant; may cause fire in contact with organic materials such as wood, cotton or straw, evolving highly toxic gases (brown fumes). Highly corrosive to most metals. Causes severe burns to skin, eyes, mucous membranes.	<b>2031</b>
T8	TP2	F-A, S-B	Category D	See entry above.	<b>2031</b>

UN Nos. 3334 and 3335

Replace entries with:

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
<b>3334</b>	AVIATION REGULATED LIQUID N.O.S	9	-	-	960	-	-	-	-	-	-
<b>3335</b>	AVIATION REGULATED SOLID, N.O.S	9	-	-	960	-	-	-	-	-	-

(13)	(14)	(15)	(16)	(17)	(18)
-	-	-	-	Not subject to the provisions of this Code but may be subject to provisions governing the transport of dangerous goods by other modes.	<b>3334</b>
-	-	-	-	Not subject to the provisions of this Code but may be subject to provisions governing the transport of dangerous goods by other modes.	<b>3335</b>

**Column (1)** Renumber “UN 0333, 1.4S” as “UN 0337”**Column (2)** Insert a comma after the words “30% water” for UN 0114**Column (2)** Insert a comma after the words “20% water” for UN 0129

- Column (2)** Insert a comma after the words “20% water” for UN 0135
- Column (2)** Delete the comma after the word “wetted” for UN 0220 (English only)
- Column (2)** Insert a comma after the word “carbon” for UN 0222 (English only)
- Column (2)** Delete “,” after “... RDX” for UN 0391
- Column (2)** Delete the comma after the word “RDX” for UN 0391 (English only)
- Column (2)** Insert “, PENTHRITE” before “, PETN” for UN 0411 (French)
- Column (2)** Delete “-” after “, PLASTICS” for UN 0459
- Column (2)** Delete “-” after “, PLASTICS” for UN 0460
- Column (2)** Delete the comma after “NITRITE” for UN 1194 (English only)
- Column (2)** Insert “(PICRIC ACID)” after “TRINITROPHENOL” for UN 1344
- Column (2)** Insert “(TNT)” after “TRINITROTOLUENE” for UN 1356
- Column (2)** Insert commas after “12%” and “15”, respectively for UN 1374 (English only)
- Column (2)** Insert a comma after the word “acid” and before the words “by mass” for UN 1779 (English and French only)
- Column (2)** Replace “hydrofluoric acid” with “hydrogen fluoride” for UN 1790
- Column (2)** Delete “solution” for UN 1790 (twice) (French)
- Column (2)** Insert a comma after the word “90%” and before the words “by mass” for UN 1848 (English and French only)
- Column (2)** Insert a comma after the word “12%” and before the words “by mass” for UN 2216 (English and French only)
- Column (2)** Replace “ISOCYANATES” with “ISOCYANATE” (twice) for UN 2478 (English only)
- Column (2)** Insert a comma after the word “ammonia” and before the words “by mass” for UN 2672 (English and French only)
- Column (2)** Insert a comma after the word “PENTOXIDE” and before the word “non-fused” for UN 2862
- Column (2)** Delete the comma after the words “N.O.S” for UN 2903 (English only)
- Column (2)** Insert a comma before the words “non-fissile” for UN 2912 (English and Spanish only)

- Column (2)** Insert a comma before the words “non-fissile” for UN 2916 (English and Spanish only)
- Column (2)** Insert a comma before the words “non-fissile” for UN 2917 (English and Spanish only)
- Column (2)** Insert a comma before the words “non-fissile” for UN 2919
- Column (2)** Replace “LITHIUM BATTERIES” with “LITHIUM METAL BATTERIES (including lithium alloy batteries)” for UN 3090
- Column (2)** Insert “METAL” after “LITHIUM” for UN 3091 (twice)  
Insert “(including lithium alloy batteries)” after “WITH EQUIPMENT”
- Column (2)** Insert a comma after the word “acid” and before the word “STABILIZED” for UN 3149 (English only)
- Column (2)** Delete comma after the word “ALCOHOL” and before the word “with” for UN 3294 (English only)
- Column (2)** Insert a comma after the word “water” and before the words “by mass” for UN 3317 (English and French only)
- Column (2)** Insert a comma before the word “non-fissile” for UN 3323 (English only)
- Column (2)** Insert a comma before the word “non-special form” for UN 3327
- Column (2)** Insert a comma before the word “non-fissile” for UN 3332 (English and Spanish only)
- Column (2)** Add “,” after “... LIQUID” for UN 3334
- Column (2)** Insert “(PENTAERYTHRITOL TETRANITRATE; PETN)” after “... TETRANITRATE” for UN 3344
- Column (2)** Add “,” after “TOXINS” for UN 3462 PG I, II and III
- Column (2)** Insert “or HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM CONTAINED IN EQUIPMENT or HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM PACKED WITH EQUIPMENT” after “... STORAGE SYSTEM” for UN 3468
- Column (2)** Replace “FUEL CELL CARTRIDGES” with “FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT” for UN 3473

**Column (4)** Delete “●” for:

No PG UN Nos. 1075, 1078, 1950, 1953, 1954, 1955, 1956, 1964, 1965, 1967, 1968, 3156, 3157, 3158, 3160, 3161, 3162, 3163, 3164, 3167, 3168, 3169, 3303, 3304, 3305, 3306, 3307, 3308, 3309, 3310, 3311, 3312, 3319, 3343, 3354 and 3355

PG I UN Nos. 1133, 1139, 1263, 1268, 1383, 1389, 1392, 1409, 1421, 1479, 1544, 1556, 1557, 1583, 1601, 1602, 1693, 1694, 1759, 1760, 1866, 1903, 1986, 1988, 1989, 1992, 1993, 2430, 2570, 2588, 2630, 2733, 2734, 2735, 2757, 2758, 2759, 2760, 2761, 2762, 2763, 2764, 2771, 2772, 2775, 2776, 2779, 2780, 2781, 2782, 2783, 2784, 2801, 2810, 2811, 2813, 2845, 2846, 2902, 2903, 2920, 2921, 2922, 2923, 2924, 2927, 2928, 2929, 2930, 2988, 2991, 2992, 2993, 2994, 2995, 2996, 2997, 2998, 3005, 3006, 3009, 3010, 3013, 3014, 3015, 3016, 3017, 3018, 3021, 3024, 3025, 3026, 3027, 3084, 3085, 3086, 3087, 3093, 3094, 3095, 3096, 3098, 3099, 3100, 3121, 3122, 3123, 3124, 3125, 3129, 3130, 3131, 3132, 3134, 3135, 3137, 3139, 3140, 3142, 3143, 3145, 3147, 3148, 3172, 3194, 3200, 3208, 3209, 3259, 3260, 3261, 3262, 3263, 3264, 3265, 3266, 3267, 3273, 3275, 3276, 3278, 3279, 3280, 3281, 3282, 3283, 3284, 3285, 3286, 3287, 3288, 3289, 3290, 3295, 3301, 3336, 3345, 3346, 3347, 3348, 3349, 3350, 3351, 3352, 3381, 3382, 3383, 3384, 3385, 3386, 3387, 3388, 3389, 3390, 3391, 3392, 3393, 3394, 3395, 3396, 3397, 3398, 3399, 3401, 3402, 3439, 3440, 3448, 3449, 3462, 3464, 3465, 3466, 3467 and 3469

PG II UN Nos. 1133, 1139, 1169, 1197, 1203, 1224, 1228, 1263, 1266, 1268, 1287, 1293, 1300, 1306, 1325, 1393, 1409, 1450, 1458, 1459, 1461, 1462, 1477, 1479, 1482, 1483, 1544, 1556, 1557, 1564, 1583, 1601, 1602, 1693, 1719, 1740, 1759, 1760, 1851, 1866, 1903, 1908, 1986, 1987, 1988, 1989, 1992, 1993, 1999, 2206, 2430, 2478, 2557, 2570, 2588, 2627, 2733, 2734, 2735, 2742, 2757, 2758, 2759, 2760, 2761, 2762, 2763, 2764, 2771, 2772, 2775, 2776, 2779, 2780, 2781, 2782, 2783, 2784, 2801, 2810, 2811, 2813, 2837, 2902, 2903, 2920, 2921, 2922, 2923, 2924, 2925, 2926, 2927, 2928, 2929, 2930, 2985, 2986, 2987, 2991, 2992, 2993, 2994, 2995, 2996, 2997, 2998, 3005, 3006, 3009, 3010, 3013, 3014, 3015, 3016, 3017, 3018, 3021, 3024, 3025, 3026, 3027, 3066, 3071, 3080, 3084, 3085, 3086, 3087, 3088, 3089, 3093, 3094, 3095, 3096, 3097, 3098, 3099, 3100, 3121, 3122, 3123, 3124, 3125, 3126, 3127, 3128, 3129, 3130, 3131, 3132, 3133, 3134, 3135, 3139, 3140, 3142, 3143, 3147, 3148, 3172, 3175, 3176, 3178, 3179, 3180, 3181, 3182, 3183, 3184, 3185, 3186, 3187, 3188, 3189, 3190, 3191, 3192, 3205, 3206, 3208, 3209, 3210, 3211, 3212, 3213, 3214, 3218, 3219, 3243, 3244, 3248, 3249, 3259, 3260, 3261, 3262, 3264, 3265, 3266, 3267, 3269, 3271, 3272, 3273, 3274, 3275, 3276, 3277, 3278, 3279, 3280, 3281, 3282, 3283, 3284, 3285, 3286, 3287, 3288, 3289, 3290, 3295, 3301, 3336, 3344, 3345, 3346, 3347, 3348, 3349, 3350, 3351, 3352, 3357, 3361, 3362, 3395, 3396, 3397, 3398,

3399, 3400, 3407, 3439, 3440, 3448, 3462, 3464, 3465, 3466, 3467,  
3469, 3470 and 3471

PG III UN Nos. 1133, 1139, 1169, 1197, 1224, 1228, 1263, 1266, 1268, 1287,  
1293, 1300, 1306, 1325, 1353, 1373, 1458, 1459, 1477, 1479, 1481,  
1482, 1483, 1544, 1556, 1557, 1564, 1583, 1601, 1602, 1719, 1740,  
1759, 1760, 1851, 1866, 1903, 1908, 1986, 1987, 1988, 1989, 1992,  
1993, 1999, 2006, 2206, 2238, 2319, 2430, 2478, 2570, 2588, 2623,  
2667, 2693, 2733, 2735, 2757, 2759, 2761, 2763, 2771, 2775, 2779,  
2781, 2783, 2801, 2810, 2811, 2813, 2837, 2856, 2902, 2903, 2904,  
2905, 2922, 2923, 2924, 2925, 2926, 2991, 2992, 2993, 2994, 2995,  
2996, 2997, 2998, 3005, 3006, 3009, 3010, 3013, 3014, 3015, 3016,  
3017, 3018, 3025, 3026, 3027, 3066, 3077, 3082, 3085, 3087, 3088,  
3089, 3097, 3098, 3099, 3126, 3127, 3128, 3129, 3130, 3131, 3132,  
3133, 3134, 3135, 3139, 3140, 3142, 3143, 3145, 3145, 3147, 3148,  
3172, 3176, 3178, 3179, 3180, 3181, 3182, 3183, 3184, 3185, 3186,  
3187, 3188, 3189, 3190, 3191, 3192, 3205, 3206, 3208, 3209, 3210,  
3211, 3213, 3215, 3216, 3218, 3219, 3248, 3249, 3256, 3257, 3258,  
3259, 3260, 3261, 3262, 3263, 3263, 3264, 3265, 3266, 3267, 3269,  
3271, 3272, 3276, 3278, 3280, 3281, 3282, 3283, 3284, 3285, 3287,  
3288, 3295, 3336, 3345, 3347, 3348, 3349, 3351, 3352, 3395, 3396,  
3397, 3398, 3399, 3400, 3407, 3439, 3440, 3462, 3464, 3465, 3466,  
3467, 3469 and 3471

**Column (4)** Replace “PP” with “P” for:

PG I UN Nos. 1259, 1381, 1626, 1698, 1699, 2024, 2025, 2026, 2316, 2317,  
2447, 2471, 2777, 2778, 2786, 2787, 2788, 3011, 3012, 3019, 3020, 3146  
and 3450

PG II UN Nos. 1587, 1623, 1624, 1625, 1627, 1629, 1630, 1631, 1634, 1636,  
1637, 1639, 1640, 1641, 1642, 1643, 1644, 1645, 1646, 1653, 1674,  
1679, 1894, 1895, 2024, 2025, 2026, 2315, 2567, 2574, 2777, 2778,  
2786, 2787, 2788, 3011, 3012, 3019, 3020, 3146, 3151, 3152, 3155 and  
3432

PG III UN Nos. 2024, 2025, 2026, 2046, 2279, 2518, 2777, 2786, 2788, 3011,  
3012, 3019, 3020 and 3146

**Column (4)** Replace “0” with “-” for UN 0004

**Column (4)** Insert “5.1” for UN 1017

**Column (4)** Replace “5.1P” with “5.1” over “P” for UN 2727 (English only)

**Column (4)** Replace “172” with “SP 172” for UN 3322 (English only)

**Column (5)** Replace “I” with “II” for UN Nos. 1250 and 1305

**Column (6)** Insert “332” for UN 1474

**Column (6)** Insert “340” for UN Nos. 3269 and 3316

**Column (6)** Insert “179” for UN Nos. 3077 and 3082

**Column (6)** Insert “335” for UN Nos. 3077 and 3082

**Column (6)** Insert “341” for UN Nos. 2814, 2900 and 3373

**Column (6)** Delete “330” for UN Nos. 1170, 1987 and 1993

**Column (6)** Delete “918” for UN No. 1357

**Column (6)** Delete “944” for:

PG II UN Nos. 1133, 1139, 1169, 1197, 1203, 1224, 1228, 1263, 1266, 1268, 1287, 1293, 1300, 1306, 1325, 1450, 1458, 1459, 1461, 1462, 1477, 1479, 1481, 1482, 1483, 1719, 1740, 1759, 1760, 1866, 1903, 1908, 1986, 1987, 1988, 1989, 1992, 1993, 1999, 2430, 2478, 2627, 2733, 2734, 2735, 2758, 2760, 2762, 2764, 2772, 2776, 2780, 2782, 2784, 2801, 2920, 2921, 2922, 2923, 2924, 3021, 3024, 3066, 3084, 3085, 3087, 3089, 3093, 3095, 3096, 3098, 3099, 3139, 3145, 3147, 3175, 3178, 3179, 3180, 3181, 3182, 3210, 3211, 3212, 3214, 3218, 3219, 3244, 3248, 3259, 3260, 3261, 3262, 3263, 3264, 3265, 3266, 3267, 3269, 3271, 3272, 3273, 3274, 3286, 3295, 3336, 3346, 3350, 3407, 3469, 3470 and 3471

PG III UN Nos. 1133, 1139, 1169, 1197, 1224, 1228, 1263, 1266, 1268, 1287, 1293, 1300, 1306, 1325, 1353, 1458, 1459, 1477, 1479, 1481, 1482, 1483, 1544, 1556, 1557, 1564, 1583, 1601, 1602, 1719, 1740, 1759, 1760, 1851, 1866, 1903, 1908, 1986, 1987, 1988, 1989, 1992, 1993, 1999, 2206, 2319, 2430, 2478, 2570, 2588, 2623, 2667, 2693, 2733, 2735, 2757, 2759, 2761, 2763, 2771, 2775, 2779, 2781, 2783, 2801, 2810, 2811, 2813, 2837, 2856, 2902, 2903, 2904, 2905, 2922, 2923, 2924, 2925, 2926, 2991, 2992, 2993, 2994, 2995, 2996, 2997, 2998, 3005, 3006, 3009, 3010, 3013, 3014, 3015, 3016, 3017, 3018, 3025, 3026, 3027, 3066, 3077, 3082, 3085, 3087, 3089, 3098, 3099, 3134, 3139, 3140, 3142, 3143, 3145, 3147, 3148, 3172, 3178, 3179, 3180, 3181, 3182, 3208, 3210, 3211, 3213, 3215, 3216, 3218, 3219, 3248, 3249, 3259, 3260, 3261, 3262, 3263, 3264, 3265, 3266, 3267, 3269, 3271, 3272, 3276, 3278, 3280, 3281, 3282, 3283, 3284, 3285, 3287, 3288, 3295, 3336, 3345, 3347, 3348, 3349, 3351, 3352, 3407, 3439, 3440, 3462, 3464, 3465, 3466, 3467, 3469 and 3471

**Column (7a)** Replace “None” with “0” wherever it appears

**Column (7a)** Replace “3 l” with “1 l” for UN 1170, PG II

**Column (7a)** Replace “g” and “kg” with “m<sup>l</sup>” and “l” respectively for UN 3148 PG II and PG III

**Column (7a)** Replace “1 l” with “0” for UN 1818

**Column (7a)** Replace “500 m<sup>l</sup>” with “1 l” for UN 2315, UN 2778, UN 2787 and UN 3151, PG II

Replace “500 g” with “1 kg” for UN 3152 and UN 3432, PG II

**Column (7a)** Replace “500 m<sup>l</sup>” with “5 l” for UN 2024, UN 2046, UN 2279, UN 2518, UN 2788, UN 3011, UN 3012, UN 3019 and UN 3020, PG III

Replace “500 g” with “5 kg” for UN 2025, UN 2026, UN 2777, UN 2786 and UN 3146, PG III

**Column (7b)** Insert “E0” for:

All goods of classes 1, 2.1, 2.3, 5.2, 6.2 and 7

All goods of class 2.2 with a subsidiary risk in column (4) and UN Nos. 1044, 1950, 2037, 2857 and 3164

UN Nos. 1204, 2059, 3064, 3256, 3343, 3357, 3379 and 3473 in class 3

All goods of class 3 with a subsidiary risk in column (4), PG I

All goods of class 4.1, PG I, and UN Nos. 1327, 2304, 2448, 2555, 2556, 2557, 2907, 3176 (PG II and PG III), 3221 to 3240, 3319, 3344 and 3360

All goods of class 4.2, PG I, and UN 1856

All goods of class 4.3, PG I, and UN 3292

All goods of class 5.1, PG I and UN Nos. 2426 and 3356

All goods of class 8, PG I, and UN Nos. 1774, 2028, 2215 (MOLTEN), 2576, 2794, 2795, 2800, 2803, 2809 and 3028

UN Nos. 1845, 2807, 2990, 3072, 3090, 3091, 3166, 3171, 3245, 3257, 3258, 3268, 3359 and 3363 of class 9

UN Nos. 1600, 1700, 2016, 2017, 2312 and 3250 of class 6.1

**Column (7b)** Insert “E1” for:

All goods of class 2.2 without subsidiary risk in column (4)

All goods of class 3 without a subsidiary risk in column (4), PG III, except for UN Nos. 2059, 3256 and 3269

All goods of class 3 with a subsidiary risk in column (4), PG III

All goods of class 4.1, PG III, except for UN Nos. 2304, 2448 and 3176

All goods of class 4.2, PG III

All goods of class 4.3, PG III

All goods of class 5.1, PG III

All goods of class 6.1, PG III

All goods of class 8, PG III, except for UN Nos. 2215 (MOLTEN), 2803 and 2809

All goods of class 9, PG III, except for UN 1845, 2807, 3257, 3258 and 3268

**Column (7b)** Insert “E2” for:

All goods of class 3 without a subsidiary risk in column (4), PG II, except for UN Nos. 1204, 2059, 3064, 3269 and 3357

All goods of class 3 with a subsidiary risk in column (4), PG II

All goods of class 4.1, PG II, except for UN Nos. 2555, 2556, 2557, 2907, 3176, 3319 and 3344

All goods of class 4.2, PG II

All goods of class 4.3, PG II, except for UN 3292

All goods of class 5.1, PG II, except for UN 3356

All goods of class 8, PG II, except for UN Nos. 1774, 2028 and 2576

All goods of class 9, PG II, except for UN Nos. 3090, 3091, 3480 and 3481

**Column (7b)** Insert “E3” for all goods of class 3 without a subsidiary risk in column (4), PG I, except for UN Nos. 2059 and 3379

**Column (7b)** Insert “E4” for all goods of class 6.1, PG II, except for UN Nos. 1600, 1700, 2016, 2017, 2312 and 3250

**Column (7b)** Insert “E5” for all goods of class 6.1, PG I

**Column (7b)** Insert “See SP340” for UN Nos. 3269 and 3316

- Column (8)** Replace “P003” with “P004” for UN 3473
- Column (8)** Replace “P001” with “P010” for UN Nos. 1162, 1196, 1250, 1298, 1305, 1724, 1728, 1747, 1753, 1762, 1763, 1766, 1767, 1769, 1771, 1781, 1784, 1799, 1800, 1801, 1804, 1816, 2434, 2435, 2437, 2985, 2986, 2987, 3361 and 3362
- Column (8)** Replace “P601” with “P804” for UN 1744
- Column (8)** Replace “P001” with “P010” for UN 1818
- Column (9)** Delete “PP6” for UN Nos. 1851, 3248 and 3249, PG II and PG III
- Column (9)** Delete “PP88” for UN 3473
- Column (9)** Insert “PP1” for UN 3082
- Column (9)** Insert “PP31” for UN 3398 and UN 3399, PG I, PG II and PG III
- Column (9)** Delete “PP82” for UN 1744
- Column (10)** Insert “IBC02” for UN 2059 PG II
- Column (10)** Insert “IBC03” for UN 2059 PG III
- Column (10)** Delete “IBC01” for UN Nos. 3361 and 3362
- Column (10)** Delete “IBC02” for UN Nos. 1162, 1196, 1298, 1724, 1728, 1747, 1753, 1762, 1763, 1766, 1767, 1769, 1771, 1781, 1784, 1799, 1800, 1801, 1804, 1816, 1818, 2434, 2435, 2437, 2985, 2986 and 2987
- Column (11)** Insert “B2” and “B4” for UN 3432
- Column (11)** Insert “B2” for UN Nos. 1463, 1473, 1484, 1485, 1487, 1488, 1490, 1493, 1494, 1495, 1512, 1514, 1751, 2465, 2468, 2627 and 3247
- Column (11)** Replace “T7” with “-” for UN 2949
- Column (13)** Insert “BK2” for UN Nos. 2814 and 3373
- Column (13)** Delete “only for animal carcasses” for UN 2900
- Column (13)** Insert “T9” for UN Nos. 2813 and 3131, PG I
- Column (13)** Replace “T11” with “T10” for UN Nos. 1250 and 1305
- Column (13)** Replace “T14” with “T22” for UN Nos. 1092, 1238, 1239 and 1244, PG I
- Column (13)** Replace “T14” with “T20” for UN Nos. 1098, 1143, 1163, 1595, 1695, 1752, 1809, 2334, 2337, 2646 and 3023, PG I

**Column (13)** Replace “T7” with “T10” for UN Nos. 1162, 1196, 1298, 1724, 1728, 1747, 1753, 1762, 1763, 1766, 1767, 1769, 1771, 1781, 1784, 1799, 1800, 1801, 1804, 1816, 1818, 2434, 2435 and 2437

**Column (13)** Replace “T10” with “T14” for UN Nos. 1183, 1242 and 2988

**Column (13)** Insert “T22” for UN Nos. 1185, 1994 and 2480, PG I

**Column (13)** Replace “T11” with “T14” for UN Nos. 2985, 2986, 3361 and 3362

**Column (13)** Replace “T10” with “T20” for UN 1569

**Column (13)** Insert “T20” for UN 1647, PG I

**Column (13)** Insert “TP2” and “TP13” for UN 1647, PG I

**Column (13)** Replace “TP2” with “T7” for UN 2949

**Column (13)** Insert “BK2” for UN 3077

**Column (13)** Insert “T14” for UN 3129 PG I

**Column (13)** Insert “T11” for UN 3129 PG II

**Column (13)** Insert “T7” for UN 3129 PG III

**Column (13)** Insert “T9” for UN 3148 PG I

**Column (13)** Insert “T7” for UN 3148 PG II

**Column (13)** Insert “T7” for UN 3148 PG III

**Column (14)** Delete “TP9” for:

PG I UN Nos. 1268, 1383, 1544, 1556, 1557, 1588, 1601, 1655, 1759, 1760, 1935, 1986, 1988, 1989, 1992, 1993, 2025, 2026, 2430, 2588, 2733, 2734, 2735, 2758, 2760, 2762, 2764, 2772, 2776, 2778, 2780, 2782, 2784, 2787, 2788, 2801, 2810, 2811, 2845, 2902, 2903, 2920, 2921, 2922, 2923, 2924, 2927, 2928, 2929, 2930, 2988, 2991, 2992, 2993, 2994, 2995, 2996, 2997, 2998, 3005, 3006, 3009, 3010, 3011, 3012, 3013, 3014, 3015, 3016, 3017, 3018, 3019, 3020, 3021, 3024, 3025, 3026, 3084, 3086, 3095, 3096, 3124, 3125, 3143, 3145, 3146, 3147, 3200, 3259, 3260, 3261, 3262, 3263, 3264, 3265, 3266, 3267, 3273, 3275, 3276, 3278, 3279, 3280, 3281, 3282, 3283, 3284, 3285, 3286, 3287, 3288, 3289, 3290, 3295, 3345, 3346, 3347, 3348, 3349, 3350, 3351, 3352, 3381, 3382, 3383, 3384, 3385, 3386, 3387, 3388, 3389, 3390, 3439, 3440, 3448, 3462, 3464, 3465, 3466, and 3467

**Column (14)** Delete “TP12” for:

PG I UN Nos. 1739, 1744, 1745, 1746, 1754, 1758, 1777, 1786, 1790, 1796, 1798, 1826, 1828, 1829, 1831, 1834, 1836, 1873, 2031, 2032, 2240, 2692, 2699, 2879, and 3246

PG II UN Nos. 1716, 1717, 1736, 1737, 1738, 1742, 1743, 1755, 1764, 1768, 1776, 1778, 1782, 1789, 1790, 1796, 1817, 1826, 1830, 1832, 1906, 2031, 2308, 2353, 2513, 2571, 2584, 2796, and 2817

PG III UN Nos. 1755, 1789 and 2817

**Column (14)** Insert “TP27” for UN Nos. 3361 and 3362

**Column (14)** Insert “TP35” for UN Nos. 1092, 1238, 1239 and 1244, PG I

**Column (14)** Insert “TP35” for UN Nos. 1098, 1143, 1163, 1595, 1695, 1752, 1809, 2334, 2337, 2646 and 3023, PG I

**Column (14)** Insert “TP7” for UN Nos. 1162, 1196, 1250, 1298, 1305, 1724, 1728, 1747, 1753, 1762, 1763, 1766, 1767, 1769, 1771, 1781, 1784, 1799, 1800, 1801, 1804, 1816, 2434, 2435, 2437, 2985, 2986, 2987, 3361 and 3362

**Column (14)** Insert “TP2” and “TP13” for UN Nos. 1185, 1994 and 2480, PG I

**Column (14)** Insert “TP13” for UN 1239, PG I, and for UN Nos. 1781, 1804, 1818, 2986 and 2987

**Column (14)** Insert “TP7” for UN Nos. 2813 and 3131, PG I

**Column (14)** Insert “TP33” for UN Nos. 2813 and 3131, PG I

**Column (14)** Replace “-” with “TP2” for UN 2949

**Column (14)** Insert “TP2” and “TP7” for UN 3129 PG I

**Column (14)** Insert “TP2” for UN 3129 PG II

**Column (14)** Insert “TP1” for UN 3129 PG III

**Column (14)** Insert “TP2” and “TP7” for UN 3148 PG I

**Column (14)** Insert “TP2” for UN 3148 PG II

**Column (14)** Insert “TP1” for UN 3148 PG III

**Column (14)** Insert “TP9” for UN 3375

**Column (16)** Replace “chlorates and perchlorates” with “chlorates or perchlorates” for UN 0082

**Column (16)** Replace the words “siftproof” and “packaging” with the words “sift-proof” and “packages”, respectively for UN 0160 (English only)

**Column (16)** Replace the words “siftproof” and “packaging” with the words “sift-proof” and “packages”, respectively for UN 0161 (English only)

**Column (16)** Insert a full stop at the end of the sentence for UN 0243 (English only)

**Column (16)** Insert a full stop at the end of the sentence for UN 0244 (English only)

**Column (16)** Insert a full stop at the end of the sentence for UN 0245 (English only)

**Column (16)** Delete the comma after the words “WHITE PHOSPHORUS” for UN 0246 (English and French only)

**Column (16)** Insert a full stop at the end of the sentence for UN 0248 (English only)

**Column (16)** Insert a full stop at the end of the sentence for UN 0248 (English only)

**Column (16)** Insert a full stop at the end of the sentence for UN 0249 (English only)

**Column (16)** Insert a full stop at the end of the sentence for UN 0250 (English only)

**Column (16)** Insert a full stop at the end of the sentence for UN 0303 (English only)

**Column (16)** Insert a full stop at the end of the sentence for UN 0332 (English only)

Replace “chlorates and perchlorates” with “chlorates or perchlorates”

**Column (16)** Insert a full stop at the end of the sentence for UN 0354 (English only)

**Column (16)** Insert a full stop at the end of the sentence for UN 0355 (English only)

**Column (16)** In the first sentence, insert a semi-colon after the word “stowage” for UN 0498 (English only)

**Column (16)** In the first sentence, insert a semi-colon after the word “stowage” for UN 0499 (English only)

**Column (16)** Insert “Segregation as for class 5.1 but “Separated from” class 7 for UN 1017

**Column (16)** Replace “Category B” with “Category D” for UN 1082

**Column (16)** Insert the words “goods of” before the words “class 1” for UN 1131 (English only)

**Column (16)** Insert the words “goods of” before the words “class 1” for UN 1259 (English only)

- Column (16)** Insert a full stop at the end of the sentence for UN 1386 (English only)
- Column (16)** Insert the word “is” after “stowage” and before “recommended” for UN 1363 (English and French only)
- Column (16)** Insert after “ammonium compounds” “, other than AMMONIUM PERSULPHATE (UN 1444),” for UN 1492 and UN 1505
- Column (16)** Remove the parentheses around the words “c.c.” for UN 2211
- Column (16)** Replace “carbon tetrachloride” with “CARBON TETRACHLORIDE (UN 1846)” for UN 3254
- Column (16)** Delete “UN 3052 and UN 3461” for UN 2716
- Column (16)** Insert the words “goods of” after “carrying” and before “class 1” for UN 3194 (English and French only)
- Column (16)** Insert “However the segregation provisions concerning ammonium compounds do not apply to mixtures of ammonium persulphates and/or potassium persulphates and/or sodium persulphates” for UN 3215
- Column (16)** Replace “Category E” with “Category D” for UN 3399 PG I and II
- Column (17)** Insert “For ships transporting an INF cargo as defined in regulation VII/14 of the SOLAS Convention, 1974, as amended, refer also to the INF Code.” For UN Nos. 2916, 2917, 2919, 3323, 3328, 3329, 3330 and 3331.
- Column (17)** Insert a full stop at the end of the sentence for UN 0018 (English only)
- Column (17)** In the second sentence, replace “substance” with “substances” for UN 0151 (English only)
- Column (17)** Replace “substances” with “substance” for UN 0216 (English only)
- Column (17)** Insert a full stop at the end of the sentence for UN 0246 (English only)
- Column (17)** Insert quotation marks after “WEAPONS, BLANK” and before “CARTRIDGES” for UN 0338 (English and French only)
- Column (17)** Insert quotation marks after “PROJECTILE” and before “CARTRIDGES” for UN 0339 (English and French only)
- Column (17)** Insert a comma after the word “CASES” for UN 0446
- Column (17)** Insert a comma after the word “CASES” for UN 0447
- Column (17)** Move the sentence “Highly irritating to skin, eyes and mucous membranes” to the end of the text for UN 1005

- Column (17)** Insert “Powerful oxidant which may cause fire” after “mucous membranes.” for UN 1017
- Column (17)** Insert “%” after “1.6” for UN 1088 (English only)
- Column (17)** Delete the comma after the word “liquid” for UN 1092
- Column (17)** Insert a colon after the words “Explosive limits” for UN 1106 (English only)
- Replace the comma after “22%” with a full stop for UN 1106 (English only)
- Column (17)** Move the sentence “Toxic if swallowed, by skin contact or by inhalation” to the end of the text for UN 1131
- Column (17)** Remove the sentence “reacts violently with acids” from the end of the text and insert it before “Highly toxic if swallowed...” for UN 1163
- Column (17)** Replace “Flashpoint” with “flashpoint” for UN 1170 (English only)
- Column (17)** Insert a colon after the word “product” for UN 1194 (English only)
- Column (17)** Remove the sentence “Reacts violently with acids” and insert it before the sentence “Causes burns...” for UN 1235
- Column (17)** Remove the sentence “Reacts violently with acids” and insert it after the sentence “Miscible with water.” For UN 1244
- Column (17)** Delete the comma before the word “cotton” for UN 1318
- Column (17)** Replace “explosive” with “explosives” for UN 1321
- Column (17)** Delete the comma after the words “such as” for UN 1350 (English and Spanish only)
- Column (17)** Move the sentence “Harmful if swallowed or by skin contact” to the end of the text for UN 1354
- Column (17)** Move the sentence “Harmful if swallowed or by skin contact” to the end of the text for UN 1356
- Column (17)** Replace “acid” with “acids” for UN 1390 (English only)
- Column (17)** Replace “acid” with “acids” for UN 1405 (English only)
- Column (17)** Insert a comma after the word “fire” and before the word “may” for UN 1455 (English and Spanish only)
- Column (17)** Insert a comma after the word “fire” and before the word “may” for UN 1456 (English and Spanish only)

- Column (17)** Insert a comma after the word “fire” and before the word “may” for UN 1458 (English and Spanish only)
- Column (17)** Insert a comma after the word “fire” and before the word “may” for UN 1459 (English and Spanish only)
- Column (17)** Insert a comma after the word “fire” and before the word “may” for UN 1473 (English and Spanish only)
- Column (17)** Insert a comma after the word “fire” and before the word “may” for UN 1475 (English and Spanish only)
- Column (17)** Insert a comma after the word “fire” and before the word “may” for UN 1484 (English and Spanish only)
- Column (17)** Insert a comma after the word “fire” and before the word “may” for UN 1485 (English and Spanish only)
- Column (17)** Insert a comma after the word “fire” and before the word “may” for UN 1490 (English and Spanish only)
- Column (17)** Insert a comma after the word “fire” and before the word “may” for UN 1495 (English and Spanish only)
- Column (17)** Insert a comma after the word “fire” and before the word “may” for UN 1496 (English and Spanish only)
- Column (17)** Insert a comma after the word “fire” and before the word “may” for UN 1502 (English and Spanish only)
- Column (17)** Insert a comma after the word “fire” and before the word “may” for UN 1503 (English and Spanish only)
- Column (17)** Insert a comma after the word “fire” and before the word “may” for UN 1506 (English and Spanish only)
- Column (17)** Insert a comma after the word “fire” and before the word “may” for UN 1508 (English and Spanish only)
- Column (17)** Insert a comma after the word “fire” and before the word “may” for UN 1513 (English and Spanish only)
- Column (17)** Insert a comma after the word “fire” and before the word “may” for UN 1515 (English and Spanish only)
- Column (17)** Replace the first “acid” with “acids” for UN 1626 (English only)
- Column (17)** Replace the first “acid” with “acids” for UN 1636 (English only)

- Column (17)** Replace the first “acid” with “acids” for UN 1642 (English only)
- Column (17)** Replace “acid” with “acids” for UN 1688 (English only)
- Column (17)** Insert a colon after the word “Flashpoint” and before the word “25°C” for UN 1695 (English only)
- Column (17)** Move the sentence “Reacts violently with acids” after the sentence “Corrosive..” and before the sentence “Reacts with ammonium” for UN 1719 (English and French only)
- Column (17)** Replace “acid” with “acids” for UN 1727 (English only)
- Column (17)** Replace “acid” with “acids” for UN 1756 (English only)
- Column (17)** Replace “acid” with “acids” for UN 1757 (English only)
- Column (17)** Remove the sentence “Pure FORMIC ACID...” from the end of the text and insert it before the sentence “Corrosive to most metals” for UN 1779
- Column (17)** Replace “acid” with “acids” for UN 1791 (English only)
- Column (17)** Delete the comma after the word “liquid” for UN 1808
- Column (17)** Delete the comma after the word “liquid” for UN 1809
- Column (17)** Delete the comma after the word “liquid” for UN 1810
- Column (17)** Delete the comma after the word “liquid” for UN 1817
- Column (17)** Delete the comma after the word “liquid” for UN 1828
- Column (17)** Delete the comma after the word “liquid” for UN 1837
- Column (17)** Insert a colon after the words “Boiling range” for UN 1863 (English only)
- Column (17)** Replace “acid” with “acids” for UN 1869 (English only)
- Column (17)** Replace “acid” with “acids” for UN 1908 (English only)
- Column (17)** Insert “%” after “1.8” for UN 1917 (English only)
- Column (17)** Remove the sentence “Reacts violently with acids” and insert it before the second sentence of the text for UN 1922
- Column (17)** Replace “acid” with “acids” for UN 1935 (English only)
- Column (17)** Delete the comma after the word “air” for UN 1923 (English only)

- Column (17)** Insert a comma after the word “liquefied” for UN 1951
- Column (17)** Replace “Poisonous” with “Toxic” for UN 1975 (English and Spanish only)
- Column (17)** Replace “acid” with “acids” for UN 2019 (English only)
- Column (17)** Remove the sentence “Reacts violently with acids” and insert it after the second sentence of the text for UN 2029
- Column (17)** Delete the comma after the word “liquid” for UN 2258
- Column (17)** Replace “liquid” with “liquids” for UN 2348 (English and Spanish only)
- Column (17)** Replace “liquid” with “liquids” for UN 2371 (English only)
- Column (17)** Remove the sentence “Reacts violently with acids” and insert it after the sentence “Miscible with water.” for UN 2379
- Column (17)** Remove the sentence “Reacts violently with acids” and insert it after the sentence “Miscible with water.” for UN 2382
- Column (17)** Remove the sentence “Reacts violently with acids” and insert it after the sentence “Immiscible with water.” for UN 2386
- Column (17)** Remove the sentence “Reacts violently with acids” and insert it after the sentence “Miscible with water.” for UN 2399
- Column (17)** Insert a colon after the word “Flashpoint” for UN 2604 (English only)
- Column (17)** Replace “acid” with “acids” for UN 2624 (English only)
- Column (17)** Replace “flashpoints” with “flashpoint” for UN 2742 (English only)
- Column (17)** Replace “Salt-c” with “C” for UN 2950
- Column (17)** Move the sentence “Cause burns to skin, eyes and mucous membranes” to the end of the text for UN 2986
- Column (17)** Move the sentence “Cause burns to skin, eyes and mucous membranes” to the end of the text for UN 2987
- Column (17)** Replace “Causes” with “Cause” for UN 2988 (English only)
- Column (17)** At the beginning of the sentence, replace “They” with “It” for UN 2995
- Column (17)** At the beginning of the sentence, replace “They” with “It” for UN 2997

- Column (17)** At the beginning of the sentence, replace “They” with “It”, and “Mercury-based” with “Mercury based” for UN 3011 (second replacement English only)
- Column (17)** Replace “Mercury-based” with “Mercury based” for UN 3012 (English only)
- Column (17)** Insert a new line before paragraph 5 for UN 3065 (English only)
- Column (17)** Delete “or lithium alloy” for UN 3090
- Column (17)** Replace “Immiscible with” with “Insoluble in” for UN 3232
- Column (17)** Replace “Immiscible with” with “Insoluble in” for UN 3238
- Column (17)** Replace “Immiscible with” with “Insoluble in” for UN 3240
- Column (17)** Replace “acid” with “acids” for UN 3275 (English only)
- Column (17)** Replace “acid” with “acids” for UN 3276 (English only)
- Column (17)** Replace “Soluble in water” with “Miscible with water” for UN 3302
- Column (17)** Insert the word “c.c.” after “-30°C” for UN 3342
- Column (17)** Replace “generator” with “generators” for UN 3356 (English only)
- Column (17)** Replace existing text with “See entry above” for UN 3412 (English only)
- Column (17)** Delete the parentheses around the word “c.c.” for UN 3463 (English only)
- Column (17)** Insert “, which is much lighter than air” after “odourless gas” for UN 3468
- Column (17)** Replace existing text with “See entry above” for UN 3469
- Column (17)** Replace existing text with “See entry above” for UN 3471 (English only)
- Column (17)** Insert “Fuel cell cartridges may also be shipped in, or packed with, equipment.” after “... water solutions.” for UN 3473
- Column (17)** Insert “Electrical batteries containing lithium ion encased in a rigid metallic body. Lithium batteries may also be shipped in, or packed with, equipment. Electrical lithium batteries may cause fire due to an explosive rupture of the body caused by improper construction or reaction with contaminants.” for UN Nos. 3480 and 3481
- Column (17)** Replace “See 1.1.3.1.1 and IAEA Transport Schedule” with “See 1.5.1” for UN Nos. 2908, 2909, 2910, 2911, 2912, 2913, 2915, 2916, 2917, 2919, 2977, 2978, 3321, 3322, 3323, 3324, 3325, 3326, 3327, 3328, 3329, 3330, 3331, 3332 and 3333

Insert new entries:

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(13)	(14)	(15)	(16)	(17)	(18)
0505	SIGNALS, DISTRESS, ship	1.4G	-	-	-	0	E0	P135	-	-	-	-	-	F-B, S-X	Category 06	See glossary of terms in appendix B for "SIGNALS, DISTRESS, ship"	0506
0506	SIGNALS, DISTRESS, ship	1.4S	-	-	-	0	E0	P135	-	-	-	-	-	F-B, S-X	Category 05	See glossary of terms in appendix B for "SIGNALS, DISTRESS, ship"	0506
0507	SIGNALS, SMOKE	1.4S	-	-	-	0	E0	P135	-	-	-	-	-	F-B, S-X	Category 05	See glossary of terms in appendix B for "SIGNALS, SMOKE"	0507
0508	1-HYDROXYBENZOTRIAZOLE, ANHYDROUS, dry or wetted with less than 20% water, by mass	1.3C	-	-	-	0	E0	P114(b)	PP48 PP50	-	-	-	-	F-B, S-Y	Category 10	Substance	0508
1910	CALCIUM OXIDE	8	-	-	960	-	-	-	-	-	-	-	-	-	-	Not subject to the provisions of this Code but may be subject to provisions governing the transport of dangerous goods by other modes.	1910
2808	MAGNETIZED MATERIAL	9	-	-	960	-	-	-	-	-	-	-	-	-	-	Not subject to the provisions of this Code but may be subject to provisions governing the transport of dangerous goods by other modes.	2807

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(13)	(14)	(15)	(16)	(17)	(18)
2812	SODIUM ALUMINATE, SOLID	8	-	-	960	-	-	-	-	-	-	-	-	-	-	Not subject to the provisions of this Code but may be subject to provisions governing the transport of dangerous goods by other modes.	2812
3166	ENGINE, INTERNAL COMBUSTION or VEHICLE, FLAMMABLE GAS POWERED or VEHICLE, FLAMMABLE LIQUID POWERED	9	-	-	960	-	-	-	-	-	-	-	-	-	-	Types of articles transported under this entry include internal combustion engines, compression/ignition engines, motor vehicles, hybrid vehicles, motorcycles and boats. Not subject to the provisions of this Code but may be subject to provisions governing the transport of dangerous goods by other modes.	3166

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(13)	(14)	(15)	(16)	(17)	(18)
3171	BATTERY-POWERED VEHICLE or BATTERY-POWERED EQUIPMENT	9	-	-	960	-	-	-	-	-	-	-	-	-	-	Types of articles transported under this entry include vehicles or equipment powered by wet batteries, sodium batteries or lithium batteries with the batteries installed, such as electrically-powered cars, lawnmowers, wheelchairs and other mobility aids. Not subject to the provisions of this Code but may be subject to provisions governing the transport of dangerous goods by other modes.	3171

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(13)	(14)	(15)	(16)	(17)	(18)
3474	1-HYDROXYBENZOTRIAZOLE, ANHYDROUS, WETTED with not less than 20% water, by mass	4.1	-	I	28	0	E0	P406	PP48	-	-	-	-	F-B, S-J	Category D. "Away from" class 3 and heavy metals and their salts.	Desensitized explosive. White to light beige powder. Explosive and sensitive to friction in the dry state. When involved in a fire, evolves toxic fumes; in closed compartments these fumes may form an explosive mixture with air. May form extremely sensitive compounds with heavy metals or their salts.	3474
3475	ETHANOL AND GASOLINE MIXTURE or ETHANOL AND MOTOR SPIRIT MIXTURE or ETHANOL AND PETROL MIXTURE, with more than 10% ethanol	3	-	II	333	1 l	E2	P001	-	IBC02	-	T4	TP1	F-E, S-E	Category E.	Colourless, volatile liquids. Miscibility with water depends on the composition.	3475
3476	FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing water-reactive substances	4.3	-	-	328 334	500 ml or 500 g	E0	P004	-	-	-	-	-	F-G, S-P	Category A.	Fuel cell cartridges containing water reactive substances may also be shipped in or packed with, equipment.	3476

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(13)	(14)	(15)	(16)	(17)	(18)
3477	FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing corrosive substances	8	-	-	328 334	1 l or 1 kg	E0	P004	-	-	-	-	-	F-A, S-B	Category A.	Fuel cell cartridges containing corrosive substances may also be shipped in or packed with, equipment.	3477
3478	FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing liquefied flammable gas	2.1	-	-	328 338	120 ml	E0	P004	-	-	-	-	-	F-D, S-U	Category B.	Fuel cell cartridges containing butane or other flammable liquefied gas may also be shipped in or packed with equipment.	3478
3479	FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing hydrogen in metal hydride	2.1	-	-	328 339	120 ml	E0	P004	-	-	-	-	-	F-D, S-U	Category B.	Fuel cell cartridges containing hydrogen, butane or other flammable odourless gas, which is much lighter than air, may also be shipped in or packed with equipment.	3479

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(13)	(14)	(15)	(16)	(17)	(18)
3480	LITHIUM ION BATTERIES (including lithium ion polymer batteries)	9	-	II	188 230 310 957	0	E0	P903	-	-	-	-	-	F-A, S-I	Category A.	Electrical batteries containing lithium ion encased in a rigid metallic body. Lithium ion batteries may also be shipped in, or packed with, equipment. Electrical lithium batteries may cause fire due to an explosive rupture of the body caused by improper construction or reaction with contaminants.	3480

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(13)	(14)	(15)	(16)	(17)	(18)
3481	LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries)	9	-	II	188 230 957	0	E0	P903	-	-	-	-	-	F-A, S-I	Category A.	Electrical batteries containing lithium ion encased in a rigid metallic body. Lithium ion batteries may also be shipped in, or packed with, equipment. Electrical lithium batteries may cause fire due to an explosive rupture of the body caused by improper construction or reaction with contaminants.	3481

### Chapter 3.3

- SP106** Delete
- SP169** Replace “no more than” with “not more than” (English only)
- Replace “these regulations” with “the provisions of this Code” (English only)
- SP181** Insert the word “see” before “5.4.2.5.5.1” (English only)
- SP188** Replace SP188 with “Cells and batteries offered for transport are not subject to other provisions of this Code if they meet the following:
- .1 For a lithium metal or lithium alloy cell, the lithium content is not more than 1g, and for a lithium-ion cell, the Watt-hour rating is not more than 20 Wh;
  - .2 For a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g, and for a lithium-ion battery, the Watt-hour rating is not more than 100 Wh. Lithium ion batteries subject to this provision shall be marked with the Watt-hour rating on the outside case;
  - .3 Each cell or battery is of the type proved to meet the requirements of each test in the United Nations Manual of Tests and Criteria, Part III, sub-section 38.3;
  - .4 Cells and batteries, except when installed in equipment, shall be packed in inner packagings that completely enclose the cell or battery. Cells and batteries shall be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit. The inner packagings shall be packed in strong outer packagings which conform to the provisions of 4.1.1.1, 4.1.1.2, and 4.1.1.5.
  - .5 Cells and batteries when installed in equipment shall be protected from damage and short circuit, and the equipment shall be equipped with an effective means of preventing accidental activation. When batteries are installed in equipment, the equipment shall be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packagings capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained.
  - .6 Except for packages containing no more than four cells installed in equipment or no more than two batteries installed in equipment, each package shall be marked with the following:
    - (i) an indication that the package contains “lithium metal” or “lithium ion” cells or batteries, as appropriate;

- (ii) an indication that the package shall be handled with care and that a flammability hazard exists if the package is damaged;
  - (iii) an indication that special procedures shall be followed in the event the package is damaged, to include inspection and repacking if necessary; and
  - (iv) a telephone number for additional information.
- .7 Each consignment of one or more packages marked in accordance with paragraph .6 shall be accompanied with a document including the following:
- (i) an indication that the package contains “lithium metal” or “lithium ion” cells or batteries, as appropriate;
  - (ii) an indication that the package shall be handled with care and that a flammability hazard exists if the package is damaged;
  - (iii) an indication that special procedures shall be followed in the event the package is damaged, to include inspection and repacking if necessary; and
  - (iv) a telephone number for additional information.
- .8 Except when batteries are installed in equipment, each package shall be capable of withstanding a 1.2 m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents; and
- .9 Except when batteries are installed in or packed with equipment, packages shall not exceed 30 kg gross mass.”

As used above and elsewhere in this Code, “lithium content” means the mass of lithium in the anode of a lithium metal or lithium alloy cell. Separate entries exist for lithium metal batteries and lithium ion batteries to facilitate the transport of these batteries for specific modes of transport and to enable the application of different emergency response actions.”

**SP198** Replace “UN 1210, UN 1263 and UN 3066.” with “UN Nos. 1210, 1263, 3066, 3469 and 3470.”

**SP199** Replace “are considered insoluble. See ISO 3711:1990.” with “(see ISO 3711:1990 “Lead chromate pigments and lead chromate-molybdate pigments – Specifications and methods of test”) are considered insoluble and are not subject to the provisions of this Code unless they meet the criteria for inclusion in another hazard class.”

- SP216** Replace “bulk packaging” with “bulk container”
- SP217** Replace “bulk packaging” with “bulk container”
- SP218** Replace “bulk packaging” with “bulk container”
- SP236** Replace “The quantity limit shown in column 7 of the Dangerous Goods List applies to the base material.” with “The quantity limit and the excepted quantity code shown in columns 7a and 7b of the Dangerous Goods List apply to the base material”
- SP251** Replace “the word “NONE” has been indicated in column 7” with “the quantity “0” has been indicated in column 7a”
- Replace “quantity limits applicable to individual substances as specified in column 7” with “quantity limits for limited quantities applicable to individual substances as specified in column 7a”
- SP289** Replace “Air bags or seat-belts” with “Air bag inflators, air bag modules or seat-belt pretensioners”
- SP299.iv** Tampico Fibre, dry having a density not less than 360 kg/m<sup>3</sup>
- SP301** Replace “in column 7” by “in column 7a” (twice)
- SP307.2** Insert “and/or mineral calcium sulphate” after “dolomite”
- SP310** Replace “100 lithium cells” with “100 cells”
- SP328** Replace text with:
- “328** This entry applies to fuel cell cartridges including when contained in equipment or packed with equipment. Fuel cell cartridges installed in or integral to a fuel cell system are regarded as contained in equipment. Fuel cell cartridge means an article that stores fuel for discharge into the fuel cell through a valve(s) that controls the discharge of fuel into the fuel cell. Fuel cell cartridges, including when contained in equipment, shall be designed and constructed to prevent fuel leakage under normal conditions of transport.
- Fuel cell cartridge design types using liquids as fuels shall pass an internal pressure test at a pressure of 100 kPa (gauge) without leakage.
- Except for fuel cell cartridges containing hydrogen in metal hydride which shall be in compliance with special provision 339, each fuel cell cartridge design type shall be shown to pass a 1.2 meter drop test onto an unyielding surface in the orientation most likely to result in failure of the containment system with no loss of contents.”

- SP330** Delete
- Insert “**SP332** Magnesium nitrate hexahydrate is not subject to the provisions of this Code.
- SP333** Ethanol and gasoline, motor spirit or petrol mixtures for use in spark-ignition engines (e.g., in automobiles, stationary engines and other engines) shall be assigned to this entry regardless of variations in volatility.
- SP334** A fuel cell cartridge may contain an activator provided it is fitted with two independent means of preventing unintended mixing with the fuel during transport.
- SP335** Mixtures of solids which are not subject to the provisions of this Code and environmentally hazardous liquids assigned to UN 3082 may be classified and transported as UN 3077, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or cargo transport unit is closed. If free liquid is visible at the time the mixture is loaded or at the time the packaging or cargo transport unit is closed the mixture shall be classified as UN 3082. Each cargo transport unit shall be leakproof when used as a bulk container. Sealed packets and articles containing less than 10 ml of an environmentally hazardous liquid assigned to UN 3082, absorbed into a solid material but with no free liquid in the packet or article, or containing less than 10 g of an environmentally hazardous solid assigned to UN 3077, are not subject to the provisions of this Code.
- SP338** Each fuel cell cartridge transported under this entry and designed to contain a liquefied flammable gas shall:
- .1 Be capable of withstanding, without leakage or bursting, a pressure of at least two times the equilibrium pressure of the contents at 55°C;
  - .2 Not contain more than 200 ml of liquefied flammable gas with a vapour pressure not exceeding 1 000 kPa at 55°C; and
  - .3 Pass the hot water bath test prescribed in 6.2.4.1 of chapter 6.2.
- SP339** Fuel cell cartridges containing hydrogen in a metal hydride transported under this entry shall have a water capacity less than or equal to 120 ml. The pressure in the fuel cell cartridge shall not exceed 5 MPa at 55°C. The design type shall withstand, without leaking or bursting, a pressure of two (2) times the design pressure of the cartridge at 55°C or 200 kPa more than the design pressure of the cartridge at 55°C, whichever is greater. The pressure at which this test is conducted is referred to in the Drop Test and the Hydrogen Cycling Test as the “minimum shell burst pressure”.

Fuel cell cartridges shall be filled in accordance with procedures provided by the manufacturer. The manufacturer shall provide the following information with each fuel cell cartridge:

- .1 Inspection procedures to be carried out before initial filling and before refilling of the fuel cell cartridge;
- .2 Safety precautions and potential hazards to be aware of;
- .3 Method for determining when the rated capacity has been achieved;
- .4 Minimum and maximum pressure range;
- .5 Minimum and maximum temperature range; and
- .6 Any other requirements to be met for initial filling and refilling including the type of equipment to be used for initial filling and refilling.

The fuel cell cartridges shall be designed and constructed to prevent fuel leakage under normal conditions of transport. Each cartridge design type, including cartridges integral to a fuel cell, shall be subjected to and shall pass the following tests:

#### **Drop test**

A 1.8 metre drop test onto an unyielding surface in four different orientations:

- .1 Vertically, on the end containing the shut-off valve assembly;
- .2 Vertically, on the end opposite to the shut-off valve assembly;
- .3 Horizontally, onto a steel apex with a diameter of 38 mm, with the steel apex in the upward position; and
- .4 At a 45° angle on the end containing the shut-off valve assembly.

There shall be no leakage, determined by using a soap bubble solution or other equivalent means on all possible leak locations, when the cartridge is charged to its rated charging pressure. The fuel cell cartridge shall then be hydrostatically pressurized to destruction. The recorded burst pressure shall exceed 85% of the minimum shell burst pressure.

#### **Fire test**

A fuel cell cartridge filled to rated capacity with hydrogen shall be subjected to a fire engulfment test. The cartridge design, which may

include a vent feature integral to it, is deemed to have passed the fire test if:

- .1 The internal pressure vents to zero gauge pressure without rupture of the cartridge; or
- .2 The cartridge withstands the fire for a minimum of 20 minutes without rupture.

### **Hydrogen cycling test**

This test is intended to ensure that a fuel cell cartridge design stress limits are not exceeded during use.

The fuel cell cartridge shall be cycled from not more than 5% rated hydrogen capacity to not less than 95% rated hydrogen capacity and back to not more than 5% rated hydrogen capacity. The rated charging pressure shall be used for charging and temperatures shall be held within the operating temperature range. The cycling shall be continued for at least 100 cycles.

Following the cycling test, the fuel cell cartridge shall be charged and the water volume displaced by the cartridge shall be measured. The cartridge design is deemed to have passed the hydrogen cycling test if the water volume displaced by the cycled cartridge does not exceed the water volume displaced by an uncycled cartridge charged to 95% rated capacity and pressurized to 75% of its minimum shell burst pressure.

### **Production leak test**

Each fuel cell cartridge shall be tested for leaks at  $15^{\circ}\text{C} \pm 5^{\circ}\text{C}$ , while pressurized to its rated charging pressure. There shall be no leakage, determined by using a soap bubble solution or other equivalent means on all possible leak locations.

Each fuel cell cartridge shall be permanently marked with the following information:

- .1 The rated charging pressure in megapascals (MPa);
- .2 The manufacturer's serial number of the fuel cell cartridges or unique identification number; and
- .3 The date of expiry based on the maximum service life (year in four digits; month in two digits).

**SP340** Chemical kits, first aid kits and polyester resin kits containing dangerous substances in inner packagings which do not exceed the quantity limits for excepted quantities applicable to individual substances as specified in

column 7b of the Dangerous Goods List may be transported in accordance with chapter 3.5. Class 5.2 substances, although not individually authorized as excepted quantities in the Dangerous Goods List, are authorized in such kits and are assigned code E2 (see 3.5.1.2).

- SP341** Bulk transport of infectious substances in BK2 bulk containers is only permitted for infectious substances contained in animal material as defined in 1.2.1 (see 4.3.2.4.1).”
- SP900** Delete comma after the word “BROMATE” (English only)
- Delete comma after the word “CHLORATE” (English only)
- Delete comma after the word “PERMANGANATE” (English only)
- Delete comma after the word “CYANIDE” (English only)
- SP909** Delete “The provisions of this entry are applicable to:
- substances designated as marine pollutants by a superscript “P” or “PP” next to its name in the Index; and
  - mixtures or isomers of substances identified as marine pollutants by a “P” or “PP” in the Index and which meet the criteria of 2.10.3 and which do not meet the classification criteria of any other hazard class.”
- SP910.1** Replace “the IMO publication *Recommendations on the Safe Use of Pesticides in Ships*” with “MSC/Circ.[...] Recommendations on the safe use of pesticides in ships applicable to the fumigation of cargo transport units”
- SP911** Delete
- SP919** Replace the words “packing method” with the words “packing instruction”
- SP920** Replace “provision” with “provisions” (English only)
- SP921** Replace “provision” with “provisions” (English only)
- SP922** Replace “provision” with “provisions” (English only)
- SP927** Replace “provision” with “provisions” (English only)
- SP929** Insert a full stop after the words “SEED CAKE, UN 2217” (English only)
- SP930** Replace “provision” with “provisions” (English only)
- SP931** Replace “provision” with “provisions” (English only)
- SP937** Replace “provision” with “provisions” (English only)

- SP939** Replace “provision” with “provisions” (English only)
- SP944** Delete
- SP951** Replace “packaging” with “container”
- SP952** Replace “packaging” with “container”
- SP960** Insert “Not subject to the provisions of this Code but may be subject to provisions governing the transport of dangerous goods by other modes.”

**Consequential Amendment:**

**Column (6)** Delete “911” for UN 1013

**Chapter 3.4**

- 3.4.1** Replace “in column 7” with “in column 7a” (twice)  
Replace “the word “None”” with “the quantity “0””
- 3.4.8.2** Delete

**Chapter 3.5**

Insert new **Chapter 3.5:**

**“Chapter 3.5**

***Dangerous goods packed in excepted quantities***

**3.5.1 Excepted quantities**

- 3.5.1.1** Excepted quantities of dangerous goods of certain classes, other than articles, meeting the provisions of this chapter are not subject to any other provisions of this Code except for:
- .1 The training provisions in chapter 1.3;
  - .2 The classification procedures and packing group criteria in Part 2, Classification;
  - .3 The packaging provisions of 4.1.1.1, 4.1.1.2, 4.1.1.4, 4.1.1.4.1 and 4.1.1.6 in Part 4; and
  - .4 The provisions for documentation specified in chapter 5.4.

**Note:** In the case of radioactive material, the provisions for radioactive material in excepted packages in 1.5.1.5 apply.

**3.5.1.2** Dangerous goods which may be carried as excepted quantities in accordance with the provisions of this chapter are shown in column 7b of the dangerous goods list by means of an alphanumeric code as follows:

<b>Code</b>	<b>Maximum net quantity per inner packaging</b> (in grams for solids and ml for liquids and gases)	<b>Maximum net quantity per outer packaging</b> (in grams for solids and ml for liquids and gases, or sum of grams and ml in the case of mixed packaging)
E0	Not permitted as Excepted Quantity	
E1	30	1000
E2	30	500
E3	30	300
E4	1	500
E5	1	300

For gases, the volume indicated for inner packagings refers to the water capacity of the inner receptacle and the volume indicated for outer packagings refers to the combined water capacity of all inner packagings within a single outer packaging.

**3.5.1.3** Where dangerous goods in excepted quantities for which different codes are assigned are packaged together the total quantity per outer packaging shall be limited to that corresponding to the most restrictive code.

**3.5.2 Packagings**

**3.5.2.1** Packagings used for the transport of dangerous goods in excepted quantities shall be in compliance with the following:

- .1 There shall be an inner packaging and each inner packaging shall be constructed of plastic (when used for liquid dangerous goods it shall have a thickness of not less than 0.2 mm), or of glass, porcelain, stoneware, earthenware or metal (see also 4.1.1.2) and the closure of each inner packaging shall be held securely in place with wire, tape or other positive means; any receptacle having a neck with moulded screw threads shall have a leak proof threaded type cap. The closure shall be resistant to the contents;
- .2 Each inner packaging shall be securely packed in an intermediate packaging with cushioning material in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents. The intermediate packaging shall completely contain the contents in case of breakage or leakage, regardless of package orientation. For liquid dangerous goods, the intermediate packaging shall contain sufficient absorbent material to absorb the entire contents of the inner packaging. In such cases, the absorbent material may be the cushioning material. Dangerous goods shall not react dangerously with cushioning, absorbent material and packaging material or reduce the integrity or function of the materials;

- .3 The intermediate packaging shall be securely packed in a strong, rigid outer packaging (wooden, fibre-board or other equally strong material);
- .4 Each package type shall be in compliance with the provisions in 3.5.3;
- .5 Each package shall be of such a size that there is adequate space to apply all necessary markings; and
- .6 Overpacks may be used and may also contain packages of dangerous goods or goods not subject to the provisions of this Code.

### **3.5.3** *Tests for packages*

**3.5.3.1** The complete package as prepared for transport, with inner packagings filled to not less than 95% of their capacity for solids or 98% for liquids, shall be capable of withstanding, as demonstrated by testing which is appropriately documented, without breakage or leakage of any inner packaging and without significant reduction in effectiveness:

- .1 Drops onto a rigid, non-resilient flat and horizontal surface from a height of 1.8 m:
  - (i) Where the sample is in the shape of a box, it shall be dropped in each of the following orientations:
    - flat on the base;
    - flat on the top;
    - flat on the longest side;
    - flat on the shortest side;
    - on a corner;
  - (ii) Where the sample is in the shape of a drum, it shall be dropped in each of the following orientations:
    - diagonally on the top chime, with the centre of gravity directly above the point of impact;
    - diagonally on the base chime;
    - flat on the side.

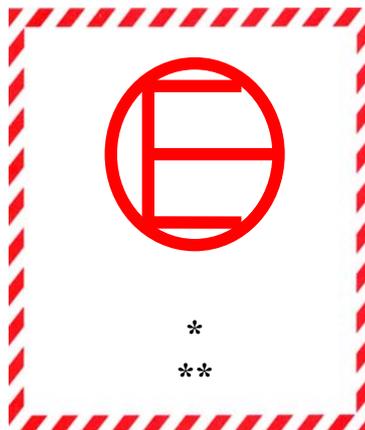
**Note:** Each of the above drops may be performed on different but identical packages.

- .2 A force applied to the top surface for a duration of 24 hours, equivalent to the total weight of identical packages if stacked to a height of 3 m (including the drop sample).

**3.5.3.2** For the purposes of testing, the substances to be transported in the packaging may be replaced by other substances except where this would invalidate the results of the tests. For solids, when another substance is used, it shall have the same physical characteristics (mass, grain size, etc.) as the substance to be carried. In the drop tests for liquids, when another substance is used, its relative density (specific gravity) and viscosity shall be similar to those of the substance to be transported.

### **3.5.4 Marking of packages**

**3.5.4.1** Packages containing excepted quantities of dangerous goods prepared in accordance with this chapter shall be durably and legibly marked with the mark shown below. The primary hazard class of each of the dangerous goods contained in the package shall be shown in the mark. Where the name of the consignor or consignee is not shown elsewhere on the package this information shall be included within the mark.



**Excepted quantities mark**

Hatching and symbol of the same colour, black or red,  
on white or suitable contrasting background

\* *The class shall be shown in this location.*

\*\* *The name of the consignor or of the consignee shall be shown in this location if not shown elsewhere on the package.*

**3.5.4.2** The dimensions of the mark shall be a minimum of 100 mm x 100 mm.

**3.5.4.3** An overpack containing dangerous goods in excepted quantities shall display the markings required by 3.5.4.1, unless such markings on packages within the overpack are clearly visible.

**3.5.5 Maximum number of packages in any cargo transport unit**

**3.5.5.1** The number of packages containing dangerous goods packed in excepted quantities in any cargo transport unit shall not exceed 1,000.

**3.5.6 Documentation**

**3.5.6.1** In addition to the provisions for documentation specified in chapter 5.4, the words “dangerous goods in excepted quantities” and the number of packages shall be included on the dangerous goods declaration together with the description of the shipment.

**3.5.7 Stowage**

**3.5.7.1** Notwithstanding the stowage provisions indicated in the Dangerous Goods List, dangerous goods transported under the provisions of this chapter are allocated stowage category A.

**3.5.8 Segregation**

**3.5.8.1** The segregation provisions of chapter 7.2 are not applicable for packagings containing dangerous goods in excepted quantities or in relation to other dangerous goods.

**3.5.8.2** The segregation provisions of chapter 7.2 are not applicable for different dangerous goods in excepted quantities in the same outer packaging provided that they do not react dangerously with each other (see 4.1.1.6

**Consequential amendments:**

**Contents page:**

**Chapter 3.5 Insert “Chapter 3.5 Dangerous goods packed in excepted quantities**

3.5.1 Excepted quantities

3.5.2 Packagings

3.5.3 Tests for packages

3.5.4 Marking of packages

3.5.5 Maximum number of packages in any cargo transport unit

3.5.6 Documentation

3.5.7 Stowage

3.5.8 Segregation”

## PART 4

### Chapter 4.1

- 4.1.1** Replace text of note with “For the packing of goods of classes 2, 6.2 and 7, the general provisions of this section only apply as indicated in 4.1.8.2 (class 6.2), 4.1.9.1.5 (class 7) and in the applicable packing instructions of 4.1.4 (P201 and LP02 for class 2 and P620, P621, P650, IBC620 and LP621 for class 6.2).”
- 4.1.1.3** **Insert “otherwise” before “provided”**
- Insert “However, IBCs manufactured before 1 January 2011 and conforming to a design type which has not passed the vibration test of 6.5.6.13 or which has not passed the drop test criteria of 6.5.6.9.5.4 may still be used.” after “with the provisions of 6.1.5, 6.3.5, 6.5.6 or 6.6.5, as applicable.”
- 4.1.1.16** Replace “class I” with “class 1” (English only)
- 4.1.2.2** Number first paragraph “**4.1.2.2.1**”  
Number second paragraph “**4.1.2.2.2**”
- 4.1.2.2.1.2** Insert “and” after “... as appropriate;”
- 4.1.3.6.4** Replace “doivent” with “peuvent” after “, les recipients à pression” (French version)
- 4.1.4.1** P001/P002/P400/P401/P402/P403/P404/P410/P601/P602/P800
- Replace “**Pressure receptacles** may be used provided that the general provisions of 4.1.3.6 are met.” with “**Pressure receptacles**, provided that the general provisions of 4.1.3.6 are met”
- P001 – PP1** Replace “UN 1133, UN 1210, UN 1263 and UN 1866, packagings for substances of packing groups II and III in quantities of 5 l or less per metal or plastics” with “UN Nos. 1133, 1210, 1263 and 1866 and for adhesives, printing inks, printing ink related materials, paints, paint related materials and resin solutions which are assigned to UN 3082, metal or plastics packagings for substances of packing groups II and III in quantities of 5 litres or less per”
- P001 – PP6** Delete
- P001 – PP31** Replace “3207” with “3398 (PG II and III), 3399 (PG II and III)”
- P001 – PP81** Replace “hydrofluoric acid” with “hydrogen fluoride”
- P002 – PP6** Delete
- P003 – PP17** Replace “packagings shall not exceed 55 kg net mass for fibreboard” with “packages shall not exceed 55 kg net mass for fibreboard packagings”

**P003 – PP88** Delete

**P010** Insert **P010**:

<b>P010</b>		<b>P010</b>
<b>PACKING INSTRUCTION</b>		
The following packagings are authorized, provided that the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:		
<b>Combination packagings</b>		
<b>Inner packagings</b>	<b>Outer packagings</b>	<b>Maximum net mass (see 4.1.3.3)</b>
Glass 1 l Steel 40 l	<b>Drums</b> steel (1A2) 400 kg plastics (1H2) 400 kg plywood (1D) 400 kg fibre (1G) 400 kg  <b>Boxes</b> steel (4A) 400 kg natural wood (4C1, 4C2) 400 kg plywood (4D) 400 kg reconstituted wood (4F) 400 kg fibreboard (4G) 400 kg expanded plastics (4H1) 60 kg solid plastics (4H2) 400 kg	
<b>Single packagings</b>		<b>Maximum capacity (see 4.1.3.3)</b>
<b>Drums</b> steel, non-removable head (1A1)		450 l
<b>Jerricans</b> steel, non-removable head (3A1)		60 l
<b>Composite packagings</b> plastics receptacle in steel drums (6HA1)		250 l

**P099** Insert “for these goods” before “by the competent authority”

Insert “A copy of the competent authority approval shall accompany each consignment or the transport document shall include an indication that the packaging was approved by the competent authority.” after “may be used (see 4.1.3.7).”

**P112 (a)** Replace “removable-head” with “removable head” (English only)

**P114 (a)** Replace “removable-head” with “removable head” (English only)

**P114(b)** Insert “**PP48** For UN 0508, metal packagings shall not be used.”

**P114(b) – PP50** Replace “For UN 0160 and UN 0161” with “For UN Nos. 0160, 0161 and 0508”

Replace “required” with “necessary”

- P116** Replace “removable-head” with “removable head” (English only)
- P143** In the title, replace “provisions” with “provision” (English only)
- P200(3)(b)** Replace “provided that the above criterion is met, except where special packing provision “o” applies” with:
- “The use of test pressures and filling ratios other than those in the table is permitted, except where (4), special packing provision “o” applies, provided that:
- (i) the criterion of (4), special packing provision “r” is met when applicable; or
  - (ii) the above criterion is met in all other cases.”
- P200(4)(k)** Replace “assemblies (groups)” with “groups”
- P200(4)(n)** Replace paragraph with “Cylinders and individual cylinders in a bundle shall contain not more than 5 kg of the gas. When bundles containing UN 1045 Fluorine, compressed are divided into groups of cylinders in accordance with special packing provision “k” each group shall contain not more than 5 kg of the gas.”
- P200(4)(r)** Insert new provision “The filling ratio of this gas shall be limited such that, if complete decomposition occurs, the pressure does not exceed two thirds of the test pressure of the pressure receptacle.”
- P200(4)(z)** Insert “Mixtures containing UN 2192 germane, other than mixtures of up to 35% germane in hydrogen or nitrogen or up to 28% germane in helium or argon, shall be filled to a pressure such that, if complete decomposition of the germane occurs, two thirds of the test pressure of the pressure receptacle shall not be exceeded.” after “may be transported in pressure drums.”
- Table 1** Replace “200” with “225” in column “Test pressure, bar\*” for UN 1660
- Replace “50” with “33” in column “Maximum working pressure” for UN 1660
- Table 2** Insert “5.1” in column “Subsidiary risk” for UN 1017
- Replace “1.02” with “0.064” in column “Filling ratio” for UN 2192
- Insert “, r” in column “Special packing provisions” for UN 2192
- Delete “d,” in column “Special packing provisions” for UN 2203 (twice)

Insert “, r” in column “Special packing provisions” for UN 2676

Insert “200” in column “Test Pressure, bar<sup>\*</sup>” for UN 2189

Insert “1.08” in column “Filling ratio” for UN 2189

Replace values in column “Filling ratio”:

UN No.	Name	Test pressure, bar	Filling ratio
1011	Butane	10	0.52
1013	Carbon dioxide	190	0.68
1013	Carbon dioxide	250	0.76
1020	Chloropentafluoroethane (R115)	25	1.05
1022	Chlorotrifluoromethane (R13)	250	1.11
1035	Ethane	120	0.30
1035	Ethane	300	0.40
1048	Hydrogen bromide	60	1.51
1080	Sulphur hexafluoride	70	1.06
1080	Sulphur hexafluoride	140	1.34
1080	Sulphur hexafluoride	160	1.38
1962	Ethylene	300	0.38
1973	R502	31	1.01
1976	Octafluorocyclobutane (RC318)	11	1.32
1982	Tetrafluoromethane (R14)	200	0.71
1982	Tetrafluoromethane (R14)	300	0.90
1984	Trifluoromethane (R23)	190	0.88
1984	Trifluoromethane (R23)	250	0.96
2035	1,1,1-trifluoroethane (R143a)	35	0.73
2036	Xenon	130	1.28
2193	Hexafluoroethane (R116)	200	1.13
2196	Tungsten hexafluoride	10	3.08
2198	Phosphorus pentafluoride	300	1.25
2424	Octafluoropropane (R218)	25	1.04
2454	Methyl fluoride (R41)	300	0.63
2599	R503	31	0.12
2599	R503	42	0.17
2599	R503	100	0.64

Replace values in columns “Test pressure” and “Filling ratio”:

UN No.	Name	Test pressure, bar		Filling ratio
		Existing	Amended	
1005	Ammonia, anhydrous	33	29	0.54
1018	Chlorodifluoromethane (R22)	29	27	Unchanged
1021	1-Chloro-1,2,2,2-tetrafluoroethane (R124)	12	11	Unchanged
1027	Cyclopropane	20	18	0.55
1028	Dichlorodifluoromethane (R12)	18	16	Unchanged
1030	1,1-Difluoroethane (R152a)	18	16	Unchanged
1053	Hydrogen sulphide	55	48	Unchanged

UN No.	Name	Test pressure, bar		Filling ratio
		Existing	Amended	
1077	Propylene	30	27	Unchanged
1079	Sulphur dioxide	14	12	Unchanged
1978	Propane	25	23	0.43
2204	Carbonyl sulphide	26	30	0.87
2676	Stibine	20	200	0.49
3159	1,1,1,2-Tetrafluoroethane (R134a)	22	18	1.05
3220	Pentafluoroethane (R125)	36	35	0.87
3296	Heptafluoropropane (R227)	15	13	1.21
3338	R407A	36	32	Unchanged
3339	R407B	38	33	Unchanged
3340	R407C	35	30	Unchanged

Insert new packing instruction **P004**:

<b>P004</b>	<b>PACKING INSTRUCTION</b>	<b>P004</b>
This instruction applies to UN Nos. 3473, 3476, 3477, 3478 and 3479		
The following packagings are authorized provided the general provisions of 4.1.1.1, 4.1.1.2, 4.1.1.3, 4.1.1.6 and 4.1.3 are met:		
<ol style="list-style-type: none"> <li>(1) For fuel cell cartridges, packagings conforming to the packing group II performance level; and</li> <li>(2) For fuel cell cartridges contained in equipment or packed with equipment, strong outer packagings. Large robust equipment (see 4.1.3.8) containing fuel cell cartridges may be transported unpackaged. When fuel cell cartridges are packed with equipment, they shall be packed in inner packagings or placed in the outer packaging with cushioning material or divider(s) so that the fuel cell cartridges are protected against damage that may be caused by the movement or placement of the contents within the outer packaging. Fuel cell cartridges which are installed in equipment shall be protected against short circuit and the entire system shall be protected against inadvertent operation.</li> </ol>		

**P402 – PP31** Replace “and 3207 (PGI)” with “, 3398 (PG I) and 3399 (PG I)”

**P404** Replace “, 3393 and 3461.” with “and 3393.”

**P404 – PP31** Replace “, 3200 and 3461,” with “and 3200,”

**P406** Insert “**PP48** For UN 3474, metal packagings shall not be used.”

**P601(2)** Delete “or additionally, for UN 1744 only, in polyvinylidene fluoride (PVDF) inner packagings,”

**P601** Delete **PP82**

**P602** In the first sentence, insert a comma after the word “authorized” (English only)

- P620** In the first sentence, insert a comma after the word “authorized” (English only)
- P620.1(i)** Replace “watertight” with “leakproof”
- P620.1(ii)** Replace “watertight” with “leakproof”
- P620.2** Delete “of adequate strength for its capacity, mass and intended use”
- P620 2(b)** Replace “6.3.1.1” with “6.3.3”
- P620 4** Insert “4 Alternative packagings for the transport of animal material may be authorized by the competent authority in accordance with the provisions of 4.1.3.7.”
- P621** Delete “and the special provisions of 4.1.8” after “general provisions of 4.1.1 and 4.1.3”
- P650** In the diamond shaped mark, insert a space between “UN” and “3373”
- P650** Insert “**Additional requirement:**
- (1) Alternative packagings for the transport of animal material may be authorized by the competent authority in accordance with the provisions of 4.1.3.7.”
- P650 (4)** Replace “package” with “packaging” in the last sentence
- P650(6)** Replace “6.3.2.5” with “6.3.5.3”
- Replace “6.3.2.2 to 6.3.2.4” with “6.3.5.2”
- P800** Delete the colon at the end of the sentence (English only)
- P801** Insert “, except 4.1.1.3,” after “provisions of 4.1.1”
- Replace “Part 6” with “part 6” (English and Spanish only)

Insert new packing instruction **P804**:

<b>P804</b>	<b>PACKING INSTRUCTION</b>	<b>P804</b>
This instruction applies to UN 1744.		
<p>The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met and the packagings are hermetically sealed:</p>		
<p>(1) Combination packagings with a maximum gross mass of 25 kg, consisting of:</p> <ul style="list-style-type: none"><li>- one or more glass inner packaging(s) with a maximum capacity of 1.3 litres each and filled to not more than 90% of their capacity, the closure(s) of which shall be physically held in place by any means capable of preventing back-off or loosening by impact or vibration during transport, individually placed in:</li><li>- metal receptacles together with cushioning and absorbent material sufficient to absorb the entire contents of the glass inner packaging(s), further packed in:</li><li>- 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings.</li></ul>		
<p>(2) Combination packagings consisting of metal or polyvinylidene fluoride (PVDF) inner packagings, not exceeding 5 litres in capacity individually packed with absorbent material sufficient to absorb the contents and inert cushioning material in 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings with a maximum gross mass of 75 kg. Inner packagings shall not be filled to more than 90% of their capacity. The closure of each inner packaging shall be physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transport.</p>		
<p>(3) Packagings consisting of:</p> <p>Outer packagings:</p> <p>Steel or plastic drums, removable head (1A2 or 1H2) tested in accordance with the test requirements in 6.1.5 at a mass corresponding to the mass of the assembled package either as a packaging intended to contain inner packagings, or as a single packaging intended to contain solids or liquids, and marked accordingly;</p> <p>Inner packagings:</p> <p>Drums and composite packagings (1A1, 1B1, 1N1, 1H1 or 6HA1) meeting the requirements of chapter 6.1 for single packagings, subject to the following conditions:</p> <ul style="list-style-type: none"><li>(a) The hydraulic pressure test shall be conducted at a pressure of at least 300 kPa (3 bar) (gauge pressure);</li><li>(b) The design and production leakproofness tests shall be conducted at a test pressure of 30 kPa (0,3 bar);</li><li>(c) They shall be isolated from the outer drum by the use of inert shock-mitigating cushioning material which surrounds the inner packaging on all sides;</li><li>(d) Their capacity shall not exceed 125 litres;</li></ul>		

P804	PACKING INSTRUCTION	P804
<p>(e) Closures shall be of a screw type that are:</p> <ul style="list-style-type: none"><li>(i) Physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transport;</li><li>(ii) Provided with a cap seal;</li></ul> <p>(f) The outer and inner packagings shall be subjected periodically to an internal inspection and leakproofness test according to (b) at intervals of not more than two and a half years; and</p> <p>(g) The outer and inner packagings shall bear in clearly legible and durable characters:</p> <ul style="list-style-type: none"><li>(i) the date (month, year) of the initial test and the latest periodic test and inspection of the inner packaging; and</li><li>(ii) the name or authorized symbol of the expert performing the tests and inspections.</li></ul> <p>(4) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met.</p> <ul style="list-style-type: none"><li>(a) They shall be subjected to an initial test and periodic tests every 10 years at a pressure of not less than 1 MPa (10 bar) (gauge pressure);</li><li>(b) They shall be subjected periodically to an internal inspection and leakproofness test at intervals of not more than two and a half years;</li><li>(c) They may not be equipped with any pressure relief device;</li><li>(d) Each pressure receptacle shall be closed with a plug or valve(s) fitted with a secondary closure device; and</li><li>(e) The materials of construction for the pressure receptacle, valves, plugs, outlet caps, luting and gaskets shall be compatible with each other and with the contents.</li></ul>		

**P903** Replace “UN 3090 and UN 3091.” with “UN Nos. 3090, 3091, 3480 and 3481.”

Delete “lithium” before “cells and batteries” (twice)

**P904** Replace “Part 6” with “part 6” (English and Spanish only)

#### 4.1.4.2

**IBC01** Delete the *Additional provision*

**IBC02** Delete the *Additional provision*

Insert “B15 For UN 2031 with more than 55% nitric acid, the permitted use of rigid plastics IBCs and of composite IBCs with a rigid plastics inner receptacle shall be two years from their date of manufacture.”

**IBC03** Delete the *Additional provision*

**IBC03(B11)** Insert “Notwithstanding the provisions of 4.1.1.10 “ before “UN 2672 ammonia solution”

**IBC05(B2)** Delete “packing group II”

**IBC06(B2)** Delete “packing group II”

**IBC07(B2)** Delete “packing group II”

**IBC08(B2)** Delete “packing group II”

**IBC99** Insert “for these goods” before “by the competent authority”

Insert “A copy of the competent authority approval shall accompany each consignment or the transport document shall include an indication that the packaging was approved by the competent authority.” after “competent authority may be used (see 4.1.3.7).”

**IBC520** Replace “32%” with “37%” for UN 3109 – tert-Butyl peroxy-3, 5, 5-trimethylhexanoate, not more than 32% in diluent type A (third entry)

Replace “52%” with “62%” for UN 3119 – Di-(2-ethylhexyl) peroxydicarbonate, not more than 52%, stable dispersion, in water (eleventh entry)

**IBC520** Delete “and the special provisions of 4.1.8”

Insert new entries:

UN No.	Organic peroxide	Type of IBC	Maximum quantity (litres)	Control temperature	Emergency temperature
3109	tert-Butyl peroxybenzoate, not more than 32% in diluent type A	31A	1250		
3109	1,1-Di-(tert-Butylperoxy)cyclohexane, not more than 37% in diluent type A	31A	1250		
3119	tert-Amyl peroxy-pivalate, not more than 32% in diluent type A	31A	1250	+10	+15
3119	tert-Butyl peroxyneodecanoate, not more than 52%, stable dispersion, in water	31A	1250	-5	+5
3119	Di-(2-neodecanoylperoxyisopropyl)benzene, not more than 42%, stable dispersion, in water	31A	1250	-15	-5
3119	3-Hydroxy-1,1-dimethylbutyl peroxy-neodecanoate, not more than 52%, stable dispersion, in water	31A	1250	-15	-5

#### 4.1.4.3

**LP01** In the first sentence, insert a comma after the word “authorized” (English only)

**LP02** In the first sentence, insert a comma after the word “authorized” (English only)

Bring words and figures to the centre of columns in column 3

**LP99** Insert “for these goods” before “by the competent authority”

Insert “A copy of the competent authority approval shall accompany each consignment or the transport document shall include an indication that the packaging was approved by the competent authority” after “**competent authority may be used (see 4.1.3.7).**”

**LP621`** Delete “and the special provisions of 4.1.8”

**4.1.6** Amend the heading to read: “Special packing provisions for goods of class 2”

**4.1.6.1.2** Delete “Pressure receptacles for UN 1001 acetylene ... compatible with the pressure receptacles.”

**4.1.7.4.1** Delete first round bracket after “2.4.2.3.2.3” (English only)

**4.1.8** Replace “(class 6.2)” with “of Category A (class 6.2, UN 2814 and UN 2900)”

**4.1.8.2** Replace “liquids shall be filled into packagings, including IBCs, which” with “liquids shall only be filled into packagings which”

**4.1.8.3** Delete “For UN 2814 and UN 2900,” and “and assignment to UN 2814 or UN 2900”

**4.1.8.4** Delete “thoroughly”

Insert “to nullify any hazard” after “sterilized”

**4.1.8.5** Replace with the text of existing 6.3.2.8

**4.1.9.1.1** Replace “2.7.7.1.” with “2.7.2.2, 2.7.2.4.1, 2.7.2.4.4, 2.7.2.4.5, 2.7.2.4.6 and 4.1.9.3

The types of packages for radioactive materials covered by the provisions of this Code are:

- .1 Excepted package (see 1.5.1.5);
- .2 Industrial package Type 1 (Type IP-1 package);
- .3 Industrial package Type 2 (Type IP-2 package);

- .4 Industrial package Type 3 (Type IP-3 package);
- .5 Type A package;
- .6 Type B(U) package;
- .7 Type B(M) package;
- .8 Type C package.

Packages containing fissile material or uranium hexafluoride are subject to additional requirements.”

Replace section 4.1.9.1.6 with:

**“4.1.9.1.6** Before the first shipment of any package, the following provisions shall be fulfilled:

- .1 If the design pressure of the containment system exceeds 35 kPa (gauge), it shall be ensured that the containment system of each package conforms to the approved design requirements relating to the capability of that system to maintain its integrity under that pressure;
- .2 For each Type B(U), Type B(M) and Type C package and for each package containing fissile material, it shall be ensured that the effectiveness of its shielding and containment and, where necessary, the heat transfer characteristics and the effectiveness of the confinement system, are within the limits applicable to or specified for the approved design;
- .3 For packages containing fissile material, where, in order to comply with the requirements of 6.4.11.1, neutron poisons are specifically included as components of the package, checks shall be performed to confirm the presence and distribution of those neutron poisons.

**4.1.9.1.7** Before each shipment of any package, the following provisions shall be fulfilled:

- .1 For any package it shall be ensured that all the provisions specified in the relevant provisions of this Code have been satisfied;
- .2 It shall be ensured that lifting attachments which do not meet the requirements of 6.4.2.2 have been removed or otherwise rendered incapable of being used for lifting the package, in accordance with 6.4.2.3;
- .3 For each package requiring competent authority approval, it shall be ensured that all the requirements specified in the approval certificates have been satisfied;

- .4 Each Type B(U), Type B(M) and Type C package shall be held until equilibrium conditions have been approached closely enough to demonstrate compliance with the requirements for temperature and pressure unless an exemption from these requirements has received unilateral approval;
- .5 For each Type B(U), Type B(M) and Type C package, it shall be ensured by inspection and/or appropriate tests that all closures, valves, and other openings of the containment system through which the radioactive contents might escape are properly closed and, where appropriate, sealed in the manner for which the demonstrations of compliance with the requirements of 6.4.8.8 and 6.4.10.3 were made;
- .6 For each special form radioactive material, it shall be ensured that all the provisions specified in the approval certificate and the relevant provisions of these Regulations have been satisfied;
- .7 For packages containing fissile material the measurement specified in 6.4.11.4 (b) and the tests to demonstrate closure of each package as specified in 6.4.11.7 shall be performed where applicable;
- .8 For each low dispersible radioactive material, it shall be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Regulations have been satisfied.

**4.1.9.1.8** The consignor shall also have a copy of any instructions with regard to the proper closing of the package and any preparation for shipment before making any shipment under the terms of the certificates.

**4.1.9.1.9** Except for consignments under exclusive use, the transport index of any package or overpack shall not exceed 10, nor shall the criticality safety index of any package or overpack exceed 50.

**4.1.9.1.10** Except for packages or overpacks transported under exclusive use by rail or by road under the conditions specified in 7.1.14.7.1, or under exclusive use and special arrangement by ship under the conditions specified in 7.1.14.9, the maximum radiation level at any point on any external surface of a package or overpack shall not exceed 2 mSv/h.

**4.1.9.1.11** The maximum radiation level at any point on any external surface of a package or overpack under exclusive use shall not exceed 10 mSv/h.

**4.1.9.1.12** Pyrophoric radioactive material shall be packaged in Type A, Type B(U), Type B(M) or Type C packages and shall also be suitably inerted.”

**4.1.9.3** Insert new section:

**“4.1.9.3 Packages containing fissile material**

Unless not classified as fissile in accordance with 2.7.2.3.5, packages containing fissile material shall not contain:

- .1 A mass of fissile material different from that authorized for the package design;
  - .2 Any radionuclide or fissile material different from those authorized for the package design; or
  - .3 Contents in a form or physical or chemical state, or in a spatial arrangement, different from those authorized for the package design,
- as specified in their certificates of approval where appropriate.”

## Chapter 4.2

**4.2.0.1** Delete “IMO type portable tanks and road tank vehicles may continue to be constructed in accordance with the provisions of the IMDG Code in force on 1 July 1999 (amendment 29) until 1 January 2003.”

Replace “Tanks certified and approved prior to 1 January 2003” with “IMO type portable tanks and road tank vehicles certified and approved prior to 1 January 2003 in accordance with the provisions of the IMDG Code in force on 1 July 1999 (amendment 29)”

Delete “However, the provisions of column (12) may be used instead of the provisions of column (13) until 1 January 2010.”

**4.2.1.13.8** Insert “**Note:** An example of a method to determine the size of emergency-relief devices is given in Appendix 5 of the Manual of Tests and Criteria.”

### 4.2.5.2.6

**T23** Insert “or type B” after “type A” for UN 3119 - Di-(3, 5, 5-trimethylhexanoyl) peroxide, not more than 38% in diluent type A

Insert new entry:

UN No	Substance	Min. test pressure (bar)	Min. shell thickness (mm-reference steel)	Bottom opening requirements	Pressure-relief requirements	Degree of filling	Control temp.	Emergency temp.
3119	tert-Amyl peroxyneodecanoate, not more than 47% in diluent type A						-10	-5

#### 4.2.5.3

TP12 Delete

TP13 Replace “is transported.” With “is transported, unless no self-contained breathing apparatus, as required by SOLAS regulation II-2/19 (II-2/54), is onboard”

TP35 Insert “Portable tank instruction T14 may continue to be applied until 31 December 2014.”

### Chapter 4.3

4.3.2.4 Delete “waste”

4.3.2.4.1 Replace “*Bulk waste goods of class 6.2 (UN Nos. 2814 and 2900 (animal carcasses only))*” with “*Transport in bulk containers of animal material of class 6.2*”

Insert “Animal material containing infectious substances (UN Nos. 2814, 2900 and 3373) is authorized for transport in bulk containers provided the following conditions are met.” before “.1 closed bulk containers ...”

4.3.2.4.1.2 Replace “Waste goods UN 2814 and 2900” with “The animal material”

4.3.2.4.1.3 Delete “used for the transport of waste goods UN 2814 and 2900”

Insert “**Note:** Additional provisions may be required by appropriate national health authorities.”

## PART 5

### Chapter 5.1

5.1.2.1 Insert “, except as required in 5.2.2.1.12.” after “in the overpack are visible.”

5.1.3.2 Replace “Tanks and intermediate bulk containers” with “Packagings, including IBCs, and tanks”

5.1.5 Delete “**Note:** The provisions of chapter 5.2 apply to all class 7 packages as defined in 2.7.2.”

5.1.5.1 Delete paragraph 5.1.5.1

#### **Consequential amendments:**

5.1.5.1 Renumber paragraphs 5.1.5.2 to 5.1.5.3.3

**5.1.5.2.1** Replace “5.1.5.2.2”, “5.1.5.2.3” and “5.1.5.2.4” with “5.1.5.1.2”, “5.1.5.1.3” and “5.1.5.1.4”

**6.4.22.2** Replace “5.1.5.3.1” with “5.1.5.2.1”

**6.4.22.3** Replace “5.1.5.3.1” with “5.1.5.2.1”

**6.4.23.2** Replace “5.1.5.3.1” with “5.1.5.2.1”

**6.4.23.14(h)** Replace “5.1.5.2.2” with “5.1.5.1.2”

**5.1.5.2.2** (current **5.1.5.3.2**)

Delete “The consignor shall also have a copy of any instructions with regard to the proper closing of the package and any preparation for shipment before making any shipment under the terms of the certificates.”

**5.1.5.3** Insert new section:

**“5.1.5.3 Determination of transport index (TI) and criticality safety index (CSI)**

**5.1.5.3.1** The transport index (TI) for a package, overpack or freight container, or for unpackaged LSA-I or SCO-I, shall be the number derived in accordance with the following procedure:

.1 Determine the maximum radiation level in units of millisieverts per hour (mSv/h) at a distance of 1 m from the external surfaces of the package, overpack, freight container, or unpackaged LSA-I and SCO-I. The value determined shall be multiplied by 100 and the resulting number is the transport index. For uranium and thorium ores and their concentrates, the maximum radiation level at any point 1 m from the external surface of the load may be taken as:

0.4 mSv/h for ores and physical concentrates of uranium and thorium;

0.3 mSv/h for chemical concentrates of thorium;

0.02 mSv/h for chemical concentrates of uranium, other than uranium hexafluoride;

.2 For tanks, freight containers and unpackaged LSA-I and SCO-I, the value determined in 5.1.5.3.1.1 above shall be multiplied by the appropriate factor from Table 5.1.5.3.1;

.3 The value obtained in 5.1.5.3.1.1 and 5.1.5.3.1.2 above shall be rounded up to the first decimal place (e.g., 1.13 becomes 1.2), except that a value of 0.05 or less may be considered as zero.

**Table 5.1.5.3.1: Multiplication factors for tanks, freight containers and unpackaged LSA-I and SCO-I**

Size of load <sup>a</sup>	Multiplication factor
size of load $\leq 1 \text{ m}^2$	1
$1 \text{ m}^2 < \text{size of load} \leq 5 \text{ m}^2$	2
$5 \text{ m}^2 < \text{size of load} \leq 20 \text{ m}^2$	3
$20 \text{ m}^2 < \text{size of load}$	10

<sup>a</sup> Largest cross-sectional area of the load being measured.

- 5.1.5.3.2** The transport index for each overpack, freight container or conveyance shall be determined as either the sum of the TIs of all the packages contained, or by direct measurement of radiation level, except in the case of non-rigid overpacks for which the transport index shall be determined only as the sum of the TIs of all the packages.
- 5.1.5.3.3** The criticality safety index for each overpack or freight container shall be determined as the sum of the CSIs of all the packages contained. The same procedure shall be followed for determining the total sum of the CSIs in a consignment or aboard a conveyance.
- 5.1.5.3.4** Packages and overpacks shall be assigned to either category I-WHITE, II-YELLOW or III-YELLOW in accordance with the conditions specified in Table 5.1.5.3.4 and with the following requirements:
- .1 For a package or overpack, both the transport index and the surface radiation level conditions shall be taken into account in determining which is the appropriate category. Where the transport index satisfies the condition for one category but the surface radiation level satisfies the condition for a different category, the package or overpack shall be assigned to the higher category. For this purpose, category I-WHITE shall be regarded as the lowest category;
  - .2 The transport index shall be determined following the procedures specified in 5.1.5.3.1 and 5.1.5.3.2;
  - .3 If the surface radiation level is greater than 2 mSv/h, the package or overpack shall be transported under exclusive use and under the provisions of 7.2.3.1.3, 7.2.3.2.1, or 7.2.3.3.3, as appropriate;
  - .4 A package transported under a special arrangement shall be assigned to category III-YELLOW except when otherwise specified in the competent authority approval certificate of the country of origin of design (see 2.7.2.4.6);

- 5 An overpack which contains packages transported under special arrangement shall be assigned to category III-YELLOW except when otherwise specified in the competent authority approval certificate of the country of origin of design (see 2.7.2.4.6).

**Table 5.1.5.3.4: Categories of packages and overpacks**

<b>Conditions</b>		
<b>Transport index</b>	<b>Maximum radiation level at any point on external surface</b>	<b>Category</b>
0 <sup>a</sup>	Not more than 0.005 mSv/h	I-WHITE
More than 0 but not more than 1 <sup>a</sup>	More than 0.005 mSv/h but not more than 0.5 mSv/h	II-YELLOW
More than 1 but not more than 10	More than 0.5 mSv/h but not more than 2 mSv/h	III-YELLOW
More than 10	More than 2 mSv/h but not more than 10 mSv/h	III-YELLOW <sup>b</sup>

<sup>a</sup> If the measured TI is not greater than 0.05, the value quoted may be zero in accordance with 5.1.5.3.1.3.

<sup>b</sup> Shall also be transported under “exclusive use”.

## Chapter 5.2

**5.2.1.5.2** Replace paragraph with “In the case of excepted packages marking the proper shipping name is not required.”

**5.2.1.6** Replace section with:

“**5.2.1.6.1** Packages containing marine pollutants meeting the criteria of 2.10.3 shall be durably marked with the marine pollutant mark with the exception of single packagings and combination packagings containing inner packagings with:

- contents of 5 l or less for liquids; or
- contents of 5 kg or less for solids.

**5.2.1.6.2** The marine pollutant mark shall be located adjacent to the markings required by 5.2.1.1. The provisions of 5.2.1.2 and 5.2.1.4 shall be met.

**5.2.1.6.3** The marine pollutant mark shall be as shown below. For packagings, the dimensions shall be at least 100 mm × 100 mm, except in the case of packages of such dimensions that they can only bear smaller marks.

### Marine pollutant mark



Symbol (fish and tree): black on white or suitable contrasting background”

- 5.2.1.7** Delete “open” before “cryogenic receptacles intended for the transport of”
- 5.2.1.7.1(a)** Insert “except for cryogenic receptacles” after “pressure receptacles”
- 5.2.1.8** Insert new section:
- “5.2.1.8 Excepted quantity mark**
- 5.2.1.8.1** Packages containing excepted quantities of dangerous goods shall be marked according to 3.5.4.”
- 5.2.2.1.12.1** Replace “Except as provided for large freight containers and tanks in accordance with 5.3.1.1.5.1” with “Except when enlarged labels are used in accordance with 5.3.1.1.5.1”
- 5.2.2.1.12.2.4** Replace “See 2.7.6.1.1 and 2.7.6.1.2” with “The number determined in accordance with 5.1.5.3.1 and 5.1.5.3.2”
- 5.2.2.2.1.1** Replace “They shall have a line of the same colour as the symbol, 5 mm inside the edge and running parallel with it.” with “They shall have a line 5 mm inside the edge and running parallel with it. In the upper half of a label the line shall have the same colour as the symbol and in the lower half it shall have the same colour as the figure in the bottom corner.”
- 5.2.2.2.1.2** Replace “ISO 7225:1994” with “ISO 7225:2005” (twice)
- 5.2.2.2.1.3** Replace with “With the exception of divisions 1.4, 1.5 and 1.6 of class 1, the upper half of the label shall contain the pictorial symbol and the lower half shall contain the class number 1, 2, 3, 4, 4.1, 5.2, 6, 7, 8 or 9 as appropriate. The label may include text such as the UN number, or words describing the hazard class (e.g., “flammable”) in accordance with 5.2.2.2.1.5 provided the text does not obscure or detract from the other label elements.”
- 5.2.2.2.1.4** Replace “Except for divisions 1.4, 1.5 and 1.6, labels for class 1 show in the lower half” with “In addition, except for divisions 1.4, 1.5 and 1.6, labels for class 1 shall show in the lower half, above the class number,”

Replace “Labels for divisions 1.4, 1.5 and 1.6 show in the upper half the division number and in the lower half the” with “Labels for divisions 1.4, 1.5 and 1.6 shall show in the upper half the division number and in the lower half the class number and the”

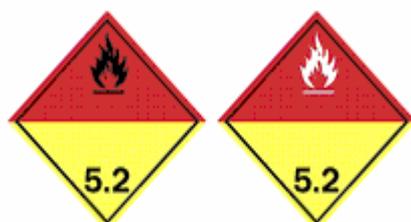
**5.2.2.2.1.6.3** Renumber as “**5.2.2.2.1.6.4**”

Insert “the class 5.2 label, where the symbol may be shown in white; and”

**Consequential amendments:**

**5.2.2.2.2** Replace “5.2.2.2.1.6.3” with “5.2.2.2.1.6.4” for class 2.1

Replace:



(No. 5.2(b))

**Class 5.2**

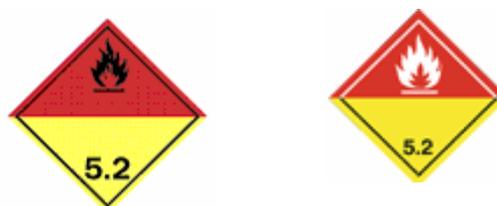
***Organic peroxides***

Symbol (flame): black or white; □

Background: upper half red; lower half yellow; □

Figure '5.2' in bottom corner.

with:



(No. 5.2(b))

**Class 5.2**

***Organic peroxides***

Symbol (flame): black or white; □

Background: upper half red; lower half yellow; □

Figure '5.2' in bottom corner.

**5.2.2.2.1.6.2** Delete “and” after “... where they may be shown in white;”

### Chapter 5.3

**5.3.1.2.1.1** Delete “of the same colour as the symbol”

**5.3.1.2.1.1** Replace “;” with “. In the upper half of the placard the line shall have the same colour as the symbol and in the lower half it shall have the same colour as the figure in the bottom corner.”

**5.3.2.1.2.1** Replace “against a white background in the lower half of each primary hazard class placard; or” with “against a white background in the area below the pictorial symbol and above the class number and the compatibility group letter in a manner that does not obscure or detract from the other required label elements (see 5.3.2.1.3); or”

- 5.3.2.3** Replace “The mark shall conform to 5.2.1.6.3 and shall have sides of at least 250 mm.” with “The mark shall conform to the specifications given in 5.2.1.6.3, and shall have minimum dimensions of 250 mm x 250 mm.”

## Chapter 5.4

- 5.4.1.2.5** Replace footnote with “<sup>1</sup> For standardized formats, see also the relevant recommendations of the UNECE United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT), in particular Recommendation No.1 (United Nations Lay-out Key for Trade Documents) (ECE/TRADE/137, edition 81.3), UN Layout Key for Trade Documents – Guidelines for Applications (ECE/TRADE/270, edition 2002), Recommendation No.11 (Documentary Aspects of the International Transport of Dangerous Goods).

(ECE/TRADE/204, edition 96.1 – currently under revision) and Recommendation No.22 (Lay-out Key for standard Consignment Instructions) (ECE/TRADE/168, edition 1989). Refer also to the UN/CEFACT Summary of Trade Facilitation Recommendations (ECE/TRADE/346, edition 2006) and the United Nations Trade Data Elements Directory (UNTDDED) (ECE/TRADE/362, edition 2005).”

- 5.4.1.4.4** Delete “, n.o.s.” for UN 2761

- 5.4.1.5.2.1** Replace “in column 7” with “in column 7a”

- 5.4.1.5.11.1** Replace paragraph with “For substances, mixtures, solutions or preparations classified under N.O.S. entries not included in the segregation groups listed in 3.1.4.4 but belonging, in the opinion of the consignor, to one of these groups (see 3.1.4.2), the appropriate segregation group name preceded by the phrase “IMDG Code segregation group” shall be included in the transport document after the dangerous goods description. For example:

“UN 1760 CORROSIVE LIQUID, N.O.S. (Phosphoric acid) 8 III IMDG Code segregation group – 1 Acids”

- 5.4.1.5.13** Insert new paragraph “**5.4.1.5.13**”:

- “5.4.1.5.13** *Transport of IBCs or portable tanks after the date of expiry of the last periodic test or inspection*

For transport in accordance with 4.1.2.2.2.2, 6.7.2.19.6.2, 6.7.3.15.6.2 or 6.7.4.14.6.2, a statement to this effect shall be included in the transport document, as follows: “Transport in accordance with 4.1.2.2.2.2”, “Transport in accordance with 6.7.2.19.6.2”, “Transport in accordance with 6.7.3.15.6.2” or “Transport in accordance with 6.7.4.14.6.2” as appropriate.”

Insert new section:

**“5.4.1.5.14 Dangerous goods in excepted quantities**

**5.4.1.5.14.1** When dangerous goods are transported according to the exceptions for dangerous goods packed in excepted quantities provided for in column 7b of the Dangerous Goods List and chapter 3.5, the words “dangerous goods in excepted quantities” shall be included.”

**5.4.2.2** Insert “Facsimile signatures are acceptable where applicable laws and regulations recognize the legal validity of facsimile signatures.” after “shall be identified on the document.”

**5.4.2.3** Insert new paragraph “**5.4.2.3**”:

**“5.4.2.3** If the dangerous goods documentation is presented to the carrier by means of electronic data processing (EDP) or electronic data interchange (EDI) transmission techniques, the signature(s) may be replaced by the name(s) (in capitals) of the person authorized to sign.”

**5.4.5.1** Insert a full stop at the end of the note, after “tanks” (English only)

## **PART 6**

### **Chapter 6.1**

**6.1.1.3** Insert “**Note:** ISO 16106:2006 “Packaging – Transport packages for dangerous goods – Dangerous goods packagings, intermediate bulk containers (IBCs) and large packagings – Guidelines for the application of ISO 9001” provides acceptable guidance on procedures which may be followed.” after “packaging meets the provisions of this chapter.”

**6.1.2.6** Insert “**Note:** *Plastics materials*, is taken to include other polymeric materials such as rubber.” after “Glass, porcelain or stoneware”

**6.1.3.1(a)** Replace “This shall not be used for any purpose other than certifying that a packaging complies with the relevant provisions of this chapter.” with “This symbol shall not be used for any purpose other than certifying that a packaging complies with the relevant requirements in chapter 6.1, 6.2, 6.3, 6.5 or 6.6.”

**6.1.5.1.2** Replace “Tests shall be successfully performed on each packaging design type before such packaging is used.” with “Each packaging design type shall successfully pass the tests prescribed in this chapter before being used.”

**6.1.5.3.4** Replace “The target shall be a rigid, non-resilient, flat and horizontal surface.” with:

**“Target**

The target shall be a non-resilient and horizontal surface and shall be:

- .1 Integral and massive enough to be immovable;
- .2 Flat with a surface kept free from local defects capable of influencing the test results;
- .3 Rigid enough to be non-deformable under test conditions and not liable to become damaged by the tests; and
- .4 Sufficiently large to ensure that the test package falls entirely upon the surface.”

## Chapter 6.2

**Title** Replace “*and small receptacles containing gas (gas cartridges)*” with “*, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas*”

**6.2.1** Replace “*and small receptacles containing gas (gas cartridges)*” with “*, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas*”

**6.2.1.1.6** Replace “Manifolds shall be designed such that they are protected from impact.” with “Manifold assemblies (e.g., manifold, valves, and pressure gauges) shall be designed and constructed such that they are protected from impact damage and forces normally encountered in transport. Manifolds shall have at least the same test pressure as the cylinders.”

Replace “means shall be provided” with “each pressure receptacle shall have an isolation valve”

**6.2.1.1.9** Insert “*Additional requirements for the construction of pressure receptacles for acetylene*”.

Pressure receptacles for UN 1001 acetylene, dissolved, and UN 3374 acetylene, solvent free, shall be filled with a porous material, uniformly distributed, of a type that conforms to the requirements and testing specified by the competent authority and which:

- .1 is compatible with the pressure receptacle and does not form harmful or dangerous compounds either with the acetylene or with the solvent in the case of UN 1001; and

- .2 is capable of preventing the spread of decomposition of the acetylene in the porous material.

In the case of UN 1001, the solvent shall be compatible with the pressure receptacles.”

- 6.2.1.3.1** Replace “Except for pressure relief devices, valves, piping, fittings and other equipment subjected to pressure shall be designed and constructed to withstand at least 1.5 times the test pressure of the pressure receptacles.” with “Valves, piping and other fittings subjected to pressure, excluding pressure relief devices, shall be designed and constructed so that the burst pressure is at least 1.5 times the test pressure of the pressure receptacle.”
- 6.2.1.6.1.5** Insert new paragraph “.5 Check of service equipment, other accessories and pressure-relief devices, if to be reintroduced into service.”
- 6.2.1.6.2** Replace paragraph with “Pressure receptacles intended for the transport of UN 1001 acetylene, dissolved and UN 3374 acetylene, solvent free, shall be examined only as specified in 6.2.1.6.1.1, 6.2.1.6.3 and 6.2.1.6.1.5. In addition the condition of the porous material (e.g., cracks, top clearance, loosening, or settlement) shall be examined.”
- 6.2.2.1.3** Delete “ISO 11118:1999 Gas cylinders – Non-refillable metallic gas cylinders – Specification and test methods”
- 6.2.2.2** Insert after the table “**Note:** The limitations imposed in ISO 11114-1 on high strength steel alloys at ultimate tensile strength levels up to 1 100 MPa do not apply to SILANE (UN 2203).” after “Part 2: Non-metallic materials”
- 6.2.2.4** Replace “ISO 6406:1992 Periodic inspection and testing of seamless steel gas cylinders” with “ISO 6406:2005 Seamless steel gas cylinders – Periodic inspection and testing”
- Replace “ISO 10461:1993” with “ISO 10461:2005/A1:2006”
- Replace “ISO 10462:1994 Cylinders for dissolved acetylene – Periodic inspection and maintenance” with “ISO 10462:2005 Transportable cylinders for dissolved acetylene – Periodic inspection and maintenance”
- 6.2.2.7.1** **Replace** “This symbol shall only be marked on pressure receptacles which conform to the provisions of this Code for UN pressure receptacles.” with “This symbol shall not be used for any purpose other than certifying that a packaging complies with the relevant requirements in chapter 6.1, 6.2, 6.3, 6.5 or 6.6.”
- 6.2.4** Replace “and small receptacles containing gas (gas cartridges)” with “, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas”
- 6.2.4.1** Insert “and fuel cell cartridges containing liquefied flammable gas” after “(gas cartridges)”

- 6.2.4.1.1** Insert “or fuel cell cartridge” after “Each receptacle”  
Insert “or the fuel cell cartridge” after “95% of the capacity of the receptacle”  
Insert “or the fuel cell cartridges” after “or if the receptacles”  
Insert “or fuel cell cartridge” after “but in addition one receptacle”
- 6.2.4.1.2** Insert “or fuel cell cartridge” after “receptacle” (twice)
- 6.2.4.2.2.3** Replace “weight” with “mass”

**Consequential amendments:**

**Contents page:**

- Chapter 6.2** Replace “and small receptacles containing gas (gas cartridges)” with “, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas”
- 6.2.1.4** Renumber “6.2.1.4” as “6.2.1.5”  
Renumber “6.2.1.4.1” as “6.2.1.5.1”  
Renumber “6.2.1.4.2” as “6.2.1.5.2”
- 6.2.1.5** Renumber “6.2.1.5” as “6.2.1.6”  
Renumber “6.2.1.5.1” as “6.2.1.6.1”  
Renumber “6.2.1.5.1” as “6.2.1.6.2”
- 6.2.1.6** Renumber “6.2.1.6” as “6.2.1.4”  
Renumber “6.2.1.6.1” as “6.2.1.4.1”  
Renumber “6.2.1.6.1” as “6.2.1.4.2”
- 6.2.4** Replace “and small receptacles containing gas (gas cartridges)” with “, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas”
- 4.1.6.1.4** Replace “6.2.1.5” with “6.2.1.6”
- 4.1.6.1.10** Replace “6.2.1.5” with “6.2.1.6”
- 4.2.4.2** Replace “6.2.1.5” with “6.2.1.6”

- 6.2.1.4.2** Replace “6.2.1.4.1.1” with “6.2.1.5.1.1”  
Replace “6.2.1.4.1.2” with “6.2.1.5.1.2”  
Replace “6.2.1.4.1.4” with “6.2.1.5.1.4”  
Replace “6.2.1.4.1.6” with “6.2.1.5.1.6”  
Replace “6.2.1.4.1.7” with “6.2.1.5.1.7”  
Replace “6.2.1.4.1.8” with “6.2.1.5.1.8”  
Replace “6.2.1.4.1.9” with “6.2.1.5.1.9”
- 6.7.5.12.4** Replace “6.2.1.5” with “6.2.1.6”

### Chapter 6.3

- Title** Replace “**substances**” with “**infectious substances of category A**”
- 6.3.1.1** Replace paragraph with “The provisions of this chapter apply to packagings intended for the transport of infectious substances of Category A.”
- 6.3.1.2** Delete
- 6.3.1.3** Delete
- 6.3.2** Replace section with:
- “6.3.2 Provisions for packagings**
- 6.3.2.1** The provisions for packagings in this section are based on packagings, as specified in 6.1.4, 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 in this chapter provided that they are equally effective, acceptable to the competent authority and able successfully to withstand the tests described in 6.3.5. Methods of testing other than those described in the provisions of this Code are acceptable provided they are equivalent.
- 6.3.2.2** Packagings shall be manufactured and tested under a quality assurance programme which satisfies the competent authority in order to ensure that each packaging meets the provisions of this chapter.
- Note:** ISO 16106:2006 “Packaging – Transport packages for dangerous goods – Dangerous goods packagings, intermediate bulk containers (IBCs) and large packagings – Guidelines for the application of ISO 9001” provides acceptable guidance on procedures which may be followed.”

**6.3.2.3** Insert text of existing 6.3.1.3

**6.3.3** Replace section with:

**“6.3.3 Code for designating types of packagings**

**6.3.3.1** The codes for designating types of packagings are set out in 6.1.2.7.

**6.3.3.2** The letters “U” or “W” may follow the packaging code. The letter “U” signifies a special packaging conforming to the provisions of 6.3.5.1.6. The letter “W” signifies that the packaging, although, of the same type indicated by the code is manufactured to a specification different from that in 6.1.4 and is considered equivalent under the provisions of 6.3.2.1.”

Insert new sections 6.3.4 and 6.3.5:

**“6.3.4 Marking**

**Note 1:** The marking indicates that the packaging which bears it corresponds to a successfully tested design type and that it complies with the provisions of this chapter which are related to the manufacture, but not to the use, of the packaging.

**Note 2:** The marking is intended to be of assistance to packaging manufacturers, reconditioners, packaging users, carriers and regulatory authorities.

**Note 3:** The marking does not always provide full details of the test levels, etc., and these may need to be taken further into account, e.g., by reference to a test certificate, to test reports or to a register of successfully tested packagings.

**6.3.4.1** Each packaging intended for use according to the provisions of this Code shall bear markings which are durable, legible and placed in a location and of such a size relative to the packaging as to be readily visible. For packages with a gross mass of more than 30 kg, the markings or a duplicate thereof shall appear on the top or on a side of the packaging. Letters, numerals and symbols shall be at least 12 mm high, except for packagings of 30 litres or 30 kg capacity or less, when they shall be at least 6 mm in height and for packagings of 5 litres or 5 kg or less when they shall be of an appropriate size.

**6.3.4.2** Insert text of existing 6.3.1.1 with the following modifications:

Replace “6.3.2” with “6.3.5”

**6.3.4.2(a)** Replace “the United Nations Packaging symbol;” with “the United Nations Packaging symbol. This symbol shall not be used for any purpose other than certifying that a packaging complies with the relevant provisions in chapter 6.1, 6.2, 6.3, 6.5 or 6.6;”

- 6.3.4.2(g)** Replace “6.3.2.9” with “6.3.5.1.6”
- 6.3.4.2(h)** Delete “shall be clearly separated, such as by a slash or space, so as to be easily identifiable” after “with subparagraphs (a) to (g)”
- 6.3.4.3** Marking shall be applied in the sequence shown in 6.3.4.2 (a) to (g); each element of the marking required in these sub-paragraphs shall be clearly separated, e.g., by a slash or space, so as to be easily identifiable. For examples, see 6.3.4.4
- Any additional markings authorized by a competent authority shall still enable the parts of the mark to be correctly identified with reference to 6.3.4.1
- 6.3.4.4** Insert text of existing 6.3.1.2 with the following modifications:
- Replace “**4G/CLASS 6.2/01**” with “**4G/CLASS 6.2/06**”
- Replace “6.3.1.1” with “6.3.4.2” (twice)
- 6.3.5** Insert heading of existing 6.3.2
- 6.3.5.1 Performance and frequency of tests**
- 6.3.5.1.1** The design type of each packaging shall be tested as provided in this section in accordance with procedures established by the competent authority.
- 6.3.5.1.2** Each packaging design type shall successfully pass the tests prescribed in this chapter before being used. A packaging design type is defined by the design, size, material and thickness, manner of construction and packing, but may include various surface treatments. It also includes packagings which differ from the design type only in their lesser design height.
- 6.3.5.1.3** Tests shall be repeated on production samples at intervals established by the competent authority.
- 6.3.5.1.4** Tests shall also be repeated after each modification which alters the design, material or manner of construction of a packaging.
- 6.3.5.1.5** Insert text of existing 6.3.2.7 with the following modifications:
- Replace “of inner packagings or inner packagings of lower net mass” with “or lower net mass of primary receptacles”
- Delete “, bags” after “such as drums”

- 6.3.5.1.6** Insert text of existing 6.3.2.9 with the following modifications:
- Replace “Inner” with “Primary”
  - Replace “intermediate (secondary)” with “secondary”
  - Replace “outer” with “rigid outer”
- 6.3.5.1.6.1** Replace “intermediate/outer packaging combination” with “rigid outer packaging”
- Replace “6.3.2.3” with “6.3.5.2.2”
  - Replace “inner” with “primary”
- 6.3.5.1.6.2** Replace “inner” with “primary” (twice)
- 6.3.5.1.6.3** Replace “inner” with “primary” (seven times)
- Replace “intermediate” with “secondary” (twice)
  - Insert “spaces” after “to take up the void”
- 6.3.5.1.6.4** Replace “outer” with “rigid outer”
- Replace “inner receptacles” with “packagings”
- 6.3.5.1.6.5** Replace “inner” with “primary” (twice)
- 6.3.5.1.6.6** Replace “outer” with “rigid outer”
- Replace “inner” with “primary” (twice)
- 6.3.5.1.6.7** Replace “6.3.1.1” with “6.3.4.2” (twice)
- 6.3.5.1.7** The competent authority may at any time require proof, by tests in accordance with this section, that serially-produced packagings meet the provisions of the design type tests.
- 6.3.5.1.8** Provided the validity of the test results is not affected and with the approval of the competent authority, several tests may be made on one sample.
- 6.3.5.2** Preparation of packagings for testing
- 6.3.5.2.1** Insert text of existing 6.3.2.2 with the following modifications:
- Replace “98% capacity” with “not less than 98% of its capacity”**
- Insert “**Note:** The term water includes water/antifreeze solution with a minimum specific gravity of 0.95 for testing at -18°C.” after “98% of its capacity.”

### 6.3.5.2.2 Tests and number of samples required

Tests required for packaging types

Type of packaging <sup>a</sup>			Tests required					Stack 6.1.5.6
Rigid outer packaging	Primary receptacle		Water spray 6.3.5.3.6.1	Cold conditioning 6.3.5.3.6.2	Drop 6.3.5.3	Additional drop 6.3.5.3.6.3	Puncture 6.3.5.4	
	Plastics	Other						
			No. of samples	No. of samples	No. of samples	No. of samples	No. of samples	
Fibreboard box	x		5	5	10	Required on one sample when the packaging is intended to contain dry ice.	2	Required on three samples when testing a “U”-marked packaging as defined in 6.3.5.1.6 for specific provisions.
		x	5	0	5		2	
Fibreboard drum	x		3	3	6		2	
		x	3	0	3		2	
Plastics box	x		0	5	5		2	
		x	0	5	5		2	
Plastics drum/ jerrican	x		0	3	3		2	
		x	0	3	3		2	
Boxes of other material	x		0	5	5		2	
		x	0	0	5		2	
Drums/ jerricans of other material	x		0	3	3	2		
		x	0	0	3	2		

<sup>a</sup> “Type of packaging” categorizes packagings for test purposes according to the kind of packaging and its material characteristics.

**Note 1:** In instances where a primary receptacle is made of two or more materials, the material most liable to damage determines the appropriate test.

**Note 2:** The material of the secondary packagings are not taken into consideration when selecting the test or conditioning for the test.

Explanation for use of the table:

If the packaging to be tested consists of a fibreboard outer box with a plastics primary receptacle, five samples must undergo the water spray test (see 6.3.5.3.6.1) prior to dropping and another five must be conditioned to -18°C (see 6.3.5.3.6.2) prior to dropping. If the packaging is to contain dry ice then one further single sample shall be dropped five times after conditioning in accordance with 6.3.5.3.6.3.

Packagings prepared as for transport shall be subjected to the tests in 6.3.5.3 and 6.3.5.4. For outer packagings, the headings in the table relate to fibreboard or similar materials whose performance may be rapidly affected by moisture; plastics which may embrittle at low temperature; and other materials such as metal whose performance is not affected by moisture or temperature.

### **6.3.5.3 Drop test**

**6.3.5.3.1** Samples shall be subjected to free-fall drops from a height of 9 m onto a non-resilient, horizontal, flat, massive and rigid surface in conformity with 6.1.5.3.4.

**6.3.5.3.2** Where the samples are in the shape of a box; five shall be dropped one in each of the following orientations:

- .1 flat on the base;
- .2 flat on the top;
- .3 flat on the longest side;
- .4 flat on the shortest side; and
- .5 on a corner.

**6.3.5.3.3** Where the samples are in the shape of a drum, three shall be dropped one in each of the following orientations:

- .1 diagonally on the top chime, with the centre of gravity directly above the point of impact;
- .2 diagonally on the base chime; and
- .3 flat on the side.

**6.3.5.3.4** While the sample shall be released in the required orientation, it is accepted that for aerodynamic reasons the impact may not take place in that orientation.

**6.3.5.3.5** Following the appropriate drop sequence, there shall be no leakage from the primary receptacle(s) which shall remain protected by cushioning/absorbent material in the secondary packaging.

**6.3.5.3.6** *Special preparation of test sample for the drop test*

#### **6.3.5.3.6.1 Fibreboard – Water spray test**

Fibreboard outer packagings: The sample shall be subjected to a water spray that simulates exposure to rainfall of approximately 5 cm per hour for at least one hour. It shall then be subjected to the test described in 6.3.5.3.1.

#### **6.3.5.3.6.2 Plastics material – Cold conditioning**

Plastics primary receptacles or outer packagings: The temperature of the test sample and its contents shall be reduced to -18°C or lower for a period of at least 24 hours and within 15 minutes of removal from that atmosphere the test sample shall be subjected to the test described in 6.3.5.3.1. Where the sample contains dry ice, the conditioning period shall be reduced to 4 hours.

#### **6.3.5.3.6.3 Packagings intended to contain dry ice – Additional drop test**

Where the packaging is intended to contain dry ice, a test additional to that specified in 6.3.5.3.1 and, when appropriate, in 6.3.5.3.6.1 or 6.3.5.3.6.2 shall be carried out. One sample shall be stored so that all the dry ice dissipates and then that sample shall be dropped in one of the orientations described in 6.3.5.3.2 which shall be that most likely to result in failure of the packaging.

#### **6.3.5.4 Puncture test**

##### **6.3.5.4.1 *Packagings with a gross mass of 7 kg or less***

Insert text of existing 6.3.2.6.1 with the following modification:

Replace “not exceeding 38 mm” with “of 38 mm”

##### **6.3.5.4.2 *Packagings with a gross mass exceeding 7 kg***

Insert text of existing 6.3.2.6.2 with the following modifications:

Replace “the primary receptacle(s) and the outer surface” with “the centre of the primary receptacle(s) and the outer surface”

Insert “with its top face lowermost” before “in a vertical free fall”

Replace “the steel rod would penetrate” with “the steel rod would be capable of penetrating”

Replace “there shall be no leakage” with “penetration of the secondary packaging is acceptable provided that there is no leakage”

##### **6.3.5.5 Insert heading of existing 6.3.3**

##### **6.3.5.5.1 Insert text of existing 6.3.3.1 with the following modifications:**

Insert “written” before “test report”

##### **6.3.5.5.1.4 Replace “the test report” with “the test and of the report”**

**6.3.5.5.1.8** Replace “Characteristics of test contents, e.g., viscosity and relative density for liquids and particle size for solids;” with “Test contents;”

**6.3.5.5.2** Insert text of existing 6.3.3.2”

**Consequential amendments:**

**Contents page:**

**Chapter 6.3** Replace “**substances**” with “**infectious substances of category A**”

6.3.2 Replace “Test p” with “P”

6.3.3 Replace “Test report” with “Code for designating types of packagings”

6.3.4 Insert “6.3.4 Marking”

6.3.5 Insert “6.3.5 Test provisions for packagings”

**Chapter 6.4**

**6.4.5.4.1.2** Replace “conform to the standards prescribed in chapter 6.1, or other provisions at least equivalent to those standards” with “satisfy the provisions for packing group I or II in chapter 6.1 of this Code”

**6.4.5.4.2.2** Replace “conform to the standards prescribed in chapter 6.7, or other provisions at least equivalent to those standards” with “satisfy the provisions of chapter 6.7 of this Code”

**6.4.5.4.3** Replace “that they conform to standards at least equivalent to those prescribed in 6.4.5.4.2.” with “that:

- .1 They satisfy the provisions of 6.4.5.1;
- .2 They are designed to satisfy the provisions prescribed in regional or national regulations for the transport of dangerous goods and are capable of withstanding a test pressure of 265 kPa; and
- .3 They are designed so that any additional shielding which is provided shall be capable of withstanding the static and dynamic stresses resulting from handling and routine conditions of transport and of preventing an increase of more than 20% in the maximum radiation level at any external surface of the tanks.”

**6.4.5.4.4** Insert “of a permanent enclosed character” after “Freight containers”

- 6.4.5.4.5.2** Replace “conform to the standards and test prescribed in chapter 6.5, for packing group I or II, and if they were subjected to the tests prescribed” with “satisfy the provisions of chapter 6.5 of this Code for packing group I or II, and if they were subjected to the tests prescribed in that chapter”
- 6.4.8.8** Justify the text to the left after .2(i) and .2(ii)
- 6.4.11.2** Replace “of this paragraph” with “of 2.7.2.3.5”
- 6.4.11.2.1 to 6.4.11.2.4** Delete text and table
- 6.4.11.11** Replace ““*N*” is subcritical” with ““*N*” packages shall be subcritical”
- 6.4.11.12** Replace ““*N*” is subcritical” with ““*N*” packages shall be subcritical”
- 6.4.11.13** Insert “**6.4.11.13** The criticality safety index (CSI) for packages containing fissile material shall be obtained by dividing the number 50 by the smaller of the two values of *N* derived in 6.4.11.11 and 6.4.11.12 (i.e.  $CSI = 50/N$ ). The value of the criticality safety index may be zero, provided that an unlimited number of packages is subcritical (i.e. *N* is effectively equal to infinity in both cases).”
- 6.4.23.14(o)** Insert “6.4.8.4,” before “6.4.8.5”

## Chapter 6.5

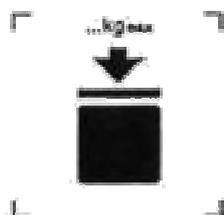
- 6.5.1.2** In the definition of *Plastics*:  
Insert “*material*” after “*Plastics*”  
Delete “, etc”
- 6.5.1.4.1(a)** Renumber 6.5.1.4.1(a) 6.5.1.4.1.1
- 6.5.1.4.1(b)** Renumber 6.5.1.4.1(b) as 6.5.1.4.1.2
- 6.5.2.1.1.1** Insert “This symbol shall not be used for any purpose other than certifying that a packaging complies with the relevant requirements in chapter 6.1, 6.2, 6.3, 6.5 or 6.6.” before “For metal IBCs”
- 6.5.2.1.2** In the fourth, fifth, sixth and seventh examples, insert a full stop after the word “packaging” (English only)  
In the fifth example, insert a full stop after the word “solids” (English only)  
In the sixth example, insert a full stop after the word “stacked” (English only)
- 6.5.2.2.1** Replace “\*” with “<sup>a</sup>” (five times)

Insert new entry:

Additional marking	Category of IBC				
	Metal	Rigid Plastics	Composite	Fibreboard	Wooden
Maximum permitted stacking load <sup>b</sup>	X	X	X	X	X

Insert <sup>b</sup> See 6.5.2.2.2 This additional marking shall apply to all IBCs manufactured, repaired or remanufactured as from 1 January 2011..” after <sup>a</sup> The unit used shall be indicated.”

**6.5.2.2.2** Replace paragraph with “The maximum permitted stacking load applicable when the IBC is in use shall be displayed on a symbol as follows:



IBCs capable of being stacked



IBCs NOT capable of being stacked

The symbol shall be not less than 100 mm × 100 mm, be durable and clearly visible. The letters and numbers indicating the mass shall be at least 12 mm high.

The mass marked above the symbol shall not exceed the load imposed during the design type test (see 6.5.6.6.4) divided by 1.8.

**Note:** The provisions of 6.5.2.2.2 shall apply to all IBCs manufactured, repaired or remanufactured as from 1 January 2011.”

**6.5.2.2.3** Replace paragraph with “Each flexible IBC may also bear a pictogram or pictograms indicating the recommended lifting methods.”

**6.5.2.2.4** Insert the existing text of 6.5.2.2.3

**6.5.2.2.5** Insert the existing text of 6.5.2.2.5

**6.5.4.1** Insert **Note:** ISO 16106:2006 “Packaging – Transport packages for dangerous goods – Dangerous goods packagings, intermediate bulk containers (IBCs) and large packagings – Guidelines for the application of ISO 9001” provides acceptable guidance on procedures which may be followed.”

**6.5.4.4.2** Insert “at least equally effective as the test prescribed in 6.5.6.7.3” after “a suitable leakproofness test”

Replace “For this test the IBC need not have its closures fitted.” with “For this test the IBC shall be fitted with the primary bottom closure.”

**6.5.4.5.4** Renumber as 6.5.4.4.4

**6.5.5.4.1** In the last paragraph replace “6.5.1.4.1.2” with “6.5.1.4.1(b)”

**6.5.6.1.1** Replace “Tests shall be successfully performed on each IBC design type before such an IBC is used.” with “Each IBC design type shall successfully pass the tests prescribed in this chapter before being used.”

**6.5.6.3.5** Replace the seven first columns with the following new eight first columns (3 last columns unchanged):

Type of IBC	Vibration <sup>f</sup>	Bottom lift	Top lift <sup>a</sup>	Stacking <sup>b</sup>	Leak-proofness	Hydraulic pressure	Drop
Metal:							
11A, 11B, 11N	-	1st <sup>a</sup>	2nd	3rd	-	-	4th <sup>e</sup>
21A, 21B, 21N	-	1st <sup>a</sup>	2nd	3rd	4th	5th	6th <sup>e</sup>
31A, 31B, 31N	1st	2nd <sup>a</sup>	3rd	4th	5th	6th	7th <sup>e</sup>
Flexible <sup>d</sup>	-	-	x <sup>c</sup>	x	-	-	x
Rigid plastics:							
11H1, 11H2	-	1st <sup>a</sup>	2nd	3rd	-	-	4th
21H1, 21H2	-	1st <sup>a</sup>	2nd	3rd	4th	5th	6th
31H1, 31H2	1st	2nd <sup>a</sup>	3rd	4th	5th	6th	7th
Composite:							
11HZ1, 11HZ2	-	1st <sup>a</sup>	2nd	3rd	-	-	4th <sup>e</sup>
21HZ1, 21HZ2	-	1st <sup>a</sup>	2nd	3rd	4th	5th	6th <sup>e</sup>
31HZ1, 31HZ2	1st	2nd <sup>a</sup>	3rd	4th	5th	6th	7th <sup>e</sup>
Fibreboard	-	1st	-	2nd	-	-	3rd
Wooden	-	1st	-	2nd	-	-	3rd

Insert “<sup>f</sup> Another IBC of the same design may be used for the vibration test.”

**6.5.6.5.5.1** Replace “no permanent deformation which renders the IBC, including the base pallet, if any, unsafe for transport” with “the IBC remains safe for normal conditions of transport, there is no observable permanent deformation of the IBC, including the base pallet, if any,”

**6.5.6.7.3** Delete “Other methods at least equally effective may be used.”

**6.5.6.9.3** Replace “rigid, non-resilient, smooth, flat and horizontal surface, in such a manner so as to ensure that the point of impact is on” with “non-resilient, horizontal, flat, massive and rigid surface in conformity with the requirements of 6.1.5.3.4, in such a manner as to ensure that the point of impact is”

- 6.5.6.9.5.4** Insert new paragraph “All IBCs: no damage which renders the IBC unsafe to be transported for salvage or for disposal, and no loss of contents. In addition, the IBC shall be capable of being lifted by an appropriate means until clear of the floor for five minutes.

**Note:** The criterion in 6.5.6.9.5.4 applies to design types for IBCs manufactured as from 1 January 2011.”

- 6.5.6.13** Insert new section 6.5.6.13:

**“6.5.6.13      *Vibration test***

**6.5.6.13.1      *Applicability***

For all IBCs used for liquids, as a design type test.

**Note:** This test applies to design types for IBCs manufactured as from 1 January 2011.

**6.5.6.13.2      *Preparation of the IBC for test***

A sample IBC shall be selected at random and shall be fitted and closed as for transport. The IBC shall be filled with water to not less than 98% of its maximum capacity.

**6.5.6.13.3      *Test method and duration***

- 6.5.6.13.3.1** The IBC shall be placed in the center of the test machine platform with a vertical sinusoidal, double amplitude (peak-to peak displacement) of  $25 \text{ mm} \pm 5\%$ . If necessary, restraining devices shall be attached to the platform to prevent the specimen from moving horizontally off the platform without restricting vertical movement.

- 6.5.6.13.3.2** The test shall be conducted for one hour at a frequency that causes part of the base of the IBC to be momentarily raised from the vibrating platform for part of each cycle to such a degree that a metal shim can be completely inserted intermittently at, at least, one point between the base of the IBC and the test platform. The frequency may need to be adjusted after the initial set point to prevent the packaging from going into resonance. Nevertheless, the test frequency shall continue to allow placement of the metal shim under the IBC as described in this paragraph. The continuing ability to insert the metal shim is essential to passing the test. The metal shim used for this test shall be at least 1.6 mm thick, 50 mm wide, and be of sufficient length to be inserted between the IBC and the test platform a minimum of 100 mm to perform the test.

#### **6.5.6.13.4**     *Criteria for passing the test*

No leakage or rupture shall be observed. In addition, no breakage or failure of structural components, such as broken welds or failed fastenings, shall be observed.”

#### **Consequential amendments:**

**6.5.6.2.1**     Replace “6.5.6.12” with “6.5.6.13”

**6.5.6.2.3**     Replace “6.5.6.13” with “6.5.6.14”

**6.5.6.14**     Renumber 6.5.6.13 to 6.5.6.14

### **Chapter 6.6**

**6.6.1.2**     Insert “**Note:** ISO 16106:2006 “Packaging – Transport packages for dangerous goods – Dangerous goods packagings, intermediate bulk containers (IBCs) and large packagings – Guidelines for the application of ISO 9001” provides acceptable guidance on procedures which may be followed.” after “meets the provisions of this chapter.”

**6.6.3.1(a)**    Insert “This symbol shall not be used for any purpose other than certifying that a packaging complies with the relevant requirements in chapter 6.1, 6.2, 6.3, 6.5 or 6.6.” before “For metal large packagings”

**6.6.3.2**     Insert a full stop at the end of the sentence (English only)

**6.6.5.1.2**     Replace “Tests shall be successfully performed on each large packaging design type before such a packaging is used.” with “Each large packaging design type shall successfully pass the tests prescribed in this chapter before being used.”

**6.6.5.3.4.3**    Replace “rigid, non-resilient, smooth, flat and horizontal surface,” with “non resilient, horizontal, flat, massive and rigid surface in conformity with the requirements of 6.1.5.3.4,”

### **Chapter 6.7**

**6.7.1.1**     Delete “of classes 1, 2, 3, 4, 5, 6, 8 and 9”

**6.7.2.12.2.1**    Replace “kW.m<sup>-2</sup>.K<sup>-1</sup>” with “kW/m.K”

**6.7.3.2.12.2**    Replace “W.m<sup>-2</sup>.K<sup>-1</sup>” with “W/mK”

**6.7.3.8.1.1**     Replace “kW.m<sup>-2</sup>.K<sup>-1</sup>” with “kW/m.K”

Insert “C may also be taken from the following table” before the table

- 6.7.4.14.4** Insert “and tests” after “5-year periodic inspection”
- 6.7.4.14.5** Replace paragraph with “(Reserved)”
- 6.7.4.14.10** Replace “, 6.7.4.14.5 and 6.7.4.14.7” with “and 6.7.4.14.7”
- 6.7.5.3.2** Replace “isolated by a valve into assemblies of not more than 3000 litres” with “divided into groups of not more than 3000 litres each isolated by a valve”
- 6.7.5.4.1** **Replace** “shall be isolated by a valve into assemblies of not more than 3000 litres. Each assembly shall be fitted” with “shall be divided into groups of not more than 3000 litres each isolated by a valve. Each group shall be fitted”

## **PART 7**

### **Chapter 7.1**

- 7.1.7.4.5.2.2** Insert a comma between the words “deck” and “deckhead” (English only)

Insert new paragraph:

**“7.1.7.4.10 Loading and unloading operations**

In the event that a package containing goods of class 1 is found to be suffering from breakage or leakage expert advice should be obtained for its safe handling and disposal (see 7.3.1.3). Loading and unloading procedures and equipment used should be of such a nature that sparks are not produced, in particular where the floors of the cargo compartment are not constructed of close-boarded wood. All cargo handlers should be briefed by the shipper or receiver of the possible risks and necessary precautions, prior to commencing the handling of explosives.”

- 7.1.9.2** Replace “substances with a flashpoint of 23°C c.c. or less” with “substances with a flashpoint of less than 23°C c.c.”
- 7.1.9.6** Replace “flammable liquids with a flashpoint of 23°C c.c. or less” with “flammable liquids with a flashpoint of less than 23°C c.c.”

### **Chapter 7.2**

- 7.2.7.1.1** Replace “and sodium nitrate of class 5.1” with “(UN 1942), AMMONIUM NITRATE FERTILZERS (UN 2067), alkali metal nitrates (e.g., UN 1486) and alkaline earth metal nitrates (e.g., UN 1454)”

### Chapter 7.3

Insert new paragraph:

- “7.3.1.3** In the event that a package containing dangerous goods is found to be suffering from breakage or leakage while the ship is in port, the port authorities should be informed and appropriate procedures should be followed.”
- 7.3.4.3** Replace “Safety Guide No. TS-G-1-2 (ST-3) (ISBN 92-0-111602-0)” with “Safety Standard Series No. TS-G-1.2 (ST-3), IAEA, Vienna (2002).”

### Chapter 7.4

- 7.4.2.5** Replace “3.5 of the IMO publication *Recommendations on the Safe Use of Pesticides in Ships*” in the footnote with “MSC/Circ.[...] Recommendations on the safe use of pesticides in ships applicable to the fumigation of cargo transport units”
- 7.4.4.1.1** Replace “23°C c.c. or less” with “less than 23°C c.c.”
- 7.4.4.1.2** Replace “below” with “less than”
- 7.4.4.1.3** Replace “below” with “less than”
- 7.4.5.8** Replace “23°C c.c. or less” with “less than 23°C c.c.”
- 7.4.5.11** Replace “23°C c.c. or less” with “less than 23°C c.c.”
- 7.4.5.13** Replace “23°C c.c. or less” with “less than 23°C c.c.”

### Chapter 7.7

- 7.7.3.1.3** Replace “W/m<sup>2</sup> K” with “W/(m<sup>2</sup>.K)”
- 7.7.6** Replace “below” with “less than”
- 7.7.6.1** Replace “below” with “less than”
- 7.7.6.2** Replace “below” with “less than”

### Chapter 7.9

- 7.9.1 Note 2** Replace “1.1.3.4” with “1.5.4”
- 7.9.3** Subject to review by the Secretariat on the basis of information received from member States and Organizations.

Update the following Contact information:

Amend the entry of Germany to read:

Federal Ministry of transport, Building and Urban Affairs  
Division A 33 – Transport of Dangerous Goods  
PO Box 20 01 00  
D 53170 Bonn  
GERMANY  
Telephone: +49 228 3000 or 300-extension  
+49 228 300 2643  
Telefax: +49 228 300 3428  
E-mail: Ref-A33@bmvbs.bund.de

Insert:

**GHANA**

The Director General  
Ghana Maritime Authority  
P.M.B. 34, Ministries Post Office  
Accra  
GHANA  
Telephone: +233 21 662122  
Telefax: +233 21 677702

Amend the entry of Iran (Islamic Republic of) to read:

Ports and Shipping Organization  
PSO Building, South Didar Ave,  
Shahid Haghani Highway, Vanak Square  
Tehran  
IRAN  
Telephone: +98 21 8493 2201  
Telefax: +98 21 8493 2227

Amend the entry of Italy to read:

Italian Coast Guard Headquarters  
Ponte Dei Mille  
Genoa  
16100  
ITALY  
Telephone: +39 010 25 18 154 + 102  
+39 010 25 18 154 + 111  
Fax: +39 010 24 78 245  
E-mail: 001@sicnavge.it  
005@sicnavge.it

Insert:

**MONTENEGRO**

Ministry of Interior and Public Administration of the Republic of Montenegro  
Department for Contingency Plans and Civil Security  
REPUBLIC OF MONTENEGRO  
Telephone: +382 81 241 590  
Fax: +382 81 246 779  
E-mail: mup.emergency@cg.yu

Amend the entry of New Zealand to read:

Maritime New Zealand  
Level 10 Optimisation House  
1 Grey Street  
PO Box 27006  
Wellington  
NEW ZEALAND  
Telephone: +64 4 473 0111  
Telefax: +64 4 494 1263  
E-mail: enquiries@maritimenz.govt.nz  
Website: www.maritimenz.govt.nz

Amend the entry of Norway to read:

Norwegian Maritime Directorate  
Smedasundeh 50B  
P.O. Box 2222  
N-5509 HAUGESUND  
NORWAY  
Telephone: +47 5274 5000  
Fax: +47 5244 5001  
E-mail: postmottak@sjofartsdir.no

Amend the entry of Peru to read:

Dirección General de Capitanías y Guardacostas  
Autoridad Marítima del Peru  
Dirección de Medio Ambiente  
Jr. Independencia No 150  
Callao  
PERU  
Telefax: +51 1 613 6857  
E-mail: dicapi.medioambiente@dicapi.mil.peru

Autoridad Portuaria Nacional  
Unidad de Protección y Seguridad  
Contralmirante Raygada No. 111  
Callao  
PERU  
Telephone: +51 1 453 5656 ext. 114  
+51 1 453 8112  
Fax: +51 1 453 5656

Amend the entry of Poland to read:

Ministry of Maritime Economy  
Department of Maritime Safety  
00-928 Warsaw  
ul. Chalubinskiego 4/6  
POLAND  
Telephone: +48 22 630 15 40  
Telefax: +48 22 830 09 47

Amend the entry of the Republic of Korea to read:

Maritime Technology Team  
Maritime Safety Bureau  
Ministry of Maritime Affairs and Fisheries  
140-2 Gye-Dong, Jongno-gu, Seoul, 110-793  
REPUBLIC OF KOREA  
Telephonhe: +82 2 3674 6323  
Telefax: +82 2 3674 6327

Insert:

**UNITED ARAB EMIRATES**

National Authority of Communications  
Marine Affairs Department  
PO Box 900 Abu Dhabi  
UNITED ARAB EMIRATES  
Telephone: +9712 4182 124  
Fax: +9712 4491 500  
E-mail: marine@naoc.gov.ae

Amend the entry of the United States to read:

US Department of Transportation  
Pipeline and Hazardous Materials Safety Administration  
Office of International Standards  
East building/PHH-70  
1200 New Jersey Ave S.E.  
Washington DC 20590  
USA  
Telephone: +1 202 366 0656  
Telefax: +1 202 366 5713  
E-mail: infocntr@dot.gov  
Website: hazmat.dot.gov

United States Coast Guard  
Hazardous Materials Standards Division (G-3PSO-3)  
2100 Second Street SW  
Washington, D.C. 20593-0001  
USA  
Telephone: +1 202 372 1420  
+1 202 372 1426  
Telefax: +1 202 372 1926

## APPENDIX A

Replace “division 6.1” with “class 6.1”

Replace “61°C” with “60°C” In the General entries for ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S.

- Class 1.3L** Insert “4.3” in the column marked “Subsidiary risk” for UN 0249
- Class 3** Delete the comma after the words “N.O.S” UN 3343 (English and French only)
- Class 3** Delete the comma after the words “N.O.S.” in the column marked “Proper shipping name” for UN 3357 (English and French only)
- Class 3** Replace “61°C” with “60°C” for UN 3256
- Class 4.1** Delete “5.1” in the column marked “Subsidiary Risk” for UN 3181 (English only)
- Class 4.1** Replace “6.1” with “5.1” in the column marked “Subsidiary Risk” for UN 3097 (English only)
- Class 4.1** Replace “8” with “6.1” in the column marked “Subsidiary Risk” for UN 3179 (English only)

- Class 4.1** Insert “8” in the column marked “Subsidiary Risk” for UN 3180 (English only)
- Class 6.1** Replace title with “NICOTINE COMPOUND, LIQUID, N.O.S. or NICOTINE PREPARATION, LIQUID, N.O.S.” in the column marked “Proper shipping name” for UN 3144 (English only)
- Class 6.1** Delete “3” in the column marked “Subsidiary Risk” for UN 3466 (English only)
- Class 6.1** Delete “8” in the column marked “Subsidiary Risk” for UN 3275 (English only)
- Class 6.1** Delete “8” in the column marked “Subsidiary Risk” for UN 3279 (English only)
- Class 6.1** Replace existing entry with “3+8” in the column marked “Subsidiary Risk” for UN 2742 (English only)
- Class 6.1** Replace existing entry with “3+8” in the column marked “Subsidiary Risk” for UN 3362 (English only)
- Class 6.1** Insert “8” in the column marked “Subsidiary Risk” for UN 3277 (English only)
- Class 6.1** Insert “8” in the column marked “Subsidiary Risk” for UN 3361 (English only)
- Class 6.2** Replace existing entry with “BIOLOGICAL SUBSTANCE, CATEGORY B” for UN 3373 (English and French only)
- Class 8** Insert new entry (English and French only)

Class or division	Subsidiary risk	UN Number	Proper Shipping Name
8	6.1	3471	HYDROGENDIFLUORIDES SOLUTION, N.O.S

## INDEX

- Note 1** Replace “Certain marine pollutants or severe marine pollutants are identified only in the Index” with “Certain marine pollutants are identified only in the Index.”

Replace “These marine pollutants or severe marine pollutants have not been assigned to an N.O.S. or generic entry. These marine pollutants or severe marine pollutants may possess properties of classes 1 to 8 and shall be classified accordingly.” with “These marine pollutants have not been assigned to an N.O.S. or generic entry. These marine pollutants may possess properties of classes 1 to 8 and shall be classified accordingly.”

Delete:

Substance, material or article	MP	Class	UN No.
Paraffins, <i>see</i>	-	3	1223
2,4-D, <i>see</i> PHENOXY PESTICIDE	P	-	-
2,4-DB, <i>see</i> PHENOXY PESTICIDE	-	-	-

Replace:

<b>Substance, material or article</b>	<b>MP</b>	<b>Class</b>	<b>UN No.</b>
2,4-D, <i>see</i> PHENOXY PESTICIDE	P	-	-
2,4-DB, <i>see</i> PHENOXY PESTICIDE	-	-	-

With:

<b>Substance, material or article</b>	<b>MP</b>	<b>Class</b>	<b>UN No.</b>
2,4-D, <i>see</i> PHENOXYACETIC ACID DERIVATIVE	-	-	-
2,4-DB, <i>see</i> PHENOXYACETIC ACID DERIVATIVE	-	-	-

Replace “-” with “P” for:

<b>Substance, material or article</b>	<b>MP</b>	<b>Class</b>	<b>UN No.</b>
<i>N, N</i> -Bis(2-hydroxyethyl)oleamide (loa), <i>see</i> Note 1	-	-	

Replace “PP” with “P” for:

<b>Substance, material or article</b>	<b>MP</b>	<b>Class</b>	<b>UN No.</b>
Aldrin, <i>see</i> ORGANOCHLORINE PESTICIDE	PP		
Azinphos-ethyl, <i>see</i> ORGANOPHOSPHORUS PESTICIDE	PP		
Azinphos-methyl, <i>see</i> ORGANOPHOSPHORUS PESTICIDE	PP		
Binapacryl, <i>see</i> SUBSTITUTED NITROPHENOL PESTICIDE	PP		
Brodifacoum, <i>see</i> COUMARIN DERIVATIVE PESTICIDE	PP		
Bromophos-ethyl, <i>see</i> ORGANOPHOSPHORUS PESTICIDE	PP		
Camphechlor, <i>see</i> ORGANOCHLORINE PESTICIDE	PP	-	
Carbophenothion, <i>see</i> ORGANOPHOSPHORUS PESTICIDE	PP		
Chlordane, <i>see</i> ORGANOCHLORINE PESTICIDE	PP		
Chlorinated Paraffins (C10-C13), <i>see</i>	PP	9	3082
Chlorinated Paraffins (C14-C17) with more than 1% shorter chain length, <i>see</i>	PP	9	3082
Chlorpyrifos, <i>see</i> ORGANOPHOSPHORUS PESTICIDE	PP		
Chlorthiophos, <i>see</i> ORGANOPHOSPHORUS PESTICIDE	PP		
COPPER CHLORIDE	PP	8	2802
COPPER CYANIDE	PP	6.1	1587
Copper Metal Powder, <i>see</i> Note 1	PP		
Copper Sulphate, anhydrous, hydrates and solutions, <i>see</i> Note 1	PP		
Coumaphos, <i>see</i> COUMARIN DERIVATIVE PESTICIDE	PP		

<b>Substance, material or article</b>	<b>MP</b>	<b>Class</b>	<b>UN No.</b>
Cresyl Diphenyl Phosphate, see	PP	9	3082
Cupric Chloride, see	PP	8	2802
Cupric Cyanide, see	PP	6.1	1587
Cupric Sulphate, see Note 1	PP		
Cuprous Chloride, see	PP	8	2802
1,5,9-CYCLODODECATRIENE	PP	6.1	2518
Cyhexatin, see ORGANOTIN PESTICIDE,	PP		
CYMENES	PP	3	2046
Cymol, see	PP	3	2046
Cypermethrin, see PYRETHROID PESTICIDE	PP		
DDT, see ORGANOCHLORINE PESTICIDE	PP		
Dialifos, see ORGANOPHOSPHORUS PESTICIDE	PP		
Dialifos, see ORGANOPHOSPHRUS PESTICIDE	PP		
Diazinon, see ORGANOPHOSPHORUS PESTICIDE	PP		
Dichlofenthion, see ORGANOPHOSPHORUS PESTICIDE and	PP		
Dichlorvos, see ORGANOPHOSPHORUS PESTICIDE	PP		
Diclofop-methyl, see Note 1	PP		
Dieldrin, see ORGANOCHLORINE PESTICIDE	PP		
Dimethoate, see ORGANOPHOSPHORUS PESTICIDE	PP		
N,N-Dimethyldodecylamine, see Note 1	PP		
DIPHENYLAMINE CHLOROARSINE	PP	6.1	1698
DIPHENYLCHLOROARSINE, LIQUID	PP	6.1	1699
DIPHENYLCHLOROARSINE, SOLID	PP	6.1	3450
Dodecyl Hydroxypropyl Sulphide, see Note 1	PP		
Dodecylphenol, see	PP	8	3145
Endosulfan, see ORGANOCHLORINE PESTICIDE	PP		
Endrin, see ORGANOCHLORINE PESTICIDE	PP		
EPN, see ORGANOPHOSPHORUS PESTICIDE	PP		
Esfenvalerate, see Note 1	PP		
Ethion, see ORGANOPHOSPHORUS PESTICIDE	PP		
Fenbutatin Oxide, see Note 1	PP		
Fenitrothion, see ORGANOPHOSPHORUS PESTICIDE	PP		
Fenoxapro-ethyl, see Note 1	PP		
Fenoxaprop-P-ethyl, see Note 1	PP		
Fenpropathrin, see PESTICIDE, N.O.S.	PP		
Fenthion, see ORGANOPHOSPHORUS PESTICIDE	PP		
Fentin Acetate, see ORGANOTIN PESTICIDE	PP		
Fentin Hydroxide, see ORGANOTIN PESTICIDE	PP		

<b>Substance, material or article</b>	<b>MP</b>	<b>Class</b>	<b>UN No.</b>
Fonofos, see ORGANOPHSPHORUS PESTICIDE	<b>PP</b>		
Furathiocarb (iso), see CARBAMATE PESTICIDES	<b>PP</b>		
Heptachlor, see ORGANOCHLORINE PESTICIDE	<b>PP</b>		
Hexachloro-1,3-butadiene, see	<b>PP</b>	6.1	2279
HEXACHLOROBUTADIENE	<b>PP</b>	6.1	2279
1,3-Hexachlorobutadiene, see	<b>PP</b>	6.1	2279
Isopropyltoluene, see	<b>PP</b>	3	2046
Isopropyltoluol, see	<b>PP</b>	3	2046
Isoxathion, see ORGANOPHOSPHORUS PESTICIDE	<b>PP</b>		
Lindane, see ORGANOCHLORINE PESTICIDE	<b>PP</b>		
Mercuric Acetate, see	<b>PP</b>	6.1	1629
Mercuric Ammonium Chloride, see	<b>PP</b>	6.1	1630
MERCURIC ARSENATE	<b>PP</b>	6.1	1623
Mercuric Benzoate, see	<b>PP</b>	6.1	1631
Mercuric Bisulphate, see	<b>PP</b>	6.1	1645
Mercuric Bromide, see	<b>PP</b>	6.1	1634
MERCURIC CHLORIDE	<b>PP</b>	6.1	1624
Mercuric Cyanide, see	<b>PP</b>	6.1	1636
Mercuric Gluconate, see	<b>PP</b>	6.1	1637
MERCURIC NITRATE	<b>PP</b>	6.1	1625
Mercuric Oleate, see	<b>PP</b>	6.1	1640
Mercuric Oxide, see	<b>PP</b>	6.1	1641
Mercuric Oxycyanide, Desensitized, see	<b>PP</b>	6.1	1642
MERCURIC POTASSIUM CYANIDE	<b>PP</b>	6.1	1626
Mercuric Sulphate, see	<b>PP</b>	6.1	1645
Mercuric Thiocyanate, see	<b>PP</b>	6.1	1646
Mercuriol, see	<b>PP</b>	6.1	1639
Mercurous Acetate, see	<b>PP</b>	6.1	1629
Mercurous Bisulphate, see	<b>PP</b>	6.1	1645
Mercurous Bromide, see	<b>PP</b>	6.1	1634
Mercurous Chloride, see	<b>PP</b>	9	3077
MERCUROUS NITRATE	<b>PP</b>	6.1	1627
Mercurous Salicylate, see	<b>PP</b>	6.1	1644
Mercurous Sulphate, see	<b>PP</b>	6.1	1645
MERCURY ACETATE	<b>PP</b>	6.1	1629
MERCURY AMMONIUM CHLORIDE	<b>PP</b>	6.1	1630
MERCURY BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC flashpoint less than 23°C	<b>PP</b>	3	2778
MERCURY BASED PESTICIDE, LIQUID, TOXIC	<b>PP</b>	6.1	3012
MERCURY BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE flashpoint not less than 23°C	<b>PP</b>	6.1	3011
MERCURY BASED PESTICIDE, SOLID, TOXIC	<b>PP</b>	6.1	2777
MERCURY BENZOATE	<b>PP</b>	6.1	1631

<b>Substance, material or article</b>	<b>MP</b>	<b>Class</b>	<b>UN No.</b>
Mercury Bichloride, see	<b>PP</b>	6.1	1624
Mercury Bisulphate, see	<b>PP</b>	6.1	1645
MERCURY BROMIDES	<b>PP</b>	6.1	1634
MERCURY COMPOUND, LIQUID, N.O.S.	<b>PP</b>	6.1	2024
MERCURY COMPOUND, SOLID, N.O.S.	<b>PP</b>	6.1	2025
MERCURY CYANIDE	<b>PP</b>	6.1	1636
MERCURY GLUCONATE	<b>PP</b>	6.1	1637
MERCURY NUCLEATE	<b>PP</b>	6.1	1639
MERCURY OLEATE	<b>PP</b>	6.1	1640
MERCURY OXIDE	<b>PP</b>	6.1	1641
MERCURY OXYCYANIDE, DESENSITIZED	<b>PP</b>	6.1	1642
Mercury Potassium Cyanide, see	<b>PP</b>	6.1	1626
MERCURY POTASSIUM IODIDE	<b>PP</b>	6.1	1643
MERCURY SALICYLATE	<b>PP</b>	6.1	1644
MERCURY SULPHATE	<b>PP</b>	6.1	1645
MERCURY THIOCYANATE	<b>PP</b>	6.1	1646
Mercury(II) (mercuric) Compounds or Mercury(I) (mercurous) Compounds, see MERCURY BASED PESTICIDE	<b>PP</b>		
Methylpropylbenzenes, see	<b>PP</b>	3	2046
Mevinphos, see ORGANOPHOSPHORUS PESTICIDE	<b>PP</b>		
Nickel (II) Cyanide, see	<b>PP</b>	6.1	1653
NICKEL CARBONYL	<b>PP</b>	6.1	1259
NICKEL CYANIDE	<b>PP</b>	6.1	1653
Nickel Tetracarbonyl, see	<b>PP</b>	6.1	1259
ORGANOTIN COMPOUND, LIQUID, N.O.S.	<b>PP</b>	6.1	2788
ORGANOTIN COMPOUND, SOLID, N.O.S.	<b>PP</b>	6.1	3146
Organotin Compounds (pesticides), see ORGANOTIN PESTICIDE	<b>PP</b>		
ORGANOTIN PESTICIDE, LIQUID, FLAMMABLE, TOXIC flashpoint less than 23°C	<b>PP</b>	3	2787
ORGANOTIN PESTICIDE, LIQUID, TOXIC	<b>PP</b>	6.1	3020
ORGANOTIN PESTICIDE, LIQUID, TOXIC, FLAMMABLE flashpoint not less than 23°C	<b>PP</b>	6.1	3019
ORGANOTIN PESTICIDE, SOLID, TOXIC	<b>PP</b>	6.1	2786
OSMIUM TETROXIDE	<b>PP</b>	6.1	2471
Parathion, see ORGANOPHOSPHORUS PESTICIDE	<b>PP</b>		
Parathion-methyl, see ORGANOPHOSPHORUS PESTICIDE	<b>PP</b>		
PCBs, LIQUID, see	<b>PP</b>	9	2315
PCBs, SOLID, see	<b>PP</b>	9	3432
PENTACHLOROPHENOL	<b>PP</b>	6.1	3155

<b>Substance, material or article</b>	<b>MP</b>	<b>Class</b>	<b>UN No.</b>
Pentachlorophenol, see ORGANOCHLORINE PESTICIDE	<b>PP</b>		
Phenarsazine Chloride, see Phenthoate, see ORGANOPHOSPHORUS PESTICIDE	<b>PP</b>	6.1	1698
PHENYLMERCURIC ACETATE	<b>PP</b>	6.1	1674
PHENYLMERCURIC COMPOUND, N.O.S.	<b>PP</b>	6.1	2026
PHENYLMERCURIC HYDROXIDE	<b>PP</b>	6.1	1894
PHENYLMERCURIC NITRATE	<b>PP</b>	6.1	1895
Phorate, see ORGANOPHOSPHORUS PESTICIDE	<b>PP</b>		
Phosalone, see ORGANOPHOSPHORUS PESTICIDE	<b>PP</b>		
Phosphamidon, see ORGANOPHOSPHORUS PESTICIDE	<b>PP</b>		
PHOSPHORUS, WHITE, DRY	<b>PP</b>	4.2	1381
PHOSPHORUS, WHITE, IN SOLUTION	<b>PP</b>	4.2	1381
PHOSPHORUS, WHITE, MOLTEN	<b>PP</b>	4.2	2447
PHOSPHORUS, WHITE, UNDER WATER	<b>PP</b>	4.2	1381
PHOSPHORUS, YELLOW, DRY	<b>PP</b>	4.2	1381
PHOSPHORUS, YELLOW, IN SOLUTION	<b>PP</b>	4.2	1381
PHOSPHORUS, YELLOW, UNDER WATER	<b>PP</b>	4.2	1381
Pirimiphos-ethyl, see ORGANOPHOSPHORUS PESTICIDE	<b>PP</b>		
POLYCHLORINATED BIPHENYLS, LIQUID	<b>PP</b>	9	2315
POLYCHLORINATED BIPHENYLS, SOLID	<b>PP</b>	9	3432
POLYHALOGENATED BIPHENYLS, LIQUID	<b>PP</b>	9	3151
POLYHALOGENATED BIPHENYLS, SOLID	<b>PP</b>	9	3152
POLYHALOGENATED TERPHENYLS, LIQUID	<b>PP</b>	9	3151
POLYHALOGENATED TERPHENYLS, SOLID	<b>PP</b>	9	3152
POTASSIUM CUPROCYANIDE	<b>PP</b>	6.1	1679
Potassium Cyanocuprate(I), see	<b>PP</b>	6.1	1679
Potassium Cyanomercurate, see	<b>PP</b>	6.1	1626
Potassium Mercuric Iodide, see	<b>PP</b>	6.1	1643
Pyrazophos, see ORGANOPHOSPHORUS PESTICIDE	<b>PP</b>		
Quizalofop, see Note 1	<b>PP</b>		
Quizalofop-p-ethyl, see Note 1	<b>PP</b>		
Silafluofen, see Note 1	<b>PP</b>		
Sodium Copper Cyanide Solution, see	<b>PP</b>	6.1	2317
Sodium Copper Cyanide, Solid, see	<b>PP</b>	6.1	2316
SODIUM CUPROCYANIDE SOLUTION	<b>PP</b>	6.1	2317
SODIUM CUPROCYANIDE, SOLID	<b>PP</b>	6.1	2316
Sodium Dicyanocuprate(I), Solid, see	<b>PP</b>	6.1	2316
SODIUM PENTACHLOROPHENATE	<b>PP</b>	6.1	2567

<b>Substance, material or article</b>	<b>MP</b>	<b>Class</b>	<b>UN No.</b>
Sulprophos, see ORGANOPHOSPHORUS PESTICIDE	PP		
Terbufos, see ORGANOPHOSPHORUS PESTICIDE	PP		
Tetrachlorvinphos, see Note 1	PP		
Tetraethyl lead, see	PP	6.1	1649
Triaryl Phosphates, N.O.S., see	PP	9	3082
Tributyltin Compounds, see ORGANOTIN PESTICIDE	PP		
1,2,3-Trichlorobenzenes, see Note 1	PP		
TRICRESYL PHOSPHATE with more than 3% ortho-isomer	PP	6.1	2574
Tricresyl Phosphate, not less than 1% but not more than 3% ortho- isomer, see	PP	9	3082
Triphenyl Phosphate, see	PP	9	3077
Triphenyl Phosphate/tert-butylatedTriphenyl Phosphates mixtures containing 10% to 48% of Triphenyl Phosphate, see Note 1	PP		
Triphenyltin Compounds (other than Fentin Acetate and Fentin Hydroxide), see ORGANOTIN PESTICIDE	PP		
Tritolyl Phosphate, see	PP	6.1	2574
White Phosphorus, Dry, see	PP	4.2	1381
White Phosphorus, Wet, see	PP	4.2	1381
Yellow Phosphorus, Dry, see	PP	4.2	1381
Yellow Phosphorus, Wet, see	PP	4.2	1381

Delete “●” for:

<b>Substance, material or article</b>	<b>MP</b>	<b>Class</b>	<b>UN No.</b>
ADHESIVES containing flammable liquid	●	3	1133
AEROSOLS	●	2	1950
ALCOHOLATES SOLUTION, N.O.S. in alcohol	●	3	3274
ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	●	3	1986
ALCOHOLS, N.O.S.	●	3	1987
ALDEHYDES, FLAMMABLE, TOXIC, N.O.S.	●	3	1988
ALDEHYDES, N.O.S.	●	3	1989
ALKALI METAL ALCOHOLATES, SELF-HEATING, CORROSIVE, N.O.S.	●	4.2	3206
ALKALI METAL ALLOY, LIQUID, N.O.S.	●	4.3	1421
ALKALI METAL AMALGAM, LIQUID	●	4.3	1389
ALKALI METAL AMALGAM, SOLID	●	4.3	3401
Alkaline Caustic Liquid, N.O.S., see	●	8	1719

Substance, material or article	MP	Class	UN No.
ALKALINE EARTH METAL ALCOHOLATES, N.O.S.	●	4.2	3205
ALKALINE EARTH METAL ALLOY, N.O.S.	●	4.3	1393
ALKALINE EARTH METAL AMALGAM, LIQUID	●	4.3	1392
ALKALINE EARTH METAL AMALGAM, SOLID	●	4.3	3402
ALKALOIDS SALTS, LIQUID, N.O.S.	●	6.1	3140
ALKALOIDS SALTS, SOLID, N.O.S.	●	6.1	1544
ALKALOIDS, LIQUID, N.O.S.	●	6.1	3140
ALKALOIDS, SOLID, N.O.S.	●	6.1	1544
ALKYLPHENOLS, LIQUID, N.O.S. (including C2 -C12 homologues)	●	8	3145
ALKYLPHENOLS, SOLID, N.O.S.(including C2 - C12 homologues)	●	8	2430
Aluminium Powder, Pyrophoric, see	●	4.2	1383
AMINES, FLAMMABLE, CORROSIVE, N.O.S.	●	3	2733
AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.	●	8	2734
AMINES, LIQUID, CORROSIVE, N.O.S.	●	8	2735
AMINES, SOLID, CORROSIVE, N.O.S.	●	8	3259
Ammonium Bisulphite Solution, see	●	8	2693
Animal Fabrics, Oily, see	●	4.2	1373
Animal Fibres, Oily, see	●	4.2	1373
Arsenates, Liquid, N.O.S., Inorganic, see	●	6.1	1556
Arsenates, Solid, N.O.S., Inorganic, see	●	6.1	1557
ARSENIC COMPOUND, LIQUID, N.O.S. inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s., and Arsenic sulphides, n.o.s.	●	6.1	1556
ARSENIC COMPOUND, SOLID, N.O.S. inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides, n.o.s.	●	6.1	1557
Arsenic Sulphides, Liquid, N.O.S., Inorganic, see	●	6.1	1556
Arsenic Sulphides, Solid, N.O.S., Inorganic, see	●	6.1	1557
ARSENICAL PESTICIDE, LIQUID, FLAMMABLE, TOXIC flashpoint less than 23°C	●	3	2760
ARSENICAL PESTICIDE, LIQUID, TOXIC	●	6.1	2994
ARSENICAL PESTICIDE, LIQUID, TOXIC, FLAMMABLE flashpoint not less than 23°C	●	6.1	2993
ARSENICAL PESTICIDE, SOLID, TOXIC	●	6.1	2759
Arsenites, Liquid, N.O.S., Inorganic, see	●	6.1	1556
Arsenites, Solid, N.O.S., Inorganic, see	●	6.1	1557
ARTICLES, PRESSURIZED, HYDRAULIC (containing non-flammable gas)	●	2.2	3164

Substance, material or article	MP	Class	UN No.
ARTICLES, PRESSURIZED, PNEUMATIC (containing non-flammable gas)	•	2.2	3164
Asphalt, see	•	3	1999
Barium Alloys, non-pyrophoric, see	•	4.3	1393
BARIUM ALLOYS, PYROPHORIC	•	4.2	1854
Barium Amalgams, see	•	4.3	1392
BARIUM COMPOUND, N.O.S.	•	6.1	1564
Barium Powder, Pyrophoric, see	•	4.2	1383
Bifluorides, N.O.S., see	•	8	1740
BIPYRIDILIUM PESTICIDE, LIQUID, FLAMMABLE, TOXIC flashpoint less than 23°C	•	3	2782
BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC	•	6.1	3016
BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC, FLAMMABLE flashpoint not less than 23°C	•	6.1	3015
BIPYRIDILIUM PESTICIDE, SOLID, TOXIC	•	6.1	2781
BISULPHATES, AQUEOUS SOLUTION	•	8	2837
BISULPHITES, AQUEOUS SOLUTION, N.O.S.	•	8	2693
Bitumen, see	•	3	1999
Borate and Chlorate Mixture, see	•	5.1	1458
BROMATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	•	5.1	3213
BROMATES, INORGANIC, N.O.S.	•	5.1	1450
Butylphenols, Liquid, N.O.S., see	•	8	3145
Butylphenols, Solid, N.O.S., see	•	8	2430
BUTYLTOLUENES	•	6.1	2667
CADMIUM COMPOUND	•	6.1	2570
Caesium Alloy (liquid), see	•	4.3	1421
Caesium Amalgams, see	•	4.3	1389
Caesium Powder, Pyrophoric, see	•	4.2	1383
Calcium Alloy, non-pyrophoric, see	•	4.3	1421
Calcium Amalgams, see	•	4.3	1389
CARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC flashpoint less than 23°C	•	3	2758
CARBAMATE PESTICIDE, LIQUID, TOXIC	•	6.1	2992
CARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flashpoint not less than 23°C	•	6.1	2991
CARBAMATE PESTICIDE, SOLID, TOXIC	•	6.1	2757
CAUSTIC ALKALI LIQUID, N.O.S.	•	8	1719
Cellulose Nitrate with plasticizing substance, see	•	4.1	2557
Cement, Liquid, see	•	3	1133
CHLORATE AND BORATE MIXTURE	•	5.1	1458
CHLORATE AND MAGNESIUM CHLORIDE MIXTURE SOLUTION	•	5.1	3407
CHLORATE AND MAGNESIUM CHLORIDE MIXTURE, SOLID	•	5.1	1459

Substance, material or article	MP	Class	UN No.
CHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	•	5.1	3210
CHLORATES, INORGANIC, N.O.S.	•	5.1	1461
CHLORITE SOLUTION	•	8	1908
CHLORITES, INORGANIC, N.O.S.	•	5.1	1462
Chlorocarbonates, Toxic, Corrosive, Flammable, N.O.S., see	•	6.1	2742
Chlorocarbonates, Toxic, Corrosive, N.O.S., see	•	6.1	3277
CHLOROFORMATES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.	•	6.1	2742
CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S.	•	6.1	3277
CHLOROPHENOLATES, LIQUID	•	8	2904
CHLOROPHENOLATES, SOLID	•	8	2905
CHLOROPICRIN MIXTURE, N.O.S.	•	6.1	1583
CHLOROSILANES, CORROSIVE, FLAMMABLE, N.O.S.	•	8	2986
CHLOROSILANES, CORROSIVE, N.O.S.	•	8	2987
CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S.	•	3	2985
CHLOROSILANES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.	•	6.1	3362
CHLOROSILANES, TOXIC, CORROSIVE, N.O.S.	•	6.1	3361
CHLOROSILANES, WATER-REACTIVE, FLAMMABLE, CORROSIVE, N.O.S.	•	4.3	2988
CHLOROTOLUENES	•	3	2238
Coal Tar Naphtha, see	•	3	1268
COATING SOLUTION (includes surface treatments or coatings used for industrial purposes such as vehicle under-coating, drum or barrel lining)	•	3	1139
Collodion Cotton with plasticizing substance, see	•	4.1	2557
COMPRESSED GAS, FLAMMABLE, N.O.S.	•	2.1	1954
COMPRESSED GAS, N.O.S.	•	2.2	1956
COMPRESSED GAS, OXIDIZING, N.O.S.	•	2.2	3156
COMPRESSED GAS, TOXIC, CORROSIVE, N.O.S.	•	2.3	3304
COMPRESSED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	•	2.3	3305
COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.	•	2.3	1953
COMPRESSED GAS, TOXIC, N.O.S.	•	2.3	1955
COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	•	2.3	3306
COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S.	•	2.3	3303

Substance, material or article	MP	Class	UN No.
Copper Arsenate, see	●	6.1	1557
COPPER BASED PESTICIDE, LIQUID, TOXIC	●	6.1	3010
COPPER BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE flashpoint less than 23°C	●	3	2776
COPPER BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE flashpoint not less than 23°C	●	6.1	3009
COPPER BASED PESTICIDE, SOLID, TOXIC	●	6.1	2775
CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	●	8	3265
CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.	●	8	3264
CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	●	8	3266
CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	●	8	3267
CORROSIVE LIQUID, FLAMMABLE, N.O.S.	●	8	2920
CORROSIVE LIQUID, N.O.S.	●	8	1760
CORROSIVE LIQUID, OXIDIZING, N.O.S.	●	8	3093
CORROSIVE LIQUID, SELF-HEATING, N.O.S.	●	8	3301
CORROSIVE LIQUID, TOXIC, N.O.S.	●	8	2922
CORROSIVE LIQUID, WATER-REACTIVE, N.O.S.	●	8	3094
CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.	●	8	3260
CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.	●	8	3261
CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.	●	8	3262
CORROSIVE SOLID, BASIC, ORGANIC, N.O.S.	●	8	3263
CORROSIVE SOLID, FLAMMABLE, N.O.S.	●	8	2921
CORROSIVE SOLID, N.O.S.	●	8	1759
CORROSIVE SOLID, OXIDIZING, N.O.S.	●	8	3084
CORROSIVE SOLID, SELF- HEATING, N.O.S.	●	8	3095
CORROSIVE SOLID, TOXIC, N.O.S.	●	8	2923
CORROSIVE SOLID, WATER-REACTIVE, N.O.S.	●	8	3096
Cosmetics, see	●	3	1266
COUMARIN DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC flashpoint less than 23°C	●	3	3024
COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC	●	6.1	3026
COUMARIN DERIVATIVE PESTICIDE, SOLID, TOXIC	●	6.1	3027
COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE flashpoint not less than 23°C	●	6.1	3025

Substance, material or article	MP	Class	UN No.
Crude naphtha, see	●	3	1268
Cut-backs, see	●	3	1999
Cyanides, Organic, flammable, toxic, N.O.S., see	●	3	3273
Cyanides, Organic, toxic, flammable, N.O.S., see	●	6.1	3275
Cyanides, Organic, toxic, N.O.S., see	●	6.1	3276
DISINFECTANT, LIQUID, CORROSIVE, N.O.S.	●	8	1903
DISINFECTANT, LIQUID, TOXIC, N.O.S.	●	6.1	3142
DISINFECTANT, SOLID, TOXIC, N.O.S.	●	6.1	1601
DYE INTERMEDIATE, LIQUID, CORROSIVE, N.O.S.	●	8	2801
DYE INTERMEDIATE, LIQUID, TOXIC, N.O.S.	●	6.1	1602
DYE INTERMEDIATE, SOLID, CORROSIVE, N.O.S.	●	8	3147
DYE INTERMEDIATE, SOLID, TOXIC, N.O.S.	●	6.1	3143
DYE, LIQUID, CORROSIVE, N.O.S.	●	8	2801
DYE, LIQUID, TOXIC, N.O.S.	●	6.1	1602
DYE, SOLID, CORROSIVE, N.O.S.	●	8	3147
DYE, SOLID, TOXIC, N.O.S.	●	6.1	3143
ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flashpoint above 60°C, at or above its flashpoint	●	3	3256
ELEVATED TEMPERATURE LIQUID, N.O.S. at or above 100°C and below its flashpoint (including molten metals, molten salts, etc.)	●	9	3257
ELEVATED TEMPERATURE SOLID, N.O.S. at or above 240°C	●	9	3258
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.	●	9	3082
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.	●	9	3077
ETHERS, N.O.S.	●	3	3271
EXTRACTS, AROMATIC, LIQUID	●	3	1169
EXTRACTS, FLAVOURING, LIQUID	●	3	1197
FABRICS IMPREGNATED WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S.	●	4.1	1353
FABRICS, ANIMAL with oil	●	4.2	1373
FABRICS, SYNTHETIC N.O.S. with oil	●	4.2	1373
FABRICS, VEGETABLE with oil	●	4.2	1373
FIBRES WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S.	●	4.1	1353
FIBRES, SYNTHETIC N.O.S. with oil	●	4.2	1373
FIBRES, ANIMAL with oil, N.O.S.	●	4.2	1373
FIBRES, VEGETABLE with oil, N.O.S.	●	4.2	1373
FIRELIGHTERS, SOLID with flammable liquid	●	4.1	2623
FLAMMABLE LIQUID, CORROSIVE, N.O.S.	●	3	2924

Substance, material or article	MP	Class	UN No.
FLAMMABLE LIQUID, N.O.S.	●	3	1993
FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.	●	3	3286
FLAMMABLE LIQUID, TOXIC, N.O.S.	●	3	1992
FLAMMABLE SOLID, CORROSIVE, INORGANIC, N.O.S.	●	4.1	3180
FLAMMABLE SOLID, CORROSIVE, ORGANIC, N.O.S.	●	4.1	2925
FLAMMABLE SOLID, INORGANIC, N.O.S.	●	4.1	3178
FLAMMABLE SOLID, ORGANIC, MOLTEN, N.O.S.	●	4.1	3176
FLAMMABLE SOLID, ORGANIC, N.O.S.	●	4.1	1325
FLAMMABLE SOLID, OXIDIZING, N.O.S.	●	4.1	3097
FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S.	●	4.1	3179
FLAMMABLE SOLID, TOXIC, ORGANIC, N.O.S.	●	4.1	2926
FLUROSILICATES, N.O.S.	●	6.1	2856
Gas Drips, Hydrocarbon, see HYDROCARBONS, LIQUID, N.O.S.	●	-	-
GAS SAMPLE, NON-PRESSURIZED, FLAMMABLE, N.O.S. not refrigerated liquid	●	2.1	3167
GAS SAMPLE, NON-PRESSURIZED, TOXIC, FLAMMABLE, N.O.S. not refrigerated liquid	●	2.3	3168
GAS SAMPLE, NON-PRESSURIZED, TOXIC, N.O.S. not refrigerated liquid	●	2.3	3169
GAS, REFRIGERATED LIQUID, FLAMMABLE, N.O.S.	●	2.1	3312
GAS, REFRIGERATED LIQUID, N.O.S.	●	2.2	3158
GAS, REFRIGERATED LIQUID, OXIDIZING, N.O.S.	●	2.2	3311
GASOLINE	●	3	1203
Gasoline, Casinghead, see	●	3	1203
Hydrides, Metal, Water-reactive, N.O.S., see	●	4.3	1409
HYDROCARBON GAS MIXTURE, COMPRESSED, N.O.S.	●	2.1	1964
HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S.	●	2.1	1965
HYDROCARBONS, LIQUID, N.O.S.	●	3	3295
Hydrogen Sulphates, Aqueous Solution, see	●	8	2837
HYDROGENDIFLUORIDES SOLUTION, N.O.S.	●	8	3471
HYDROGENDIFLUORIDES, SOLID, N.O.S.	●	8	1740
HYPOCHLORITES, INORGANIC, N.O.S.	●	5.1	3212
INSECTICIDE GAS, FLAMMABLE, N.O.S.	●	2.1	3354
INSECTICIDE GAS, N.O.S.	●	2.2	1968

Substance, material or article	MP	Class	UN No.
INSECTICIDE GAS, TOXIC, FLAMMABLE, N.O.S.	●	2.3	3355
INSECTICIDE GAS, TOXIC, N.O.S.	●	2.3	1967
ISOCYANATE SOLUTION, FLAMMABLE, TOXIC, N.O.S.	●	3	2478
ISOCYANATE SOLUTION, TOXIC, FLAMMABLE, N.O.S.	●	6.1	3080
ISOCYANATE SOLUTION, TOXIC, N.O.S.	●	6.1	2206
ISOCYANATES, FLAMMABLE, TOXIC, N.O.S.	●	3	2478
ISOCYANATES, TOXIC, FLAMMABLE, N.O.S.	●	6.1	3080
ISOCYANATES, TOXIC, N.O.S.	●	6.1	2206
KETONES, LIQUID, N.O.S.	●	3	1224
LIQUEFIED GAS, FLAMMABLE, N.O.S.	●	2.1	3161
LIQUEFIED GAS, N.O.S.	●	2.2	3163
LIQUEFIED GAS, OXIDIZING, N.O.S.	●	2.2	3157
LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	●	2.3	3309
LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	●	2.3	3310
LIQUEFIED GAS, TOXIC, OXIDIZING, N.O.S.	●	2.3	3307
LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S.	●	2.3	3308
LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.	●	2.3	3160
LIQUEFIED GAS, TOXIC, N.O.S.	●	2.3	3162
LPG, see	●	2.1	1075
Magnesium Chloride and Chlorate Mixture, see	●	5.1	1459
MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	●	3	3248
MEDICINE, LIQUID, TOXIC, N.O.S.	●	6.1	1851
MEDICINE, SOLID, TOXIC, N.O.S.	●	6.1	3249
MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, N.O.S.	●	3	3336
MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	●	3	1228
MERCAPTAN MIXTURE, LIQUID, TOXIC, FLAMMABLE, N.O.S.	●	6.1	3071
MERCAPTANS, LIQUID, FLAMMABLE, N.O.S.	●	3	3336
MERCAPTANS, LIQUID, FLAMMABLE, TOXIC, N.O.S.	●	3	1228
MERCAPTANS, LIQUID, TOXIC, FLAMMABLE, N.O.S.	●	6.1	3071
Metal Alkyl Halides, Water-reactive, N.O.S., see	●	4.2	3394
Metal Alkyl Hydrides, Water-reactive, N.O.S., see	●	4.2	3394
Metal Alkyls, Water-reactive, N.O.S., see	●	4.2	3394
Metal Aryl Halides, Water-reactive, N.O.S., see	●	4.2	3394
Metal Aryl Hydrides, Water-reactive, N.O.S., see	●	4.2	3394

Substance, material or article	MP	Class	UN No.
Metal Aryls, Water-reactive, N.O.S., see	●	4.2	3394
METAL CARBONYLS, LIQUID, N.O.S.	●	6.1	3281
METAL CARBONYLS, SOLID, N.O.S.	●	6.1	3466
METAL HYDRIDES, FLAMMABLE, N.O.S.	●	4.1	3182
METAL HYDRIDES, WATER-REACTIVE, N.O.S.	●	4.3	1409
METAL POWDER, FLAMMABLE, N.O.S.	●	4.1	3089
METAL POWDER, SELF-HEATING, N.O.S.	●	4.2	3189
METAL SALTS OF ORGANIC COMPOUNDS, FLAMMABLE, N.O.S.	●	4.1	3181
METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S.	●	4.3	3208
METALLIC SUBSTANCE, WATER-REACTIVE, SELF-HEATING, N.O.S.	●	4.3	3209
Methylchlorobenzenes, see	●	3	2238
MOTOR SPIRIT	●	3	1203
Naphtha, Petroleum, see	●	3	1268
Naphtha, see	●	3	1268
NITRATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	●	5.1	3218
NITRATES, INORGANIC, N.O.S.	●	5.1	1477
NITRILES, FLAMMABLE, TOXIC, N.O.S.	●	3	3273
NITRILES, TOXIC, FLAMMABLE, N.O.S.	●	6.1	3275
NITRILES, TOXIC, LIQUID, N.O.S.	●	6.1	3276
NITRILES, TOXIC, SOLID, N.O.S.	●	6.1	3439
NITRITES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	●	5.1	3219
NITRITES, INORGANIC, N.O.S.	●	5.1	2627
NITROCELLULOSE with not more than 12.6% nitrogen, by dry mass MIXTURE WITH PLASTICIZER WITHOUT PIGMENT	●	4.1	2557
NITROCELLULOSE with not more than 12.6% nitrogen, by dry mass MIXTURE WITHOUT PLASTICIZER WITH PIGMENT	●	4.1	2557
NITROCELLULOSE with not more than 12.6% nitrogen, by dry mass MIXTURE WITHOUT PLASTICIZER WITHOUT PIGMENT	●	4.1	2557
NITROCELLULOSE with not more than 12.6% nitrogen, by dry mass, MIXTURE WITH PLASTICIZER WITH PIGMENT	●	4.1	2557
Nitrocotton with plasticizing substance, see	●	4.1	2557
NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, FLAMMABLE, N.O.S. with not more than 30% nitroglycerin, by mass	●	3	3343

Substance, material or article	MP	Class	UN No.
NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, N.O.S with not more than 30% nitroglycerin, by mass	●	3	3357
NITROGLYCERIN MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 2% but not more than 10% nitroglycerin, by mass	●	4.1	3319
ORGANOARSENIC COMPOUND, LIQUID, N.O.S.	●	6.1	3280
ORGANOARSENIC COMPOUND, SOLID, N.O.S.	●	6.1	3465
ORGANOCHLORINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC flashpoint less than 23°C	●	3	2762
ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC	●	6.1	2996
ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE flashpoint not less than 23°C	●	6.1	2995
ORGANOCHLORINE PESTICIDE, SOLID, TOXIC	●	6.1	2761
ORGANOMETALLIC COMPOUND, SOLID, TOXIC, N.O.S.	●	6.1	3467
ORGANOMETALLIC COMPOUND, TOXIC, LIQUID, N.O.S.	●	6.1	3282
ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC	●	4.2	3392
ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC, WATER-REACTIVE	●	4.2	3394
ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE	●	4.3	3398
ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE	●	4.3	3399
ORGANOMETALLIC SUBSTANCE, SOLID, PYROPHORIC	●	4.2	3391
ORGANOMETALLIC SUBSTANCE, SOLID, PYROPHORIC, WATER-REACTIVE	●	4.2	3393
ORGANOMETALLIC SUBSTANCE, SOLID, SELF-HEATING	●	4.2	3400
ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE	●	4.3	3395
ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE, FLAMMABLE	●	4.3	3396
ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE, SELF-HEATING	●	4.3	3397
ORGANOPHOSPHORUS COMPOUND, TOXIC, FLAMMABLE, N.O.S.	●	6.1	3279

Substance, material or article	MP	Class	UN No.
ORGANOPHOSPHORUS COMPOUND, TOXIC, LIQUID, N.O.S.	●	6.1	3278
ORGANOPHOSPHORUS COMPOUND, TOXIC, SOLID, N.O.S.	●	6.1	3464
ORGANOPHOSPHORUS PESTICIDE, LIQUID, FLAMMABLE, TOXIC flashpoint less than 23°C	●	3	2784
ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC	●	6.1	3018
ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE flashpoint not less than 23°C	●	6.1	3017
ORGANOPHOSPHORUS PESTICIDE, SOLID, TOXIC	●	6.1	2783
OXIDIZING LIQUID, CORROSIVE, N.O.S.	●	5.1	3098
OXIDIZING LIQUID, N.O.S.	●	5.1	3139
OXIDIZING LIQUID, TOXIC, N.O.S.	●	5.1	3099
OXIDIZING SOLID, CORROSIVE, N.O.S.	●	5.1	3085
OXIDIZING SOLID, FLAMMABLE, N.O.S.	●	5.1	3137
OXIDIZING SOLID, N.O.S.	●	5.1	1479
OXIDIZING SOLID, SELF-HEATING, N.O.S.	●	5.1	3100
OXIDIZING SOLID, TOXIC, N.O.S.	●	5.1	3087
OXIDIZING SOLID, WATER-REACTIVE, N.O.S.	●	5.1	3121
PAINT (including paint, lacquer, enamel, stain, shellac solutions, varnish, polish, liquid filler and liquid lacquer base)	●	3	1263
PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	●	8	3066
PAINT RELATED MATERIAL (including paint thinning or reducing compound)	●	3	1263
PAINT RELATED MATERIAL (including paint thinning or reducing compound)	●	8	3066
PAINT, CORROSIVE, FLAMMABLE (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL CORROSIVE, FLAMMABLE (including paint thinning or reducing compound)	●	8	3470
PAINT, FLAMMABLE, CORROSIVE (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL, FLAMMABLE, CORROSIVE (including paint thinning or reducing compound)	●	3	3469

Substance, material or article	MP	Class	UN No.
PENTAERYTHRITE TETRANITRATE MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 10% but not more than 20% PETN, by mass	•	4.1	3344
PERCHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	•	5.1	3211
PERCHLORATES, INORGANIC, N.O.S.	•	5.1	1481
PERFUMERY PRODUCTS with flammable liquid	•	3	1266
PERMANGANATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	•	5.1	3214
PERMANGANATES, INORGANIC, N.O.S.	•	5.1	1482
PEROXIDES, INORGANIC, N.O.S.	•	5.1	1483
PERSULPHATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	•	5.1	3216
PERSULPHATES, INORGANIC, N.O.S.	•	5.1	3215
PESTICIDE, LIQUID, FLAMMABLE, TOXIC, N.O.S. flashpoint less than 23°C	•	3	3021
PESTICIDE, LIQUID, TOXIC, FLAMMABLE, N.O.S. flashpoint not less than 23°C	•	6.1	2903
PESTICIDE, LIQUID, TOXIC, N.O.S.	•	6.1	2902
PESTICIDE, SOLID, TOXIC, N.O.S.	•	6.1	2588
PETROL	•	3	1203
PETROLEUM DISTILLATES, N.O.S.	•	3	1268
Petroleum Ether, see	•	3	1268
PETROLEUM GASES, LIQUEFIED	•	2.1	1075
Petroleum Naphtha, see	•	3	1268
Petroleum Oil, see	•	3	1268
PETROLEUM PRODUCTS, N.O.S.	•	3	1268
Petroleum Raffinate, see	•	3	1268
PHENOLATES, LIQUID	•	8	2904
PHENOLATES, SOLID	•	8	2905
PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC flashpoint less than 23°C	•	3	3346
PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC	•	6.1	3348
PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE flashpoint not less than 23°C	•	6.1	3347
PHENOXYACETIC ACID DERIVATIVE PESTICIDE, SOLID, TOXIC	•	6.1	3345
PLASTICS, NITROCELLULOSE-BASED, SELF-HEATING, N.O.S.	•	4.2	2006
POLYAMINES, FLAMMABLE, CORROSIVE, N.O.S.	•	3	2733

Substance, material or article	MP	Class	UN No.
POLYAMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.	•	8	2734
POLYAMINES, LIQUID, CORROSIVE, N.O.S.	•	8	2735
POLYAMINES, SOLID, CORROSIVE, N.O.S.	•	8	3259
POLYESTER RESIN KIT	•	3	3269
PYRETHROID PESTICIDE, LIQUID, FLAMMABLE, TOXIC flashpoint less than 23°C	•	3	3350
PYRETHROID PESTICIDE, LIQUID, TOXIC	•	6.1	3352
PYRETHROID PESTICIDE, LIQUID, TOXIC, FLAMMABLE flashpoint not less than 23°C	•	6.1	3351
PYRETHROID PESTICIDE, SOLID, TOXIC	•	6.1	3349
PYROPHORIC ALLOY, N.O.S.	•	4.2	1383
PYROPHORIC LIQUID, INORGANIC, N.O.S.	•	4.2	3194
PYROPHORIC LIQUID, ORGANIC, N.O.S.	•	4.2	2845
PYROPHORIC METAL, N.O.S.	•	4.2	1383
PYROPHORIC SOLID, INORGANIC, N.O.S.	•	4.2	3200
PYROPHORIC SOLID, ORGANIC, N.O.S.	•	4.2	2846
REFRIGERANT GAS, N.O.S.	•	2.2	1078
RESIN SOLUTION flammable	•	3	1866
Road Asphalt, see	•	3	1999
RUBBER SOLUTION	•	3	1287
SELENATES	•	6.1	2630
SELENITES	•	6.1	2630
SELENIUM COMPOUND, LIQUID, N.O.S.	•	6.1	3440
SELENIUM COMPOUND, SOLID, N.O.S.	•	6.1	3283
SELF-HEATING LIQUID, CORROSIVE, INORGANIC, N.O.S.	•	4.2	3188
SELF-HEATING LIQUID, CORROSIVE, ORGANIC, N.O.S.	•	4.2	3185
SELF-HEATING LIQUID, INORGANIC, N.O.S.	•	4.2	3186
SELF-HEATING LIQUID, ORGANIC, N.O.S.	•	4.2	3183
SELF-HEATING LIQUID, TOXIC, INORGANIC, N.O.S.	•	4.2	3187
SELF-HEATING LIQUID, TOXIC, ORGANIC, N.O.S.	•	4.2	3184
SELF-HEATING SOLID, CORROSIVE, INORGANIC, N.O.S.	•	4.2	3192
SELF-HEATING SOLID, CORROSIVE, ORGANIC, N.O.S.	•	4.2	3126
SELF-HEATING SOLID, INORGANIC, N.O.S.	•	4.2	3190
SELF-HEATING SOLID, ORGANIC, N.O.S.	•	4.2	3088
SELF-HEATING SOLID, OXIDIZING, N.O.S.	•	4.2	3127
SELF-HEATING SOLID, TOXIC, INORGANIC, N.O.S.	•	4.2	3191

Substance, material or article	MP	Class	UN No.
SELF-HEATING SOLID, TOXIC, ORGANIC, N.O.S.	●	4.2	3128
Silicofluorides, N.O.S., see	●	6.1	2856
Sodium Dicyanocuprate(I) Solution, see	●	6.1	2317
SOLIDS CONTAINING CORROSIVE LIQUID, N.O.S.	●	8	3244
SOLIDS CONTAINING FLAMMABLE LIQUID, N.O.S.	●	4.1	3175
SOLIDS CONTAINING TOXIC LIQUID, N.O.S.	●	6.1	3243
Solvents, Flammable, N.O.S., see	●	3	1993
Solvents, Toxic, Flammable, N.O.S., see	●	3	1992
Strontium Alloy, non-pyrophoric, see	●	4.3	1393
Strontium Alloy, Pyrophoric, see	●	4.2	1383
SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, FLAMMABLE, TOXIC flashpoint less than 23°C	●	3	2780
SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC	●	6.1	3014
SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC, FLAMMABLE flashpoint not less than 23°C	●	6.1	3013
SUBSTITUTED NITROPHENOL PESTICIDE, SOLID, TOXIC	●	6.1	2779
Synthetic Fabrics, Oily, see	●	4.2	1373
Synthetic Fibres, Oily, see	●	4.2	1373
TARS, LIQUID including road asphalt and oils, bitumen and cut backs	●	3	1999
TEAR GAS SUBSTANCE, LIQUID, N.O.S.	●	6.1	1693
TEAR GAS SUBSTANCE, SOLID, N.O.S.	●	6.1	3448
TELLURIUM COMPOUND, N.O.S.	●	6.1	3284
TERPENE HYDROCARBONS, N.O.S.	●	3	2319
Terpenes, N.O.S., see	●	3	2319
THIOCARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC flashpoint less than 23°C	●	3	2772
THIOCARBAMATE PESTICIDE, LIQUID, TOXIC	●	6.1	3006
THIOCARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE flashpoint not less than 23°C	●	6.1	3005
THIOCARBAMATE PESTICIDE, SOLID, TOXIC	●	6.1	2771
TINCTURES, MEDICINAL	●	3	1293

Substance, material or article	MP	Class	UN No.
TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an inhalation toxicity lower than or equal to 1000 ml/m <sup>3</sup> and saturated vapour concentration greater than or equal to 10 LC <sub>50</sub>	●	6.1	3390
TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an inhalation toxicity lower than or equal to 200 ml/m <sup>3</sup> and saturated vapour concentration greater than or equal to 500 LC <sub>50</sub>	●	6.1	3389
TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an inhalation toxicity lower than or equal to 1000 ml/m <sup>3</sup> and saturated vapour concentration greater than or equal to 10 LC <sub>50</sub>	●	6.1	3384
TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an inhalation toxicity lower than or equal to 200 ml/m <sup>3</sup> and saturated vapour concentration greater than or equal to 500 LC <sub>50</sub>	●	6.1	3383
TOXIC BY INHALATION LIQUID, N.O.S. with an inhalation toxicity lower than or equal to 1000 ml/m <sup>3</sup> and saturated vapour concentration greater than or equal to 10 LC <sub>50</sub>	●	6.1	3382
TOXIC BY INHALATION LIQUID, N.O.S. with an inhalation toxicity lower than or equal to 200 ml/m <sup>3</sup> and saturated vapour concentration greater than or equal to 500 LC <sub>50</sub>	●	6.1	3381
TOXIC BY INHALATION LIQUID, OXIDIZING, N.O.S. with an inhalation toxicity lower than or equal to 1000 ml/m <sup>3</sup> and saturated vapour concentration greater than or equal to 10 LC <sub>50</sub>	●	6.1	3388
TOXIC BY INHALATION LIQUID, OXIDIZING, N.O.S. with an inhalation toxicity lower than or equal to 200 ml/m <sup>3</sup> and saturated vapour concentration greater than or equal to 500 LC <sub>50</sub>	●	6.1	3387
TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an inhalation toxicity lower than or equal to 1000 ml/m <sup>3</sup> and saturated vapour concentration greater than or equal to 10 LC <sub>50</sub>	●	6.1	3386
TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an inhalation toxicity lower than or equal to 200 ml/m <sup>3</sup> and saturated vapour concentration greater than or equal to 500 LC <sub>50</sub>	●	6.1	3385

Substance, material or article	MP	Class	UN No.
TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S.	●	6.1	3289
TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S.	●	6.1	2927
TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.	●	6.1	2929
TOXIC LIQUID, INORGANIC, N.O.S.	●	6.1	3287
TOXIC LIQUID, ORGANIC, N.O.S.	●	6.1	2810
TOXIC LIQUID, OXIDIZING, N.O.S.	●	6.1	3122
TOXIC LIQUID, WATER-REACTIVE, N.O.S.	●	6.1	3123
TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S.	●	6.1	3290
TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.	●	6.1	2928
TOXIC SOLID, FLAMMABLE, ORGANIC, N.O.S.	●	6.1	2930
TOXIC SOLID, INORGANIC, N.O.S.	●	6.1	3288
TOXIC SOLID, ORGANIC, N.O.S.	●	6.1	2811
TOXIC SOLID, OXIDIZING, N.O.S.	●	6.1	3086
TOXIC SOLID, SELF-HEATING, N.O.S.	●	6.1	3124
TOXIC SOLID, WATER-REACTIVE, N.O.S.	●	6.1	3125
TOXINS, EXTRACTED FROM LIVING SOURCES, LIQUID, N.O.S.	●	6.1	3172
TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S.	●	6.1	3462
TRIAZINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC flashpoint less than 23°C	●	3	2764
TRIAZINE PESTICIDE, LIQUID, TOXIC	●	6.1	2998
TRIAZINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flashpoint not less than 23°C	●	6.1	2997
TRIAZINE PESTICIDE, SOLID, TOXIC	●	6.1	2763
Trimethylgallium, see	●	4.2	3394
TURPENTINE SUBSTITUTE	●	3	1300
VANADIUM COMPOUND, N.O.S.	●	6.1	3285
Vegetable Fabrics, Oily, see	●	4.2	1373
Vegetable Fibres, Oily, see	●	4.2	1373
WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.	●	4.3	3129
WATER-REACTIVE LIQUID, N.O.S.	●	4.3	3148
WATER-REACTIVE LIQUID, TOXIC, N.O.S.	●	4.3	3130
WATER-REACTIVE SOLID, CORROSIVE, N.O.S.	●	4.3	3131
WATER-REACTIVE SOLID, FLAMMABLE, N.O.S.	●	4.3	3132
WATER-REACTIVE SOLID, N.O.S.	●	4.3	2813
WATER-REACTIVE SOLID, OXIDIZING, N.O.S.	●	4.3	3133

Substance, material or article	MP	Class	UN No.
WATER-REACTIVE SOLID, SELF-HEATING, N.O.S.	●	4.3	3135
WATER-REACTIVE SOLID, TOXIC, N.O.S.	●	4.3	3134
WOOD PRESERVATIVES, LIQUID	●	3	1306
Replace (French version)			
ACIDE FLUORHYDRIQUE, solution contenant au plus 60% de fluorure d'hydrogène with	-	8	1790
ACIDE FLUORHYDRIQUE, contenant au plus 60% de fluorure d'hydrogène	-	8	1790
Replace (French version)			
ACIDE FLUORHYDRIQUE, solution contenant plus de 60% de fluorure d'hydrogène with	-	8	1790
ACIDE FLUORHYDRIQUE, contenant plus de 60% de fluorure d'hydrogène	-	8	1790
Replace (French version)			
ALKYLALUMINIUMS with	-	4.2	3051
Alkylaluminiums, <i>voir</i>	-	4.2	3394
Replace			
2-Butenoic Acid, <i>see</i> with	-	8	2823
2-Butenoic Acid, Solid, <i>see</i>	-	8	2823
2-Butenoic Acid, Liquid, <i>see</i>	-	8	3472
Replace			
Barium Amalgams, <i>see</i> with	-	4.3	1392
Barium Amalgams, Liquid, <i>see</i>	-	4.3	1392
Barium Amalgams, Solid, <i>see</i>	-	4.3	3402
Insert new entry			
BATTERY-POWERED VEHICLE or BATTERY-POWERED EQUIPMENT	-	9	3171
Replace			
Caesium Amalgams, <i>see</i> with	-	4.3	1389
Caesium Amalgams, Liquid, <i>see</i>	-	4.3	1389
Caesium Amalgams, Solid, <i>see</i>	-	4.3	3401

Replace			
Calcium Amalgams, <i>see</i>	-	4.3	1389
with			
Calcium Amalgams, Liquid, <i>see</i>	-	4.3	1389
Calcium Amalgams, Solid, <i>see</i>	-	4.3	3402
Insert new entry			
CALCIUM OXIDE	-	8	1910
Replace			
Cesium, <i>see</i>	-	4.3	1407
with			
Caesium, <i>see</i> CAESIUM	-	-	-
Replace			
CHARGES, BURSTING, PLASTICS-BONDED	-	1.4D	0459
with			
CHARGES, BURSTING, PLASTICS BONDED	-	1.4D	0459
Replace			
CHARGES, BURSTING, PLASTICS-BONDED	-	1.4S	0460
with			
CHARGES, BURSTING, PLASTICS BONDED	-	1.4S	0460
Replace			
2,4-Di- <i>tert</i> -butylphenol, <i>see</i>	-	8	2430
with			
2,4-Di- <i>tert</i> -butylphenol, <i>see</i> <b>Note 1</b>	-	-	-
Replace			
2,6-Di- <i>tert</i> -butylphenol, <i>see</i>	-	8	2430
with			
2,6-Di- <i>tert</i> -butylphenol, <i>see</i> <b>Note 1</b>	-	-	-
Insert new entry			
ENGINE, INTERNAL COMBUSTION or VEHICLE, FLAMMABLE GAS POWERED or VEHICLE, FLAMMABLE LIQUID POWERED	-	9	3166
Insert new entry			
ETHANOL AND GASOLINE MIXTURE or ETHANOL AND MOTOR SPIRIT MIXTURE or ETHANOL AND PETROL MIXTURE, with more than 10% ethanol	-	3	3475

Replace FUEL CELL CARTRIDGES containing flammable liquids with FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PLACED WITH EQUIPMENT	-	3	3473
Insert new entry FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing corrosive substances	-	8	3477
Insert new entry FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing hydrogen in metal hydride	-	2.1	3479
Insert new entry FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing liquefied flammable gas	-	2.1	3478
Insert new entry FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing water-reactive substances	-	4.3	3476
Replace HYDROFLUORIC ACID solution, with more than 60% hydrofluoric acid with HYDROFLUORIC ACID solution, with more than 60% hydrogen fluoride	-	8	1790
Replace HYDROFLUORIC ACID solution, with not more than 60% hydrofluoric acid with HYDROFLUORIC ACID solution, with not more than 60% hydrogen fluoride	-	8	1790
	-	8	1790

Replace HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM	-	2.1	3468
with HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM or HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM CONTAINED IN EQUIPMENT OR HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM PACKED WITH EQUIPMENT	-	2.1	3468
Insert new entry 1-HYDROXYBENZOTRIAZOLE, ANHYDROUS, dry or wetted with less than 20% water, by mass	-	1.3C	0508
Insert new entry 1-HYDROXYBENZOTRIAZOLE, ANHYDROUS, WETTED with not less than 20% water, by mass	-	4.1	3474
Replace Lithium Amalgams, <i>see</i>	-	4.3	1389
with Lithium Amalgams, Liquid, <i>see</i>	-	4.3	1389
Lithium Amalgams, Solid, <i>see</i>	-	4.3	3401
Replace LITHIUM BATTERIES	-	9	3090
with LITHIUM METAL BATTERIES (including lithium alloy batteries)	-	9	3090
Replace LITHIUM BATTERIES CONTAINED IN EQUIPMENT	-	9	3091
with LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT	-	9	3091
Replace LITHIUM BATTERIES PACKED WITH EQUIPMENT	-	9	3091
with LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT	-	9	3091
Insert new entry LITHIUM ION BATTERIES (including lithium ion polymer batteries)	-	9	3480

Insert new entry			
LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries)	-	9	3481
Replace			
Magnesium Amalgams, <i>see</i> with	-	4.3	1392
Magnesium Amalgams, Liquid, <i>see</i>	-	4.3	1392
Magnesium Amalgams, Solid, <i>see</i>	-	4.3	3402
Insert new entry			
MAGNETIZED MATERIAL	-	9	2807
Replace			
3-Methacrylic Acid, <i>see</i> with	-	8	2823
3-Methacrylic Acid, Solid, <i>see</i>	-	8	2823
3-Methacrylic Acid, Liquid, <i>see</i>	-	8	3472
Replace			
NITRIC ACID other than red fuming, with not more than 70% nitric acid with	-	8	2031
NITRIC ACID other than red fuming, with at least 65% but with not more than 70% nitric acid	-	8	2031
NITRIC ACID other than red fuming, with less than 65% nitric acid	-	8	2031
Replace			
PENTAERYTHRITE TETRANITRATE MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 10% but not more than 20% PETN, by mass with	-	4.1	3344
PENTAERYTHRITE TETRANITRATE (PENTAERYTHRITOL TETRANITRATE; PETN) MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 10% but not more than 20% PETN, by mass	-	4.1	3344
Replace			
Potassium Amalgams, <i>see</i> with	-	4.3	1389
Potassium Amalgams, Liquid, <i>see</i>	-	4.3	1389
Potassium Amalgams, Solid, <i>see</i>	-	4.3	3401

Replace			
Rubidium Amalgams, <i>see</i>	-	4.3	1389
with			
Rubidium Amalgams, Liquid, <i>see</i>	-	4.3	1389
Rubidium Amalgams, Solid, <i>see</i>	-	4.3	3401
Insert new entry			
SIGNALS, DISTRESS, ship	-	1.4G	0506
Insert new entry			
SIGNALS, DISTRESS, ship	-	1.4S	0506
Insert new entry			
SIGNALS, SMOKE	-	1.4S	0507
Insert new entry			
SODIUM ALUMINATE, SOLID	-	8	2812
Replace			
Sodium Amalgams, <i>see</i>	-	4.3	1389
With			
Sodium Amalgams, Liquid, <i>see</i>	-	4.3	1389
Sodium Amalgams, Solid, <i>see</i>	-	4.3	3401
Replace			
Strontium Amalgams, <i>see</i>	-	4.3	1392
With			
Strontium Amalgams, Liquid, <i>see</i>	-	4.3	1392
Strontium Amalgams, Solid, <i>see</i>	-	4.3	3402
Replace			
TRINITROPHENOL, WETTED with not less than 30% water, by mass	-	4.1	1344
with			
TRINITROPHENOL (PICRIC ACID), WETTED with not less than 30% water, by mass	-	4.1	1344
Replace			
TRINITROLUENE, WETTED with not less than 30% water, by mass	-	4.1	1356
with			
TRINITROLUENE (TNT), WETTED with not less than 30% water, by mass	-	4.1	1356

Insert	Aluminium alkyls, <i>see</i>	-	4.2	3394
	Aluminium alkyl halides, liquid, <i>see</i>	-	4.2	3394
	Aluminium alkyl halides, solid, <i>see</i>	-	4.2	3393
	Aluminium alkyl hydrides, <i>see</i>	-	4.2	3394
Insert	Diethylzinc, <i>see</i>	-	4.2	3394
	Dimethylzinc, <i>see</i>	-	4.2	3394
	Lithium alkyls, liquid, <i>see</i>	-	4.2	3394
Replace	LITHIUM ALKYLs, SOLID	-	4.2	3443
with	Lithium alkyls, solid, <i>see</i>	-	4.2	3393
Insert	Magnesium alkyls, <i>see</i>	-	4.2	3394
	Magnesium diphenyl, <i>see</i>	-	4.2	3393
Insert	Organometallic compound solid, water reactive, flammable, <i>see</i>	-	4.3	3396
	Organometallic compound dispersion, water reactive, flammable, <i>see</i>	-	4.3	3399
	Organometallic compound solution, water reactive, flammable, <i>see</i>	-	4.3	3399
Replace	ORGANOMETALLIC COMPOUND, SOLID, TOXIC, N.O.S	-	6.1	3467
with	ORGANOMETALLIC COMPOUND, SOLID, TOXIC, N.O.S	-	6.1	3467
Insert	Pyrophoric organometallic compound, water reactive, liquid, <i>see</i>	-	4.2	3394
	Pyrophoric organometallic compound, water reactive, solid, <i>see</i>	-	4.2	3393