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ECONOMIC COMMISSION FOR EUROPE

INLAND TRANSPORT COMMITTEE

Working Party on the Transport
of Dangerous Goods

REPORT OF THE WORKING PARTY ON ITS FIFTY-SEVENTH SESSION

Addendum 1

EUROPEAN PROVISIONS CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAY (ADN)

Annexes A and B.1 of ADN

Note by the secretariat

1. This document contains the text of Annexes A and B.1 of ADN, and has been prepared on the basis of the decisions of the Working Party at its fifty-third session (20-29 October 1993) and fifty-seventh (extraordinary) session (23-24 August 1995) (see also TRANS/WP.15/136, para. 13).

2. Any editorial comment on this text or new proposal should be sent to the secretariat at the latest by 22 March 1996, for consideration by the Working Party at an extraordinary session scheduled to be held from 3 to 5 June 1996 (possibly 3 - 7 June 1996).

GE.95-24619

ADN

ANNEX A

CONTENTS AND INSTRUCTIONS FOR APPLICATION OF ANNEX A

PART I

1-5999 **DEFINITIONS AND GENERAL PROVISIONS**

Definitions

6000 (1) For the purposes of this Annex:

ADN means the European Provisions concerning the International Carriage of Dangerous Goods by Inland Waterway;

ADR means the European Agreement concerning the International Carriage of Dangerous Goods by Road;

IMDG Code means the International Maritime Dangerous Goods Code of the International Maritime Organization (IMO);

ICAO-TI means the Technical Instructions for the Safe Transport of Dangerous Goods by Air of the International Civil Aviation Organization (ICAO);

RID means the Regulations concerning the International Carriage of Dangerous Goods by Rail which are Annex I of Appendix B - Uniform rules concerning the contract for international carriage of goods by rail (CIM) - of the Convention concerning international carriage by rail (COTIF);

BC Code means the Code of Safe Practice for Solid Bulk Cargoes of the International Maritime Organization (IMO) (applicable to the carriage of solid bulk cargoes in seagoing vessels);

International Regulations means RID, ADR, IMDG Code, ICAO-TI or BC Code;

Miscellaneous

Competent authority means the authority designated or recognized as such in each country and in each specific case in connection with these provisions;

Dangerous goods means the substances, materials and articles (including wastes according to paragraph (5)) which are covered by the relevant definitions (list of substances) for the classes 1 to 9 of ADR or as listed in Part II of this Annex.

Identification number means the number to identify a substance, material or article. As a rule, these numbers are taken from the United Nations Recommendations on the Transport of Dangerous Goods;

Gas means gases and vapours;

6000 (cont'd) *Carriage in bulk* means the carriage of solid substances, materials or articles without packaging (unpackaged);

Fragile package means a package containing a fragile receptacle, i.e. a receptacle made of glass, porcelain, stoneware or similar materials, which is not enclosed in a packaging with complete sides protecting it effectively against shock and stacking forces. Fragile receptacles secured, either singly or in groups, by cushioning materials in a strong receptacle are not regarded as fragile receptacles if the strong receptacle is leakproof and so designed that in the event of breakage or leakage of the fragile receptacles their contents cannot escape from the strong receptacle and the mechanical strength of the latter is not impaired by corrosion during carriage.

(2) For the purposes of this Annex, tanks are not placed on the same footing as receptacles, the term "receptacle" being used in a restrictive sense. Provisions concerning receptacles are applicable to fixed tanks, batteries of receptacles 1/, demountable tanks and tank-containers only if this is expressly stipulated.

(3) For the purposes of this Annex, the terms "package" and "packaging" also apply to intermediate bulk containers (IBCs), containers, including swap-bodies, tank-containers, road vehicles and batteries of receptacles 1/.

(4) For the purposes of ADR, a n.o.s. (not otherwise specified) entry means a collective heading to which substances, materials, mixtures, solutions or articles can be assigned if they:

(a) are not mentioned by name in the lists of substances; and

(b) exhibit chemical, physical and/or dangerous properties corresponding to the class, item, letter and the designation of the n.o.s. entry.

(5) Wastes are substances, materials, solutions, mixtures or articles for which no direct use is envisaged but which are transported for reprocessing, dumping, elimination by incineration or other methods of disposal.

6001 (1) Unless expressly stated otherwise, the sign "%" in this Annex and in Annexes B.1 and B.2 represents:

(a) In the case of mixtures of solids or of liquids, and also in the case of solutions and of solids wetted by a liquid: a percentage by mass based on the total mass of the mixture, the solution or the wetted solid;

(b) In the case of mixtures of compressed gases: the proportion of the volume indicated as a percentage of the total volume of the gaseous mixture; in the case of mixtures of liquefied gases and gases dissolved under pressure: the proportion of the mass indicated as a percentage of the total mass of the mixture.

1/ The term "batteries of receptacles" shall be replaced by "elements of battery-vehicles" as from 1.1.1997.

6001 (cont'd)

(2) Whenever the word "weight" is used in this Annex and in Annexes B.1 and B.2 it means "mass".

(3) Whenever the weight of a package is mentioned, the gross mass is meant unless otherwise stated. The mass of containers, tanks or road vehicles used for the carriage of goods is not included in the gross mass.

(4) Pressures of all kinds relating to receptacles (such as test pressure, internal pressure, safety-valve opening pressure) are always indicated in gauge pressure (pressure in excess of atmospheric pressure); however, the vapour pressure of substances is always expressed in absolute pressure.

(5) Where this Annex or Annexes B.1 and B.2 specify a degree of filling for receptacles or tanks, that degree of filling is always referred to a temperature of the substance of 15 °C unless some other temperature is indicated.

General Provisions

6002

(1) (a) Part II of Annex A to ADR and Part II of this Annex specify the dangerous goods to be excluded from carriage and the dangerous goods to be accepted for such carriage under certain conditions. These last goods are considered as goods of ADN.

The grouping of dangerous goods in restrictive and non restrictive classes is based on Part I of Annex A of ADR. Of the dangerous goods covered by the headings of the restrictive classes, those which are listed in the clauses concerning these classes are to be accepted for carriage only under the conditions specified in these clauses, and others are to be excluded from carriage.

Some of the dangerous goods covered by the headings of the non-restrictive classes are, by notes inserted in the clauses concerning the various non-restrictive classes, excluded from carriage; of the other goods covered by the headings of the non-restrictive classes, those which are mentioned in the clauses concerning these classes are to be accepted for carriage only under the conditions specified in these clauses; those which are not mentioned or covered by one of the collective headings are not deemed to be dangerous goods for the purposes of ADR and are not subject to ADN.

(b) Solid substances shall only be carried in bulk if this is explicitly stated in Annex B.1, marginal XX 111 of each individual class.

(c) Liquid, liquefied or gaseous substances may only be carried in tank vessels if they are listed in Appendix 4 of Annex B.2 (list of substances).

(d) The provisions relating to the carriage of dangerous goods in dry-cargo vessels or tank vessels are contained exclusively in Annexes B.1 and B.2. These annexes also contain the rules for the construction of such vessels.

6002 (cont'd)

(2) Dangerous goods which are accepted for carriage under the provisions of the IMDG Code but not under ADR, may be carried in:

(a) packages - or packages in vehicles or containers - if the provisions of the IMDG Code concerning packing, mixed packing, labelling and marking are complied with;

(b) tank-containers if they comply with the relevant provisions of the IMDG Code for portable tanks.

In the case of dangerous goods for which a transport temperature is given in accordance with the provisions of the IMDG Code, this transport temperature shall also be observed during transport in inland waterway vessels.

In each case, the most stringent provisions of Parts I and II of Annex B.1 of ADN shall be observed; however, prohibitions of mixed loading do not apply if the goods are loaded in containers in accordance with the segregation provisions of the IMDG Code.

A maximum mass of 60 000/120 000 kg (in total) for goods of class 2 shall be observed as a limitation in accordance with marginal 10 401 (1).

(3) Unless otherwise specified in this Annex, the provisions of Part II of Annex A to ADR which are listed in the following table shall be applied:

6002
(contd)

Class			Provisions of ADR concerning		
			Classification	Listing of substances	Particulars in the transport document
			Marginal	Marginal	Marginal
1	Explosive substances and articles	Restrictive	2100	2101	2110
2	Gases: compressed, liquefied or dissolved under pressure	Restrictive 2/	2200	2201, 2201 a	2226
3	Flammable liquids	Non-restrictive	2300	2301, 2301 a	2314
4.1	Flammable solids	Non- restrictive	2400	2401, 2401 a	2414
4.2	Substances liable to spontaneous combustion	Non-restrictive	2430	2431	2444
4.3	Substances which in contact with water, emit flammable gases	Non-restrictive	2470	2471, 2471 a	2484
5.1	Oxidizing substances	Non-restrictive	2500	2501, 2501 a	2514
5.2	Organic peroxides	Non-restrictive	2550	2551, 2551a	2561
6.1	Toxic substances	Non-restrictive	2600	2601, 2601 a	2614
6.2	Infectious substances	Non-restrictive	2650	2651	2664
7	Radioactive material	Restrictive	2700	2701 to 2704	2704 Item 10 of each schedule
8	Corrosive substances	Non-restrictive	2800	2801, 2801 a	2814
9	Miscellaneous dangerous substances and articles	Non-restrictive	2900	2901, 2901 a	2914

For provisions concerning particulars in the transport document, information in accordance with the provisions of RID or in the case of paragraph (7) in accordance with the provisions of the IMDG Code is also permitted. Instead of the abbreviation "ADR" (or "RID") the abbreviation "ADN" may also be used.

2/ Non restrictive class as from 1.1.1997.

6002 (cont'd)

(4) Dangerous goods used for the propulsion of vessels and vehicles, for the operation of their special equipment, for household purposes or for maintaining the safety, and which are carried on board in their usual containment are not subject to the provisions of ADN.

(5) For each transport of goods regulated in accordance with the provisions of this Annex, the following documents shall be transported on board:

(a) a transport document containing at least the following particulars (for class 7 see also marginal 2709 of ADR):

- the name of the substance, material or article including the identification number (if applicable) 3/, the class 3/, the item number and, if applicable, the letter 3/, 4/; the name shall correspond to one of the names underlined in Annex A of ADR 5/;
- the capital letters ADN, ADR, RID or IMDG Code;
- the number and a description of the packages or Intermediate Bulk containers (IBCs);
- the gross mass, as well as the net explosive quantity for explosive substances and articles of class 1 in grammes or kilogrammes;
- the name and address of the consignor;
- the name and address of the consignee(s).

The document containing this information may be that already required by other regulations in force for transport by another mode of transport. The consignor shall, before loading, communicate this information to the carrier in writing.

The particulars to be entered in the transport document shall be in an official language of the forwarding country and, if so required by countries of transit or destination, in a language accepted by those countries for international transport.

(b) The written instructions for all dangerous goods carried as provided for in marginal 10 385 of Annex B.1 or marginal 210 385 of Annex B.2. This does not apply if the dangerous goods are carried in quantities below the maximum quantities mentioned in marginal 10 011.

3/ These explanations and other information are contained in Section 2 B "Particulars in the transport document" of each class or in the schedules of class 7 of Annex A to ADR.

4/ For class 2, as from 1.1.97, the indication of the letter shall be replaced by the indication of the group.

5/ For class 2, as from 1.1.97, the name shall correspond to one of the name in capital letter in marginal 2201 of Annex A of ADR.

6002 (cont'd)

(c) if required,

- the instructions to carriers referred to in marginal 71 002;
- the certificates and information referred to in marginal 71 381; and
- the provisions and the approval certificates referred to in marginal 71 403.

(6) If, by reason of the volume or weight of the load, a consignment cannot be loaded in its entirety on a single vessel, at least as many separate documents, or copies of the single document, shall be made out as the number of vessels to be loaded. Furthermore, in all cases, separate transport documents shall be made out for consignments or parts of consignments which may not be loaded together by reason of the prohibitions set forth in Annex B.1, Parts I and II.

(7) If transport by sea follows or precedes transport by inland waterway, a transport document in accordance with the provisions of the IMDG Code may also be used.

(8) As evidence that the dangerous goods to be carried comply with the provisions of ADN, the following particulars shall be certified in the transport document or be confirmed otherwise in writing by the consignor:

(a) general:

The nature of the goods conforms to the provisions of ADN (or of RID, of ADR, of the ICAO-TI or of the IMDG Code, as appropriate);

(b) for packages:

The packages conform to the provisions of ADR (or of RID, of the ICAO-TI or of the IMDG Code, as appropriate);

(c) for road vehicles:

The road vehicles conform to the provisions of ADR;

(d) for tank-containers and containers:

The containers and/or tank-containers conform to the provisions of ADR (or of RID or of the IMDG Code, as appropriate).

(9) In case of mixed packing, the provisions of this Annex concerning the particulars in the transport document shall apply in respect of each of the different kinds of dangerous goods contained in the collective package.

6002 (cont'd) (10) For substances, solutions and mixtures (such as preparations and wastes) not mentioned by name in the list of substances of the various classes, the provisions of marginal 2002 (8) of Annex A of ADR are applicable.

(11) For non-radioactive material (specific activity not exceeding 70 kBq/kg (2n(Ci/g)), the provisions of Annex A to ADR, marginal 2002, paragraphs (10) and (11), are applicable.

6003 (1) Part II of this Annex contains the special provisions for the individual classes, which apply in addition to, or instead of, the provisions of ADR referred to in marginal 6002 (3) of this Annex. For class 7, Appendix A.7 of Annex A to ADR is also applicable.

(2) The following provisions apply to packages:

(a) Packages shall comply with the provisions for packing, labelling and mixed packing of one of the International Regulations;

(b) Road vehicles, as well as their contents, shall comply with the provisions of ADR;

(c) Tank-containers, containers, batteries of receptacles 6/ and IBCs, as well as their contents, shall comply with the provisions of one of the International Regulations.

6004 As ADN does not contain any testing requirement for the classification of dangerous goods (e.g. flashpoint, viscosity, sensitivity, etc.), the provisions of the other International Regulations shall apply in so far as they contain appropriate testing requirements.

6005-6099

6/ As from 1.1.1997, the term "batteries of receptacles" shall be replaced by "elements of battery-vehicles".

PART II

LIST OF SUBSTANCES AND SPECIAL PROVISIONS FOR THE VARIOUS CLASSES

Class 1. Explosive substances and articles

**6100-
6199**

Class 2. Gases: compressed, liquefied or dissolved under pressure

6200

List of substances

6201 The list of substances shall be supplemented as follows, until 31.12.1996:

C. Deeply refrigerated liquefied gases
7° (at) non flammable
Ammonia

As from 1.1.1997, "3° refrigerated liquefied gases
3° TC Toxic, corrosive gases
1005 AMMONIA, ANHYDROUS"

**6202
6225**

6226 The entry in accordance with marginal 2226 (2) of Annex A of ADR is not required.

**6227-
6299**

Class 3. Flammable liquids

6300

List of substances

6301 This list of substances shall be supplemented as follows:

I. Other substances when carried in tank vessels

72° (Text valid until 31.12.1996) Substances having a flash-point above 61 °C which are handed over for carriage or which are carried heated within a limiting range of 15 K below their flash-point.

***NOTE**: Substances heated till or above their flash-points are substances of 61 °C (c).*

As from 1.1.1997, 72° shall read as follows:

"72° Substances having a flashpoint above 61 °C which are handed over for carriage or which are carried heated within a limiting range of 15 K below their flash-point.

***NOTE 1**: Substances heated till or above their flashpoint are substances of 61° (c).*
***NOTE 2**: Substances having a flashpoint of 100 °C or above, which are carried or handed over for carriage in the liquid state at or above 100 °C and below their flash-point are substances of class 9, item 20°."*

73° Substances with an auto-ignition temperature of 200 °C and below which are not listed elsewhere.

**6302-
6399**

Class 4.1. Flammable solids

6400

6401 List of substances

The list of substances is supplemented as follows:

H. Other substances

52° Oily meal, seed cakes, oil cakes containing vegetable oil and treated with solvent and which are not liable to spontaneous combustion.

***NOTE**: Substances of 52° are not subject to the provisions of Annex B.1 of ADN if they are prepared or treated in such a way that they do not release dangerous gases in dangerous quantities during transport (no risk of explosion) and if this is certified in the transport document.*

**6402-
6449**

Class 4.2. Substances liable to spontaneous combustion

**6430-
6469**

Class 4.3. Substances which, in contact with water, emit flammable gases

List of substances

6471 Item 15° (c), the list of substances is supplemented with a Note as follows:

***NOTE**: By derogation from ADR, ferrosilicon with 25% or more (mass) of silicon is a dangerous substance of class 4.3, item 15° (c) when carried in bulk or unpackaged on board inland navigation vessels.*

**6472-
6499**

Class 5.1. Oxidizing substances

6500

List of substances

6501 Item 21° (c), the list of substances is supplemented with a Note as follows:

***NOTE**: By derogation from ADR, type B ammonium nitrate fertilizers (identification number 2071, exempted from ADR by footnote 2/ to item 21° (c) of marginal 2501) are dangerous goods of class 9 of ADN, see marginal 6901, item 22° (c) [50° (c) as from 1.1.1997].*

**6502-
6549**

Class 5.2. Organic peroxides

**6550-
6599**

Class 6.1. Toxic substances

**6600-
6649**

Class 6.2. Infectious substances

**6650-
6699**

Class 7. Radioactive material

**6700-
6799**

Class 8. Corrosive substances

6800

6801 ***NOTE****: Accumulators filled with sulphuric acid (batteries) including empty uncleaned accumulators shall be carried as goods of 1° (b).*

6802-6899

Class 9. Miscellaneous dangerous substances and articles

6900

6901 List of substances

The list of substances is supplemented as follows (until 31.12.1996):

H. Miscellaneous substances when carried in tank-vessels

20° Substances with a flash-point above 61 °C and not more than 100 °C, which do not belong to another class or to class 9, items 1° to 19°.

I. Substances subject to self-sustaining exothermic decomposition

22° (c) 2071 Ammonium nitrate fertilizers
Type B: uniform non-segregating mixtures of nitrogen/phostate or nitrogen/potash types or complete fertilizers or nitrogen/phosphate/potash type, with not more than 0.4% total added combustible material or with not more than 45 % ammonium nitrate with unrestricted combustible material.

NOTE 1: *In determining the ammonium nitrate content, all nitrate ions for which a molecular equivalent of ammonium ions is present in the mixture should be calculated as ammonium nitrate.*
NOTE 2: *Ammonium nitrate fertilizers of class 9, item 22° (c) are not subject to ADN if shown by a trough test (see United Nations Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Section 38.2) not to be liable to self-sustaining decomposition and provided that they do not contain an excess of nitrate greater than 10% by mass calculated as potassium nitrate.*

6901 (cont'd) As from 1.1.1997, the supplement indicated above shall read as follows:

H. Other substances presenting a hazard during carriage but not meeting the definition of another class

Add the following item :

"50° Substances subject to self-sustaining exothermic decomposition

(c) 2071 Ammonium nitrate fertilizers
Type B: uniform non-segregating mixtures of nitrogen/phostate or nitrogen/potash types or complete fertilizers or nitrogen/phosphate/potash type, with not more than 0.4% total added combustible material or with not more than 45 % ammonium nitrate with unrestricted combustible material.

NOTE 1: *In determining the ammonium nitrate content, all nitrate ions for which a molecular equivalent of ammonium ions is present in the mixture should be calculated as ammonium nitrate.*
NOTE 2: *Ammonium nitrate fertilizers of class 9, item 22° (c) are not subject to ADN if shown by a trough test (see United Nations Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Section 38.2) not to be liable to self-sustaining decomposition and provided that they do not contain an excess of nitrate greater than 10% by mass calculated as potassium nitrate.*

J. Miscellaneous substances when carried in tank-vessels

80° Substances with a flash-point above 61 °C and not more than 100 °C, which do not belong to another class or to class 9, items 1° to 71°."

6902-6999

ANNEX B.1

PROVISIONS CONCERNING THE CARRIAGE OF DANGEROUS GOODS IN PACKAGES OR IN BULK

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Part I

DEFINITIONS AND GENERAL PROVISIONS APPLICABLE TO THE CARRIAGE OF DANGEROUS GOODS OF ALL CLASSES

General

10 000 Plan of Annex B.1

(1) This Annex comprises provisions concerning the carriage of dangerous goods in packages or in bulk.

(2) The provisions of Annex B.1 are divided into parts as follows:

Part I - Definitions and general provisions applicable to the carriage of dangerous goods of all classes

Part II - Special provisions applicable to the carriage of dangerous goods of classes 1 to 9 supplementing or amending the provisions of Part I

Part III - Rules for construction

Part IV - Rules for construction applicable to seagoing vessels which do not conform to Part III

10 001 Applicability of other regulations

(1) For the purposes of the carriage of dangerous goods, the provisions laid down in the "**Recommendations on Technical Requirements for Inland Navigation Vessels**" (Annex to the revised resolution No. 17 of the Principal Working Party on Inland Water Transport of the Inland Transport Committee of the Economic Commission for Europe) are supplemented by the applicable rules for construction of Part III or IV.

For the purposes of the carriage of dangerous goods, the provisions laid down in the **European Code for Inland Waterways (CEVNI)** are supplemented by the applicable provisions of Part I, II or IV.

(2) Where provisions of Part II, III or IV conflict with provisions of Part I or with provisions set out in the "**Recommendations on Technical Requirements for Inland Navigation Vessels**", those provisions of Part I or of the "**Recommendations on Technical Requirements for Inland Navigation Vessels**" shall not apply.

Nevertheless, the provisions of marginal 10 011 shall prevail over those of Parts II, III and IV.

(3) The special provisions applicable to the individual classes as set out in Part II shall supplement the general provisions of Part I.

**10 002-
10 010**

10 011 Exempted quantities

(1) The following maximum quantities of dangerous goods in packages may be carried on one vessel without the provisions of this Annex having to be applied. For dangerous goods not mentioned in the table below and for the carriage of tanks (tank-containers, road tank vehicles, etc.) the provisions of this Annex shall be fully complied with.

Class	**Item number**	**Maximum exempted quantity per class (gross mass)**	**Maximum total exempted quantity per vessel (gross mass)**
(1)	(2)	(3)	(4)
2 until 31.12.1996	3°(a), 4°(a)	3 000 kg */	3 000 kg */
	3°(b), 4°(b)	300 kg */	
2 As from 1.1.1997	2°A	3 000 kg */	3 000 kg */
	2°F	300 kg */	
3	3°(b), 4°(b), 5°(b), 5°(c)	300 kg */	3 000 kg */
	31°(c)	3 000 kg */	
4.1	1°(b), 6°(b), 7°(b), 8°(b), 11°(b), 12°(b), 13°(b), 14°(b), 16°(b), 17°(b)	3 000 kg */	30 000 kg */
	2°(c), 3°(c), 4°(c), 6°(c), 7°(c), 8°(c), 11°(c), 12°(c), 13°(c), 14°(c), 16°(c), 17°(c)	30 000 kg */	
5.1	41°	unlimited	unlimited
5.2	31°	30 000 kg */	30 000 kg */
6.1	any with letter (c)	3 000 kg */	3 000 kg */
7	Schedules 1 to 4 of Annex A (ADR)	unlimited	unlimited
8	any with letter (c)	30 000 kg */	30 000 kg */

*/ Including empty uncleaned packagings having previously contained these goods.

10 011 (cont'd) The total exempted quantity allowed in any one vessel shall be determined from the quantities given in:

column 3, where goods of any one line are carried;

or

column 4, where goods of more than one line are carried, however, subject to the maximum quantity given for each line in column 3. The maximum quantities per class shown in column 4 may be added.

(2) The carriage of exempted quantities shall, however, be subject to the following conditions:

- The goods shall be stowed in the holds. This shall not apply to goods loaded in:
  - containers having sprayproof complete walls;
  - road vehicles having sprayproof complete walls;
  - tank-containers; and
  - road tank vehicles.
- Goods of different classes shall be separated by a minimum horizontal distance of 3 m. They shall not be stowed one on top of the other.

  This shall not apply to:
  - containers having complete metal walls; and
  - road vehicles having complete metal walls.
- For seagoing vessels and inland waterway vessels, where the latter are only carrying containers, the above requirements shall be deemed to have been met, if the stowage and segregation requirements of the IMDG Code have been complied with and a note to this effect has been entered on the transport document.

10 012-10 013

10 014 Definitions

For the purposes of this Annex:

Electrical equipment

IEC means the International Electrotechnical Commission.

10 014 (cont'd)

Limited explosion risk electrical apparatus

means an electrical apparatus which, during normal operation, does not cause sparks or exhibits surface temperatures which are above the required temperature class, including e.g.

- three-phase squirrel cage rotor motors;
- brushless generators with contactless excitation;
- fuses with an enclosed fuse element;
- contactless electronic apparatus;

or

- an electrical apparatus with a spray-water protected closure (degree of protection IP 55) which during normal operation does not exhibit surface temperatures which are above the required temperature class.

Certified safe type electrical apparatus

means an electrical apparatus which has been tested and approved by the competent authority regarding its safety of operation in an explosive atmosphere, e.g.

- intrinsically safe apparatus;
- flameproof enclosure apparatus;
- apparatus protected by pressurization;
- powder filling apparatus;
- apparatus protected by encapsulation;
- increased safety apparatus.

Note: "Limited explosion risk" apparatus is not covered by this definition.

Explosion group (see IEC publication 79 and EN 50 014)

means a grouping of flammable gases and vapours according to their maximum experimental safe gaps and minimum ignition currents, and of electrical apparatus which may be used in the corresponding potentially explosive atmosphere.

Electrical apparatus protected against water jets

means an electrical apparatus so designed that water, projected by a nozzle on the enclosure from any direction, has no damaging effects. The test conditions are specified in the IEC publication 529, minimum of protection IP 55.

10 014 (cont'd)

Temperature class (see IEC publication 79 and EN 50 014)

means a grouping of flammable gases and vapours of flammable liquids according to their ignition temperature; and of the electrical apparatus intended to be used in the corresponding potentially explosive atmosphere according to their maximum surface temperature.

Types of protection (see IEC Publication 79 and EN 50 014)

EEx (d)	:	flameproof enclosure (EN 50 018);
EEx (e)	:	increased safety (EN 50 019);
EEx (ia) and EEx (ib)	:	intrinsically safe (EN 50 020);
EEx (m)	:	encapsulation (EN 50 028);
EEx (p)	:	pressurized apparatus (EN 50 016);
EEx (q)	:	powder filling (EN 50 017).

Classification of zones (see IEC publication 79-10)

Zone 1: areas in which dangerous explosive atmospheres of gases, vapours or sprays are likely to occur occasionally;

Zone 2: areas in which dangerous explosive atmospheres of gases, vapours or sprays are likely to occur rarely and if so for short periods only.

DIVISION OF SPACE

Service space

means a space which is accessible during the operation of the vessel and which is neither part of the accommodation nor of the holds, with the exception of the forepeak and after peak, provided no machinery has been installed in these latter spaces.

Protected area (see also "zone 2")

means a space situated above the deck, bounded:

(a) athwartships, by vertical planes corresponding to the side plating;

(b) fore and aft, by vertical planes corresponding to the end bulkheads of the hold; and

(c) upwards, by a horizontal plane 2 m above the upper level of the load, but at least by a horizontal plane 3 m above the deck.

10 014 (cont'd)

Hold (see also "zone 1")

means a part of the vessel which, whether covered by hatchway covers or not, is bounded fore and aft by bulkheads and which is intended to carry goods in packages or in bulk. The upper boundary of the hold is the upper edge of the hatchway coaming. Cargo extending above the hatchway coaming shall be considered as loaded on deck.

Cargo tank

means a tank which is permanently attached to the vessel and the boundaries of which are either formed by the hull itself or by walls separate from the hull and which is intended for the carriage of dangerous goods.

Bulkhead

means a metal wall or partition, generally vertical, both sides of which are inside the vessel and which is bounded by the bottom, the side plating, a deck, the hatchway covers or by another bulkhead.

Bulkhead (watertight)

A bulkhead shall be considered watertight if it has been constructed such that it can withstand water pressure with a head of 1 metre above the deck but at least to the top of the hatchway coaming whichever is the greater.

Accommodation

means spaces intended for the use of persons normally living on board, including galleys, food stores, lavatories, washrooms, bathrooms, laundries, halls, alleyways, etc., but excluding the wheelhouse.

REGULATIONS

ADR

means the European Agreement concerning the International Carriage of Dangerous Goods by Road.

BC Code

means the Code of Safe Practice for Solid Bulk Cargoes of the International Maritime Organization (IMO).

ICAO-TI

means the Technical Instructions for the Safe Transport of Dangerous Goods by Air of the International Civil Aviation Organization (ICAO).

10 014 (cont'd)

IMDG Code

means the International Maritime Dangerous Goods Code of the International Maritime Organization (IMO).

International regulations

means ADR, BC Code, ICAO-TI, IMDG Code or RID.

RID

means the Regulations concerning the International Carriage of Dangerous Goods by Rail.

SOLAS

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

Identification number

means the number for identifying a substance, material or article. These numbers are, as a rule, taken from the United Nations "Recommendations on the Transport of Dangerous Goods".

MISCELLANEOUS

Battery of receptacles (battery of tanks) */

means an assembly of several receptacles with a capacity not less than 100 litres and not more than 1 000 litres, or tanks with a capacity of not less than 1 m^3, interconnected by a manifold and permanently mounted in a frame.

Breathing apparatus (self-contained)

means an apparatus which supplies the person wearing it when working in a dangerous atmosphere with breathing air by means of pressurized air carried with him or by means of a tube.

Carriage in bulk

means the carriage of solid substances, material or articles without packaging.

Classification society (recognized)

means a classification society which is recognized by the competent authorities.

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*/ Definition to be deleted as from 1.1.1997.

10 014 (cont'd) *Container*

means an article of transport equipment (lift van, demountable tank or other similar structure):

- of a permanent character and accordingly strong enough to be suitable for repeated use;
- specially designed to facilitate the carriage of goods, by one or more means of transport, without breakage of load;
- fitted with devices permitting its ready handling, particularly when being transloaded from one means of transport to another; and
- so designed as to be easy to fill and empty, and having an internal volume of not less than 1 m^3.

The term "container" does not cover conventional packagings, intermediate bulk containers (IBCs), vehicles and tank-containers.

Containers for the carriage of materials of class 7 shall be of a permanent enclosed caracter, rigid and strong enough for repeated use. They may be used as packagings if the applicable requirements are met, and they may also be used to perform the functions of overpacks.

Damage control plan

The damage control plan shall indicate the water-tight subdivision serving as the basis for the stability calculations, the arrangements necessary to offset a list caused by water penetration and all closing appliances which are to be kept closed during the voyage.

Dangerous goods

means the substances and materials themselves and articles containing dangerous substances, including wastes as defined in marginal 6000(5), and which are covered by the relevant definitions (see lists of substances) for classes 1 to 9 of ADR or which are listed as such in Part II of Annex A to ADN.

NOTE: *In accordance with marginal 6002(4) of Annex A, dangerous goods used for the propulsion of the vessels or vehicles, the operation of their special equipment, for household purposes or for maintaining safety and which are carried on board in their usual containment are not subject to the provisions of ADN.*

Escape device (suitable)

means a respiratory protection device, designed to cover the wearer's mouth, nose and eyes, which can be easily put on and which serves to escape from a danger area.

10 014 *Flammable gas detector*

(cont'd)

"Flammable gas detector" means a device allowing measuring of any significant concentration of flammable gases below the lower explosive limit and which clearly indicates the presence of higher concentrations of such gases given off by the cargo. Flammable gas detectors may be designed for measuring both flammable gas concentrations and oxygen content.

Gases

means gases or vapours.

Gas detector

means a device allowing measurements to be made of any significant concentration of flammable gases given off by the cargo under the lower explosivity limit and which clearly reveals the presence of higher concentrations.

Gas detectors may be designed and calibrated for measuring flammable gases only, but may also be designed for measuring both flammable gas and oxygen concentrations.

Such measurements shall be possible without the necessity of entering the spaces to be checked.

Highest class may be assigned to a vessel when:

- the hull, inclusive of rudder and steering gear and equipment of anchors and chains, complies with the rules and regulations of a recognized classification society and has been built and tested under its supervision;

- the propulsion plant, together with the essential auxiliary engines, remainder machinery and electrical installation, have been made and tested in conformity with the rules and regulations of this classification society, and the installation has been carried out under its supervision and, was tested to its satisfaction on completion.

Hold (condition)

discharged: empty, but still containing cargo residues

empty: no cargo residues (swept clean).

Intermediate Bulk Container (IBC)

means a rigid, semi-rigid or flexible portable packaging, other than those specified in Appendix A.5 of Annex A to ADR, and which:

- has a capacity of not more than 3 m^3 (3,000 litres);

10 014 (cont'd)

- is designed for mechanical handling;
- is resistant to the stresses produced in handling and transport, as determined by the tests specified in international regulations.

Naked light

means light produced by a flame which is not enclosed in a flameproof enclosure.

Oxygen meter

means a device allowing measuring of any significant reduction of the oxygen content of the air. Oxygen meters may be designed and constructed for measuring oxygen only but also for measuring flammable gases and oxygen.

This device shall be designed so that such measurements shall be possible without the necessity of entering the spaces to be checked.

Package

The term package also includes road vehicles, containers (including swap bodies), tank-containers, intermediate bulk containers (IBCs) and batteries of receptacles */.

Packages (carriage in)

means the carriage of any packaged solid, liquid or gaseous substance, material or article, or any solid material which cannot be carried in bulk.

Packages (fragile)

means packages containing fragile receptacles (i.e. receptacles made of glass, porcelain, stoneware or similar material) which are not enclosed in packaging with complete sides protecting them effectively against shock and stacking forces.

Fragile receptacles secured either singly or in groups by cushioning material in a strong receptacle are not regarded as fragile receptacles if the strong receptacle is leakproof and so designed that, in the event of breakage or leakage of the fragile receptacles, their contents cannot escape from the strong receptacle and the mechanical strength of the latter is not impaired by corrosion during carriage.

Road vehicle means any vehicle covered by the definition of the term "vehicle" in the ADR.

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*/ The term "batteries of receptacles" shall be deleted as from 1.1.1997.

10 014 (cont'd)

Steersman

means a person as defined in Article 1.02 of the European Code for Inland Waterways (CEVNI).

Tank-container

means an article of transport equipment conforming to the definition of "container" given above and built to contain liquid, gaseous, powdery or granular substances or materials and having a capacity of more than 0.45 m^3.

Toximeter

means a device allowing measuring of any significant concentration of toxic gases given off by the cargo.

This device shall be designed so that such measurements shall be possible without the necessity of entering the spaces to be checked.

Vessel

means an inland navigation vessel or a seagoing vessel.

The following definitions refer only to the carriage of materials of class 7

Conveyance

means, with respect to the carriage by inland waterway, any vessel, hold or defined deck area of any vessel.

Exclusive use

means the sole use, by a single consignor, of a conveyance or of a large container with a minimum length of 6 m, 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.

**10 015-
10 099**

Section 1. Mode of carriage of goods

**10 100-
10 109**

10 110 Carriage of packages

Unless otherwise specified, the masses given for packages shall be the gross masses.

10 110 (cont'd) Where packages are carried in containers or vehicles, the mass of the container or vehicle shall not be included in the gross mass of such packages.

10 111 Carriage in bulk

The carriage of dangerous goods in bulk is prohibited, except where this mode of carriage is explicitly authorized by the provisions of Part II.

10 112-
10 117

10 118 Containers and intermediate bulk containers (IBCs)

The carriage of containers, IBCs, tank-containers and batteries of receptacles */ shall be in accordance with the provisions applicable to the carriage of packages.

10 119 Road vehicles

The carriage of road vehicles shall be in accordance with the provisions applicable to the carriage of packages.

10 120

10 121 Carriage in cargo tanks

The carriage of dangerous goods in cargo tanks in dry-cargo vessels is prohibited.

For carriage in tank vessels see Annex B.2.

10 122-
10 199

Section 2. Provisions applicable to vessels

10 200 Construction

(1) The vessels referred to in marginal 10 282 (1) shall comply with the rules for construction of Part III.

(2) For seagoing vessels, this requirement shall be deemed to have been met if, instead of the provisions of Part III, the provisions set out in Part IV are complied with.

10 201-
10 204

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*/ As from 1.1.1997, the terms "and batteries of receptacles" shall be deleted.

10 205 Instructions for the use of devices and installations

Where specific safety rules have to be complied with when using any device or installation, instructions for the use of the particular device or installation, in the language the steersman understands and, additionally, in the language(s) normally spoken on board, shall be readily available for consultation at appropriate places on board.

10 206-
10 207

10 208 Classification

Double-hull vessels carrying dangerous goods of classes 2, 3, 4.1, 5.2, 6.1, 8 or 9, except those of 31° (b), 32° (b), 41° (b) and 42° (b) of class 4.1 and of 1° (b) and 2° (b), 11° (b) and 12° (b) of class 5.2, in quantities larger than those indicated in marginal 10 401 (1) or carrying materials of class 7, marginal 2704 schedules 5 to 13, of Annex A to ADR, shall comply with the provisions of marginals 110 288 or 120 288.

10 209-
10 218

10 219 Pushed convoys and side-by-side formations

(1) Where at least one vessel of a convoy or side-by-side formation is required to be in possession of a certificate of approval in accordance with marginal 10 282, all vessels of such convoy or side-by-side formation shall be provided with an appropriate certificate of approval.

Vessels not carrying dangerous goods need not comply with marginals 10 208, 10 240 to 10 260, 10 280, 110 211 (1) to (3), 110 212, 110 217 (1), 110 240, 110 252 (1) and 110 288 to 110 295.

(2) For the purposes of the application of the provisions of Parts I and II, the entire pushed convoy or the side-by-side formation shall be deemed to be a single vessel.

10 220-
10 239

10 240 Fire-extinguishing systems

In addition to the fire-extinguishing appliances prescribed by the Recommendations on Technical Requirements for Inland Navigation Vessels each vessel shall be equipped with at least two additional hand fire-extinguishers having the same capacity. The fire-extinguishing agent contained in these additional hand fire-extinguishers shall be suitable and sufficient in quantity for fighting fires involving the dangerous goods being carried. The fire-extinguishing agent contained in fixed fire-extinguishing systems shall be suitable and sufficient in quantity for fighting fires.

**10 241-
10 250**

10 251 Electrical installations

The insulation resistance of electrical installations, the earthing and the flameproof electrical equipment shall be inspected once in every two and half years by a person authorized for this purpose by the competent authority. An appropriate inspection certificate shall be kept on board.

**10 252-
10 259**

10 260 Special equipment

(1) When this is required in Part II, the following equipment shall be available on board:

(a) for each member of the crew a pair of protective goggles, gloves and boots and a protective suit;

(b) a suitable escape device for each person on board;

(c) a flammable gas detector;

(d) a toximeter;

Materials and additional protective equipment specified by the consignor in the written instructions shall be provided by the consignor and shall be available on board.

(2) For pushed convoys or side-by-side formations under way it shall be sufficient, however, if the pusher tug or the vessel propelling the formation is equipped with the special equipment referred to in (1) above, when this is required in Part II.

**10 261-
10 279**

10 280 Checking and inspection of equipment

(1) The fire-extinguishing appliances and hoses shall be inspected at least once every two years by persons authorized for this purpose by the competent authority.

(2) The special equipment referred to in marginal 10 260 (1) shall be inspected in accordance with the instructions of the manufacturer concerned by persons authorized either by the manufacturer himself or by the competent authority.

10 281

10 282 Certificate of approval

(1) Vessels carrying dangerous goods in excess of the limited quantities referred to in marginal 10 011 shall be in possession of an appropriate certificate of approval.

(2) The certificate of approval shall attest that the vessel has been inspected and that its construction and equipment comply with the applicable provisions of this Annex.

(3) The certificate of approval shall be issued by the competent authority after the inspection has been carried out by an expert designated by that authority. It shall conform to the model No. 1 in Appendix 1 to this Annex. The competent authority may exempt a vessel from the inspection, provided that a certificate issued by a recognized classification society attests that the construction and equipment of the vessel comply with the applicable provisions of this Annex.

(4) The certificate of approval shall be valid for not more than five years. The date on which the period of validity expires shall be shown on the certificate. The competent authority which issued the certificate may, without inspection of the vessel, extend the validity of the certificate by not more than one year. Such extension may be granted only once within two periods of validity.

(5) If the vessel's hull or equipment has undergone alterations liable to reduce the safety as regards the carriage of dangerous goods or has sustained damage affecting such safety, the vessel shall undergo without delay a further inspection in accordance with (3) above.

(6) The certificate of approval may be withdrawn either if the vessel is not properly maintained or if the vessel's construction or equipment no longer complies with the applicable provisions of this Annex.

(7) The certificate of approval may only be withdrawn by the authority by which it has been issued. Nevertheless, in the cases referred to in (5) and (6) above, the competent authority of the State in which the vessel is staying, may prohibit its use for the carriage of those dangerous goods for which the certificate is required. For this purpose it may withdraw the certificate until such time as the vessel again complies with the applicable provisions of this Annex. In that case it shall notify the competent authority which issued the certificate.

(8) Notwithstanding (7) above, any competent authority may amend or withdraw the certificate of approval at the request of the vessel's owner, provided that it so notifies the competent authority which issued the certificate.

(9) For double-hull vessels which comply with the additional rules for construction of Part III or IV, the competent authority shall enter in the certificate of approval the following endorsement:

> "The vessel complies with the additional provisions of Annex B.1 of ADN applicable to double-hull vessels."

10 283 **Provisional certificate of approval**

(1) For a vessel which is not provided with a certificate of approval, a provisional certificate of approval of limited duration may be issued in the following cases and subject to the following conditions:

(a) The vessel complies with the applicable provisions of this Annex, but the certificate of approval could not be issued in time. The provisional certificate of approval shall be valid for an appropriate period but not exceeding three months.

(b) The vessel does not comply with every applicable provision of this Annex after sustaining damage. In this case the provisional certificate of approval shall be valid only for a single specified voyage and for a specified cargo. The competent authority may impose additional conditions.

(2) The provisional certificate of approval shall conform to model No. 2 in Appendix 1 to this Annex, or to a single certificate model for the provisional certificate of inspection and the provisional certificate of approval provided that this single certificate model include the same particulars as Model No. 2 and is approved by the competent authority.

10 284-
10 299

Section 3. General service provisions

10 300

10 301 **Access to holds, double-hull spaces and double bottoms; inspections**

(1) Access to the holds is not permitted except for the purpose of loading or unloading and carrying out inspections or cleaning work.

(2) Access to the double-hull spaces and the double bottoms is not permitted while the vessel is under way.

(3) If the concentration of gases or the oxygen content of the air in holds, double-wall spaces or double bottoms has to be measured before entry the results of these measurements shall be recorded in writing. Entry into the spaces is not permitted for the purpose of measuring.

10 302-
10 307

10 308 Repair and maintenance work

No repair or maintenance work liable to cause sparks, or requiring the use of an open flame or electric current, shall be undertaken in the protected area or on deck within 3 metres fore and aft of it, unless permission has been given by the competent authority, or a gas-free certificate has been issued for the protected area. The use of chromium vanadium steel screw drivers and wrenches is permitted.

10 309-
10 314

10 315 Dangerous goods training

(1) An expert shall be on board the vessel. This person shall not be less than 18 years of age.

(2) An expert is a person who has a special knowledge of the ADN. Proof of this knowledge shall be furnished by means of a certificate from a competent authority or from an agency recognized by the competent authority.

This certificate shall be delivered to persons who, after training, have successfully passed a qualifying ADN examination.

The certificate shall conform to the model No. 3 in Appendix 1 to this Annex.

(3) The training programme shall comprise the items listed below and the training shall include practical exercises:

(a) general provisions concerning the carriage of dangerous goods, e.g. with respect to contents, temperature, mass, quantity, concentration, degree of filling, calculation of contents, liquid-level gauging, sampling, check list, overfilling, pumping, marking of vessels, labelling of packages, instructions in writing;

(b) definitions of terms (e.g. liquids, gases or vapours), basic knowledge of products;

(c) nature of risks such as combustion, explosion, sources of ignition, electrostatic charge, prevention of explosion, toxicity, radioactivity, corrosivity, danger to the aquatic environment;

(d) measures to avoid accidents;

(e) measures to be taken in the event of an accident or an incident (first aid, "keep-off" signal, emergency call, safety of traffic, use of appliances such as fire-extinguishers and personal protective equipment);

10 315 (cont'd)

(f) tasks of the crew and of the expert with respect to the carriage of dangerous goods;

(g) equipment of vessels carrying dangerous goods, e.g. flammable gas detectors, oxygen meters and toximeters; tests to be carried out before entering spaces; certificates attesting a gas-free condition; and

(h) use of fire-extinguishers, fire-fighting equipment and personal protective equipment.

(4) Every competent authority or agency recognized by that competent authority may determine the procedures and syllabus of the qualifying examination according to (2) above on the basis of the items listed in (3) above, letters (a) to (g).

(5) The certificate referred to in (2) above shall be valid for a period of five years and may, at any time, be extended if proof is furnished of participation in a refresher or advanced training course recognized by the competent authority, which is based on the programme referred to in (3) above and which comprises, in particular, current new developments. The refresher or advanced training course shall be taken in the last year prior to the expiry of the certificate. The new period of validity shall begin on the expiry date of the preceding certificate.

10 316-
10 319

10 320 Water ballast

Double-hull spaces and double bottoms may be used for water ballast.

10 321

10 322 Opening of holds

(1) Dangerous goods shall be protected against the influences of weather and against spray water except during loading and unloading, during inspection or during cleaning operations. This provision does not apply when dangerous goods are loaded in sprayproof containers, sprayproof IBCs, tank-containers or road vehicles.

(2) Where dangerous goods are carried in bulk, the holds shall be covered with hatch covers.

10 323-
10 326

10 327 Passengers

(1) The carriage of passengers is prohibited. The following persons shall not be deemed to be passengers:

(a) persons who, although not being members of the crew, normally live on board; and

(b) persons who are on board in an official capacity.

(2) The persons referred to in (1) (a) above are not permitted to remain in the protected area except for short periods.

**10 328-
10 330**

10 331 Engines

The use of engines running on fuels having a flash-point below 55° C c.c. (e.g. petrol engines) is prohibited.

10 332 Oil fuel tanks

Double bottoms with a depth of at least 0.6 m and complying with the requirements of Part III may be used for oil fuel.

**10 333-
10 339**

10 340 Fire-extinguishing systems

The crew shall have been trained in the use of the fire-extinguishing systems and the fire-extinguishing appliances.

10 341 Fire and naked light

(1) The use of fire or naked light is prohibited. This provision does not apply to the accommodation and the wheelhouse.

(2) Heating, cooking and refrigerating appliances shall not be fuelled with liquid fuels, liquid gas or solid fuels. cooking and refrigerating appliances may only be used in the accommodation and in the wheelhouse.

(3) Heating appliances or boilers fuelled with liquid fuels having a flashpoint above 55 °C which are installed in the engine room or in an other suitable space may, however, be used.

10 342 Heating of holds

The heating of holds or the operation of a heating system in the holds is prohibited.

10 343

10 344 Cleaning operations

The use of liquids having a flash-point below 55° C c.c. for cleaning purposes is prohibited.

**10 345-
10 350**

10 351 Electrical installations

(1) The electrical installations shall be properly maintained in a faultless condition.

(2) The use of movable electric cables is prohibited in the protected area. This provision does not apply to:

- intrinsically safe electric circuits;
- electric cables for connecting signal lights or gangway lighting, provided the socket is permanently fitted to the ship close to the signal mast or gangway;
- electric cables for connecting containers;
- electric cables for electrically operated hatch cover gantries.

(3) The sockets for connecting the signal lights and gangway lighting and for connecting containers of hatch cover gantries shall not be live except when the signal lights or the gangway lighting are switched on or when the containers or the hatch cover gantries are in operation. In the protected area, connecting or disconnecting shall not be possible except when the sockets are not live.

(4) The electrical installations in the holds shall be kept switched off and protected against unintentional connection. This provision does not apply to permanently installed cables passing through the holds, to movable cables connecting containers or hatch cover gantries, or to electrical apparatus of a "certified safe type".

**10 352-
10 353**

10 354 Portable lamps

The only portable electric lamps permitted in the protected area and in the holds shall be electric lamps having their own source of power. They shall be of the certified safe type.

10 355-
10 359

10 360 Special equipment

(1) The crew shall be familiar with the use of the special equipment referred to in marginal 10 260 (1).

(2) Persons entering the holds wearing breathing apparatus in accordance with marginals 21 301 (2), 31 301 (2), 43 301 (2), 61 301 (2) or 81 301 (2) of Part II of this Annex shall have been trained in the use of such apparatus and shall be capable of withstanding the additional physical strain.

10 361-
10 370

10 371 Admittance on board

No unauthorized persons shall be permitted on board. This prohibition shall be displayed on notice boards at appropriate places.

10 372-
10 373

10 374 Prohibition of smoking

Smoking on board the vessel is prohibited. This prohibition shall be displayed on notice boards at appropriate places.

This prohibition does not apply to the accommodation or the wheelhouse, provided its windows, doors, skylights and hatches are closed.

10 375-
10 379

10 380 Checking of equipment

The measuring instruments prescribed in this Annex shall be checked before use by the user in accordance with the instructions for use.

10 381 Documents

(1) In addition to the documents required by other regulations, the following documents shall be kept on board:

(a) the vessel’s certificate of approval;

10 381 (cont'd)

(b) transport documents (see marginal 6002 (5)):
the transport documents shall cover all dangerous goods on board;

(c) the instructions in writing referred to in marginal 10 385 for all dangerous goods on board;

(d) the stowage plan required by marginal 10 411;

(e) a copy of Annexes A and B.1 of ADN in force in their latest amended form;

(f) the certificate required to in marginal 10 315;

(g) a book in which all required measurements are recorded;

(h) for double-hull vessels (see marginal 10 208), the damage control plan;

(i) for double-hull vessels (see marginal 10 208) the documents concerning intact stability as well as all conditions of intact stability taken into account for the damaged stability calculations in a form the steersman understands.

(2) The transport documents and the instructions in writing shall be given to the steersman before loading.

(3) Where an inspection or examination is prescribed in this Annex, the following additional documents shall also be kept on board:

- the valid inspection documents for the fire-extinguishing appliances, fire-hoses, electrical appliances and, if required, for the special equipment.

  Particulars of the inspection shall be marked on the fire-extinguishing appliances as a proof of inspection.

(4) For pushed barges which are not carrying dangerous goods (marginal 10 219), the certificate of approval need not be kept on board, provided the following additional particulars are marked in identical characters on the metal plate required by the European Code for Inland Waterways:

Number of the certificate of approval: ...

Issued by: ...

Valid until: ...

The certificate of approval shall, in this case, be kept by the owner of the pushed barge.

A competent authority shall check whether the particulars shown on the plate are in conformity with those on the certificate of approval and emboss the plate with its stamp.

**10 382-
10 384**

10 385 Instructions in writing

(1) Regarding the action to be taken in the event of an accident or incident, the steersman shall be supplied by the consignor with instructions in writing specifying concisely:

(a) the nature of the danger presented by the dangerous goods carried and the safety measures that need to be taken to avert it;

(b) the action to be taken and the treatment to be given in the event of any person coming into contact with the goods being carried or with any substances which might escape from them;

(c) the measures to be taken in case of fire and the fire-extinguishing agents or groups of agents to be used or not to be used to fight the fire;

(d) the measures to be taken in case of breakage or deterioration of the packagings or of the goods being carried, in particular where such dangerous goods have spilled; and

(e) the materials and additional protective equipment if the protective equipment referred to in marginal 10 260 (1) is not sufficient.

(2) Instructions shall be provided for each dangerous cargo carried in bulk. In all other cases, one set of instructions for each of the classes to which the goods being carried have been assigned shall be sufficient.

The instructions shall be drawn up in the language the steersman understands and, additionally, in the language(s) normally spoken on board.

(3) The steersman shall bring these instructions to the knowledge of the persons on board to enable them to carry them out. They shall be kept readily at hand in the wheelhouse and clearly separated from those instructions which are not applicable.

**10 386-
10 399**

Section 4. Additional provisions concerning loading, carriage, unloading and other handling of the cargo

10 400

10 401 Limitation of the quantities carried

(1) The following gross masses shall not be exceeded on any vessel. No gross mass limitations apply to dangerous goods not mentioned in the table below.

Class	Item	Maximum permissible gross mass	
			In the case of one substance per vessel
1		see marginal 11 401	
2 (until 31.12.1996)	any with letter (at), (bt) or (ct) and 13°, total	60 000 kg	120 000 kg
	any with letter (b) or (c) and 12°, total	120 000 kg	300 000 kg
2 (as from 1.1.1997)	any classified under groups T, TC, TF, TO, TFC or TOC	60 000 kg	120 000 kg
	any classified under group F	120 000 kg	300 000 kg
3	1° to 5° and 21° to 26° with letter (a) or (b), total	120 000 kg	300 000 kg
	12°, 13°, 11° to 19°, 27° and 41° to 57° with letter (a) or (b), and 28°, 32° (c) and 33° (c) total	60 000 kg	120 000 kg
	however, maximum of 12° or 13°	15 000 kg	30 000 kg
	31° (c), total	300 000 kg	unlimited
4.1	31° (b), 32° (b), 41° (b), 42° (b) total	10 000 kg	15 000 kg
	26° (b), 33° (b), 34° (b), 35° (b), 36° (b), 37° (b), 38° (b), 39° (b), 40° (b), 43° (b), 44° (b), 45° (b), 46° (b), total	60 000 kg	120 000 kg
5.2	1° (b), 2° (b), 11° (b), 12° (b), total	10 000 kg	15 000 kg
	other items, total	60 000 kg	120 000 kg
6.1	any without letter, total	15 000 kg	30 000 kg
	any with letter (a), total	60 000 kg	120 000 kg
	any with letter (b), total	120 000 kg	300 000 kg
7		see marginal 71 401	
8	any with letter (a) and 6°, 14°, 15°, total	120 000 kg	300 000 kg
	32°, 37°, 53°, 54°, total	300 000 kg	unlimited
9	any with letter (b), total	120 000 kg	300 000 kg

10 401 (cont'd)

Example

60,000 kg of class 2, 13° and 120,000 kg of class 3, 5° (a) and 60,000 kg of class 6.1, 11° (a), which is 240,000 kg of dangerous goods altogether, may be carried on any one vessel.

Where only one single dangerous substance, for example of class 2, 13° is carried on any one vessel, its mass shall not exceed 120,000 kg in the case of this example.

(2) The limitation, in accordance with (1) above, of the quantities of goods of classes 2, 3, 5.2, 6.1, 8 and 9 with the exception of 31° (b), 32° (b), 41° (b) and 42° (b) of class 4.1 and 1° (b), 2° (b), 11° (b) and 12°(b) of class 5.2, shall not apply to double-hull vessels complying with the additional rules for construction of Parts III or IV.

10 402

10 403 Prohibition of mixed loading (holds)

(1) Goods of different classes shall be separated by a minimum horizontal distance of 3 m. They shall not be stowed one on top of the other.

(2) Irrespective of the quantity, dangerous goods for which marginal 10 500 prescribes marking of the vessel with two blue cones or blue lights, shall not be stowed in the same hold together with flammable goods for which marginal 10 500 prescribes marking with one blue cone or blue light.

(3) Goods of class 3, 11° to 19°, 27°, 28°, 32° and 41° to 57° and classes 6.1, 6.2, 7 and 9 shall not be stowed in the same hold together with foodstuffs, other articles of consumption or animal feeds.

10 404 Prohibition of mixed loading (containers, road vehicles)

(1) Marginal 10 403 shall not apply to packages stowed in containers or road vehicles in accordance with international regulations.

(2) Marginal 10 403 shall not apply to:

- closed containers with complete metal walls;

- road vehicles with closed body having complete metal walls.

(3) For containers other than those referred to in paragraphs (1) and (2)above the separation distance required by marginal 10 403 (1) may be reduced to 2.4 m (width of container).

10 405 Prohibition of mixed loading (seagoing vessels)

For seagoing vessels and inland waterway vessels, where the latter only carry containers, the prohibition of mixed loading shall be deemed to have been met if the stowage and segregation requirements of the IMDG Code have been complied with. Where stowage has been effected in accordance with the IMDG Code, a note to this effect shall be entered in the transport document.

10 406

10 407 Places of loading and unloading

The dangerous goods listed in marginal 10 500 shall be loaded or unloaded only at the places designated or approved for this purpose by the local competent authority.

10 408

10 409 Trans-shipment

Partial or complete trans-shipment of the cargo into another vessel without permission from the local competent authority is prohibited outside a trans-shipment place approved for this purpose.

10 410

10 411 Stowage plan

The steersman shall enter on a stowage plan the dangerous goods stowed in the individual holds or on deck. The goods shall be described as in the transport document (name of substance, class, item number, letter and, where applicable, identification number).

10 412 Ventilation

(1) During loading or unloading of road vehicles into or from the holds of ro-ro-vessels, there shall be not less than five changes of air per hour based upon the total volume of the empty hold.

(2) Where damage is suspected, holds of vessels carrying dangerous goods packed or loaded in containers shall be ventilated so as to reduce the concentration of gases given off by the cargo to less than 50% of the lower explosive limit.

(3) If tank-containers and road tank vehicles are carried in closed holds, such holds shall be permanently ventilated for ensuring five air changes per hour.

10 413 Measures to be taken before loading

The holds and cargo decks shall be cleaned prior to loading. The holds shall be ventilated.

10 414 Handling and stowage of the cargo

(1) The various components of the cargo shall be stowed such as to prevent them from shifting in relation to one another or to the vessel and such that no damage can be caused by other cargo.

(2) Dangerous goods shall be stowed at a distance of not less than 1 m from the accommodation, the engine rooms, the wheelhouse and any sources of heat.

When the accommodation or wheelhouse is situated above a hold, dangerous goods shall in no case be stowed beneath such accommodation or wheelhouse.

(3) Nothing shall be stowed on top of fragile packages. However, fragile packages containing the same dangerous goods may be stowed one on top of the other, provided this does not present any risk of breakage of the receptacles they contain.

(4) Packages shall be protected against heat, sunlight and the effects of the weather. This provision does not apply to road vehicles, tank-containers and containers.

(5) The goods shall be stowed in the holds. This provision does not apply to goods packed or loaded in:

- containers having complete sprayproof walls;
- road vehicles having complete sprayproof walls;
- tank-containers and road tank vehicles.

(6) Packages containing goods of classes 3, 4.1, 4.2, 5.1 or 8 may be stowed on deck, provided they are contained in drums, containers with complete walls or road vehicles with complete walls. Goods of class 2 may be stowed on deck, provided they are contained in cylinders.

(7) Where goods, for which marginal 10 500 prescribes marking of the vessel with two blue cones or two blue lights, are stowed on deck, they shall be separated by not less than 2 m from the vessel's sides.

(8) For seagoing vessels, the stowage requirements set out in (1) to (7) above shall be deemed to have been met, if the relevant provisions of the IMDG Code and, in the case of carriage in bulk, those set out in sub-section 9.3 of the BC Code have been complied with.

10 415 Measures to be taken after unloading

After unloading the holds shall be inspected and cleaned if necessary. In the case of carriage in bulk, this requirement shall not apply if the new cargo comprises the same goods as the previous cargo.

10 416 Measures to be taken during loading, carriage, unloading and handling

The filling or emptying of receptacles, road tank vehicles, IBCs or tank-containers on board the vessel is prohibited without special permission from the local competent authority.

**10 417-
10 452**

10 453 Lighting

If loading or unloading is performed at night or in conditions of poor visibility, effective lighting shall be provided. If provided from the deck, it shall be effected by properly secured electric lamps which shall be positioned in such a way that they cannot be damaged.

Where these lamps are positioned in the protected area, they shall be of a limited explosion risk type.

**10 454-
10 474**

10 475 Risk of sparking

All electrically continuous connections between the vessel and the shore as well as appliances used in the holds or in the protected area shall be so designed that they do not present a source of ignition.

10 476 Synthetic ropes

During loading or unloading operations, the vessel may be moored by means of synthetic ropes only when steel cables are used to prevent the vessel from going adrift.

**10 477-
10 499**

Section 5. Additional provisions concerning the operation of vessels

10 500 Marking

(1) Vessels carrying dangerous goods listed in the following table shall display the marking prescribed. No marking is required for dangerous goods which are not listed below.

Empty uncleaned tank-containers and road tank-vehicles shall be regarded as being loaded to their maximum permissible capacity.

10 500
(cont'd)

Class	Item Number	Gross mass	Cones/Lights */
1	any except 1.4	> 60 kg	3
	1.4 except 1.4 S	> 500 kg	1
2 (until 31.12.1996)	any with letter (at), (bt) or (ct) and 13°	> 1 000 kg	2
	any with letter (b) or (c) and 12°	> 3 000 kg	1
2 (as from 1.1.1997)	any classified under group T, TC, TF, TO, TFC or TOC	> 1 000 kg	2
	any classified under group F	> 3 000 kg	1
3	1° to 5° with letter (a) or (b), 6°, 7°(b)	> 3 000 kg	1
	21° to 27° with letter (a), 28°	> 1 000 kg	2
	21° to 27° with letter (b)	> 3 000 kg	1
	12°, 13°, 11° to 19° and 41° to 57° with letter (a) or (b)	> 1 000 kg	2
	5°, 31°, 32°, 33°, 34°, 41° to 57° and 61°, with letter (c)	> 30 000 kg	1
4.1	31° (b), 32° (b), 41° (b) and 42° (b)	> 60 kg	3
4.2	any	> 30 000 kg	1
4.3	any	> 30 000 kg	1
5.2	1° (b), 2° (b), 11° (b) and 12° (b)	> 60 kg	3
	other item numbers except 31°	> 1 000 kg	1
6.1	any without letter or with letter (a)	> 1 000 kg	2
	any with letter (b)	> 1 000 kg	2
7	schedules 5 to 13		2
8	any with letter (a) and 6°, 14° and 15°	> 3 000 kg	2
	32° (b), 37° (b), 53° (b), 54° (b), 64° (b) and 68° (b)	> 30 000 kg	1
9	any with letter (b)	> 3 000 kg	2

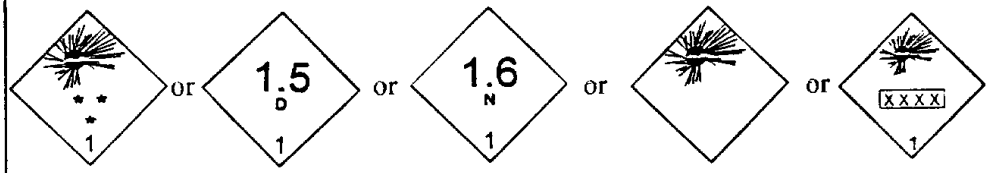
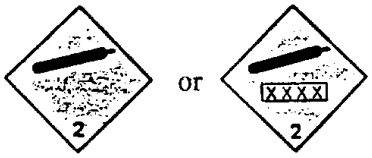
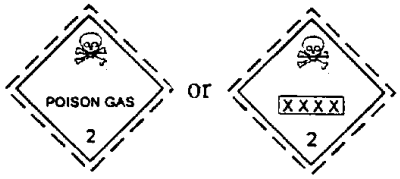
*/ The marking shall consist of :

during the day: the given number of blue cones;
at night or in case of poor visibility: the given number of blue lights.

10 500 (cont'd)

(2) For the transport of dangerous goods to and from seaports, for which transport documents have been prepared in accordance with the provisions of the IMDG Code, the marking of vessels may be derived from the danger labels on the containers, tank-containers or road vehicles, in accordance with the following table:

Note: Borders and symbols on green, red and blue labels may be white.

Danger labels	Cones/Lights */
	3
	1
	0
	2

*/ The marking shall consist of:

during the day: the given number of blue cones;
at night or in case of poor visibility: the given number of blue lights.

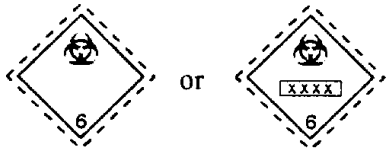
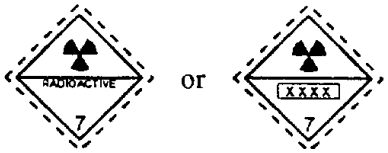
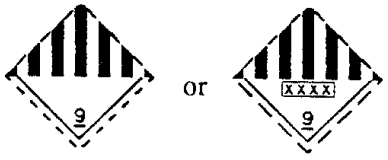
10 500
(cont'd)

Danger labels	Cones/Lights*/
	1
	1
	0
	1
	1
	0
	1

*/ The marking shall consist of:

during the day: the given number of blue cones;
at night or in case of poor visibility: the given number of blue lights.

10 500
(cont'd)

Danger labels	Cones/Lights */
	2
	0
	2
	2
	2

*/ The marking shall consist of:

during the day: the given number of blue cones;
at night or in case of poor visibility: the given number of blue lights.

10 500 (cont'd) (3) Where more than one marking could apply to a vessel, only the marking which includes the greatest number of blue cones or blue lights shall apply, i.e. in the following order of precedence:

- three blue cones or three blue lights; or
- two blue cones or two blue lights; or
- one blue cone or one blue light.

10 501 Mode of navigation

The competent local authorities may impose restrictions on the inclusion of tank vessels in pushed convoys of large dimensions.

10 502

10 503 Mooring

Vessels shall be moored securely, but in a manner permitting the moorings to be released quickly in an emergency.

10 504 Berthing

(1) The distances to be kept by vessels carrying dangerous goods at berth from other vessels shall be not less than the distance prescribed by the European Code for Inland Waterways.

(2) An expert in accordance with marginal 10 315 shall be permanently on board of vessels which are required to be marked according to marginal 10 500, as long as they are berthed. The local competent authority may, however, exempt from this obligation those vessels which are berthed in a harbour basin.

(3) Outside the berthing areas specifically designated by the local competent authority, the distances to be kept by berthed vessels shall not be less than:

- 100 m from residential areas, civil engineering structures or storage tanks, if the vessel is required to be marked with one blue cone or one blue light in accordance with marginal 10 500;

- 100 m from civil engineering structures and storage tanks and
  300 m from residential areas if the vessel is required to be marked with two blue cones or two blue lights in accordance with marginal 10 500;

- 500 m from residential areas, civil engineering structures and storage tanks if the vessel is required to be marked with three blue cones or three blue lights in accordance with marginal 10 500.

10 504 (cont'd) While waiting in front of locks or bridges, vessels are allowed to keep distances different from those given above. In no case shall the distance be less than 100 m.

(4) The local competent authority may prescribe distances different from those given in (3) above, especially taking local conditions into account.

10 505-
10 507

10 508 Reporting duty

(1) In the States where the reporting duty is in force, the steersman of a vessel for which marking in accordance with marginal 10 500 is required shall, prior to the start of any voyage, report the following particulars to the competent authority of the State in which the voyage has started:

- name of the vessel;
- official number;
- dead-weight tonnage;
- description of the dangerous goods carried as given in the transport document (name of substance, class, item number and, where shown in the transport document, identification number) together with the quantity in each case;
- number of persons on board;
- port of destination; and
- planned shipping route.

This reporting duty shall apply in each state territory once to both passages upstream and downstream so far as the competent authorities so require. The information may be given orally (e.g. by radio-telephone, where appropriate by automatic wireless message service) or in writing.

(2) When passing the other traffic control stations designated by the competent authority, the following particulars shall be reported:

- name of the vessel;
- official number;
- dead-weight tonnage.

10 508 (cont'd)

(3) Changes to any of the particulars referred to in (1) shall be reported to the competent authority without delay.

(4) The information is confidential and shall not be passed on to third parties by the competent authority. The competent authority may, however, in the event of an accident, inform the emergency services of the relevant particulars required for organizing emergency action.

**10 509-
10 999**

Part II

SPECIAL PROVISIONS APPLICABLE TO THE CARRIAGE OF DANGEROUS GOODS OF CLASSES 1 TO 9 SUPPLEMENTING OR AMENDING THE PROVISIONS OF PART I

CLASS 1. EXPLOSIVE SUBSTANCES AND ARTICLES

General

11 000-11 099 **(Only the general provisions of Part I apply)**

Section 1. Mode of carriage of goods

11 100-11 199 **(Only the general provisions of Part I apply)**

Section 2. Provisions applicable to vessels

11 200-11 269

11 270 **Aerials, lightning conductors, wire cables and masts**

(1) No part of an aerial for electronic apparatus, no lightning conductor and no wire cable shall be situated above the holds.

(2) No part of aerials for radiotelephones shall be located within 2 m from goods of class 1.

11 271-11 299

Section 3. General service provisions

11 300-11 350

11 351 **Electrical installations**

Electrical installations in the holds shall not be live.

11 352-11 399

Section 4. Additional provisions concerning loading, carriage, unloading and other handling of cargo

11 400

11 401 Limitation of quantities carried

(1) The maximum net mass of explosive substances, or, in the case of explosive articles, the maximum net mass of explosive substances contained in all the articles combined, which may be carried in any vessel shall be limited as indicated in the table below:

Class 1, division	Item number	Maximum net mass	Remarks
1.1	1° to 12°	15 000 kg	In at least 3 batches of not more than 5 000 kg each; distance between batches not less than 10 m
1.2	13° to 25°	50 000 kg	
1.3	26° to 34°	300 000 kg	Not more than 100 000 kg in one hold */
1.4	35° to 47°	unlimited	
1.5	48°, 49°	15 000 kg	In at least 3 batches of not more than 5 000 kg each; distance between batches not less than 10 m
1.6	50°	300 000 kg	Not more than 100 000 kg in one hold */
	51°	unlimited	

*/ A wooden bulkhead fitted for the purpose of subdividing a hold shall be acceptable.

(2) Where substances and articles of different divisions of class 1 are loaded in a single vessel in conformity with the provisions for prohibition of mixed loading of marginal 11 403, the entire load shall not exceed the smallest maximum net mass given in (1) above for the goods of the most dangerous division loaded, the order of precedence being 1.1, 1.5, 1.2, 1.3, 1.6, 1.4.

(3) Where the total net mass of the explosive substances and of the explosive substances contained in the article carried is not known, the table in (1) above shall apply to the gross mass of the cargo.

11 402

11 403 Prohibition of mixed loading (holds)

(1) Substances and articles of class 1 shall not be stowed in the same hold together with other dangerous goods. When carried in adjacent holds they shall be separated by a distance of not less than 12 m.

(2) Substances and articles of class 1 shall not be stowed in the same hold, except as indicated in the following table:

11 403
(cont'd)

Compatibility group	B	C	D	E	F	G	H	J	L	N	S
B	X	-	-	-	-	-	-	-	-	-	X
C	-	X	X	X	-	X	-	-	-	X 3/, 4/	X
D	-	X	X 1/	X	-	X	-	-	-	X 3/, 4	X
E	-	X	X	X	-	X	-	-	-	X 3/, 4/	X
F	-	-	-	-	X	-	-	-	-	-	X
G	-	X	X	X	-	X	-	-	-	-	X
H	-	-	-	-	-	-	X	-	-	-	X
J	-	-	-	-	-	-	-	X	-	-	X
L	-	-	-	-	-	-	-	-	X 2/	-	-
N	-	X 3/, 4/	X 3/, 4/	X 3/, 4/	-	-	-	-	-	X 3/	X
S	X	X	X	X	X	X	X	X	-	X	X

"X" Indicates that explosive substances and articles of the corresponding compatibility groups in accordance with Annex A may be stowed in the same hold.

1/ Blasting explosives, type C, 1.1 D, 4° (Identification No. 0083) shall not be stowed in the same hold together with other goods of divison 1.1 D, 4° or with goods of divison 1.5, 48°.

2/ Packages with substances and articles of compatibility group L may be stowed in the same hold together with similar substances and articles of the same compatibility group.

3/ Different types of 1.6N articles may be carried together as 1.6N articles only when it is proven by testing or analogy that there is no additional risk of sympathetic detonation between the articles. Otherwise they should be treated as hazard division 1.1.

4/ When articles of compatibility group N are carried with substances or articles of compatibility groups C, D or E, the articles of compatibility group N should be considered as having the characteristics of compatibility group D.

**11 404-
11 406**

11 407 Places for loading and unloading

When goods of class 1 are on board, no goods whatsoever shall be loaded or unloaded, except at the places designated or authorized for that purpose by the local competent authority.

11 408 Time and duration of loading and unloading operations

(1) Loading and unloading operations shall not start without permission in writing from the competent authority. This provision also applies to loading or unloading of other goods when goods of class 1 are on board. This permission is not required for goods of division 1.4.

(2) The loading and unloading operations shall be suspended in the event of a thunderstorm.

11 409

11 410 Precautions with respect to foodstuffs, other articles of consumption and animal feeds

Goods of class 1 with toxic properties shall not be stowed in the same hold together with foodstuffs, other articles of consumption and animal feeds.

**11 411-
11 412**

11 413 Measures to be taken before loading

No metallic part that is not an integral part of the vessel's structure shall protrude into the hold.

11 414 Handling and stowage of cargo

(1) Goods of class 1 shall be stowed at a distance of not less than 3 m from the accommodation, engine rooms, the wheelhouse and from any sources of heat.

(2) Packages containing goods of division 1.1 and packages containing goods of compatibility groups B and F of the other divisions shall be stowed at a distance of not less than 2 m from the sides of the vessel.

(3) Any friction, impact, jolting, overturning or dropping shall be prevented during handling of packages.

All packages loaded in the same hold shall be stowed and wedged as to prevent any jolting or friction during transport.

11 414 (cont'd)

(4) Stacking of non-dangerous goods on top of packages containing substances or articles of class 1 is prohibited.

(5) Substances and articles of class 1 shall be loaded last and unloaded first.

Derogation from this provision is only permitted when the cargo is loaded, or unloaded, in more than one harbour and the substances and articles of class 1 are not loaded in the last loading harbour or unloaded in the first unloading harbour.

(6) Where substances or articles of class 1 are loaded together with other goods into the same hold, the substances or articles of class 1 shall be loaded after, and unloaded before, all the other goods.

This provision does not apply if the substances or articles of class 1 are contained in containers.

(7) While substances or articles of class 1 are being loaded or unloaded, no loading or unloading operations shall take place in the other holds and no filling or emptying of fuel tanks shall be allowed. The local competent authority may, however, permit exemptions from this provision.

(8) For seagoing vessels, the stowage requirements are deemed to be met if the provisions of the IMDG Code are complied with.

11 415-
11 440

11 441 Fire and naked light

The use of fire or naked light is prohibited while substances and articles of divisions 1.1, 1.2, 1.3, 1.5 or 1.6 are on board and the holds are open or the goods to be loaded are located at a distance of less than 50 m from the vessel.

11 442-
11 450

11 451 Electrical installations

The use of radiotelephone or radar transmitters is not permitted, while substances or articles of divisions 1.1, 1.2, 1.3 1.5 or 1.6 are being loaded or unloaded. This shall not apply to VHF-transmitters of the vessel, in cranes or in the vicinity of the vessel, provided the power of the VHF-transmitter does not exceed 25 W and no part of its aerial is located at a distance less than 2 m from the substances or articles mentioned above.

11 452-
11 499

Section 5. Additional provisions concerning the operation of vessels

11 500 General

The provisions of marginals 11 501 to 11 505 apply only to vessels carrying goods of class 1 for which marginal 10 500 prescribes marking with three blue cones or three blue lights.

11 501 Mode of navigation

(1) Substances and articles of class 1 may only be carried by vessels navigating singly or in pushed convoys of dimensions not exceeding 110 m x 12 m. Nevertheless, temporary towing assistance by a motorized vessel is permitted.

(2) However, carriage by side-by-side formations or by pushed convoys other than those referred to in (1) or by towed convoys may be authorized by the competent authority under special conditions to be prescribed by that authority.

11 502 Vessels under way

When under way, a vessel shall keep away as far as possible, but not less than 50 m, from any other vessel.

11 503-
11 504

11 505 Stopping of vessels

If navigation of a vessel threatens to become dangerous owing either to:

- external factors (bad weather, unfavourable conditions of the waterway, etc.), or

- the condition of the vessel itself (accident or incident),

the vessel shall be stopped at a suitable berthing area as far away as possible from residential areas, harbours, civil engineering structures or storage tanks for gas or flammable liquids, regardless of the provisions set out in marginal 10 504.

The local competent authority shall be notified without delay.

11 506-
11 507

11 508 **Reporting duty**

When transmitting the information referred to in marginal 10 508 (1), fourth indent, the gross mass of the packages containing substances and articles of class 1 shall be declared in addition to the net mass of explosive substances and of explosive substances contained in the articles.

**11 509-
20 999**

CLASS 2. GASES: COMPRESSED, LIQUEFIED OR DISSOLVED UNDER PRESSURE

General

21 000-21 099 **(Only the general provisions of Part I apply)**

Section 1. Mode of carriage of goods

21 100-21 199 **(Only the general provisions of Part I apply)**

Section 2. Provisions applicable to vessels

21 200-21 259

21 260 **Special equipment**

(1) When dangerous goods of class 2 are carried on board the vessel, the protective equipment referred to in marginal 10 260 (1)(a) shall be on board and shall be suitable for the goods carried.

(2) The escape devices referred to in marginal 10 260 (1)(b) are required on board and shall be kept available for immediate use only when dangerous goods of class 2 are carried on board the vessel and marking is required in accordance with marginal 10 500.

(3) The flammable gas detector referred to in marginal 10 260 (1)(c) is required on board, together with instructions for its use, only when dangerous goods of class 2 are carried on board the vessel and marking is required in accordance with marginal 10 500.

(4) The toximeter referred to in marginal 10 260 (1)(d) is required on board, together with instructions for its use, only when dangerous goods of class 2 are carried on board the vessel and marking with two blue cones or two blue lights is required in accordance with marginal 10 500.

21 261-21 299

Section 3. General service provisions

21 300

21 301 Access to holds, double-hull spaces and double bottoms; inspections

(1) In case of suspected damage to packages, the gas concentration in the holds shall be measured by means of the device referred to in marginal 21 260 (3) and (4), before any person enters these holds.

Entry into holds is not permitted for the purpose of measuring.

(2) Entry into holds where damage is suspected as well as entry into double-hull spaces and double bottoms is not permitted, except where:

- there is no lack of oxygen and no measurable amount of dangerous substances in a dangerous concentration, or

- the person entering the space wears a self-contained breathing apparatus and other necessary protective and rescue equipment and is secured by a line. Entry into these spaces is only permitted if this operation is supervised by a second person for whom the same equipment is readily at hand. Another two persons capable of giving assistance in an emergency shall be on the vessel within calling distance.

21 302-
21 311

21 312 Ventilation

The holds shall be ventilated.

21 313-
21 399

Section 4. Additional provisions concerning loading, carriage, unloading and other handling of cargo

21 400-
21 402

21 403 Prohibition of mixed loading

Goods of class 2 shall not be stowed in the same hold together with goods of classes 1, 4.1, or 5.2 for which marginal 10 500 prescribes marking with three blue cones or three blue lights.

21 404-
21 411

21 412 Ventilation

(1) Holds containing goods of class 2

- (until 31.12.96) listed under letters (b) or (c) of the various items; or

- (as from 1.1.1997) classified in group F under any item

shall be ventilated with the ventilators operating at full power, where after measurement it has been established that the concentration of gases given off by the cargo exceeds 10% of the lower explosive limit.

(2) It has to be established through measurements that holds containing goods of class 2

- (until 31.12.1996) under letters (at), (bt) or (ct) of the various items; or

- (as from 1.1.1997) classified in groups T, TC, TF, TO, TFC or TOC under any item

are free from any significant dangerous concentration of gases given off by the cargo.

(3) The measurement required in (1) or (2) above shall be carried out once every hour.

The results of the measurements shall be recorded in writing.

**21 414-
21 499**

Section 5. Additional provisions concerning the operation of vessels

**21 500-
30 999 (Only the general provisions of Part I apply.)**

CLASS 3. FLAMMABLE LIQUIDS

General

31 000-31 099 **(Only the general provisions of Part I apply.)**

Section 1. Mode of carriage of goods

31 100-31 199 **(Only the general provisions of Part I apply.)**

Section 2. Provisions applicable to vessels

31 200-31 259 **(Only the general provisions of Part I apply.)**

31 260 **Special equipment**

(1) When dangerous goods of class 3 are carried on board the vessel, the protective equipment referred to in marginal 10 260 (1)(a) shall be on board and shall be suitable for the goods carried.

(2) The escape devices referred to in marginal 10 260 (1)(b) are required on board and shall be kept available for immediate use only when dangerous goods of class 3 are carried on board the vessel and marking is required in accordance with marginal 10 500.

(3) The flammable gas detector referred to in marginal 10 260 (1)(c) is required on board, together with instructions for its use, only when dangerous goods of class 3 are carried on board the vessel and marking is required in accordance with marginal 10 500.

(4) The toximeter referred to in marginal 10 260 (1)(d) is required on board, together with instructions for its use, only when dangerous goods of class 3 are carried on board the vessel and marking with two blue cones or two blue lights is required in accordance with marginal 10 500.

31 261-31 299

Section 3. General service provisions

31 300

31 301 **Access to holds, double-hull spaces and double bottoms; inspections**

(1) In case of suspected damage to packages, the gas concentration in the holds shall be measured by means of the device referred to in marginal 31 260 (3) and (4) before any persons enter these holds.

31 301 (cont'd) Entry into holds is not permitted for the purpose of measuring.

(2) Entry into holds where damage is suspected as well as entry into double-wall spaces and double bottoms is not permitted, except where:

- there is no lack of oxygen and no measurable amount of harmful substances in a dangerous concentration, or

- the person entering the space wears a self-contained breathing apparatus and other necessary protective and rescue equipment and is secured by a line. Entry into these spaces is only permitted if this operation is supervised by a second person for whom the same equipment is readily at hand. Another two persons, capable of giving assistance in an emergency shall be on the vessel within calling distance.

31 302-
31 311

31 312 Ventilation

The holds shall be ventilated.

31 313-
31 399

Section 4. Additional provisions concerning loading, carriage, unloading and other handling of cargo

31 400-
31 402

31 403 Prohibition of mixed loading

Goods of class 3 shall not be stowed in the same hold together with goods of classes 1, 4.1, or 5.2 for which marginal 10 500 prescribes marking with three blue cones or three blue lights.

31 404-
31 409

31 410 Precautions with respect to foodstuffs, other articles of consumption and animal feeds

Goods of class 3, items 11° to 19°, 27°, 28°, 32° and 41° to 57° shall not be stowed in the same hold together with foodstuffs, other articles of consumption and animal feeds.

31 411

31 412 Ventilation

(1) Holds containing substances of class 3, items 1° to 7° or 21° to 26° shall be ventilated with the ventilators operating at full power, where after measurement it has been established that the concentration of gases given off by the cargo exceeds 10% of the lower explosive limit.

(2) It has to be established through measurements that holds containing toxic substances of class 3, 11° to 19°, 27°, 28°, 32° or 41° to 57° are free from any significant dangerous concentration of gases given off by the cargo.

(3) The measurement required in (1) or (2) above shall be carried out once every hour.

The results of the measurements shall be recorded in writing.

**31 413-
31 499**

Section 5. Additional provisions concerning the operation of vessels

**31 500-
40 999 (Only the general provisions of Part I apply.)**

CLASS 4.1. FLAMMABLE SOLIDS

General

41 000-41 099 **(Only the general provisions of Part I apply.)**

Section 1. Mode of carriage of goods

41 100-41 110

41 111 **Carriage in bulk**

Goods of class 4.1, 4° (c), naphthalene of 6° (c), sulphur of 11° (c), and goods of class 4.1, 52° (ADN) may be carried in bulk.

41 112-41 199

Section 2. Provisions applicable to vessels

41 200-41 210

41 211 **Holds**

The inner surfaces of holds intended for the carriage in bulk of naphthalene of class 4.1, 6° (c) shall be coated or lined such that they are not readily flammable and not liable to impregnation by the cargo.

41 212-41 299

Section 3. General service provisions

41 300-41 311

41 312 **Ventilation**

Holds containing goods of class 4.1 in bulk shall be ventilated.

41 313-41 334

41 335 **Drainage**

Where goods of class 4.1, 52° (ADN) are carried in bulk on the vessel, drainage of the holds shall only be effected by drainage arrangements located within the protected area. The bilge pumping pipes through the engine room shall be blanked off.

Section 4. Additional provisions concerning loading, carriage, unloading and other handling of cargo

41 400-
41 402

41 403 **Prohibition of mixed loading**

Goods of class 4.1 for which marginal 10 500 prescribes marking with three blue cones or three blue lights shall not be stowed in the same hold together with other dangerous goods.

41 404-
41 411

41 412 **Ventilation**

(1) Holds containing goods of class 4.1, 4° (c) or 52° (ADN), shall be ventilated where after measurement it has been established that the concentration of gases given off by the cargo exceeds 50% of the lower explosive limit.

(2) The measurement required in (1) above shall be carried out once every hour.

The results of the measurements shall be recorded in writing.

41 413

41 414 **Handling and stowage of cargo**

(1) Goods of class 4.1, 4° (c) may be loaded in bulk in holds only if:

(a) these holds are separated from other spaces either by a watertight metal bulkhead or by another hold with metal bulkheads;

(b) it is ensured that no cargo can get under the ceiling.

(2) For seagoing vessels, the stowage requirements in (1) above shall be deemed to have been met, if the stowage requirements set out in sub-section 9.3 of the BC Code have been complied with.

41 415

41 416 Measures to be taken during loading, carriage, unloading and handling

(1) Before any person enters a hold containing goods of class 4.1, 4° (c) and 52° (ADN) in bulk, and prior to unloading, the concentration of gases shall be measured by the consignee of the cargo.

The hold shall not be entered or unloading started until the concentration of gases in the airspace above the cargo is below 50% of the lower explosive limit.

(2) After loading and unloading goods of class 4.1, 4° (c) and 52° (ADN) in bulk and before leaving the transshipment site, the concentration of gases in the accommodation, engine rooms and adjacent holds shall be measured by the consignor or consignee using a flammable gas detector.

(3) If significant concentrations of gases are found in the spaces referred to in (2) above, the necessary safety measures shall be taken immediately by the consignor or the consignee.

41 417-
41 499

Section 5. Additional provisions concerning the operation of vessels

41 500 General

The provisions of marginal 41 501 to 41 505 apply only to vessels carrying goods of class 4.1 for which marginal 10 500 prescribes marking with three blue cones or three blue lights.

41 501

41 502 Vessels under way

When under way, a vessel shall keep away as far as possible, but not less than 50 m, from any other vessel.

41 503-
41 504

41 505 Stopping of vessels

If navigation of a vessel threatens to become dangerous owing either

- to external factors (bad weather, unfavourable conditions of the waterway, etc.), or

- to the condition of the vessel itself (accident or incident),

41 405 (cont'd) the vessel shall be stopped at a suitable berthing area as far away as possible from residential areas, harbours, civil engineering structures or storage tanks for gas or flammable liquids, regardless of the provisions set out in marginal 10 504.

The local competent authority shall be notified without delay.

**41 506-
41 999**

CLASS 4.2. SUBSTANCES LIABLE TO SPONTANEOUS COMBUSTION

General

**42 000-
42 099** (Only the general provisions of Part I apply.)

Section 1. Mode of carriage of goods

**42 100-
42 110**

42 111 Carriage in bulk

Goods of 3° (c) and 16° (c), ferrous metal borings, shavings, turnings or cuttings of 12° (c) and goods of 16° (c) of class 4.2 may be carried in bulk.

**42 112-
42 199**

Section 2. Provisions applicable to vessels

**42 200-
42 259**

42 260 Special equipment

(1) (Reserved)

(2) (Reserved)

(3) The flammable gas detector referred to in marginal 10 260 (1) (c) is required on board, only when together with instructions for its use, substances of class 4.2 are carried in bulk or unpackaged on board the vessel and marking is required in accordance with marginal 10 500.

(4) (Reserved)

**42 261-
42 299**

Section 3. General service provisions

42 300

42 301 Access to holds, double-hull spaces and double bottoms; inspections

(1) Before any person enters holds containing goods of class 4.2, item 2° (c), in bulk, the gas concentration in these holds and in the adjacent holds shall be measured by means of the device referred to in marginal 42 260 (3).
Entry into holds is not permitted for the purpose of measuring.

(2) Entry into holds containing goods of class 4.2, items 2° (c) or 12° (c), in bulk, as well as entry into double-hull spaces and double bottoms is not permitted, except where:

- there is no lack of oxygen and no measurable amount of dangerous substances in dangerous concentration; or

- the person entering the space wears a self-contained breathing apparatus and other necessary protective and rescue equipment and is secured by a line. Entry into the spaces is only permitted if this operation is supervised by a second person for whom the same equipment is readily at hand. Another tow persons capable of giving assistance in an emergency shall be on the vessel within calling distance.

**42 302-
42 311**

42 312 Ventilation

Holds containing goods of class 4.2, item 2° (c), in bulk, shall be ventilated.

**42 313-
42 399**

Section 4. Additional provisions concerning loading, carriage, unloading and other handling of cargo

**42 400-
42 402**

42 403 Prohibition of mixed loading

Goods of class 4.2 shall not be stowed in the same hold together with goods of classes 1, 4.1, or 5.2 for which marginal 10 500 prescribes marking with three blue cones or three blue lights.

**42 404-
42 411**

42 412 (1) Holds containing goods of class 4.2, item 2° (c), in bulk, shall be ventilated where after measurement it has been established that the concentration of gases given off by the cargo exceeds 50 % of the lower explosive limit.

(2) The measurement required in (1) above shall be carried out once every hour.

42 413 Measures to be taken before loading substances of class 4.2, item 12° (c) may be loaded only if their temperature is not above 55 °C.

42 414 **Handling and stowage of cargo**

Packages loaded on deck which are not stowed in road vehicles, tank-containers or containers, shall be covered with tarpaulins which are not readily flammable.

42 415

42 416 **Measures to be taken during loading, carriage, unloading and handling**

(1) Before any person enters a hold containing goods of class 4.2, item 2° (c), in bulk, and prior to unloading, the concentration of gases shall be measured by the consignee of the cargo.

The hold shall not be entered or unloading started until the concentration of gases in the airspace above the cargo is below 50% of the lower explosive limit.

(2) After loading and unloading goods of class 4.2, item 2° (c), in bulk, and before leaving the transshipment site, the concentration of gases in the accommodation, engine rooms and adjacent holds shall be measured by the consignor or consignee using a flammable gas detector.

(3) If significant concentrations of gases are found in the spaces referred to in (2) above, the necessary safety measures shall be taken immediately by the consignor or the consignee.

42 417-
42 499

Section 5. Additional provisions concerning the operation of vessels

42 500-
42 999 (Only the general provisions of Part I apply.)

CLASS 4.3. SUBSTANCES WHICH GIVE OFF FLAMMABLE GASES ON CONTACT WITH WATER

General

43 000-43 099 (Only the general provisions of Part I apply.)

Section 1. Mode of carriage of goods

43 100-43 110

43 111 Carriage in bulk

Aluminium silicon powder, uncoated, and zinc ashes of item 13° (c) and ferrosilicium of item 15° (c) of class 4.3 may be carried in bulk.

Section 2. Provisions applicable to vessels

43 200-43 259

43 260 Special equipment

(1) When dangerous goods of class 4.3 are carried in bulk or unpackaged on board the vessel, the protective equipment referred to in marginal 10 260(1)(a) shall be on board and shall be suitable for the goods carried.

(2) (Reserved)

(3) The flammable gas detector referred to in marginal 10 260(1)(c) is required on board, together with instructions for its use only when dangerous goods of class 4.3 are carried in bulk or unpackaged on the vessel and marking is required in accordance with marginal 10 500.

(4) The toximeter referred to in marginal 10 260(1)(d) is required on board, together with instructions for its use only when dangerous goods of class 4.3 are carried in bulk or unpackaged on the vessel.

43 261-43 299

Section 3. General service provisions

43 300

43 301 Access to holds, double-hull spaces and double bottoms; inspections

(1) Before any person enters holds containing goods of class 4.3 in bulk or unpackaged, the gas concentration in those holds and in the adjacent holds shall be measured by means of the devices referred to in marginal 43 260(3) and (4).

Entry into holds is not permitted for the purpose of measuring.

(2) Entry into holds containing goods of class 4.3 in bulk or unpackaged as well as entry into double-hull spaces and double bottoms shall not be permitted except where:

- there is no lack of oxygen and no measurable amount of dangerous substances in a dangerous concentration; or

- the person entering the space wears a self-contained breathing apparatus and other necessary protective and rescue equipment and is secured by a line. Entry into these spaces is only permitted if this operation is supervised by a second person for whom the same equipment is readily at hand. Another two persons capable of giving assistance in an emergency shall be on the vessel within calling distance.

(3) If a hold contains goods of class 4.3 in bulk or unpackaged, the gas concentration shall be measured in all other spaces of the vessel which are used by the crew at least once every 8 hours with the device mentioned in marginal 43 260 (4). The results of the measurements shall be recorded in writing.

(4) The steersman shall make sure every day by checking the bilge wells or pump ducts that no water has entered the bilges in the cargo area. Water which has entered the bilges shall be removed immediately.

**43 302-
43 311**

43 312 Ventilation

(1) Holds containing goods of class 4.3 in bulk or unpackaged shall be ventilated, with the ventilation equipment operating at full power.

(2) Spaces adjacent to holds containing goods of class 4.3 in bulk or unpackaged and accommodation shall be ventilated.

**43 313-
43 334**

43 335 Drainage

Where goods of class 4.3 are carried in bulk or unpackaged on the vessel, drainage of the holds shall only be effected by drainage arrangements located within the protected area. The bilge pumping pipes through the engine room shall be blanked off.

Section 4. Additional provisions concerning loading, carriage, unloading and other handling of cargo

**43 400-
43 402**

43 403 Prohibition of mixed loading

Goods of class 4.3 shall not be stowed in the same hold together with goods of classes 1, 4.1, or 5.2 for which marginal 10 500 prescribes marking with three blue cones or three blue lights.

**43 404-
43 409**

43 410 Precautions with respect to foodstuffs, other articles of consumption and animal feeds

Goods of class 4.3 carried in bulk or unpackaged shall not be stowed in the same hold together with foodstuffs, other articles of consumption and animal feeds.

43 411

43 412 Ventilation

(1) It shall be established through measurement that holds containing goods of class 4.3 in bulk or unpackaged are free from dangerous concentrations of gas given off by the cargo.

(2) The measurements required in (1) above shall be carried out once every hour. The results of the measurements shall be recorded in writing.

43 413 Measures to be taken before loading

Before loading goods of class 4.3 in bulk or unpackaged, holds shall be made as dry as possible.

43 414 Handling and stowage of cargo

(1) It is prohibited to load or unload substances of class 4.3 in bulk or unpackaged if there is a danger that they may get wet because of the prevailing weather conditions.

(2) Goods of class 4.3 may be loaded in bulk or unpackaged only in holds which are separated from other spaces by a watertight metal bulkhead or by another hold with metal bulkheads.

(3) Packages shall be protected against moisture.

(4) No packages shall be stowed on top of packages containing goods of class 4.3, unless they contain the same goods.

43 414 (5) If the packages are not contained in a container, they shall be placed on gratings and

(cont'd) covered with water-proof tarpaulins arranged in such a way that the water drains off to the outside and the air circulation is not hindered.

(6) For seagoing vessels and inland waterway vessels, provided that the latter are only carrying containers, the stowage requirements shall be deemed to have been met, if the provisions of the IMDG Code and, for carriage in bulk, those section 9.3 of the BC Code have been complied with.

43 415 Measures to be taken after unloading

(1) After unloading, holds which have contained goods of class 4.3 in bulk or unpackaged, shall undergo forced ventilation.

After ventilation, the gas concentration in these holds shall be measured with the devices referred to in marginal 43 260(3) and (4). Entry into the holds is not permitted for the purpose of measuring.

(2) Holds which have contained goods of class 4.3 in bulk or unpackaged shall be cleaned after unloading unless their next cargo is to be the same goods of class 4.3 in bulk or unpackaged.

**43 416-
43 499**

Section 5. Additional provisions concerning the operation of vessels

**43 500-
50 999** (Only the general provisions of Part I apply.)

CLASS 5.1. OXIDIZING SUBSTANCES

General

51 000-51 099 (Only the general provisions of Part I apply.)

Section 1. Mode of carriage of goods

51 100-51 110

51 111 Carriage in bulk

Ammonium nitrate fertilizers of class 5.1, 21°(c) and solid substances of 22° (c) may be carried in bulk. Ammonium nitrate fertilizers of 21° (c) shall have been stabilized in accordance with the requirements applicable to ammonium nitrate fertilizers set out in the BC Code. Stabilizing shall be certified by the consignor with an appropriate entry in the transport document.

In those States where this is required, ammonium nitrate fertilizers of 21° (c) may be carried in bulk only with the approval of the competent national authority.

51 122-51 199

Section 2. Provisions applicable to vessels

51 200-51 210

51 211 Holds

Any part of the holds and of the hatchway covers which may come into contact with goods of class 5.1 shall consist of metal or of wood having a specific density of not less than 0.75 kg/dm^3 (seasoned wood).

51 212-51 299

Section 3. General service provisions

51 300-51 399 (Only the general provisions of Part I apply.)

Section 4. Additional provisions concerning loading, carriage, unloading and other handling of cargo

**51 400-
51 401**

51 402 Prohibition of mixed loading (general)

No other goods shall be loaded on vessels carrying goods of class 5.1 in bulk.

51 403 Prohibition of mixed loading

Goods of class 5.1 shall not be stowed in the same hold together with goods of classes 1, 4.1, or 5.2 for which marginal 10 500 prescribes marking with three blue cones or three blue lights.

**51 404-
51 412**

51 413 Measures to be taken before loading

Any loose organic material shall be removed from the holds before loading goods of class 5.1 in bulk.

**51 414-
51 499**

Section 5. Additional provisions concerning the operation of vessels

**51 500-
51 999** (Only the general provisions of Part I apply.)

CLASS 5.2. ORGANIC PEROXIDES

General

**52 000-
52 099**

Section 1. Mode of carriage of goods

**52 100-
52 199** (Only the general provisions of Part I apply.)

Section 2. Provisions applicable to vessels

**52 200-
52 299** (Only the general provisions of Part I apply.)

Section 3. General service provisions

**52 300-
52 399** (Only the general provisions of part I apply.)

Section 4. Additional provisions concerning loading, carriage, unloading and other handling of cargo

**52 400-
52 402**

52 403 Prohibition of mixed loading

Goods of class 5.2 for which marginal 10 500 prescribes marking with three blue cones or three blue lights shall not be stowed in the same hold together with other dangerous goods.

**52 404-
52 406**

52 407 Sites for loading and unloading

When substances of class 5.2 are on board, no goods whatsoever shall be loaded or unloaded, except at the places designated or approved for this purpose by the local competent authority.

52 408 Time and duration of loading or unloading operations

(1) Loading and unloading operations shall not be started without permission in writing from the competent authority.

(2) Loading and unloading operations shall be suspended in the event of a thunderstorm.

**52 409-
52 411**

52 412 Ventilation

(1) Holds containing goods of class 5.2 shall be ventilated with the ventilators operating at full power, where after measurement it has been established that the concentration of gases given off by the cargo exceeds 10% of the lower explosive limit.

(2) It shall be established through measurements that the holds which contain goods of class 5.2 are free from any significant concentration of gases which may have been given off by the cargo.

(3) The measurement required in (1) or (2) above shall be carried out once every hour. The results of the measurements shall be recorded in writing.

52 413

52 414 Handling and stowage of cargo

(1) Goods of class 5.2, 1° (b), 2° (b), 11° (b) and 12° (b) shall be stowed on deck. If the goods are not contained in road vehicles, tank-containers or containers, the packages shall be securely lashed and covered with tarpaulins that are not readily flammable. The air circulation shall not be hindered.

On deck, goods of class 5.2 shall be stowed at a distance not less than 3 m from the accommodation, engine rooms, the wheelhouse and from any source of heat.

(2) Packages containing liquid organic peroxides shall be placed upright and secured in such a way that they cannot overturn or drop.

(3) No packages shall be stowed on top of packages containing goods of class 5.2 unless they contain the same goods.

(4) For seagoing vessels, the stowage requirements other than those in (3) above, shall be deemed to have been met, if the stowage provisions of the IMDG Code have been complied with.

**52 415-
52 499**

Section 5. Additional provisions concerning the operation of vessels

52 500 General

The provisions of marginals 52 501 to 52 505 apply only to vessels carrying goods of class 5.2 for which marginal 10 500 prescribes marking with three blue cones or three blue lights.

52 501

51 502 Vessels under way

When under way, a vessel shall keep away as far as possible, but at less than 50 m, from any other vessel.

**52 503-
52 504**

52 505 Stopping of vessels

If the navigation of a vessel threatens to become dangerous owing either to :

- external factors (bad weather, unfavourable conditions of the waterway, etc.), or

- circumstances involving the vessel itself (accident or incident),

the vessel shall be stopped in a suitable area as far away as possible from residential areas, harbours, civil engineering structures or storage tanks for gases or flammable liquids, regardless of the provisions of marginal 10 504.

The local competent authority shall be notified without delay.

**52 506-
60 999**

CLASS 6.1. TOXIC SUBSTANCES

General

**61 000-
61 099** (Only the general provisions of Part I apply.)

Section 1. Mode of carriage of goods

**61 100-
61 110**

61 111 Carriage in bulk

Solid substances of class 6.1, 63°(c) and solid wastes listed under (c) of the various items may be carried in bulk.

**61 112-
61 199**

Section 2. Provisions applicable to vessels

**61 200-
61 259**

61 260 Special equipment

(1) When dangerous goods of class 6.1 are carried on board the vessel, the protective equipment referred to in marginal 10 260 (1)(a) shall be on board and shall be suitable for the goods carried.

(2) The escape devices referred to in marginal 10 260 (1)(b) are required on board and shall be kept available for immediate use, are only when dangerous goods of class 6.1 are carried on board the vessel and marking is required in accordance with marginal 10 500.

(3) The flammable gas detector referred to in marginal 10 260 (1)(c) is required on board, together with instructions for its use, only when dangerous goods of class 6.1 are carried on board the vessel and marking is required in accordance with marginal 10 500.

(4) The toximeter referred to in marginal 10 260 (1)(d) is required on board, together with instructions for its use, only when dangerous goods of class 6.1 are carried on board the vessel and marking with two blue cones or two blue lights is required in accordance with marginal 10 500.

**61 261-
61 299**

Section 3. General service provisions

61 300

61 301 Access to holds, double-hull spaces and double bottoms; inspections

(1) In case of suspected damage to packages or where goods are being carried in bulk, the gas concentration in the holds and in the adjacent holds shall be measured by means of the devices referred to in marginal 61 260 (3) and (4), before any person enters these holds.

Entry into holds is not permitted for the purpose of measuring.

(2) Entry into holds where damage is suspected or where goods are carried in bulk as well as entry into double-hull spaces and double bottoms is not permitted except where:

- there is no lack of oxygen and no measurable amount of harmful substances in a dangerous concentration; or

- the person entering the space wears a self-contained breathing apparatus and other necessary protective and rescue equipment and is secured by a line. Entry into these spaces is only permitted if this operation is supervised by a second person for whom the same equipment is readily at hand. Another two persons capable of giving assistance in an emergency shall be on the vessel within calling distance.

(3) If a hold contains goods of class 6.1 in bulk the gas concentration in all other spaces of the vessel which are used by the crew shall be measured at least once every 8 hours by means of the device referred to in marginal 61 260 (4).

The results of the measurement shall be recorded in writing.

61 302-
61 311

61 312 Ventilation

(1) Holds containing goods of class 6.1 in bulk shall be ventilated, with the ventilators operating at full power.

(2) Spaces adjacent to holds containing goods of class 6.1 in bulk and the accommodation shall be ventilated.

61 313-
61 399

Section 4. Additional provisions concerning loading, carriage, unloading and other handling of cargo

**61 400-
61 402**

61 403 Prohibition of mixed loading

Goods of class 6.1 shall not be stowed in the same hold together with goods of classes 1, 4.1, or 5.2 for which marginal 10 500 prescribes marking with three blue cones or three blue lights.

**61 404-
61 409**

61 410 Precautions with respect to foodstuffs, other articles of consumption and animal feeds

Goods of class 6.1 shall not be stowed in the same hold together with foodstuffs, other articles of consumption and animal feeds.

61 411

61 412 Ventilation

(1) It has to be established through measurement that holds containing goods of class 6.1 listed under item numbers with letters (a) and (b) are free from any significant concentration of gases given off by the cargo.

(2) The measurement required in (1) above shall be carried out once every hour.

The results of the measurements shall be recorded in writing.

61 413

61 414 Handling and stowage of cargo

(1) Goods of class 6.1 may be loaded in bulk only in holds which are separated from other spaces either by a watertight metal bulkhead or by another hold with metal bulkheads.

(2) For seagoing vessels and inland waterway vessels, provided that the latter are only carrying containers, the stowage requirements shall be deemed to have been met, if the provisions of the IMDG Code and, for carriage in bulk, those of sub-section 9.3 of the BC Code have been complied with.

61 415 Measures to be taken after unloading

(1) After unloading, holds shall undergo forced ventilation. After ventilation, the gas concentration in these holds shall be measured with the devices referred to in marginal 61 260 (3) and (4).

61 415 (cont'd) Entry into the holds is not permitted for the purpose of measuring.

(2) Holds which have contained goods of class 6.1 in bulk shall be cleaned after unloading, unless their next cargo is to be the same goods of class 6.1 in bulk.

61 416-61 499

Section 5. **Additional provisions concerning the operation of vessels**

61 500-61 599 (Only the general provisions of Part I apply.)

CLASS 6.2. INFECTIOUS SUBSTANCES

General

62 000-62 099 (Only the general provisions of Part I apply.)

Section 1. Mode of carriage of goods

62 100-62 199 (Only the general provisions of Part I apply.)

Section 2. Provisions applicable to vessels

62 200-62 299 (Only the general provisions of Part I apply.)

Section 3. General service provisions

62 300 (Only the general provisions of Part I apply.)

Section 4. Additional provisions concerning loading, carriage, unloading and other handling of cargo

62 400-62 402

62 403 Prohibition of mixed loading

Goods of class 6.2 shall not be stowed in the same hold together with goods of classes 1, 4.1, or 5.2 for which marginal 10 500 prescribes marking with three blue cones or three blue lights.

62 404-62 409

62 410 Precautions with respect to foodstuffs, other articles of consumption and animal feeds

Goods of class 6.2 shall not be stowed in the same hold together with foodstuffs, other articles of consumption and animal feeds.

62 411-62 499

Section 5. Special provisions concerning the operation of vessels

62 500-70 999 [Only the general provisions of Part I apply.]

CLASS 7. RADIOACTIVE MATERIAL

General

**71 000-
71 001**

71 002 Instructions to carriers

(1) The consignor shall provide with the transport document information regarding action, if any, to be taken by the carrier. The information shall at least include the following particulars:

(a) supplementary operational provisions for loading, stowage, transport, handling and unloading of the package, overpack, container or tank, including any special stowage provisions for the safe dissipation of heat or a statement that no such provisions are necessary;

(b) any necessary routeing instructions; and

(c) instructions in writing on the action to be taken in the event of an accident.

(2) In all cases where approval of the shipment from, or prior notification to, the competent authorities is required, the carrier shall be informed accordingly 15 days in advance, if possible, and, in any case, not less than 5 days in advance, to enable him to take in good time any measures that are necessary for carriage.

(3) The consignor shall be in a position to provide the applicable competent authorities certificates to the carrier before loading, unloading and any transshipment.

**71 003-
71 099**

Section 1. Mode of carriage of goods

71 100 General provisions

For the transport of radioactive material additional national provisions, if any, shall be complied with.

71 101

71 102 Additional provisions

Where the total transport index of the consignment exceeds 0, a note to this effect shall be entered in the transport document.

71 103 Carriage in overpacks

Packages containing fissile material for which the transport index for nuclear criticality control exceeds 0 shall not be carried in an overpack.

**71 104-
71 110**

71 111 Carriage in bulk

(1) Low Specific Activity material of class 7 (LSA-I, marginal 2704, schedule 5, of Annex A of ADR) may be carried in bulk provided that:

(a) for materials other than natural ores, carriage is under exclusive use and there is no escape of contents out of the vessel and no loss of shielding under normal conditions of transport; or

(b) for natural ores, carriage is under exclusive use.

(2) Surface Contaminated Objects (SCO-I) (marginal 2704, schedule 8 of Annex A of ADR) may be carried unpackaged, provided that:

(a) they are carried in a vessel, road vehicle or container so that, under normal conditions of transport, there is no escape of contents or loss of shielding;

(b) they are carried under exclusive use if the contamination on the accessible and inaccessible surfaces is greater than 4 Bq/cm² (10^{-4} µCi/cm²) for beta and gamma emitters and low toxicity alpha emitters or 0.4 Bq/cm² (10^{-5} µCi/cm²) for all other alpha emitters;

(c) measures are taken to ensure that radioactive material is not released into the vessel (or hold, or defined deck area of the vessel), road vehicle or container, if it is suspected that non-fixed contamination exists on inaccessible surfaces of more than 4 Bq/cm² (10^{-4} µCi/cm²) for beta and gamma emitters and low toxicity alpha emitters or 0.4 Bq/cm² (10^{-5} µCi/cm²) for all other alpha emitters.

(3) Surface Contaminated Objects (SCO-II) (marginal 2704, schedule 8 of Annex A to ADR) shall not be carried unpackaged.

71 112 Special arrangement

For carriage under special arrangement (marginal 2704, schedule 13, of Annex A of ADR) the requirements specified by the competent authority shall be met.

Section 2. Provisions applicable to vessels

71 200 Construction

Vessels intended for the carriage of material of class 7, marginal 2704, schedules 5 to 13 of Annex A of ADR shall comply with the additional rules for construction for double-hull vessels included in this Annex.

**71 201-
71 299**

Section 3. General service provisions

71 300 General provisions

Details are contained in the relevant schedules (see marginal 71 381 (3)).

71 301 Access to holds, double-hull spaces and double bottoms; inspections

The radiation level shall not exceed 0.02 mSv/h (2 mrem/h) at any normally occupied place on the vessel, unless the persons occupying such places are provided with personal monitoring devices.

**71 302-
71 380**

71 381 Documents

(1) In addition to the documents referred to in marginal 10 381, the consignor shall provide in the transport document information regarding actions, if any, to be taken by the steersman.

For details see marginal 71 002.

(2) In all cases where approval of the shipment from, or prior notification to, the competent authority is required, the steersman shall be informed accordingly by the consignor, if possible, 15 days in advance or in any case at least 5 days in advance, to enable him to take in good time any measures that are necessary for transport.

(3) The consignor shall provide the steersman before loading with all certificates from the competent authorities and the information required in accordance with marginals 2704 to 2713 of ADR.

**71 382-
71 399**

Section 4. Additional provisions concerning loading, carriage, unloading and other handling of cargo

71 400 General requirements

Details are contained in the relevant schedules (see marginal 71 381 (3)).

71 401 Limitation of quantities carried

(1) For the transport of radioactive material other than under exclusive use, the total transport index in a conveyance */ shall not exceed 50.

(2) For consignments under exclusive use, the total transport index for fissile material shall not exceed 100 for a conveyance */. For non-fissile material, there shall be no limit.

(3) Any package or overpack having a transport index in excess of 10 shall be carried only under exclusive use.

(4) For a conveyance */ carrying only Low Specific Activity (LSA-I) material (marginal 2704, schedule 5 of Annex A of ADR), there shall be no limit on the total transport index.

(5) For carriage of Surface Contaminated Objects (SCO-I and II) (marginal 2704, schedule 8 of Annex A of ADR) or Low Specific Activity (LSA-II and III) material (marginal 2704, schedules 6 and 7 of Annex A of ADR), the consignor shall indicate in the transport document the sum of the individual activities of the consignment in multiples of A_2. For each separate consignment the activity in terms of A_2 values shall be added.

(6) For carriage of Low Specific Activity (LSA-II) material (marginal 2704, schedule 6 of Annex A of ADR) the total activity in a conveyance */ shall not exceed the values specified in the table below.

Activity limits for LSA-II material	
Nature of contents	Limit for a conveyance */
Non-combustible solids	100 x A_2
Combustible solids and all liquids and gases	10 x A_2

*/ See definition in marginal 10 014.

71 401 (cont'd)

(7) For carriage of Low Specific Activity (LSA-III) material (marginal 2704, schedule 7 of Annex A of ADR), the total activity in a conveyance */ shall not exceed the values specified in the table below.

Activity limits for LSA-III material	
Nature of contents	Limit for a conveyance */
Non-combustible solids	100 x A_2
Combustible solids	10 x A_2

(8) For carriage of Surface Contaminated Objects (SCO-I and II) (marginal 2704, schedule 8 of Annex A of ADR), the total activity in a conveyance */ shall not exceed 100 x A_2.

71 402 Contamination on packages, overpacks, railway wagons, road vehicles, containers and vessels

Non-fixed contamination on all external surfaces and in addition on the internal surfaces of overpacks, railway wagons, road vehicles, containers and vessels used for transporting packages shall be kept as low as practicable and shall not exceed the following limits:

(a) Beta and gamma emitters and low toxicity alpha emitters:
0.4 Bq/cm² (10^{-5} µCi/cm²) for consignments which include excepted packages and/or non-radioactive goods,
4 Bq/cm² (10^{-4} µCi/cm²) for all other consignments;

(b) All other alpha emitters:
0.04 Bq/cm² (10^{-6} µCi/cm²) for consignments which include excepted packages and/or non-radioactive goods,
0.4 Bq/cm² (10^{-5} µCi/cm²) for all other consignments.

71 403 Prohibition of mixed loading

(1) Radioactive material of class 7 shall not be stowed in the same hold together with goods of class 1, class 4.1 or class 5.2 for which marginal 10 500 prescribes marking with three blue cones or three blue lights.

(2) For the carriage of radioactive material in Type B(U) or Type B(M) packages (marginal 2704, schedules 10 and 11 of Annex A of ADR), the controls, restrictions or provisions specified in the competent authority approval certificate shall be complied with.

*/ See definition in marginal 10 014.

71 403 (cont'd) (3) For the carriage of radioactive material under special arrangement in accordance with marginal 2704, schedule 13 of Annex A of ADR, the special provisions specified by the competent authority shall be met. In particular, mixed loading shall not be permitted unless specifically authorized by the competent authority.

71 404-
71 409

71 410 Precautions with respect to foodstuffs, other articles of consumption and animal feeds

Radioactive material of class 7 shall not be stowed in the same hold together with foodstuffs, other articles of consumption, and animal feeds, unless they are separated from them by a distance of not less than 6 m.

71 411-
71 413

71 414 Handling and stowage of cargo

(1) Packages, overpacks, railway wagons, containers and tanks loaded with dangerous goods of class 7, marginal 2704, schedules 5 - 13 of Annex A of ADR shall be segregated during transport:

(a) from accommodation or regularly occupied working areas, if no protective material separates them and when the duration of exposure does not exceed 250 hours per year: by a distance of 15 metres. This distance may be reduced with the approval of the competent authorities of the countries in question. This segregation guarantees a radiation limit in such places of 1mSv annually, when the sum of the transport indices is not more than 50;

(b) from other dangerous goods in accordance with marginal 71 403;

(c) from packages bearing the word "FOTO" and from mailbags in accordance with the table below.

Note: Mailbags shall be handled as if they contain undeveloped films and plates and therefore be separated from radioactive material in the same way as undeveloped films and plates.

71 414 (cont'd) **Table 2: Minimum distance between packages of Category II-Yellow or of Category III-Yellow and packages bearing the word "FOTO" or mailbags**

Total number of packages not more than:		Sum of transport indexes not more than:	Journey or storage duration, in hours							
			1	2	4	10	24	48	120	240
CATEGORY YELLOW III	CATEGORY YELLOW II		Minimum distance in metres							
		0.2	0.5	0.5	0.5	0.5	1	1	2	3
		0.5	0.5	0.5	0.5	1	1	2	3	5
	1	1	0.5	0.5	1	1	2	3	5	7
	2	2	0.5	1	1	1.5	3	4	7	9
	4	4	1	1	1.5	3	4	6	9	13
	8	8	1	1.5	2	4	6	8	13	18
1	10	10	1	2	3	4	7	9	14	20
2	20	20	1.5	3	4	6	9	13	20	30
3	30	30	2	3	5	7	11	16	25	35
4	40	40	3	4	5	8	13	18	30	40
5	50	50	3	4	6	9	14	20	32	45

(2) A package or overpack may, provided that its average surface heat flux does not exceed 15 W/m² and that the immediately surrounding cargo is not packed in bags, be carried together with other packaged goods without any special stowage requirements, except as may be specifically required by the competent authority in an applicable approval certificate.

(3) Except in the case of shipment under special arrangement, mixing of packages containing different kinds of radioactive material including fissile material, and mixing of different kinds of packages with different transport indexes is permitted without specific competent authority approval provided that the transport index limits are not exceeded. In the case of shipment under special arrangement, mixing shall not be permitted except as specifically authorized by the special arrangement.

(4) If the total transport index is greater than 50, the consignment shall be so handled and stowed that it is always separated from any other package, overpack, container or tank carrying radioactive material by at least 6 m.
The intervening space between groups may be occupied by other goods, dangerous or otherwise. The carriage of other goods together with consignments under exclusive use is permitted, provided that the provisions are made only by the consignor and it is not prohibited by other regulations.

71 415 Measures to be taken after unloading

(1) After unloading, the holds shall be inspected and, if necessary, cleaned by the consignee. This shall include decontamination in accordance with marginal 2702, paragraph 5 of Annex A of ADR or marginal 2703, paragraph 5 of Annex A of ADR, as appropriate.

71 415 (cont'd) Vessels intended for the carriage under exclusive use of Low Specific Activity material (LSA-I, LSA-II and LSA-III) according to marginal 2704, schedules 5, 6 and 7 of Annex A of ADR and Surface Contaminated Objects (SCO-I and SCO-II) according to marginal 2704, schedule 8 of Annex A of ADR shall be excepted from these provisions as long as they remain under such exclusive use.

(2) If it is evident that a package is damaged or leaking, or if it is suspected that the package may have leaked or been damaged, access to the package shall be restricted and a radiation protection expert shall, as soon as possible, assess the extent of contamination and the resultant radiation level. The scope of assessment shall include the package, the vessel, the adjacent loading and unloading areas and, if necessary, all other cargo which has been carried in the vessel. Where necessary, measures for the protection of human health in accordance with the provisions established by the relevant competent authority shall be taken in order to eliminate or minimize the effects of such leakage or damage.

(3) Packages leaking radioactive contents in excess of the limits acceptable under normal conditions of transport shall be removed under supervision and shall not be forwarded until they have been repaired or reconditioned and decontaminated.

(4) Vessels, equipment or parts thereof which have become contaminated shall be decontaminated, as soon as possible and in any case before reuse, to levels not exceeding:

(a) for non-fixed contamination: see marginal 71 402;

(b) for fixed contamination: a surface radiation level of 5 µSv/h (0.5 rem/h) at the surface.

71 416

71 417 Additional provisions

For consignments carried under exclusive use, the radiation level shall not exceed:

10 mSv/h (1,000 mrem/h) at any point on the external surface of any package or overpack; it may only exceed 2 mSv/h (200 mrem/h), provided that:

- there is an enclosure which prevents unauthorized access to the load during carriage;

- provisions are made to secure the package or overpack so that its position within the vessel remains fixed under normal conditions of carriage; and

- there are no loading or unloading operations in the hold in which the material is carried between the beginning and the end of the transport operation.

If the exclusive use conditions and the special additional provisions do not apply, the radiation level, at any point on any external surface of any package or overpack, shall not exceed 2 mSv/h (200 mrem/h) and the transport index shall not exceed 10.

71 418 Undeliverable consignments

If neither the consignor nor the consignee can be identified or if the consignment cannot be delivered to the consignee and the carrier has no instructions from the consignor, the consignment shall be placed in a safe location and the competent authority shall be informed as soon as possible and a request made for instructions on further action.

**71 419-
71 428**

71 429 Limitation of the effect of temperature

(1) If the temperature of the accessible outer surfaces of a Type B(U) or Type B(M) package could exceed 50° C in the shade, carriage is permitted only under exclusive use. As far as practicable, the surface temperature shall be limited to 85° C. Account may be taken of barriers or screens intended to give protection to transport workers without the barriers or screens being subject to any test.

(2) If the average heat flux from the external surfaces of a Type B(U) or B(M) package could exceed 15 W/m², the special stowage requirements specified in the competent authority package design approval certificate shall be met.

**71 430-
71 499**

Section 5. Additional provisions concerning the operation of vessels

71 500

71 501 Mode of navigation

The transport of material of class 7, marginal 2704, schedules 5 - 13 of Annex A of ADR shall be performed only by vessels navigating singly or by pushed convoys of dimensions not exceeding 110 m x 12 m.

The use of a motorized vessel giving temporary towing assistance is permitted.

**71 502-
79 999**

CLASS 8. CORROSIVE SUBSTANCES

General

**80 000-
80 099** (Only the general provisions of Part I apply.)

Section 1. Mode of carriage of goods

**81 100-
81 110**

81 111 Carriage in bulk

Solid substances of class 8, 13° (b), empty packagings of class 8, 91° and solid wastes listed under (c) of the various items may be carried in bulk.

**81 112-
81 199**

Section 2. Provisions applicable to vessels

**81 200-
81 210**

81 211 Holds

The inner surfaces of holds intended for the carriage in bulk of solid substances of class 8, 13° (b), empty packagings of class 8, 91° and solid wastes listed under (c) of the various items shall be lined or coated so as to prevent corrosion.

**81 212-
81 259**

81 260 Special equipment

(1) When dangerous goods of class 8 are carried on board the vessel, the protective equipment referred to in marginal 10 260 (1) (a) shall be on board and shall be suitable for the goods carried.

(2) The escape devices referred to in marginal 10 260 (1) (b) is required on board and shall be kept available for immediate use only when dangerous goods of class 8 are carried on board the vessel and marking is required in accordance with marginal 10 500.

(3) The flammable gas detector referred to in marginal 10 260 (1) (c) is required on board, together with instructions for its use only where dangerous goods of class 8 are carried on board the vessel and marking is required in accordance with marginal 10 500.

81 260 (cont'd) (4) The toximeter referred to in marginal 10 260 (1) (d) is required on board, together with instructions for its use only when dangerous goods of class 8 are carried on board the vessel and marking with two blue cones or two blue lights is required in accordance with marginal 10 500.

81 261-
81 299

Section 3 General service provisions

81 300

81 301 Access to holds, double-hull spaces and double bottoms; inspections

(1) In case of suspected damage to packages the gas concentration in the holds shall be measured by means of the devices referred to in marginal 81 260 (3) and (4) before any person enters these holds.

Entry into holds is not permitted for the purpose of measuring.

(2) Entry into holds where damage is suspected as well as entry into double-wall spaces and double bottoms is not permitted, except where:

- there is no lack of oxygen and no measurable amount of harmful substances in a harmful concentration; or

- the person entering the space wears a self-contained breathing apparatus and other necessary protective and rescue equipment and is secured by a line. Entry into these spaces is only permitted if this operation is supervised by a second person for whom the same equipment is readily at hand. Another two persons capable of giving assistance in an emergency shall be on the vessel within calling distance.

81 302-
81 399

Section 4. Additional provisions concerning loading, carriage, unloading and other handling of cargo

81 400-
81 402

81 403 Prohibition of mixed loading

Goods of class 8 shall not be stowed in the same hold together with goods of classes 1, 4.1 or 5.2 in vessels for which marginal 10 500 prescribes marking with three blue cones or three blue lights.

**81 404-
81 414**

81 415 Measures to be taken after unloading

Holds which have contained goods of class 8 in bulk shall be cleaned after unloading, unless their next cargo is to be the same goods of class 8 in bulk.

**81 416-
81 499**

Section 5. Additional provisions concerning the operation of vessels

**81 500-
90 999** (Only the general provisions of Part I apply.)

CLASS 9. MISCELLANEOUS DANGEROUS SUBSTANCES AND ARTICLES

General

91 000-91 094 (Only the general provisions of Part I apply.)

Section 1. Mode of carriage of goods

91 100-91 110

91 111 Carriage in bulk

(1) Expandable polymeric beads (or granules) of class 9, 4°(c) may be carried in bulk.

(2) Ammonium nitrate fertilizers of class 9, 22° (c) may be carried in bulk if, as the result of testing in the trough test according to section 38.2 of the Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, or Appendix D.4 of the BC Code, shows that the self-sustaining decomposition rate is not greater than 25 cm/h. In those States where this is required, ammonium nitrate fertilizers of 22° (c) may be carried in bulk only with the approval of the competent national authority.

91 112-91 199

Section 2. Requirements applicable to vessels

91 200-91 299 (Only the general provisions of Part I apply.)

Section 3. General service requirements

91 300-91 311

91 312 Ventilation

Holds containing expandable polymeric beads of class 9, 4° (c), shall be ventilated.

91 313-91 334

91 335 Drainage

Where expandable polymeric beads of class 9, 4° (c), are carried in bulk on the vessel, drainage of the holds shall only be effected by drainage arrangements located within the protected area. The bilge pumping pipes through the engine room shall be blanked off.

**91 336-
91 384**

91 385 Instructions in writing

For the carriage of substances of class 9, 2°(b) or appliances of Class 9, 3°, the instructions in writing shall include a warning that highly toxic dioxins may develop if they are involved in a fire.

**91 386-
91 399**

Section 4. Additional provisions concerning loading, carriage, unloading and other handling of cargo

**91 400-
91 402**

91 403 Prohibition of mixed loading (holds)

(1) Goods of class 9 in packages bearing a label conforming to model No. 9 (ADR) shall not be loaded in the same hold together with goods of classes 1, 4.1 or 5.2 for which marginal 10 500 prescribes marking with 3 blue cones or 3 blue lights.

(2) Ammonium nitrate fertilizers of class 9, 22° (c), shall not be loaded in the same hold together with flammable substances.

**91 404-
91 409**

91 410 Precautions with respect to foodstuffs, other articles of consumption and animal feeds

Goods of class 9 shall not be stowed in the same hold together with foodstuffs, other articles of consumption or animal feeds.

91 411

91 412 Ventilation

(1) Holds containing expandable polymeric beads of class 9, 4° (c), or 52° (ADN), shall be ventilated where after measurement it has been established that the concentration of gases given off by the cargo exceeds 50% of the lower explosive limit.

(2) The measurement required in (1) above shall be carried out once every hour.

The results of the measurements shall be recorded in writing.

91 413

91 414 Handling and stowage of cargo

(1) Expandable polymeric beads of class 9, 4° (c) may be loaded in holds only if:

(a) these holds are separated from other spaces either by a watertight metal bulkhead or by another hold with metal bulkheads;

(b) it is ensured that no cargo can get under the ceiling.

(2) For seagoing vessels, the stowage requirements in (1) above shall be deemed to have been met, if the stowage requirements set out in sub-section 9.3 of the BC Code have been complied with.

91 415 Measures to be taken after unloading

If goods of class 9 have been spilled or have contaminated a hold, it may not be re-used until after it has been thoroughly cleaned and, if necessary, decontaminated. All other goods which have been carried in the same hold shall be checked for possible contamination.

91 416 Measures to be taken during loading, carriage, unloading and handling

(1) Before any person enters a hold containing expandable polymeric beads of class 9, 4° (c) and prior to unloading, the concentration of gases shall be measured by the consignee of the cargo.

The hold shall not be entered or unloading started until the concentration of gases in the airspace above the cargo is below 50% of the lower explosive limit.

(2) After loading and unloading expandable polymeric beads of class 9, 4° (c) and before leaving the transshipment site, the concentration of gases in the accommodation, engine rooms and adjacent holds shall be measured by the consignor or consignee using a flammable gas detector.

(3) If significant concentrations of gases are found in the spaces referred to in (2) above, the necessary safety measures shall be taken immediately by the consignor or the consignee.

**91 417-
91 499**

Section 5. Additional provisions concerning the operation of vessels

**91 500-
109 999** (Only the general provisions of Part I apply.)

Part III

RULES FOR CONSTRUCTION

**110 100-
110 199**

110 200 Construction material

The hull shall be constructed of shipbuilding steel or other metal, provided that this metal has at least equivalent mechanical properties and resistance to the effects of temperature and fire.

**110 201-
110 210**

110 211 Holds

(1) (a) Each hold shall be bounded fore and aft by watertight metal bulkheads.

(b) The holds shall have no common bulkhead with the oil fuel tanks.

(2) The bottom of the holds shall be such as to permit them to be cleaned and dried.

(3) The hatchway covers shall be spraytight and weathertight or be covered by waterproof tarpaulins. Tarpaulins used to cover the holds shall not be readily flammable.

(4) No heating appliances shall be installed in the holds.

110 212 Ventilation

(1) Ventilation of each hold shall be provided by means of two mutually independent extraction ventilators having a capacity of not less than 5 changes of air per hour based on the volume of the empty hold. The ventilation fan shall be designed so that no sparks may be emitted on contact of the impeller blades with the housing and no static electricity may be generated. The suction ducts shall be positioned at the extreme ends of the hold and carried down to not more than 50 mm above the bottom.

Ventilators are not required on vessels only carrying dangerous goods packed in containers.

(2) The ventilation system of a hold shall be arranged so that dangerous gases cannot penetrate into the accommodation, wheelhouse or engine rooms.

(3) Ventilation shall be provided for the accommodation and for service spaces.

**110 213-
110 216**

110 217 Accommodation and service spaces

(1) The accommodation shall be separated from the holds by metal bulkheads having no openings.

110 217 (cont'd) (2) Gastight closing appliances shall be provided for openings in the accommodation and wheelhouse facing the holds.

(3) No entrances or openings of the engine rooms and service spaces shall face the protected area.

110 218

110 219

110 220 Water ballast

The longitudinal compartments in double-hull spaces and double bottoms may be arranged for being filled with water ballast.

**110 221-
110 230**

110 231 Engines

(1) Only internal combustion engines running on fuel having a flashpoint above 55° C are allowed.

(2) Air intakes of the engines shall be located not less than 2 m from the protected area.

(3) There shall be no sparking in the protected area.

110 232 Oil Fuel tanks

(1) Double bottoms within the hold area may be arranged as oil fuel tanks provided their depth is not less than 0.6 m. Oil fuel pipes and openings to such tanks are not permitted in the holds.

(2) The air pipes of all oil fuel tanks shall be led to 0.50 m above the open deck. Their open ends and the open ends of the overflow pipes leaking to the deck shall be protected by a gauze diaphragm or by a perforated plate.

110 233

110 234 Exhaust pipes

(1) Exhausts shall be evacuated from the vessel into the open-air either upwards through an exhaust pipe or through the shell plating. The exhaust outlet shall be located not less than 2 m from the hatchway openings. The exhaust pipes of engines shall be arranged so that the exhaust gases are blown away from the vessel. The exhaust pipes shall not be located within the protected area.

(2) Exhaust pipes shall be provided with a device preventing the escape of sparks, e.g. spark arresters.

**110 235-
110 239**

110 240 Fire-extinguishing systems

(1) A fire-extinguishing system shall be installed on the vessel. This system shall comply with the following requirements:

- it shall be supplied by two independent fire or ballast pumps one of which shall be ready for use at any time. These pumps shall not be installed in the same space;

- it shall be provided with a water main fitted with at least three hydrants in the protected area above deck. Three suitable and sufficiently long hoses with spray nozzles having a diameter of not less than 12 mm shall be provided. It shall be possible to reach any point of the deck in the protected area simultaneously with at least two jets of water which do not emanate from the same hydrant. A spring-loaded non-return valve shall be fitted to ensure that no gases can escape through the fire-extinguishing system into the accommodation or service spaces outside the protected area;

- the capacity of the system shall be at least sufficient for a jet of water to reach a distance of not less than the vessel's breadth from any location on board with two spray nozzles being used at the same time.

(2) The engine rooms shall be provided with a fixed fire extinguishing system which can be operated from the deck.

(3) The two hand fire-extinguishers referred to in marginal 10 240 shall be located in the protected area.

110 241 Fire and naked light

(1) The outlets of funnels shall be located not less than 2 m from the hatchway openings. Arrangements shall be provided to prevent the escape of sparks and the entry of water.

(2) Heating, cooking and refrigerating appliances shall not be fuelled with liquid fuels, liquid gas or solid fuels. The installation in the engine room or other separate space of heating appliances fuelled with liquid fuel having a flashpoint above 55° C shall, however, be permitted. Cooking and refrigerating appliances are permitted only in wheelhouses with metal floor and in the accomodation.

(3) Electric lighting appliances only are permitted outside the accommodation and the wheelhouse.

**110 242-
110 251**

110 252 Type and location of electrical installations

(1) It shall be possible to isolate the electrical installations in the holds and in the protected area by means of centrally located switches except where:

- the installations in the holds are of a certified safe type corresponding at least to temperature class T4 and explosion group II B; and

- the installations in the protected area are of the limited explosion risk type.

The corresponding electrical circuits shall have control lamps to indicate whether or not the circuits are live. The switches shall be protected against unintended unauthorized operation. The sockets used in this area shall be so designed as to prevent connections being made except when they are not live.

(2) Electric motors for hold ventilators which are arranged in the air flow shall be of the "certified safe" type.

No movable couplings or branches and no sockets unless these can be locked shall be fitted within the protected area or in the holds.

(3) Sockets for the connection of signal lights, gangway lighting and containers shall be permanently fitted to the vessel close to the signal mast or the gangway or the containers.

**110 253-
110 255**

110 256 Electric cables

(1) Cables and sockets in the holds and in the protected area shall be protected against mechanical damage.

(2) Movable cables are prohibited in the holds and in the protected area, except for intrinsically safe electric circuits or for the supply of signal lights and gangway lighting, for containers and for electrically operated covergantries.

(3) For movable cables permitted in accordance with (2) above, only rubber-sheathed cables of type H07 RN-F in accordance with 245 IEC 66 or cables of at least equivalent design having conductors with a cross-section of not less than 1.5 mm^2, shall be used.

These cables shall be as short as possible and installed so that accidental damage is not likely to occur.

**110 257-
110 269**

110 270 Metal wires, masts

All metal wires passing over the holds and all masts shall be earthen, unless they are electrically bonded to the metal hull of the vessel through their installation.

110 271 Admittance on board

The notice boards indicating the prohibition of admittance in accordance with marginal 10 371 shall be clearly legible from either side of the vessel.

110 272
110 273

110 274 Prohibition of smoking; use of fire and naked light

(1) The notice boards indicating the prohibition of smoking in accordance with marginal 10 374 shall be clearly legible from either side of the vessel.

(2) Notice boards indicating the circumstances under which the prohibition is applicable shall be fitted near the entrances to the spaces where smoking or the use of fire or naked light is not always prohibited.

(3) Ashtrays shall be provided close to each exit of the accommodation and the wheelhouse.

110 275-
110 279

Additional provisions applicable to double-hull vessels

110 280-
110 287

110 288 Classification

(1) Double-hull vessels intended to carry dangerous goods of classes 2, 3, 4.1, 5.2, 6.1, 8 or 9 except those of 31° (b), 32° (b), 41° (b) and 42° (b) of class 4.1 and of 1° (b), 2° (b), 11° (b) and 12° (b) of class 5.2, in quantities exceeding those referred to in marginal 10 401 (1) or material of class 7 marginal 2704, schedules 5 to 13 of Annex A to ADR, shall be built under survey of a recognized classification society in accordance with the rules established by this classification society to its highest class. This shall be confirmed by the classification society by the issue of an appropriate certificate.

(2) Continuation of class is not required.

(3) Future conversions and major repairs to the hull shall be carried out under survey of this classification society.

**110 289-
110 290**

110 291 Holds

(1) The vessel shall be built as a double-hull vessel with double-hull spaces and double bottom within the protected area.

(2) The distance between the sides of the vessel and the longitudinal bulkheads of the hold shall be not less than 0.80 m. Regardless of the requirements relating to the width of walkways on deck, a reduction of this distance to 0.60 m is permitted, provided that, compared with the scantlings specified in the rules for construction published by a recognized classification society, the following reinforcements have been made:

(a) Where the vessel's sides are constructed according to the longitudinal framing system, the frame spacing shall not exceed 0.60 m. The longitudinals shall be supported by web frames with lightening holes similar to the floors in the double bottom and spaced not more than 1.80 m apart;

(b) Where the vessel's sides are constructed according to the transverse framing system, either:

- two longitudinal side shell stringers shall be fitted. The distance between the two stringers and between the uppermost stringer and the gangboard shall not exceed 0.80 m. The depth of the stringers shall be at least equal to that of the transverse frames and the cross-section of the face plate shall be not less than 15 cm^2.

  The longitudinal stringers shall be supported by web frames with lightening holes similar to plate floors in the double bottom and spaced not more than 3.60 m apart. The transverse shell frames and the hold bulkhead vertical stiffeners shall be connected at the bilge by a bracket plate with a height of not less than 0.90 m and thickness equal to the thickness of the floors;

  or:

- web frames with lightening holes similar to the double bottom plate floors shall be arranged on each transverse frame;

(c) the gangboards shall be supported by transverse bulkheads or cross-ties spaced not more than 32 m apart.

As an alternative to compliance with the requirements of (c) above, a proof by calculation, issued by a recognized classification society confirming that additional reinforcements have been fitted in the double-hull spaces and that the vessel's transverse strenght may be regarded as satisfactory.

110 291 (cont'd) (3) The depth of the double bottom shall be not less than 0.50 m. The depth below a suction well may however be locally reduced to 0.40 m, provided that the suction well has a capacity of not more that 0.03 m^3.

110 292 Emergency exit

Spaces the entrances or exits of which are partly or fully immersed in damaged condition shall be provided with an emergency exit not less than 0.10 m above the waterline.

110 293 Stability (general)

(1) Proof of sufficient stability in the damaged condition shall be furnished.

(2) The basic values for the stability calculation - the vessel's lightweight and the location of the centre of gravity - shall be determined either by means of an inclining experiment or by detailed mass and moment calculation. In the latter case the lightweight shall be checked by means of a lightweight test with a resulting difference of not more than ± 5% between the mass determined by the calculation and the displacement determined by the draught readings.

(3) Proof of sufficient intact stability shall be furnished for all stages of loading and unloading and for the final loading condition.

Floatability after damage shall be proved for the most unfavourable loading condition. For this purpose calculated proof of sufficient stability shall be established for critical intermediate stages of flooding and for the final stage of flooding. Negative values of stability in intermediate stage of flooding may be accepted only if the continued range of curve of righting lever in damage condition indicates adequate positive values of stability.

110 294 Stability (intact)

(1) Intact stability requirements resulting from the damage stability calculation shall be fully observed.

(2) For the carriage of containers, additional proof of sufficient stability shall be furnished in accordance with the Appendix 3 to this Annex.

(3) The most stringent of the requirements of (1) and (2) above shall prevail for the vessel.

110 295 Stability (damaged condition)

(1) The following assumptions shall be taken into consideration for the damaged condition:

110 295 (cont'd)

(a) The extent of side damage is as follows:

longitudinal extent: at least 0.10 L, but not less than 5.00 m;

transverse extent: 0.59 m;

vertical extent: from the baseline upwards without limit.

(b) The extent of bottom damage is as follows:

longitudinal extent: at least 0.10 L, but not less than 5.00 m;

transverse extent: 3.00 m;

vertical extent: from the base 0.49 m upwards, the sump excepted.

(c) Any bulkheads within the damaged area shall be assumed damaged, which means that the location of bulkheads shall be chosen so as to ensure that the vessel remains afloat after the flooding of two or more adjacent compartments in the longitudinal direction.

The following provisions are applicable:

- For bottom damage also two adjacent athwartships compartments shall be assumed as flooded.

- The lower edge of any openings that cannot be closed watertight (e.g. doors, windows, access hatchways) shall, at the final stage of flooding, be not less than 0.10 m above the damage waterline.

- In general, permeability shall be assumed to be 95%. Where an average permeability of less than 95% is calculated for any compartment, this calculated value may be used.

However, the following minimum values shall be used:

- engine rooms 85%

- accommodation 95%

- double bottoms, oil fuel tanks, ballast tanks, etc., depending on whether, according to their function, they have to be assumed as full or empty for the vessel floating at the maximum permissible draught 0% or 95%

For the main engine room only the one-compartment standard needs to be taken into account, i.e. the end bulkheads of the engine room shall be assumed as not damaged.

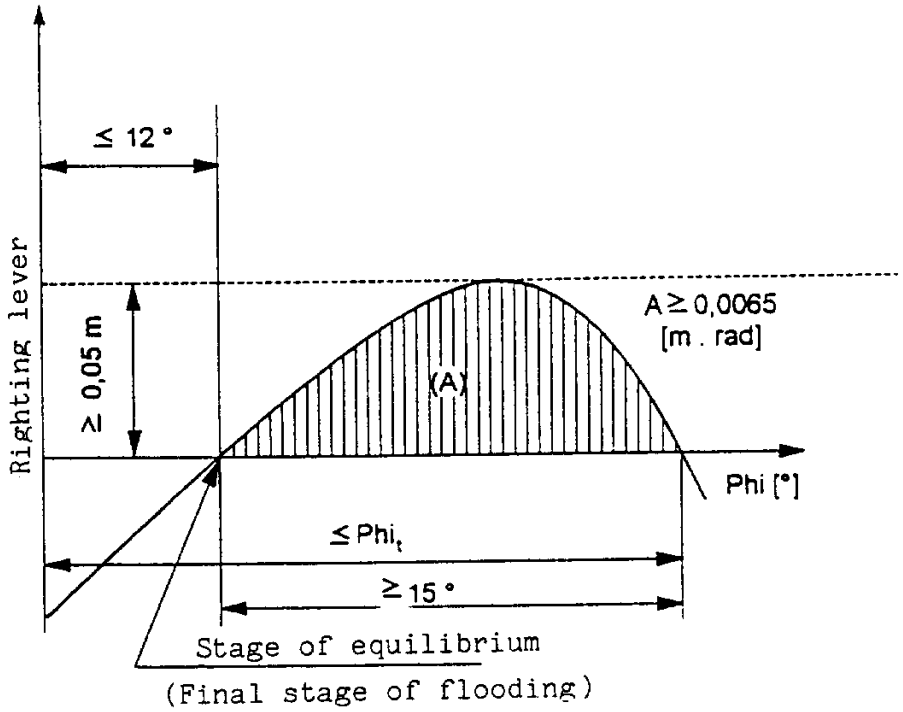
110 295 (cont'd)

(2) At the stage of equilibrium (final stage of flooding) the angle of heel shall not exceed 12°.

The positive range of the righting lever curve beyond the position of equilibrium shall have a righting lever of ≥ 0.05 m in association with an area under the curve of ≥ 0.0065 m rad.

Non-watertight openings may not be immersed before the above minimum criteria have been satisfied (angle Phi_t) or before reaching the stage of equilibrium. If such openings are immersed before that stage, the corresponding spaces shall be considered as flooded for the purpose of stability calculation.

The minimum values of stability shall be satisfied up to an angle of heel of ≤ 27°, which means that values beyond 27° shall not be taken into consideration.



(3) Inland navigation vessels carrying containers which have not been secured shall satisfy the following damage stability criteria:

At the stage of equilibrium (final stage of flooding) the angle of heel shall not exceed 5°.

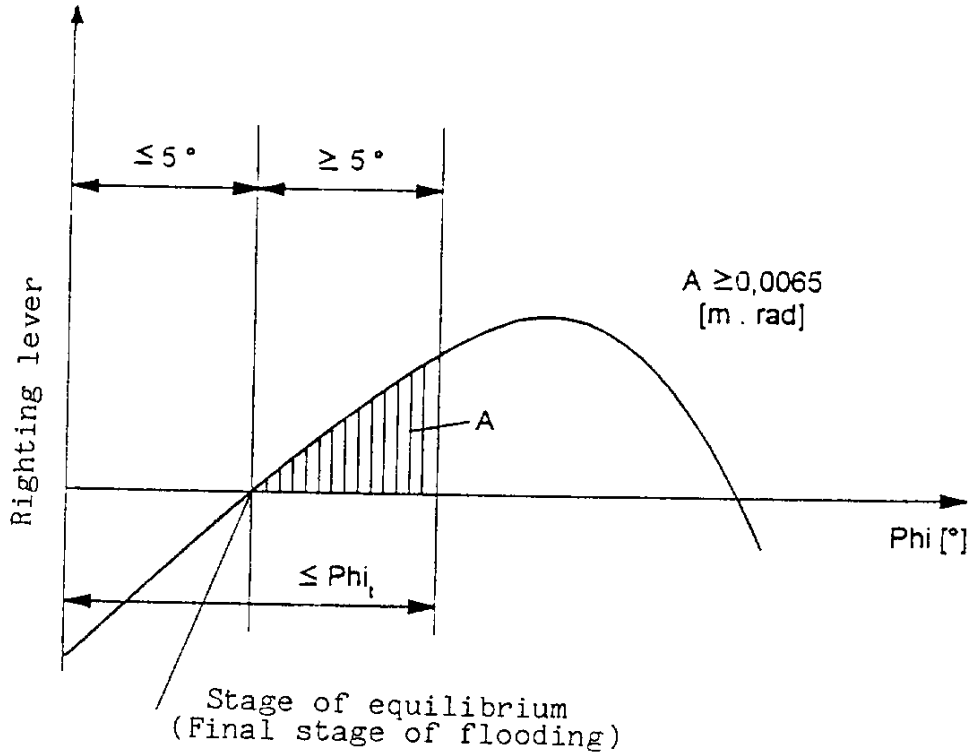
The positive range of the righting lever curve beyond the position of equilibrium shall have an area under the curve of ≥ 0.0065 m rad.

110 295 (cont'd)

Non-watertight openings shall not be immersed before the above minimum criteria have been satisfied (angle Phi_t) or before reaching the stage of equilibrium. If such openings are immersed before that stage, the corresponding spaces shall be considered as flooded for the

purpose of stability calculation.

The minimum values of stability shall be satisfied up to an angle of heel of ≤ 10°, which means that values beyond 10° shall not be taken into consideration.



(4) Watertight closing appliances shall be provided for openings through which undamaged compartments may become additionally flooded.

The closing devices shall be appropriately marked.

(5) Where cross- or down-flooding openings are provided for reduction of unsymmetrical flooding, the time for equalization shall not exceed 15 minutes if during the intermediate stages of flooding sufficient stability can be demonstrated.

**110 296-
119 999**

Part IV

RULES FOR CONSTRUCTION APPLICABLE TO SEAGOING VESSELS WHICH COMPLY WITH THE REQUIREMENTS OF THE SOLAS CONVENTION, CHAPTER II-2, REGULATION 54

**120 000-
120 099**

120 100 General

Seagoing vessels shall comply either with Part III of this Annex or with the provisions of regulation 54 of Chapter II-2 of SOLAS and the requirements set out below.

120 200 Construction materials

The hull shall be constructed of shipbuilding steel or other metal, provided that this metal has at least equivalent mechanical properties and resistance to the effects of temperature and fire.

**120 201-
120 219**

120 220 Water ballast

The longitudinal compartments in double-hull spaces and double bottoms may be arranged for being filled with water ballast.

**120 221-
120 230**

120 231 Engines

(1) Only internal combustion engines running on a fuel having a flashpoint above 60° C, are allowed.

(2) Air intakes of the engines shall be located not less than 2 m from the protected area.

(3) There shall be no sparking within the protected area.

120 232

120 233

120 234 Exhaust pipes

(1) Exhausts shall be evacuated from the vessel into the open-air either upwards through an exhaust pipe or through the shell plating. The exhaust outlet shall be located not less than 2 m from the hatchway openings. The exhaust pipes of engines shall be arranged so that the exhausts are blown away from the vessel. The exhaust pipes shall not be located within the protected area.

(2) Exhaust pipes shall be provided with a device preventing the escape of sparks, e.g. spark arresters.

**120 235-
120 240**

120 241 Fire and naked light

(1) The outlets of funnels shall be located not less than 2 m from the hatchway openings. Arrangements shall be provided to prevent the escape of sparks and the entry of water.

(2) Heating, cooking and refrigerating appliances shall not be fuelled with liquid fuels, liquid gas or solid fuels. The installation in the engine room or other separate space of heating appliances fuelled with liquid fuel having a flashpoint above 55° C shall, however, be permitted. Cooking and refrigerating appliances are permitted only in wheelhouses with metal floor and in the accommodation.

(3) Electric lighting appliances only are permitted outside the accommodation and the wheelhouse.

**120 242-
120 270**

120 271 Admittance on board

The notice boards indicating the prohibition of admittance in accordance with marginal 10 371 shall be clearly legible from either side of the vessel.

120 272

120 273

120 274 Prohibition of smoking, use of fire and naked light

(1) The notice boards indicating the prohibition of smoking in accordance with marginal 10 374 shall be clearly legible from either side of the vessel.

(2) Notice boards indicating the circumstances under which the prohibition is applicable shall be fitted near the entrances to the spaces where smoking or the use of fire or naked light is not always prohibited.

(3) Ashtrays shall be provided close to each exit of the accommodation and of the wheelhouse.

**120 275-
120 279**

Additional provisions applicable to double-hull vessels

**120 280-
120 287**

120 288 Classification

(1) Double-hull vessels intended to carry dangerous goods of classes 2, 3, 5.2, 6.1, 8 or 9 except those of 31° (b), 32° (b), 41° (b) and 42° (b) of class 4.1 and 1° (b), 2° (b), 11° (b) and 12° (b) of class 5.2 in quantities exceeding those referred to in marginal 10 401 (1) or material of class 7, marginal 2704, schedules 5 to 13 of Annex A to ADR, shall be built under survey of a recognized classification society in accordance with the rules established by that classification society to its highest class. This shall be confirmed by the classification society by the issue of an appropriate certificate.

(2) The vessel's class shall be continued.

**120 289-
120 290**

120 291 Holds

(1) The vessel shall be built as a double-hull vessel with double-wall spaces and double bottom within the protected area.

(2) The distance between the sides of the vessel and the longitudinal bulkheads of the hold shall be not less than 0.80 m. A locally reduced distance at the vessel's ends shall be permitted, provided the smallest distance between vessel's side and the longitudinal bulkhead (measured perpendicular to the side) is not less than 0.60 m. The sufficient structural strength of the vessel (longitudinal, transverse and local strength) shall be confirmed by the class certificate.

(3) The depth of the double bottom shall be not less than 0.5 m. The depth below the suction wells may however be locally reduced to 0.40 m, provided the suction well has a capacity of not more than 0.03 m^3.

120 292

120 293 Stability

(1) Proof of sufficient stability in the damaged condition shall be furnished.

(2) The basic values for the stability calculation - the vessel's lightweight and the location of the centre of gravity - shall be determined either by means of an inclining experiment or by detailed mass and moment calculation. In the latter case the lightweight shall be checked by means of a lightweight test with a resulting difference of not more than ± 5% between the mass determined by the calculation and the displacement determined by the draught readings.

(3) Proof of sufficient intact stability shall be furnished for all stages of loading and unloading and for the final loading condition.

Floatability after damage shall be proved for the most unfavourable loading condition. For this purpose calculated proof of sufficient stability shall be established for critical intermediate stages of flooding and for the final stage of flooding. Negative values of stability in intermediate stage of flooding may be accepted only if the continued range of curve of righting lever in damage condition indicates adequate prositions values of stability.

120 294 Stability (intact)

(1) Intact stability requirements resulting from the damage stability calculation shall be fully observed.

(2) For the carriage of containers, additional proof of sufficient stability shall be furnished in accordance with Appendix 3 to this Annex.

(3) The most stringent of the requirements of paragraphs (1) and (2) shall prevail for the vessel.

(4) For seagoing vessels the provisions of (2) above may be regarded as having been complied with if the stability conforms to IMO Resolutions A.167 (ES.IV) and A.206 (VII). This applies only when all containers are secured as usual on seagoing vessels and a relevant stability document has been approved by the competent authority.

120 295 Stability (damaged condition)

(1) The following assumptions shall be taken into consideration for the damaged condition:

(a) The extent of side damage is as follows:

longitudinal extent: at least 0.10 L, but not less than 5.00 m;

transverse extent: 0.59 m;

vertical extent: from the baseline upwards without limit.

120 295 (cont'd)

(b) The extent of bottom damage is as follows:

longitudinal extent: at least 0.10 L, but not less than 5.00 m;

transverse extent: 3.00 m;

vertical extent: from the base 0.49 m upwards, the sump excepted.

(c) Any bulkheads within the damaged area shall be assumed damaged, which means that the location of bulkheads shall be chosen so that the vessel will remain afloat after flooding of two adjacent compartments in the longitudinal direction.

The following provisions are applicable:

- For bottom damage also two adjacent athwartships compartments shall be assumed as flooded.

- The lower edge of any openings that cannot be closed watertight (e.g. doors, windows, access hatchways) shall, at the final stage of flooding, be not less than 0.10 m above the damage waterline.

- In general, permeability shall be assumed to be 95%. Where an average permeability of less than 95% is calculated for any compartment, this calculated value may be used.

However, the following minimum values shall be used:

- engine rooms 85%

- accommodation 95%

- double bottoms, oil fuel tanks, ballast tanks, etc., depending on whether according to their function, they have to be assumed as full or empty for the vessel floating at the maximum permissible draught 0% or 95%

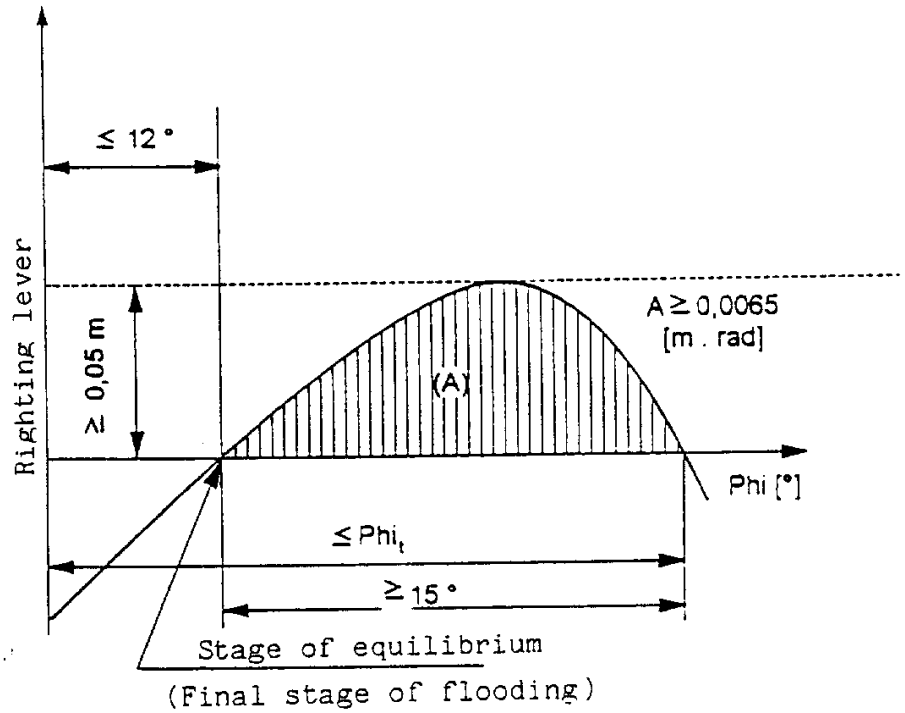
For the main engine room only the one-compartment standard needs to be taken into account.(Consequently, the end bulkheads of the engine room shall be assumed as not damaged.)

(2) At the stage of equilibrium (final stage of flooding) the angle of heel shall not exceed 12°.

The positive range of the righting lever curve beyond the position of equilibrium shall have a righting lever of ≥ 0.05 m in association with an area under the curve of ≥ 0.0065 m rad.

120 295 (cont'd) Non-watertight openings shall not be immersed before the above minimum criteria have been satisfied (angle Phi_t) or before reaching the stage of equilibrium. If such openings are immersed before that stage, the corresponding spaces shall be considered as flooded for the purpose of stability calculation.

The minimum values of stability shall be satisfied up to an angle of heel of ≤ 27°, which means that values beyond 27° shall not be taken into consideration.



(3) Watertight closing appliances shall be provided for openings through which undamaged compartments may become additionally flooded.

The closing devices shall be appropriately marked.

(4) Where cross- or down-flooding openings are provided for reduction of unsymmetrical flooding, the time for equalization shall not exceed 15 minutes if during the intermediate stages of flooding sufficient stability can be demonstrated.

120 296-
120 299

120 300-
209 999

ANNEX B.1

APPENDICES

APPENDIX 1
Model 1

Model for a certificate of approval

Competent authority :
Space reserved for the emblem and name of the State

Certificate of approval No: . . . . . .

According to Annex B.1, marginal 10 282, ADN

1. Name of vessel

2. Official number

3. Type of vessel
Vessel subject to ADN under marginal 10 219 (1) only 1/
Vessel subject to ADN under marginal 210 219 (3) only 1/

4. Additional requirements:

The vessel conforms to the additional rules for construction of annex B.1 of ADN applicable to double-hull vessels 1/

5. Permitted derogations : . . . . . .

6. The validity of this certificate of approval expires on . . . . . (date)

7. The previous certificate of approval No . . . . was issued on . . . . . .

by . . . . . (competent authority)

8. The vessel is approved for the carriage of dangerous goods following:

- inspection on 1/ (date) . . . . . .
- certification by a recognized classification society 1/
- Name of the classification society 1/ . . . . . (date) . . . . . .

9. Subject to permitted equivalences: 1/
. . . . . .

10. Subject to special authorizations: 1/
. . . . . .

11. Issued at: . . . . . on . . . . . .
(place) (date)

12. (Stamp)

) y t i r

) e r u

1/ Delete as appropriate.

Extension of the validity of the certificate of approval

13. The validity of this certificate is extended under marginal 10 282 (4) of Annex B.1 of ADN

Until . . . . . .
(date)

14. . . . . on . . . . . .
(place) (date)

15. (Stamp)

APPENDIX 1
Model 2

Model for a provisional certificate of approval

***NOTE** : This model certificate of approval may be replaced by a single certificate model combining a provisional certificate of inspection and the provisional certificate of approval, provided that this single certificate model contains the same particulars as the model below and is approved by the competent authorities.*

Competent authority :
Space reserved for the emblem and name of the State

Certificate of approval No: . . . . . .

According to Annex B.1, marginal 10 283, ADN

1. Name of vessel

2. Official number

3. Type of vessel
Vessel subject to ADN under marginal 10 219 (1) only 1/
Vessel subject to ADN under marginal 210 219 (3) only 1/

4. Additional requirements:

The vessel conforms to the additional rules for construction of annex B.1 of ADN applicable to double-hull vessels 1/

5. Permitted derogations : . . . . . .

6. The provisional certificate of approval is valid 1/

6.1 until . . . . . .

6.2 for a single journey from . . . . . to . . . . . .

7. Issued at: . . . . . on . . . . . .
(place) (date)

8. (Stamp)

) y t i r

) e r u

1/ Delete as appropriate.

APPENDIX 1
Model 3

Certificate of special knowledge of ADN according to marginals 10 315, 210 315, 210 317 or 210 318

(see next page)
(Format: A6, Colour: orange)

(Space reserved for the emblem of State, competent authority)

ADN certificate

of special knowledge of ADN

No of certificate: . . . . . .
Name:. . . . . .

First name(s): . . . . . .

Born on: . . . . . .

Nationality: . . . . . .
Signature of holder: . . . . . .

The holder of this certificate has special knowledge of ADN.

The certificate is valid for special knowledge of ADN according to marginals 10 315/210 315, 210 317, 210 318 */

until: . . . . . .

if it has not been extended during the period of validity following participation in a refresher or advanced training course

Issued by: . . . . . .

Date:. . . . . .

(Stamp)

Signature of holder: . . . . . .

*) Delete as appropriate.

(Recto) *(Verso)*

Appendix 2

Models of danger labels prescribed by international regulations

A. Danger labels

(1) The danger labels prescribed for dangerous goods are based on those appearing in the United Nations Recommendations on the Transport of Dangerous Goods. The IMDG Code and the ICAO-TI follow entirely the system of the United Nations Recommendations, which distinguishes between primary risk labels (with the class or division number in the bottom corner) and subsidiary risk labels (with no number in the bottom corner). RID and ADR use the same labels but do not distinguish systematically between primary hazard labels and subsidiary risk labels, and the figure in the bottom corner of the label is therefore not always prescribed.

(2) The table set out below describes the labels. The column furthest to the left gives the label model number appearing in the United Nations Recommendations on the Transport of Dangerous Goods; the second column gives the RID/ADR model number.

(3) Labels Nos. 1 to 7C and 8 to 9 are diamond-shaped with dimensions of 100 mm by 100 mm. They have a black line 5 mm inside the edge and running parallel to it. If the size of the package so requires, the dimensions of the labels may be reduced, provided that they remain clearly visible. On gas cylinders, the labels may be affixed to the shoulder of the cylinder and the dimensions may therefore be reduced, provided that they remain clearly visible.

(4) Label No. 7D and other labels to be affixed to transport units (containers, vehicles, wagons, tanks) must measure not less than 250 x 250 mm. According to the IMDG Code, these enlarged labels (placards) must bear the appropriate class number in the bottom corner, as prescribed for labels, in figures not less than 25 mm high.

(5) RID/ADR labels Nos. 10, 11 and 12 are rectangular, of standard format A5 (148 x 210 mm). If the size of the package so requires, the dimensions of the labels may be reduced, provided they remain clearly visible.

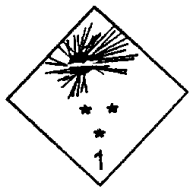
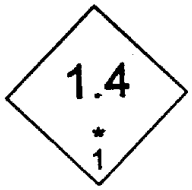
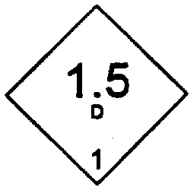
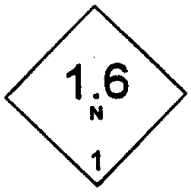
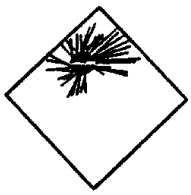
(6) An inscription in figures (e.g. the UN number) or letters (e.g. "FLAMMABLE LIQUID"), concerning the nature of the danger, may be placed on the lower part of the label.

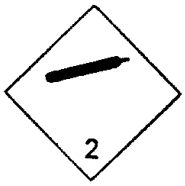
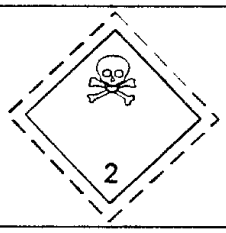
(7) Wording on danger labels must be legible and indelible. According to the IMDG Code, the stencilling of labels on packages must be so executed that the labels on the packages can still be recognized after not less than three months in seawater.

(8) The IMDG Code prescribes a special label (or marking) to identify marine pollutants. This marking must be of a colour contrasting with that of the package, or in the case of a sticker be black and white. The sides of this triangular marking must measure not less than 100 mm for packages, (except where the dimensions of the latter make it necessary to use smaller markings), and not less than 250 mm for transport equipment.

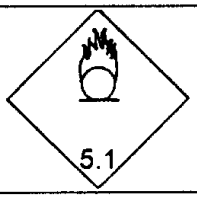
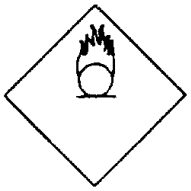
Models of danger labels prescribed by international regulations

A. Danger labels

Danger label number according to		Description	Explanation	Label
UN	RID/ADR			
1	1	Black on orange background: bomb blast in upper half; appropriate division number and compatibility group letter in lower half; small figure "1" in bottom corner	Liable to explosion, divisions 1.1, 1.2 and 1.3	
1.4	1.4	Black on orange background: division No. "1.4" filling most of the upper half; appropriate compatibility group letter in the lower half; small figure "1" in bottom corner	Liable to explosion, division 1.4	
1.5	1.5	Black on orange background: division No. "1.5" filling most of the upper half; compatibility group letter "D" in the lower half; small figure "1" in bottom corner	Liable to explosion, division 1.5	
1.6	1.6	Black on orange background: division No. "1.6" filling most of the upper half; compatibility group letter "N" in the lower half; small figure "1" in bottom corner	Liable to explosion, division 1.6	
01	01	Black on orange background: bomb blast in upper half	Liable to explosion	

Danger label number according to		Description	Explanation	Label
UN	RID/ADR			
2.1	-	Black or white flame on red ground, small figure "2" in bottom corner	Danger of fire (flammable gases) (IMDG Code and ICAO-TI only)	
2.2	2	Gas cylinder, black or white, on green background, small figure "2" in bottom corner	Non-flammable, non-toxic gas	
2.3	-	Death's head on cross-bones, black on white ground, small figure "2" in bottom corner	Toxic gases (IMDG Code and ICAO-TI only)	
3	-	Black or white flame on red ground, small figure "3" in bottom corner	Danger of fire (flammable liquids) (IMDG Code/ICAO-TI only) (primary hazard only)	
03	3	As above, without the figure "3" in the bottom corner	Danger of fire (flammable liquids and gases) (RID/ADR: primary hazard or subsidiary risk) (IMDG Codes/ICAO-TI: subsidiary risk only)	

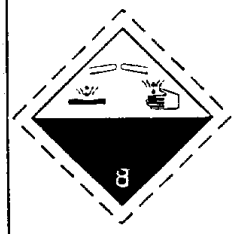
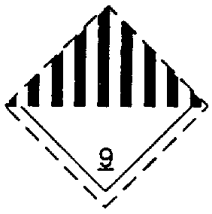
Danger label number according to		Description	Explanation	Label
UN	RID/ADR			
4.1	-	Black flame on ground of equidistant alternate red and white vertical stripes, small figure "4" in bottom corner	Danger of fire (flammable solids) (IMDG Code and ICAO-TI only; primary hazard only)	
04.1	4.1	As above, without the figure "4" in the bottom corner	Danger of fire (flammable solids) (RID/ADR: primary hazard and subsidiary risk) (IMDG Code/ICAO-TI: subsidiary risk only)	
4.2	-	Black flame on white ground, lower triangle of label red, small figure "4" in bottom corner	Substance liable to spontaneous ignition (IMDG Code/ICAO-TI only; primary hazard only)	
04.2	4.2	As above without the figure "4" in the bottom corner	Substance liable to spontaneous ignition (RID/ADR: primary hazard and subsidiary risk) (IMDG Code/ICAO-TI: subsidiary risk only)	

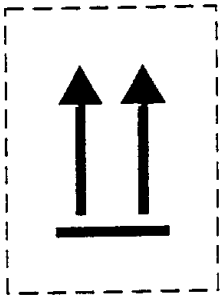
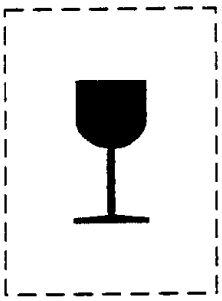
Danger label number according to		Description	Explanation	Label
UN	RID/ADR			
4.3	-	Black or white flame on blue ground, figure "4" in bottom corner	Danger of emission of flammable gas on contact with water (IMDG Code/ICAO-TI only; primary hazard only)	
04.3	4.3	As above without the figure "4" in the bottom corner	(RID/ADR: primary hazard and subsidiary risk; IMDG Code/ICAO-TI: subsidiary risk only)	
5.1	5.1	Flame over a circle, black on yellow background, small figure "5.1" in bottom corner	Oxidizing substance	
5.2	5.2	Flame over a circle, black on yellow background, small figure "5.2" in bottom corner	Organic peroxide: risk of fire	
05	05	Flame over a circle, black on yellow background	Fire-intensifying risk	

Danger label number according to		Description	Explanation	Label
UN	RID/ADR			
6.1	-	Death's head on cross-bones, black on white ground, small figure "6" in bottom corner	Toxic substance: to be kept apart from foodstuffs and other articles for consumption in vehicles and at loading, unloading or transloading points (IMDG Code/ICAO-TI only; primary hazard only)	
06.1	6.1	As above, without the figure "6" in the bottom corner	As above but: RID/ADR: primary hazard and subsidiary risk; IMDG Code/ICAO-TI: subsidiary risk only	
6.2	6.2	Three crescents superimposed on a circle, black on white ground, small figure "6" in bottom corner	Infectious substances: to be kept apart from foodstuffs and other articles for consumption in vehicles at loading, unloading or transloading points	

Danger label number according to		Description	Explanation	Label
UN	RID/ADR			
7A	7A	Stylized trefoil, inscription RADIOACTIVE followed by a vertical stripe in the lower half, with the following text: Contents ... Activity ... small figure "7" in lower corner; black symbol and inscription on white background; red vertical stripe	Radioactive material in packages of category I-WHITE; in the event of damage to the packages, danger to health by ingestion or inhalation of, or contact with, spilled contents	
7B	7B	As above, but with two red vertical stripes in the lower half and the following text: Contents ... Activity ... Transport index ... (in the rectangular black-bordered box); small figure "7" in bottom corner, black symbol and inscriptions; upper half of background: yellow; lower half of background: white; red vertical stripes	Radioactive material in packages of category II-YELLOW; packages to be kept away from packages bearing the inscription "FOTO"; in the event of damage to packages, danger to health by ingestion or inhalation of, or contact with, spilled contents, and risk of external radiation at a distance	

Danger label number according to		Description	Explanation	Label
UN	RID/ADR			
7C	7C	As above, but with three red vertical stripes in the lower half	Radioactive material in packages of category III-YELLOW; packages to be kept away from packages bearing the inscription "FOTO"; in the event of damage to packages, danger to health by ingestion or inhalation of, or contact with, spilled contents, and a risk of external radiation at a distance	
7D	7D	Stylized trefoil, inscription RADIOACTIVE, and figure "7". Black symbol and inscription; upper half of background: yellow; lower half of background: white. The use of the word "Radioactive" in the lower half is optional: the alternative use of this label to display the appropriate substance identification number for the consignment	Radioactive material presenting the dangers described under 7A, 7B or 7C	

Danger label number according to		Description	Explanation	Label
UN	RID/ADR			
8	-	Liquid dripping from a test-tube on to a plate and from another test-tube on to a hand; black or white ground, lower triangle of label black with a white border, small white figure "8" in bottom corner	Corrosive substance (IMDG Code/ICAO-TI only; primary hazard only)	
08	8	As above, without the figure "8" in the bottom corner	Corrosive substance (RID/ADR: primary hazard and subsidiary risk; IMDG Code/ICAO-TI: subsidiary risk only)	
9	9	White background with seven black vertical stripes in the upper half and small figure "9", underlined, in the bottom corner	Miscellaneous substances and articles which, during transport, present dangers other than those covered by the other classes	
-	-	Triangular marking; a cross superimposed on a fish, black on white ground	Marine pollutant (IMDG Code only)	

Danger label number according to		Description	Explanation	Label
UN	RID/ACR			
-	10	(Reserved)		
-	11	Two black arrows on white or suitable contrasting ground	This side up: label to be affixed, with arrows pointing upwards	
-	12	Black wineglass on white or suitable contrasting ground	Fragile, or handle with care	

B. Marking of transport units (placarding)

(1) In addition to the affixing of enlarged labels on transport units, the IMDG Code, RID and ADR prescribe special marking for certain transport units.

(2) The IMDG Code prescribes that the UN number for dangerous goods should be displayed in black digits not less than 65 mm high, either on a white ground in the lower half of the placard, or on an orange rectangular panel not less than 120 mm high and 300 mm wide, with a 10 mm black border, to be placed immediately adjacent to the placard (see examples 1 and 2 below). These markings are applicable to tank-vehicles and containers for bulk transport and transport units loaded with a single special substance in packages (except for goods of Class 1) constituting a full load.

(3) ADR prescribes that rectangular orange-coloured plates (40 cm x 30 cm) must be affixed to transport units carrying dangerous goods. In addition, RID and ADR prescribe for bulk tank units and vehicles, wagons and containers a marking on the orange panels (40 cm x 30 cm) including in the lower half the substance-identification number (UN number) and in the upper half the hazard-identification number. The conditions of application are set out in marginal 10 500 of Annex B of ADR, and the hazard identification numbers (and their meaning) in Appendix B.5 of ADR (ADR, Annex B, marginal 250 000).

Example of marking of a tank-container carrying acetal, Class 3, UN No 1088

1. <u>According to the IMDG Code</u>

FIRST VARIANT

black flame on red ground

SECOND VARIANT

black flame on red ground

orange ground

1088

border and digits in black

2. <u>According to RID/ADR</u>

black flame
on red ground

33
1088

Hazard-identification number (2 or 3 digits)

Substance-identification number (4 digits)

Orange ground.
Border, horizontal line and digits, 15 mm in stroke width.

Appendix 3

STABILITY OF VESSELS CARRYING CONTAINERS

1 General

1.1 The provisions of this Appendix apply to vessels carrying containers when documents concerning stability are required under marginals 110 294 or 120 294. The documents concerning stability shall be checked and stamped by a body approved by the competent authority.

1.2 The documents concerning stability shall provide information comprehensible to the steersman on the stability of the vessel for each container load.

The documents concerning stability shall include at least:

(a) tables of permissible stability coefficients, the permissible KG values or permissible heights of the cargo's centre of gravity;

(b) data on the spaces which may be filled with ballast water;

(c) the formulae for ascertaining stability;

(d) a sample calculation or instructions for the steersman.

1.3 For vessels which may carry alternatively fixed containers and non-fixed containers, separate documents concerning stability are required for the carriage of fixed containers and for the carriage of non-fixed containers.

1.4 A cargo of containers is considered as a fixed cargo when each individual container is firmly secured to the hull of the vessel by the means of guides or tensioners and its position cannot change during navigation.

2 Minimum and maximum values and calculation method for establishing the stability of vessels carrying non-fixed containers

2.1 In the case of non-fixed containers, any calculation method used to determine the vessel's stability shall conform to the following requirements:

(a) the metacentric centre $\overline{MG}$ shall not be less than 1.00 m;

(b) under the combined action of the centrifugal force produced by the turning of the vessel, the thrust of the wind and flooded free surfaces, the heel shall not be more than 5° and the deck side shall not be submerged;

(c) the heeling arm resulting from the centrifugal force due to the turning of the vessel shall be determined by the following formula:

$$h_{KZ} = C_{KZ} \cdot \frac{V^2}{L_F} \cdot (\overline{KG} - \frac{T'}{2})[m]$$

where, C_{KZ} = parameter (C_{KZ} = 0.04) [s^2/m];

V = maximum speed of vessel [m/s];

L_F = length of vessel at maximum draught [m];

$\overline{KG}$ = height of centre of gravity of loaded vessel above the baseline [m];

T' = average draught of loaded vessel [m].

(d) The heeling arm resulting from the thrust of the wind shall be determined according to the following formula:

$$h_{KZ} = C_{KW} \cdot \frac{A'}{D'} \cdot (l_w + \frac{T'}{2}) \ [m]$$

where, C_{KW} = parameter (C_{KW} = 0.025);

A' = lateral surface above the water when vessel is loaded [m^2];

D' = displacement of loaded vessel [t];

l_w = height of centre of gravity of lateral surface A above the water in relation to the water-line [m];

T' = average draught of loaded vessel [m].

(e) The heeling arm resulting from the free surfaces exposed to rainwater and residual water inside the hold or double bottom shall be determined according to the following formula:

$$h_{KfO} = \frac{C_{KfO}}{D'} \cdot \sum (b \cdot 1 \cdot (b - 0.55 \sqrt{b}))[m]$$

where, C_{KfO} = parameter (C_{KfO} = 0,015) [t/m^2];

b = breadth of hold or section of hold concerned [m] */;

l = length of hold or section of hold concerned [m] */;

D' = displacement of loaded vessel (t).

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*/ Sections of hold which provide free surfaces exposed to rainwater and residual water are those independant sections resulting from the longitudinal or transversal watertight subdivision.

(f) For each load, half the fuel and freshwater supply shall be taken into account.

2.2 The stability of a vessel loaded with non-fixed containers shall be considered adequate when the actual $\overline{KG}$ is not more than the $\overline{KG}_{zul}$ produced by the formula below. The $\overline{KG}_{zul}$ shall be calculated for various displacements covering the whole range of possible drafts:

(a)
$$\overline{KG}_{zul} = \frac{\overline{KM} + \frac{B_F}{2F}\left(Z \cdot \frac{T_m}{2} - h_{KW} - h_{KfO}\right)}{\frac{B_F}{2F} \cdot Z + 1} [m]$$

For $\frac{B_F}{2F}$, no value below 11.5 shall be used $\left(11.5 = \frac{1}{\tan 5^\circ}\right)$

(b) $\overline{KG}_{zul} = \overline{KM}$ - 1.00 [m] .

The smaller value for $\overline{KG}_{zul}$ produced by (a) or (b) shall apply.

Where, $\overline{KG}_{zul}$ = maximum permissible height of the centre of gravity of the loaded vessel above the baseline [m];

$\overline{KM}$ = metacentric height above the baseline [m] according to the approximation formula in 2.3;

B_F = breadth at maximum draught [m];

F = actual freeboard at 1/2 L [m];

Z = parameter for centrifugal force produced by turning;

$$Z = \frac{(0.7 \cdot v)^2}{9.81 \cdot 1.25 \cdot L_F} = 0.04 \cdot \frac{v^2}{L_F} [-];$$

V= maximum vessel speed on water [m/s];

L_F = length of water-line at maximum draught [m];

T_m = average draught [m];

h_{KW} = heeling arm produced by lateral wind thrust [m] (see 2.1 (d));

h_{KfO} = sum of heeling arms produced by flooded free surfaces [m] (see 2.1 (e));

2.3 Approximation formula for $\overline{KM}$

Where there is no curve plan available, the value of $\overline{KM}$ for the calculation in accordance with 2.2 and 3.2 can be determined, for example, by the following approximation formulae:

(a) pontoon vessels

$$\overline{KM} = \frac{B^2{}_F}{(12.5 - \frac{T_m}{H}) \cdot T_m} + \frac{T_m}{2} \; [m];$$

(b) other vessels

$$\overline{KM} = \frac{B^2{}_F}{(12.7 - 1.2 \cdot \frac{T_m}{H}) \cdot T_m} + \frac{T_m}{2} \; [m];$$

In these formulae, in addition to the terms defined in 2.1 and 2.2

H = lateral height of vessel [m]

3 Minimum and maximum values and calculation method for establishing the stability of vessels carrying fixed containers

3.1 In the case of fixed containers, any calculation method used to determine the stability of the vessel shall conform to the following requirements:

(a) the metacentric height $\overline{MG}$ shall not be less than 0.50 m;

(b) under the combined action of the centrifugal force produced by the turning of the vessel, the thrust of the wind and the flooded free surfaces, no hull opening shall be submerged;

(c) the heeling arm resulting from the centrifugal force produced by the turning of the vessel, the thrust of the wind and the flooded free surfaces shall be determined by the formulae referred to under 2.1 (c), (d) and (e);

(d) for each load, half the fuel and fresh water supply shall be taken into account.

3.2 The stability of a vessel loaded with fixed containers shall be considered adequate when actual $\overline{KG}$ is less than or equal to the $\overline{KG}_{zul}$ produced by the formula below. The $\overline{KG}_{zul}$ shall be calculated for various displacements covering the whole range of possible drafts.

(a)

$$\overline{KG}_{zul} = \frac{\overline{KM} - \frac{I - i}{2\nabla}(1 - 1.5\,\frac{F}{F'}) + 0.75\,\frac{B_F}{F'}\,(Z \cdot \frac{T_m}{2} - h_{KW} - h_{KfO})}{0.75\,\frac{B_F}{F'} \cdot Z + 1} \; [m]$$

for $\frac{B_F}{F'}$, no value less than 6.6 shall be used; and

for $\frac{I - i}{2\forall} \cdot (1 - 1.5 \frac{F}{F'})$ no value less than 0.

(b) $\overline{KG}_{zul} = \overline{KM} - 0.50$ [m]

The smaller value for $\overline{KG}_{zul}$ produced by (a) or (b) shall apply.

In the formulae in addition to the terms defined previously:

I = moment of inertia of cross-section at the water-line at T_m [m^4] (for the approximation formula, see 3.3);

i = moment of inertia of cross-section at the water-line parallel to the baseline, at the height $T + \frac{2}{3} F'$ $[m^4]$;

$\forall$ = displacement of vessel at T [m^3];

F' = ideal freeboard $F' = H' - T_m$ $[m]$ or $F' = \frac{a \cdot B_F}{2 \cdot b}$ $[m]$, whichever is the smaller;

a = vertical distance between the lower edge of the submerged opening in the event of heeling and the water-line, with the vessel in normal position [m];

b = distance of the same opening from amidships [m];

H' = ideal depth $H + \frac{q}{0.9 \cdot L \cdot B_F}$ $[m]$

H = minimum depth [m];

q = sum of the volumes of deckhouses, hatchways, trunk hatches and other superstructures, up to a maximum height of 1.0 m above H or up to the lowest opening of the space in question, whichever is the lower.

Parts of spaces situated within 0.05 L of the ends of the vessel shall not be taken into consideration [m^3].

3.3 Approximation formula for I

Where there is no curve plan available, the value necessary for calculation of the moment of lateral inertia I at the water-line can be obtained from the following approximation formulae:

(a) pontoon vessels

$$I = \frac{B^2{}_F \cdot \forall}{(12.5 - \frac{T_m}{H}) \cdot T_m} \ [m^4]$$

(b) other vessels

$$I = \frac{B^2{}_F \cdot \forall}{(12.7 - 1.2 \cdot \frac{T_m}{H}) \cdot T_m} [m^4]$$

4 Procedure for estimating on-board stability

The procedure for estimating stability may be determined on the basis of documents referred to in paragraph 1.2.