

## **PART 7**

### **Requirements concerning loading, carriage, unloading and handling of cargo**



## CHAPTER 7.1

### DRY CARGO VESSELS

#### **7.1.0 General requirements**

7.1.0.1 The provisions of 7.1.0 to 7.1.6 are applicable to dry cargo vessels.

7.1.0.2-  
7.1.0.99 *(Reserved)*

#### **7.1.1 Mode of carriage of goods**

7.1.1.1-  
7.1.1.9 *(Reserved)*

##### **7.1.1.10 Carriage of packages**

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

##### **7.1.1.11 Carriage in bulk**

Carriage of dangerous goods in bulk shall be prohibited except where this mode of carriage is explicitly authorized in column (8) of Table A of Chapter 3.2. The code “B” shall then appear in this column.

##### **7.1.1.12 Ventilation**

The ventilation of holds is required only if it is prescribed in 7.1.4.12 or by an additional requirement “VE ...” in column (10) of Table A of Chapter 3.2.

##### **7.1.1.13 Measures to be taken prior to loading**

Additional measures to be taken prior to loading are required only if prescribed in 7.1.4.13 or by an additional requirement “LO ...” in column (11) of Table A of Chapter 3.2.

##### **7.1.1.14 Handling and stowage of cargo**

During the handling and stowage of cargo additional measures are required only if prescribed in 7.1.4.14 or by an additional requirement “HA ...” in column (11) of Table A of Chapter 3.2.

7.1.1.15 *(Reserved)*

##### **7.1.1.16 Measures to be taken during loading, carriage, unloading and handling of cargo**

The additional measures to be taken during loading, carriage, unloading and handling of cargo are required only if prescribed in 7.1.4.16 or by an additional requirement “IN ...” in column (11) of Table A of Chapter 3.2.

7.1.1.17 *(Reserved)*

**7.1.1.18**      ***Carriage in containers, in intermediate bulk containers (IBCs) and in large packagings, in MEGCs, in portable tanks and in tank-containers***

The carriage of containers, IBCs, large packagings, MEGCs portable tanks and tank-containers shall be in accordance with the provisions applicable to the carriage of packages.

**7.1.1.19**      ***Vehicles and wagons***

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

7.1.1.20      *(Reserved)*

**7.1.1.21**      ***Carriage in cargo tanks***

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

7.1.1.22-  
7.1.1.99      *(Reserved)*

**7.1.2**            **Requirements applicable to vessels**

**7.1.2.0**        ***Permitted vessels***

7.1.2.0.1      Dangerous goods may be carried in quantities not exceeding those indicated in 7.1.4.1.1, or, if applicable, in 7.1.4.1.2:

- In dry cargo vessels conforming to the applicable construction requirements of 9.1.0.0 to 9.1.0.79; or
- In seagoing vessels conforming to the applicable construction requirements of 9.1.0.0 to 9.1.0.79, or otherwise to the requirements of 9.2.0 to 9.2.0.79.

7.1.2.0.2      Dangerous goods of classes 2, 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 7, 8 or 9, with the exception of those for which a No. 1 model label is required in column (5) of table A of Chapter 3.2, may be carried in quantities greater than those indicated in 7.1.4.1.1 and 7.1.4.1.2:

- In double-hull dry cargo vessels conforming to the applicable construction requirements of 9.1.0.80 to 9.1.0.95; or
- In double-hull seagoing vessels conforming to the applicable construction requirements of 9.1.0.80 to 9.1.0.95, or otherwise to the requirements of 9.2.0 to 9.2.0.95.

7.1.2.1-  
7.1.2.4      *(Reserved)*

**7.1.2.5**        ***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 shall be readily available for consultation at appropriate places on board in the language normally spoken on board and also if that language is not English, French or German, in English, French or German unless agreements concluded between the countries concerned in the transport operation provide otherwise.

7.1.2.6-  
7.1.2.18            *(Reserved)*

**7.1.2.19            *Pushed convoys and side-by-side formations***

7.1.2.19.1        Where at least one vessel of a convoy or side-by-side formation is required to be in possession of a certificate of approval for the carriage of dangerous goods, all vessels of such convoy or side-by-side formation shall be provided with an appropriate certificate of approval.

Vessels not carrying dangerous goods shall comply with the requirements of the following paragraphs:

7.1.2.5, 8.1.5, 8.1.6.1, 8.1.6.3, 8.1.7, 8.1.8, 8.1.9, 9.1.0.0, 9.1.0.12.3, 9.1.0.17.2, 9.1.0.17.3, 9.1.0.31, 9.1.0.32, 9.1.0.34, 9.1.0.41, 9.1.0.52.2, 9.1.0.52.3, 9.1.0.56, 9.1.0.71 and 9.1.0.74.

7.1.2.19.2        For the purposes of the application of the provisions of this Part with the exception of 7.1.4.1.1 and 7.1.4.1.2, the entire pushed convoy or the side-by-side formation shall be deemed to be a single vessel.

7.1.2.20-  
7.1.2.99            *(Reserved)*

**7.1.3                *General service requirements***

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

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

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

7.1.3.1.3        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. The measurement may only be effected by persons equipped with suitable breathing apparatus for the substance carried.

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

7.1.3.1.4        In case of suspected damage to packages, the gas concentration in holds containing dangerous goods of Classes 2, 3, 5.2, 6.1 and 8 for which EX and/or TOX appears in column (9) of Table A of Chapter 3.2, shall be measured before any person enters these holds.

7.1.3.1.5        The gas concentration in holds and in adjacent holds containing dangerous goods carried in bulk or without packaging for which EX and/or TOX appears in column (9) of Table A of Chapter 3.2, shall be measured before any person enters these holds.

7.1.3.1.6        Entry into holds where damage is suspected to packages in which dangerous goods of Classes 2, 3, 5.2, 6.1 and 8 are carried 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.

7.1.3.1.7 Entry into holds where dangerous goods are carried in bulk or without packaging 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.

7.1.3.2-  
7.1.3.14 *(Reserved)*

**7.1.3.15 *Expert on board the vessel***

When dangerous goods are carried, the responsible master shall at the same time be an expert according to 8.2.1.2.

*NOTE: Which master of the vessel's crew is the responsible master shall be determined and documented on board by the carrier. If there is no such determination, the requirement applies to every master.*

*By derogation from this, for the loading and unloading of dangerous goods in a barge, it is sufficient that the person who is responsible for loading and unloading and for ballasting of the barge has the expertise required according to 8.2.1.2.*

7.1.3.16-  
7.1.3.19 *(Reserved)*

**7.1.3.20 *Water ballast***

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

7.1.3.21 *(Reserved)*

**7.1.3.22 *Opening of holds***

7.1.3.22.1 Dangerous goods shall be protected against the influences of weather and against spray water except during loading and unloading or during inspection.

This provision does not apply when dangerous goods are loaded in sprayproof containers, IBCs, or large packagings, or in MEGCs, portable tanks, tank-containers, vehicles or wagons which are closed or sheeted.

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

7.1.3.23-  
7.1.3.30 *(Reserved)*

### **7.1.3.31**      *Engines*

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

This requirement does not apply to the petrol-operated outboard motors of lifeboats.

### **7.1.3.32**      *Oil fuel tanks*

Double bottoms with a height of at least 0.6 m may be used as oil fuel tanks provided that they have been constructed in accordance with Chapters 9.1 or 9.2.

7.1.3.33-  
7.4.3.40      (*Reserved*)

### **7.1.3.41**      *Fire and naked light*

7.1.3.41.1      The use of fire or naked light is prohibited.

This provision does not apply to the accommodation and the wheelhouse.

7.1.3.41.2      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.

7.1.3.41.3      Heating appliances or boilers fuelled with liquid fuels having a flash-point above 55° C which are installed in the engine room or in another suitable space may, however, be used.

### **7.1.3.42**      *Heating of holds*

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

7.1.3.43      (*Reserved*)

### **7.1.3.44**      *Cleaning operations*

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

7.1.3.45-  
7.1.3.50      (*Reserved*)

### **7.1.3.51**      *Electrical installations*

7.1.3.51.1      The electrical installations shall be properly maintained.

7.1.3.51.2      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 vessel close to the signal mast or gangway;

- electric cables for connecting containers;
- electric cables for electrically operated hatch cover gantries;
- electric cables for connecting submerged pumps;
- electric cables for connecting hold ventilators.

7.1.3.51.3 The sockets for connecting the signal lights and gangway lighting and for connecting containers, submerged pumps, hatch cover gantries, or hold fans shall not be live except when the signal lights or the gangway lighting are switched on or when the containers or the submerged pumps or the hatch cover gantries or hold fans are in operation. In the protected area, connecting or disconnecting shall not be possible except when the sockets are not live.

7.1.3.51.4 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 to electrical apparatus of a “certified safe type”.

7.1.3.52-  
7.1.3.69 *(Reserved)*

**7.1.3.70 *Aerials, lightning conductors, wire cables and masts***

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

7.1.3.70.2 No part of aerials for radiotelephones shall be located within 2.00 m from substances or articles of Class 1.

7.1.3.71-  
7.1.3.99 *(Reserved)*

**7.1.4 *Additional requirements concerning loading, carriage, unloading and other handling of the cargo***

**7.1.4.1 *Limitation of the quantities carried***

7.1.4.1.1 Subject to 7.1.4.1.3, the following gross masses shall not be exceeded on any vessel. For pushed convoys and side-by-side formations this gross mass applies to each unit of the convoy or formation.



**Class 1**

All substances and articles of Division 1.1 of compatibility group A	90 kg <sup>1</sup>
All substances and articles of Division 1.1 of compatibility groups B, C, D, E, F, G, J or L	15,000 kg <sup>2</sup>
All substances and articles of Division 1.2 of compatibility groups B, C, D, E, F, G, H, J or L	50,000 kg
All substances and articles of Division 1.3 of compatibility groups C, G, H, J or L	300,000 kg <sup>3</sup>
All substances and articles of Division 1.4 of compatibility groups B, C, D, E, F, G or S	1,100,000 kg
All substances of Division 1.5 of compatibility group D	15,000 kg <sup>2</sup>
All articles of Division 1.6 of compatibility group N	300,000 kg <sup>3</sup>
Empty packagings, uncleaned	1,100,000 kg

**Note:**

<sup>1</sup> In not less than three batches of a maximum of 30 kg each, distance between batches not less than 10.00 m.

<sup>2</sup> In not less than three batches of a maximum of 5 000 kg each, distance between batches not less than 10.00 m.

<sup>3</sup> Not more than 100,000 kg per hold. A wooden partition is permitted for subdividing a hold.

**Class 2**

All goods for which label No. 2.1 is required in column (5) of Table A of Chapter 3.2: total	300 000 kg
All goods for which label No. 2.3 is required in column (5) of Table A of Chapter 3.2: total	120 000 kg
Other goods	No limitation

**Class 3**

All goods for which label No. 6.1 is required in column (5) of Table A of Chapter 3.2: total	120 000 kg
Other goods: total	300 000 kg

**Class 4.1**

UN Nos. 3221, 3222, 3231 and 3232, total	15 000 kg
All goods of packing group I; all goods of packing group II for which label No. 6.1 is required in column (5) of Table A of Chapter 3.2; self-reactive substances of types C, D, E and F (UN Nos. 3223 to 3230 and 3233 to 3240); other substances of classification code SR1 or SR2 (UN Nos. 2956, 3241, 3242 and 3251); and desensitized explosive substances of packing group II (UN Nos. 2907, 3319 and 3344): total	120 000 kg
Other goods	No limitation

**Class 4.2**

All goods of packing groups I or II for which label No. 6.1 is required in column (5) of Table A of Chapter 3.2: total	300 000 kg
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Other goods No limitation

**Class 4.3**

All goods of packing groups I or II for which label No. 3, 4.1 or 6.1 is required in column (5) of Table A of Chapter 3.2: total 300 000 kg

Other goods No limitation

**Class 5.1**

All goods of packing groups I or II for which label No. 6.1 is required in column (5) of Table A of Chapter 3.2: total 300 000 kg

Other goods No limitation

**Class 5.2**

UN Nos. 3101, 3102, 3111 and 3112: total 15 000 kg

Other goods: total 120 000 kg

**Class 6.1**

All goods of packing group I: total 120 000 kg

All goods of packing group II: total 300 000 kg

Other goods No limitation

**Class 7**

UN Nos. 2912, 2913, 2915, 2916, 2917, 2919, 2977, 2978 and 3321 to 3333 0 kg

Other goods No limitation

**Class 8**

All goods of packing group I; goods of packing group II for which label No. 3 or 6.1 is required in column (5) of Table A in Chapter 3.2: total 300 000 kg

Other goods No limitation

**Class 9**

All goods of packing group II: total 300 000 kg

UN No. 3077, for goods carried in bulk and classified as hazardous to the aquatic environment, categories Acute 1 or Chronic 1, in accordance with 2.4.3: 0 kg

Other goods No limitation

7.1.4.1.2 Subject to 7.1.4.1.3, the maximum quantity of dangerous goods permitted on board a vessel or on board each unit of a pushed convoy or side-by-side formation is 1,100,000 kg.

7.1.4.1.3 The limitations of 7.1.4.1.1 and 7.1.4.1.2 shall not apply in the case of transport of dangerous goods of classes 2, 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 7, 8 and 9, except of those for which a label of Model No 1 is required in column (5) of Table A of Chapter 3.2, on board double-hull vessels complying with the additional requirements of 9.1.0.88 to 9.1.0.95 or 9.2.0.88 to 9.2.0.95.

7.1.4.1.4 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 7.1.4.3.3 or 7.1.4.3.4, the entire load shall not exceed the smallest maximum net mass given in 7.1.4.1.1 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.

7.1.4.1.5 Where the total net mass of the explosive substances carried and of explosive substances contained in articles carried is not known, the gross mass of the cargo shall apply to the mass mentioned in the table in 7.1.4.1.1 above.

7.1.4.1.6 For activity limits, transport index (TI) limits and criticality safety indices (CSI) in the case of the carriage of radioactive material, see 7.1.4.14.7.

**7.1.4.2 Prohibition of mixed loading (bulk)**

Vessels carrying substances of Class 5.1 in bulk shall not carry any other goods.

**7.1.4.3 Prohibition of mixed loading (packages in holds)**

7.1.4.3.1 Goods of different classes shall be separated by a minimum horizontal distance of 3.00 m. They shall not be stowed one on top of the other.

7.1.4.3.2 Irrespective of the quantity, dangerous goods for which marking with two blue cones or two blue lights is prescribed in column (12) of Table A of Chapter 3.2 shall not be stowed in the same hold together with flammable goods for which marking with one blue cone or one blue light is prescribed in column (12) of Table A of Chapter 3.2.

7.1.4.3.3 Packages containing substances or articles of Class 1 and packages containing substances of Classes 4.1 or 5.2 for which marking with three blue cones or three blue lights is prescribed in column (12) of Table A of Chapter 3.2 shall be separated by a distance of not less than 12 m from goods of all other classes.

7.1.4.3.4 Substances and articles of Class 1 shall not be stowed in the same hold, except as indicated in the following table:

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

“X” indicates that explosive substances or articles of corresponding compatibility groups in accordance with Part 2 of these Regulations may be stowed in the same hold.

<sup>1/</sup> Packages containing articles assigned to compatibility group B or substances or articles assigned to compatibility group D may be loaded together in the same hold provided that they are carried in containers or vehicles or wagons with complete metal walls.

<sup>2/</sup> Different categories of articles of Division 1.6, compatibility group N, may be carried together as articles of Division 1.6, compatibility group N, 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.

<sup>3/</sup> 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.

<sup>4/</sup> Packages with substances or articles of compatibility group L may be stowed in the same hold with packages containing the same type of substances or articles of the same compatibility group.

7.1.4.3.5 For the carriage of material Class 7 (UN Nos. 2916, 2917, 3323, 3328, 3329 and 3330) in Type B(U) or Type B(M) or Type C packages, the controls, restrictions or provisions specified in the competent authority approval certificate shall be complied with.

7.1.4.3.6 For the carriage of material of Class 7 under special arrangement (UN Nos. 2919 and 3331), 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.

#### **7.1.4.4 *Prohibition of mixed loading (containers, vehicles, wagons)***

7.1.4.4.1 7.1.4.3 shall not apply to packages stowed in containers, vehicles or wagons in accordance with international regulations.

7.1.4.4.2 7.1.4.3 shall not apply to:

- closed containers with complete metal walls;
- closed vehicles and closed wagons with complete metal walls;
- tank-containers, portable tanks and MEGCs;
- tank-vehicles and tank-wagons.

7.1.4.4.3 For containers other than those referred to in paragraph 7.1.4.4.1 and 7.1.4.4.2 above the separation distance required by 7.1.4.3.1 may be reduced to 2.4 m (width of container).

#### **7.1.4.5 *Prohibition of mixed loading (seagoing vessels; inland navigation vessels carrying containers)***

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.

7.1.4.6 *(Reserved)*

#### **7.1.4.7 *Places of loading and unloading***

7.1.4.7.1 The dangerous goods shall be loaded or unloaded only at the places designated or approved for this purpose by the competent authority.

7.1.4.7.2 When substances or articles of Class 1 and substances of Classes 4.1 or 5.2 for which marking with three blue cones or three blue lights is prescribed in column (12) of Table A of Chapter 3.2 are on board, no goods of any kind may be loaded or unloaded except at the places designated or permitted for this purpose by the competent authority.

#### **7.1.4.8 *Time and duration of loading and unloading operations***

7.1.4.8.1 Loading and unloading operations of substances or articles of Class 1 and substances of Classes 4.1 or 5.2 for which marking with three blue cones or three blue lights is prescribed in column (12) of Table A of Chapter 3.2 shall not start without permission in writing from

the competent authority. This provision also applies to loading or unloading of other goods when substances or articles of Class 1 or substances of Classes 4.1 or 5.2 for which marking with three blue cones or three blue lights is prescribed in column (12) of Table A of Chapter 3.2 are on board.

7.1.4.8.2 Loading and unloading operations of substances or articles of Class 1 and substances of Classes 4.1 or 5.2, for which marking with three blue cones or three blue lights is prescribed in column (12) of Table A of Chapter 3.2, shall be suspended in the event of a storm.

#### **7.1.4.9 *Cargo transhipment operations***

Partial or complete cargo transhipment into another vessel without permission from the competent authority is prohibited outside a cargo transhipment place approved for this purpose.

#### **7.1.4.10 *Precautions with respect to foodstuffs, other articles of consumption and animal feeds***

7.1.4.10.1 When special provision 802 is indicated for a dangerous good in column (6) of Table A of Chapter 3.2, precautions shall be taken as follows with respect to foodstuffs, other articles of consumption and animal feeds:

Packages as well as uncleaned empty packagings, including large packagings and intermediate bulk containers (IBCs), bearing labels conforming to models Nos. 6.1 or 6.2, and those bearing labels of Class 9, containing substances of Class 9, UN Nos. 2212, 2315, 2590, 3151, 3152 or 3245, shall not be stacked on or loaded in immediate proximity to packages known to contain foodstuffs, other articles of consumption or animal feeds in the same hold and at places of loading and unloading or trans-shipment.

When these packages, bearing the said labels, are loaded in immediate proximity of packages known to contain foodstuffs, other articles of consumption or animal feeds, they shall be kept apart from the latter:

- (a) by complete partitions which should be as high as the packages bearing the said labels, or
- (b) by packages not bearing labels conforming to models Nos. 6.1, 6.2 or 9 or packages bearing labels of Class 9 but not containing substances of that class, UN Nos. 2212, 2315, 2590, 3151, 3152 or 3245, or
- (c) by a space of at least 0.8 m,

unless the packages bearing said labels are provided with an additional packaging or are completely covered (e.g. by a sheeting, a fibreboard cover or other measures).

#### **7.1.4.11 *Stowage plan***

7.1.4.11.1 The master 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 in accordance with 5.4.1.1.1 (a), (b), (c) and (d).

7.1.4.11.2 Where the dangerous goods are transported in containers, the number of the container shall suffice. In this case, the stowage plan shall contain as an annex a list of all containers with their numbers and the description of the goods contained therein in accordance with 5.4.1.1.1 (a), (b), (c) and (d).

#### **7.1.4.12**      *Ventilation*

- 7.1.4.12.1      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.
- 7.1.4.12.2      On board vessels carrying dangerous goods only in containers placed in open holds, ventilators do not require to be incorporated but must be on board. Where damage of the container or release of content inside the container is suspected, the holds shall be ventilated so as to reduce the concentration of gases given off by the cargo to less than 10% of the lower explosive limit or in the case of toxic gases to below any significant concentration.
- 7.1.4.12.3      If tank-containers, portable tanks, MEGCs, tank vehicles or tank wagons are carried in closed holds, such holds shall be permanently ventilated for ensuring five air changes per hour.

#### **7.1.4.13**      *Measures to be taken before loading*

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

#### **7.1.4.14**      *Handling and stowage of the cargo*

- 7.1.4.14.1      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.
  - 7.1.4.14.1.1      Packages containing dangerous substances and unpackaged dangerous articles shall be secured by suitable means capable of restraining the goods (such as fastening straps, sliding slatboards, adjustable brackets) in a manner that will prevent any movement during carriage which would change the orientation of the packages or cause them to be damaged. When dangerous goods are carried with other goods (e.g. heavy machinery or crates), all goods shall be securely fixed or packed so as to prevent the release of dangerous goods. Movement of packages may also be prevented by filling any voids by the use of dunnage or by blocking and bracing. Where restraints such as banding or straps are used, these shall not be over-tightened to cause damage or deformation of the package.
  - 7.1.4.14.1.2      Packages shall not be stacked unless designed for that purpose. Where different design types of packages that have been designed for stacking are to be loaded together, consideration shall be given to their compatibility for stacking with each other. Where necessary, stacked packages shall be prevented from damaging the package below by the use of load-bearing devices.
  - 7.1.4.14.1.3      During loading and unloading, packages containing dangerous goods shall be protected from being damaged.

*NOTE:      Particular attention shall be paid to the handling of packages during their preparation for carriage, the type of vessel on which they are to be carried and to the method of loading or unloading, so that accidental damage is not caused through dragging or mishandling the packages.*
  - 7.1.4.14.1.4      When orientation arrows are required, packages and overpacks shall be oriented in accordance with such markings.

*NOTE: Liquid dangerous goods shall be loaded below dry dangerous goods whenever practicable.*

- 7.1.4.14.2 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.
- 7.1.4.14.3 Packages shall be protected against heat, sunlight and the effects of the weather. This provision does not apply to vehicles, wagons, tank-containers, portable tanks, MEGCs and containers.
- Where packages are not enclosed in vehicles, wagons or containers but loaded on deck, they shall be covered with tarpaulins that are not readily flammable.
- The ventilation shall not be obstructed.
- 7.1.4.14.4 The dangerous goods shall be stowed in the holds. However, dangerous goods packed or loaded in:
- containers having complete sprayproof walls;
  - MEGCs;
  - vehicles having complete sprayproof walls;
  - tank-containers or portable tanks;
  - tank vehicles or tank wagons;
- may be carried on deck in the protected area.
- 7.1.4.14.5 Packages containing dangerous goods of Classes 3, 4.1, 4.2, 5.1 or 8 may be stowed on deck in the protected area provided that drums are used or that they are contained in containers with complete walls or vehicles or wagons with complete walls. Substances of Class 2 may be stowed on deck in the protected area, provided they are contained in cylinders.
- 7.1.4.14.6 For seagoing vessels, the stowage requirements set out in 7.1.4.14.1 to 7.1.4.14.5 above and 7.1.4.14.7 below shall be deemed to have been met, if the relevant stowage provisions of the IMDG Code and, in the case of carriage of dangerous goods in bulk, those set out in subsection 9.3 of the IMSBC Code have been complied with.
- 7.1.4.14.7 *Handling and stowage of radioactive material*
- NOTE 1:** “Critical group” means a group of members of the public which is reasonably homogeneous with respect to its exposure for a given radiation source and given exposure pathway and is typical of individuals receiving the highest effective dose by the given exposure pathway from the given source.
- NOTE 2:** “Members of the public” means in a general sense, any individuals in the population except when subject to occupational or medical exposure.
- NOTE 3:** “Workers” are any persons who work, whether full time, part-time or temporarily, for an employer and who have recognized rights and duties in relation to occupational radiation protection.

7.1.4.14.7.1 Segregation

7.1.4.14.7.1.1 Packages, overpacks, containers, tanks and vehicles and wagons containing radioactive material and unpackaged radioactive material shall be segregated during carriage:

- (a) from workers in regularly occupied working areas;
  - (i) in accordance with Table A below; or
  - (ii) by distances calculated using a dose criterion of 5 mSv in a year and conservative model parameters;

*NOTE: Workers subject to individual monitoring for the purposes of radiation protection shall not be considered for the purposes of segregation.*

- (b) from members of the critical group of the public, in areas where the public has regular access;
  - (i) in accordance with Table A below; or
  - (ii) by distances calculated using a dose criterion of 1 mSv in a year and conservative model parameters;

- (c) from undeveloped photographic film and mailbags;
  - (i) in accordance with Table B below; or
  - (ii) by distances calculated using a radiation exposure criterion for undeveloped photographic film due to the transport of radioactive material for 0.1 mSv per consignment of such film; and

*NOTE: Mailbags shall be assumed to contain undeveloped film and plates and therefore be separated from radioactive material in the same way.*

- (d) from other dangerous goods in accordance with 7.1.4.3.

**Table A: Minimum distances between packages of category II-YELLOW or of category III-YELLOW and persons**

Sum of transport indexes not more than	Exposure time per year (hours)			
	Areas where members of the public have regular access		Regularly occupied working areas	
	50	250	50	250
	Segregation distance in metres, no shielding material intervening, from:			
2	1	3	0.5	1
4	1.5	4	0.5	1.5
8	2.5	6	1.0	2.5
12	3	7.5	1.0	3
20	4	9.5	1.5	4
30	5	12	2	5
40	5.5	13.5	2.5	5.6
50	6.5	15.5	3	6.5



**Table B: Minimum distances 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							
Category			1	2	4	10	24	48	120	240
III-yellow	II-yellow		Minimum distances 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

7.1.4.14.7.1.2 Category II-YELLOW or III-YELLOW packages or overpacks shall not be carried in compartments occupied by passengers, except those exclusively reserved for couriers specially authorized to accompany such packages or overpacks.

7.1.4.14.7.1.3 No persons other than the master of the vessel or the driver of the vehicle embarked and the other members of the crew shall be permitted in vessels carrying packages, overpacks or containers bearing category II-YELLOW or III-YELLOW labels.

7.1.4.14.7.2 *Activity limits*

The total activity in a single hold or compartment of a vessel, or in another conveyance, for carriage of LSA material or SCO articles in Type IP-1, Type IP-2, Type IP-3 or unpackaged, shall not exceed the limits shown in Table C below:

**Table C: Conveyance activity limits for LSA material and SCO in industrial packages or unpackaged**

Nature of material or articles	Activity limit for conveyances other than by vessel	Activity limit for a hold or compartment of a vessel
LSA-I	No limit	No limit
LSA-II and LSA-III non-combustible solids	No limit	100A <sub>2</sub>
LSA-II and LSA-III combustible solids, and all liquids and gases	100A <sub>2</sub>	10A <sub>2</sub>
SCO	100A <sub>2</sub>	10A <sub>2</sub>

7.1.4.14.7.3 *Stowage during carriage and storage in transit*

7.1.4.14.7.3.1 Consignments shall be securely stowed.

7.1.4.14.7.3.2 Provided that its average surface heat flux does not exceed  $15\text{W/m}^2$  and that the immediately surrounding cargo is not in bags, a package or overpack may be carried or stored among packaged general cargo without any special stowage provisions except as may be specifically required by the competent authority in an applicable approval certificate.

7.1.4.14.7.3.3 Loading of containers and accumulation of packages, overpacks and containers shall be controlled as follows:

- (a) Except under the conditions of exclusive use, and for consignments of LSA-I material, the total number of packages, overpacks and containers aboard a single conveyance shall be so limited that the total sum of the transport indexes aboard the conveyance does not exceed the values shown in Table D below;
- (b) The radiation level under routine conditions of carriage shall not exceed 2 mSv/h at any point on, and 0.1 mSv/h at 2 m from, the external surface of the conveyance, except for consignments carried under exclusive use, for which the radiation limits around the conveyance are set forth in 7.1.4.14.7.3.5 (b) and (c);
- (c) The total sum of the criticality safety indexes in a container and aboard a conveyance shall not exceed the values shown in Table E below.

**Table D: Transport Index limits for containers and conveyances not under exclusive use**

Type of container or conveyance	Limit on total sum of transport indexes in a container or aboard a conveyance
Small container	50
Large container	50
Vehicle or wagon	50
Vessel	50

**Table E: Criticality Safety Index for containers and vehicles containing fissile material**

Type of container or conveyance	Limit on total sum of criticality safety indexes	
	Not under exclusive use	Under exclusive use
Small container	50	n.a.
Large container	50	100
Vehicle or wagon	50	100
Vessel	50	100

7.1.4.14.7.3.4 Any package or overpack having either a transport index greater than 10, or any consignment having a criticality safety index greater than 50, shall be carried only under exclusive use.

7.1.4.14.7.3.5 For consignments under exclusive use in vehicles or wagons, the radiation level shall not exceed:

- (a) 10 mSv/h at any point on the external surface of any package or overpack, and may only exceed 2 mSv/h provided that:
  - (i) the vehicle or wagon is equipped with an enclosure which, during routine conditions of carriage, prevents the access of unauthorized persons to the interior of the enclosure;

- (ii) provisions are made to secure the package or overpack so that its position within the vehicle or wagon enclosure remains fixed during routine conditions of carriage; and
  - (iii) there is no loading or unloading during the shipment;
- (b) 2 mSv/h at any point on the outer surfaces of the vehicle or wagon, including the upper and lower surfaces, or, in the case of an open vehicle or wagon, at any point on the vertical planes projected from the outer edges of the vehicle or wagon, on the upper surface of the load, and on the lower external surface of the vehicle or wagon; and
  - (c) 0.1 mSv/h at any point 2 m from the vertical planes represented by the outer lateral surfaces of the vehicle or wagon, or, if the load is carried in an open vehicle or wagon, at any point 2 m from the vertical planes projected from the outer edges of the vehicle or wagon.

7.1.4.14.7.3.6 Packages or overpacks having a surface radiation area greater than 2 mSv/h, unless being carried in or on a vehicle or wagon under exclusive use and unless they are removed from the vehicle or wagon when on board the vessel shall not be transported by vessel except under special arrangement.

7.4.1.14.7.3.7 The transport of consignments by means of a special use vessel which, by virtue of its design, or by reason of its being chartered, is dedicated to the purpose of carrying radioactive material, shall be excepted from the requirements specified in 7.1.4.14.7.3.3 provided that the following conditions are met:

- (a) A radiation protection programme for the shipment shall be approved by the competent authority of the flag state of the vessel and, when requested, by the competent authority at each port of call of the transit countries;
- (b) Stowage arrangements shall be predetermined for the whole voyage including any consignments to be loaded at ports of call en route; and
- (c) The loading, carriage and unloading of the consignments shall be supervised by persons qualified in the transport of radioactive material.

7.1.4.14.7.4 *Segregation of packages containing fissile material during carriage and storage in transit*

7.1.4.14.7.4.1 Any group of packages, overpacks, and containers containing fissile material stored in transit in any one storage area shall be so limited that the total sum of the criticality safety indexes in the group does not exceed 50. Each group shall be stored so as to maintain a spacing of at least 6 m from other such groups.

7.1.4.14.7.4.2 Where the total sum of the criticality safety indexes on board a vehicle, a wagon or in a container exceeds 50, as permitted in Table E above, storage shall be such as to maintain a spacing of at least 6 m from other groups of packages, overpacks or containers containing fissile material or other vehicles or wagons carrying radioactive material. The space between such groups may be used for other dangerous goods of ADN. The carriage of other goods with consignments under exclusive use is permitted provided that the pertinent provisions have been taken by the consignor and that carriage is not prohibited under other requirements.

7.1.4.14.7.5 *Damaged or leaking packages, contaminated packagings*

- 7.1.4.14.7.5.1 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 qualified person shall, as soon as possible, assess the extent of contamination and the resultant radiation level of the package. The scope of the assessment shall include the package, the vehicle, the wagon, the adjacent loading and unloading areas, and, if necessary, all other material which has been carried in the vessel. When necessary, additional steps for the protection of persons, property and the environment, in accordance with provisions established by the competent authority, shall be taken to overcome and minimize the consequences of such leakage or damage.
- 7.1.4.14.7.5.2 Packages damaged or leaking radioactive contents in excess of allowable limits for normal conditions of carriage may be removed to an acceptable interim location under supervision, but shall not be forwarded until repaired or reconditioned and decontaminated.
- 7.1.4.14.7.5.3 Vehicles, wagons, vessels and equipment used regularly for the carriage of radioactive material shall be periodically checked to determine the level of contamination. The frequency of such checks shall be related to the likelihood of contamination and the extent to which radioactive material is carried.
- 7.1.4.14.7.5.4 Except as provided in paragraph 7.1.4.14.7.5.6, any vessel, or equipment or part thereof which has become contaminated above the limits specified in 7.1.4.14.7.5.5 in the course of carriage of radioactive material, or which shows a radiation level in excess of 5  $\mu\text{Sv/h}$  at the surface, shall be decontaminated as soon as possible by a qualified person and shall not be re-used unless the non-fixed contamination does not exceed the limits specified in 7.1.4.14.7.5.5, and the radiation level resulting from the fixed contamination on surfaces after decontamination is less than 5  $\mu\text{Sv/h}$  at the surface.
- 7.1.4.14.7.5.5 For the purposes of 7.1.4.14.7.5.4, non-fixed contamination shall not exceed:
- 4  $\text{Bq/cm}^2$  for beta and gamma emitters and low toxicity alpha emitters;
  - 0.4  $\text{Bq/cm}^2$  for all other alpha emitters.

These are average limits applicable to any area of 300  $\text{cm}^2$  on any part of the surface.

- 7.1.4.14.7.5.6 Vessels dedicated to the carriage of radioactive material under exclusive use shall be excepted from the requirements of the previous paragraph 7.1.4.14.7.5.4 solely with regard to its internal surfaces and only for as long as it remains under that specific exclusive use.

7.1.4.14.7.6 *Limitation of the effect of temperature*

- 7.1.4.14.7.6.1 If the temperature of the accessible outer surfaces of a Type B (U) or Type B (M) package could exceed 50  $^{\circ}\text{C}$  in the shade, carriage is permitted only under exclusive use. As far as practicable, the surface temperature shall be limited to 85  $^{\circ}\text{C}$ . 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.
- 7.1.4.14.7.6.2 If the average heat flux from the external surfaces of a Type B (U) or B (M) package could exceed 15  $\text{W/m}^2$ , the special stowage requirements specified in the competent authority package design approval certificate shall be met.

7.1.4.14.7.7 *Other provisions*

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.

**7.1.4.15** *Measures to be taken after unloading*

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

7.1.4.15.2 For material of Class 7 see also 7.1.4.14.7.5.

7.1.4.15.3 A cargo transport unit or hold space which has been used to carry infectious substances shall be inspected for release of the substance before re-use. If the infectious substances were released during carriage, the cargo transport unit or hold space shall be decontaminated before it is re-used. Decontamination may be achieved by any means which effectively inactivates the released infectious substance.

**7.1.4.16** *Measures to be taken during loading, carriage, unloading and handling of the cargo*

The filling or emptying of receptacles, tank vehicles, tank wagons, intermediate bulk containers (IBCs), large packagings, MEGCs, portable tanks or tank-containers on board the vessel is prohibited without special permission from the competent authority.

7.1.4.17-  
7.1.4.40-  
(Reserved)

**7.1.4.41** *Fire and naked light*

The use of fire or naked light is prohibited while substances or articles of Divisions 1.1, 1.2, 1.3, 1.5 or 1.6 of Class 1 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.

7.1.4.42-  
7.1.4.50  
(Reserved)

**7.1.4.51** *Electrical equipment*

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 of Class 1 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 2.00 m from the substances or articles mentioned above.

7.1.4.52  
(Reserved)

**7.1.4.53** *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 on deck in the protected area, they shall be of “limited explosion risk” type.

7.1.4.54-  
7.1.4.74

*(Reserved)*

#### **7.1.4.75**      ***Risk of sparking***

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

#### **7.1.4.76**      ***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.

Steel cables sheathed in synthetic material or natural fibres are considered as equivalent when the minimum tensile strength required in accordance with the Regulations referred to in 1.1.4.6 is obtained from the steel strands.

However, during loading or unloading of containers, vessels may be moored by means of synthetic ropes.

7.1.4.77-  
7.1.4.99

*(Reserved)*

### **7.1.5**      **Additional requirements concerning the operation of vessels**

#### **7.1.5.0**      ***Marking***

7.1.5.0.1      Vessels carrying dangerous goods listed in Table A of Chapter 3.2 shall, in accordance with Chapter 3 of the European Code for Inland Waterways (CEVNI), display the markings prescribed in column (12) in this table.

7.1.5.0.2      Vessels carrying the dangerous goods listed in Table A of Chapter 3.2 in packages placed exclusively in containers shall display the number of blue cones or blue lights indicated in column (12) of Table A of Chapter 3.2 where:

- three blue cones or three blue lights are required, or
- two blue cones or two blue lights are required, a substance of Class 2 is involved or packing group I is indicated in column (4) of Table A of Chapter 3.2 and the total gross mass of these dangerous goods exceeds 30,000 kg, or
- one blue cone or one blue light is required, a substance of Class 2 is involved or packing group I is indicated in column (4) of Table A of Chapter 3.2 and the total gross mass of these dangerous goods exceeds 130,000 kg.

7.1.5.0.3      Vessels carrying empty, uncleaned tanks, battery vehicles, battery wagons or MEGCs shall display the marking referred to in column (12) of Table A of Chapter 3.2 if these cargo transport units have contained dangerous goods for which this table prescribes marking.

7.1.5.0.4 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.

7.1.5.0.5 By derogation from paragraph 7.1.5.0.1, and in accordance with the footnotes to article 3.14 of the European Code for Inland Waterways (CEVNI), the competent authority of a Contracting Party may authorize seagoing vessels temporarily operating in an inland navigation area on the territory of this Contracting Party, the use of the day and night signals prescribed in the Recommendations on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas adopted by the Maritime Safety Committee of the International Maritime Organization (by night an all-round fixed red light and by day flag “B” of the International Code of Signals), instead of the signals prescribed in 7.1.5.0.1. Contracting Parties which have taken the initiative with respect to the derogation granted shall notify the Executive Secretary of the UNECE, who shall bring this derogation to the attention of the Administrative Committee.

#### **7.1.5.1 *Mode of navigation***

7.1.5.1.1 The competent authorities may impose restrictions on the inclusion of vessels carrying dangerous goods in pushed convoys of large dimension.

7.1.5.1.2 When vessels carry substances or articles of Class 1, or substances of Classes 4.1 or 5.2 for which marking with three blue cones or three blue lights is prescribed in column (12) of Table A of Chapter 3.2, or material of Class 7 of UN Nos. 2912, 2913, 2915, 2916, 2917, 2919, 2977, 2978 or 3321 to 3333, the competent authority may impose restrictions on the dimensions of convoys or side-by-side formations. Nevertheless, the use of a motorized vessel giving temporary towing assistance is permitted.

#### **7.1.5.2 *Vessels under way***

Vessels carrying substances or articles of Class 1, or substances of Classes 4.1 or 5.2 for which marking with three blue cones or three blue lights is prescribed in column (12) of Table A of Chapter 3.2, when under way shall keep not less than 50 m away from any other vessel, if possible.

#### **7.1.5.3 *Mooring***

Vessels shall be moored securely, but in such a way that they can be released quickly in an emergency.

#### **7.1.5.4 *Berthing***

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

7.1.5.4.2 An expert in accordance with 8.2.1.2 shall be permanently on board berthed vessels for which marking is prescribed in column (12) of Table A of Chapter 3.2.

The competent authority may, however, exempt from this obligation those vessels which are berthed in a harbour basin or in an accepted berthing position.

7.1.5.4.3 Outside the berthing areas specifically designated by the 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 the requirements of column (12) of Table A of Chapter 3.2;
- 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 the requirements of column (12) of Table A of Chapter 3.2;
- 500 m from residential areas, civil engineering structures and storage tanks holding gas or flammable liquids if the vessel is required to be marked with three blue cones or three blue lights in accordance with the requirements of column (12) of Table A of Chapter 3.2.

While waiting in front of locks or bridges, vessels are allowed to keep distances different from and lower than those given above. In no case shall the distance be less than 100 m.

7.1.5.4.4 The competent authority may prescribe distances lower than those given in 7.1.5.4.3 above, especially taking local conditions into account.

#### **7.1.5.5 *Stopping of vessels***

If navigation of a vessel carrying substances and articles of Class 1 or substances of Class 4.1 or 5.2 for which marking with three blue cones or three blue lights is prescribed in column (12) of Table A of Chapter 3.2 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 7.1.5.4.

The competent authority shall be notified without delay.

7.1.5.6-  
7.1.5.7 *(Reserved)*

#### **7.1.5.8 *Reporting duty***

7.1.5.8.1 In the States where the reporting duty is in force, the master of the vessel shall provide information in accordance with paragraph 1.1.4.6.1.

7.1.5.8.2-  
7.1.5.8.4 *(Deleted)*

7.1.5.9-  
7.1.5.99 *(Reserved)*



## 7.1.6 Additional requirements

7.1.6.1-  
7.1.6.10 (Reserved)

### 7.1.6.11 Carriage in bulk

The following additional requirements shall be met when they are indicated in column (11) of Table A of Chapter 3.2:

CO01: The surfaces of holds shall be coated or lined such that they are not readily flammable and not liable to impregnation by the cargo.

CO02: Any part of the holds and of the hatchway covers which may come into contact with this substance shall consist of metal or of wood having a specific density of not less than 750 kg/m<sup>3</sup> (seasoned wood).

CO03: The inner surfaces of holds shall be lined or coated so as to prevent corrosion.

ST01: The substances shall have been stabilized in accordance with the requirements applicable to ammonium nitrate fertilizers set out in the IMSBC Code. Stabilizing shall be certified by the consignor in the transport document.

In those States where this is required, these substances may be carried in bulk only with the approval of the competent authority.

ST02: These substances may be carried in bulk if the results of the trough test according to subsection 38.2 of the *Manual of Tests and Criteria* show that the self-sustaining decomposition rate is not greater than 25 cm/h.

RA01: The materials 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.

RA02: The materials may be carried in bulk provided that:

- (a) they are carried in a vessel 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/cm<sup>2</sup> (10<sup>-4</sup> μCi/cm<sup>2</sup>) for beta and gamma emitters and low toxicity alpha emitters or 0.4 Bq/cm<sup>2</sup> (10<sup>-5</sup> μCi/cm<sup>2</sup>) for all other alpha emitters;
- (c) measures are taken to ensure that radioactive material is not released into the vessel, if it is suspected that non-fixed contamination exists on inaccessible surfaces of more than 4 Bq/cm<sup>2</sup> (10<sup>-4</sup> μCi/cm<sup>2</sup>) for beta and gamma emitters and low toxicity alpha emitters or 0.4 Bq/cm<sup>2</sup> (10<sup>-5</sup> μCi/cm<sup>2</sup>) for all other alpha emitters.

Surface contaminated objects group (SCO-II) shall not be carried in bulk.

RA03: Merged with RA02.

#### 7.1.6.12 *Ventilation*

The following additional requirements shall be met when they are indicated in column (10) of Table A of Chapter 3.2:

VE01: Holds containing these substances 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. The measurement shall be carried out immediately after loading. The measurement shall be repeated after one hour for monitoring purposes. The results of the measurement shall be recorded in writing.

VE02: Holds containing these substances shall be ventilated with the ventilators operating at full power, where after measurement it has been established that the holds are not free from gases given off by the cargo. The measurement shall be carried out immediately after loading. The measurement shall be repeated after one hour for monitoring purposes. The results of the measurement shall be recorded in writing. Alternatively, on vessels only containing these substances in containers in open holds, the holds containing such containers may be ventilated with the ventilation operating at full power only when it is suspected that the holds are not free of gas. Prior to unloading, the unloader shall be informed about this suspicion.

VE03: Spaces such as holds, accommodation and engine rooms, adjacent to holds containing these substances shall be ventilated.

After unloading, holds having contained these substances shall undergo forced ventilation.

After ventilation, the concentration of gases in these holds shall be measured.

The results of the measurement shall be recorded in writing.

VE04 When aerosols are carried for the purposes of reprocessing or disposal under special provision 327 of chapter 3.3, provisions of VE01 and VE02 are applied.

#### 7.1.6.13 *Measures to be taken before loading*

The following additional requirements shall be met when they are indicated in column (11) of Table A of Chapter 3.2:

LO01: Before these substances or articles are loaded, it shall be ensured that there are no metal objects in the hold which are not an integral part of the vessel.

LO02: These substances may be loaded in bulk only if their temperature is not above 55° C.

LO03: Before loading these substances in bulk or unpackaged, holds should be made as dry as possible.

LO04: Any loose organic material shall be removed from holds before loading these substances in bulk.

LO05: Prior to carriage of pressure receptacles it shall be ensured that the pressure has not risen due to potential hydrogen generation.

#### 7.1.6.14 *Handling and stowage of cargo*

The following additional requirements shall be met when they are indicated in column (11) of Table A of Chapter 3.2:

HA01: These substances or articles shall be stowed at a distance of not less than 3.00 m from the accommodation, engine rooms, the wheelhouse and from any sources of heat.

HA02: These substances or articles shall be stowed at a distance of not less than 2.00 m from the vertical planes defined by the sides of the vessel.

HA03: Any friction, impact, jolting, overturning or dropping shall be prevented during handling of these substances or articles.

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

Stacking of non-dangerous goods on top of packages containing these substances or articles is prohibited.

Where these substances or articles are loaded together with other goods in the same hold, these substances or articles shall be loaded after, and unloaded before, all the other goods.

There is no need for these substances or articles to be loaded after, and unloaded before, all others if these substances or articles are contained in containers.

While these substances or articles 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 exceptions to this provision.

HA04: *Merged with HA03.*

HA05: *Merged with HA03.*

HA06: *Merged with HA03.*

HA07: It is prohibited to load or unload these substances in bulk or unpackaged if there is a danger that they may get wet because of the prevailing weather conditions.

HA08: If the packages with these substances are not contained in a container, they shall be placed on gratings and covered with waterproof tarpaulins arranged in such a way that the water drains off to the outside and the air circulation is not hindered.

HA09: If these substances are carried in bulk they shall not be loaded in the same hold together with flammable substances.

HA10: These substances shall be stowed on deck in the protected area. For seagoing vessels, the stowage requirements are deemed to be met if the provisions of the IMDG Code are complied with.

#### 7.1.6.15 *(Reserved)*

**7.1.6.16** *Measures to be taken during loading, carriage, unloading and handling of cargo*

The following additional requirements shall be met when they are indicated in column (11) of Table A of Chapter 3.2:

IN01: After loading and unloading of these substances in bulk or unpackaged and before leaving the cargo transfer 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.

Before any person enters a hold 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.

If significant concentrations of gases are found in these spaces, the necessary safety measures shall be taken immediately by the consignor or the consignee.

IN02: If a hold contains these substances 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 eight hours with a toximeter. The results of the measurements shall be recorded in writing.

IN03: If a hold contains these substances in bulk or unpackaged, the master shall make sure every day by checking the hold bilge wells or pump ducts that no water has entered the hold bilges.

Water which has entered the hold bilges shall be removed immediately.

7.1.6.17-  
7.1.9.99 *(Reserved)*

## CHAPTER 7.2

### TANK VESSELS

#### 7.2.0 General requirements

7.2.0.1 The provisions of 7.2.0 to 7.2.5 are applicable to tank vessels.

7.2.0.2-  
7.2.0.99 *(Reserved)*

#### 7.2.1 Mode of carriage of goods

7.2.1.1-  
7.2.1.20 *(Reserved)*

##### 7.2.1.21 Carriage in cargo tanks

7.2.1.21.1 Substances, their assignment to the various types of tank vessels and the special conditions for their carriage in these tank vessels, are listed in Table C of Chapter 3.2.

7.2.1.21.2 Substances, which according to column (6) of Table C of Chapter 3.2, have to be carried in a tank vessel of type N, open, may also be carried in a tank vessel of type N, open, with flame-arresters; type N, closed; types C or G provided that all conditions of carriage prescribed for tank vessels of type N, open, as well as all other conditions of carriage required for these substances in Table C of Chapter 3.2 are met.

7.2.1.21.3 Substances which, according to column (6) of Table C of Chapter 3.2 have to be carried in a tank vessel of type N, open, with flame-arresters, may also be carried in tank vessels of type N, closed, and types C or G provided that all conditions of carriage prescribed for tank vessels of type N, open, with flame arresters, as well as all other conditions of carriage required for these substances in Table C of Chapter 3.2 are met.

7.2.1.21.4 Substances which, according to column (6) of Table C of Chapter 3.2 have to be carried in a tank vessel of type N, closed, may also be carried in tank vessels of type C or G provided that all conditions of carriage prescribed for tank vessels of type N, closed, as well as all other conditions of carriage required for these substances in Table C of Chapter 3.2 are met.

7.2.1.21.5 Substances which, according to column (6) of Table C of Chapter 3.2 have to be carried in tank vessels of type C may also be carried in tank vessels of type G provided that all conditions of carriage prescribed for tank vessels of type C as well as all other conditions of carriage required for these substances in Table C of Chapter 3.2 are met.

7.2.1.21.6 Oily and greasy wastes resulting from the operation of the vessel may only be carried in fire-resistant receptacles, fitted with a lid, or in cargo tanks.

7.2.1.21.7 A substance which according to column (8) of Table C of Chapter 3.2 must be carried in cargo tank type 2 (integral cargo tank), may also be carried in a cargo tank type 1 (independent cargo tank) or cargo tank type 3 (cargo tank with walls distinct from the outer hull) of the vessel type prescribed in Table C or a vessel type prescribed in 7.2.1.21.2 to 7.2.1.21.5, provided that all other conditions of carriage required for this substance by Table C of Chapter 3.2 are met.

7.2.1.21.8 A substance which according to column (8) of Table C of Chapter 3.2 must be carried in cargo tank type 3 (cargo tank with walls distinct from the outer hull), may also be carried in a cargo tank type 1 (independent cargo tank) of the vessel type prescribed in Table C or a

vessel type prescribed in 7.2.1.21.2 to 7.2.1.21.5 or in a type C vessel with cargo tank type 2 (integral cargo tank), provided that at least the conditions of carriage concerning the prescribed N type are met and all other conditions of carriage required for this substance by Table C of Chapter 3.2 or 7.2.1.21.2 to 7.2.1.21.5 are met.

7.2.1.22-  
7.2.1.99  
(Reserved)

## **7.2.2 Requirements applicable to vessels**

### **7.2.2.0 Permitted vessels**

*NOTE 1: The relief pressure of the safety valves or of the high-velocity vent valves shall be indicated in the certificate of approval (see 8.6.1.3).*

*NOTE 2: The design pressure and the test pressure of cargo tanks shall be indicated in the certificate of the recognised classification society prescribed in 9.3.1.8.1 or 9.3.2.8.1 or 9.3.3.8.1.*

*NOTE 3: Where a vessel carries cargo tanks with different valve-relief pressures, the relief pressure of each tank shall be indicated in the certificate of approval and the design and test pressures of each tank shall be indicated in the certificate of the recognised classification society.*

7.2.2.0.1 Dangerous substances may be carried in tank vessels of Types G, C or N in accordance with the requirements of sections 9.3.1, 9.3.2 or 9.3.3 respectively. The type of tank vessel to be used is specified in column (6) of Table C in chapter 3.2 and in 7.2.1.21.

*NOTE: The substances accepted for carriage in the individual vessel are listed in the vessel substance list to be drawn up by the recognised classification society (see 1.16.1.2.5).*

7.2.2.1-  
7.2.2.4  
(Reserved)

### **7.2.2.5 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 shall be readily available for consultation at appropriate places on board in the language normally spoken on board, and also, if that language is not English, French or German, in English, French or German unless agreements concluded between the countries concerned in the transport operation provide otherwise.

### **7.2.2.6 Gas detection system**

The sensors of the gas detection system shall be set at not more than 20% of the lower explosive limit of the substances allowed for carriage in the vessel.

The system shall have been approved by the competent authority or a recognized classification society.

7.2.2.7  
7.2.2.18  
(Reserved)

**7.2.2.19**      ***Pushed convoys and side-by-side formations***

7.2.2.19.1      Where at least one vessel of a convoy or side-by-side formation is required to be in possession of a certificate of approval for the carriage of dangerous goods, all vessels of such convoy or side-by-side formation shall be provided with an appropriate certificate of approval.

Vessels not carrying dangerous goods shall comply with the provisions of 7.1.2.19.

7.2.2.19.2      For the purposes of the application of this Part, the entire pushed convoy or side-by-side formation shall be deemed to be a single vessel.

7.2.2.19.3      When a pushed convoy or a side-by-side formation comprises a tank vessel carrying dangerous substances, vessels used for propulsion shall meet the requirements of the following paragraphs:

7.2.2.5, 8.1.4, 8.1.5, 8.1.6.1, 8.1.6.3, 8.1.7, 8.1.8, 8.1.9, 9.3.3.0.1, 9.3.3.0.3 (d), 9.3.3.0.5, 9.3.3.10.1, 9.3.3.10.2, 9.3.3.12.4, 9.3.3.12.6, 9.3.3.16, 9.3.3.17.1 to 9.3.3.17.4, 9.3.3.31.1 to 9.3.3.31.5, 9.3.3.32.2, 9.3.3.34.1, 9.3.3.34.2, 9.3.3.40.1 (however, one single fire or ballast pump shall be sufficient), 9.3.3.40.2, 9.3.3.41, 9.3.3.50.1 (c), 9.3.3.50.2, 9.3.3.51, 9.3.3.52.3 to 9.3.3.52.6, 9.3.3.56.5, 9.3.3.71 and 9.3.3.74.

Vessels moving only type N open tank vessels do not have to meet the requirements of paragraphs 9.3.3.10.1, 9.3.3.10.2 and 9.3.3.12.6. In this case the following entry shall be made in the certificate of approval or provisional certificate of approval under number 5, permitted derogations: "Derogation from 9.3.3.10.1, 9.3.3.10.2 and 9.3.3.12.6; the vessel may only move tank vessels of type N open".

7.2.2.20      (*Reserved*)

**7.2.2.21**      ***Safety and control equipment***

It shall be possible to interrupt loading or unloading of substances of Class 2 and substances assigned to UN Nos. 1280 and 2983 of Class 3 by means of switches installed at two locations on the vessel (fore and aft) and at two locations ashore (directly at the access to the vessel and at an appropriate distance on shore). Interruption of loading and unloading shall be effected by the means of a quick action stop valve which shall be directly fitted to the flexible connecting hose between the vessel and the shore facility.

The system of disconnection shall be designed in accordance with the closed circuit principle.

**7.2.2.22**      ***Cargo tank openings***

When substances for which a type C vessel is required in column (6) of Table C of Chapter 3.2 are carried, the high-velocity vent valves shall be set so that blowing-off does not normally occur while the vessel is under way.

7.2.2.23-  
7.2.2.99      (*Reserved*)

## 7.2.3 General service requirements

### 7.2.3.1 *Access to cargo tanks, residual cargo tanks, cargo pump-rooms below deck, cofferdams, double-hull spaces, double bottoms and hold spaces; inspections*

7.2.3.1.1 The cofferdams shall be empty. They shall be inspected once a day in order to ascertain that they are dry (except for condensation water).

7.2.3.1.2 Access to the cargo tanks, residual cargo tanks, cofferdams, double-hull spaces, double bottoms and hold spaces is not permitted except for carrying out inspections or cleaning operations.

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

7.2.3.1.4 When the gas concentration or oxygen content has to be measured before entry into cargo tanks, residual cargo tanks, cargo pump-rooms below deck, cofferdams, double-hull spaces, double bottoms or hold spaces, the results of these measurements shall be recorded in writing.

The measurement may only be effected by persons equipped with breathing apparatus suited to the substance carried.

Entry into these spaces is not permitted for the purpose of measuring.

7.2.3.1.5 Before any person enters cargo tanks, the cargo pump-rooms below deck, cofferdams, double-hull spaces, double bottoms or hold spaces:

- (a) When dangerous substances of Classes 2, 3, 4.1, 6.1, 8 or 9 for which a flammable gas detector is required in column (18) of Table C of Chapter 3.2 are carried on board the vessel, it shall be established, by means of this device that the gas concentration in these cargo tanks, cargo pump-rooms below deck, cofferdams, double-hull spaces, double bottoms or hold spaces is not more than 50% of the lower explosive limit of the cargo. For the cargo pump-rooms below deck this may be determined by means of the permanent gas detection system;
- (b) When dangerous substances of Classes 2, 3, 4.1, 6.1, 8 or 9 for which a toximeter is required in column (18) of Table C of Chapter 3.2 are carried on board the vessel, it shall be established, by means of this device that the cargo tanks, cargo pump-rooms below deck, cofferdams, double-hull spaces, double bottoms or hold spaces do not contain any significant concentration of toxic gases.

7.2.3.1.6 Entry into empty cargo tanks, the cargo pump-rooms below deck, cofferdams, double-hull spaces, double bottoms and hold spaces is not permitted, except where:

- there is no lack of oxygen and no measurable amount of dangerous substances in dangerous concentrations; or
- the person entering the spaces 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. If a rescue winch has been installed, only one other person is sufficient.



### **7.2.3.2**      *Cargo pump-rooms below deck*

7.2.3.2.1      When carrying dangerous substances of classes 3, 4.1, 6.1, 8 or 9, the cargo pump-rooms below deck shall be inspected daily so as to ascertain that there are no leaks. The bilges and the drip pans shall be kept clean and free from products.

7.2.3.2.2      When the gas detection system is activated, the loading and unloading operations shall be stopped immediately. All shut-off devices shall be closed and the cargo pump-rooms shall be evacuated immediately. All entrances shall be closed. The loading or unloading operations shall not be continued except when the damage has been repaired or the fault eliminated.

7.2.3.3-  
7.2.3.5      (*Reserved*)

### **7.2.3.6**      *Gas detection system*

The gas detection system shall be maintained and calibrated in accordance with the instructions of the manufacturer.

### **7.2.3.7**      *Gas-freeing of empty cargo tanks*

7.2.3.7.0      Gas-freeing of empty or unloaded cargo tanks is permitted under the conditions below but only if it is not prohibited on the basis of international or domestic legal requirements.

7.2.3.7.1      Empty or unloaded cargo tanks having previously contained dangerous substances of Class 2 or Class 3, with a classification code including the letter "T" in column (3b) of Table C of Chapter 3.2, Class 6.1 or packing group I of Class 8, may only be gas-freed by either competent persons according to sub-section 8.2.1.2 or companies approved by the competent authority for that purpose. Gas-freeing may be carried out only at the locations approved by the competent authority.

7.2.3.7.2      Gas-freeing of empty or unloaded cargo tanks having contained dangerous goods other than those referred to under 7.2.3.7.1 above, may be carried out while the vessel is underway or at locations approved by the competent authority by means of suitable venting equipment with the tank lids closed and by leading the gas/air mixtures through flame-arresters capable of withstanding steady burning. In normal conditions of operation, the gas concentration in the vented mixture at the outlet shall be less than 50% of the lower explosive limit. The suitable venting equipment may be used for gas-freeing by extraction only when a flame-arrester is fitted immediately before the ventilation fan on the extraction side. The gas concentration shall be measured once each hour during the two first hours after the beginning of the gas-freeing operation by forced ventilation or by extraction, by an expert referred to in 7.2.3.15. The results of these measurements shall be recorded in writing.

Gas-freeing is, however, prohibited within the area of locks including their lay-bys.

7.2.3.7.3      Where gas-freeing of cargo tanks having previously contained the dangerous goods referred to in 7.2.3.7.1 above is not practicable at the locations designated or approved for this purpose by the competent authority, gas-freeing may be carried out while the vessel is under way, provided that:

- the requirements of 7.2.3.7.2 are complied with; the concentration of dangerous substances in the vented mixture at the outlet shall, however, be not more than 10% of the lower explosive limit;
- there is no risk involved for the crew;

- any entrances or openings of spaces connected to the outside are closed; this provision does not apply to the air supply openings of the engine room and overpressure ventilation systems;
- any member of the crew working on deck is wearing suitable protective equipment;
- it is not carried out within the area of locks including their lay-bys, under bridges or within densely populated areas.

7.2.3.7.4 Gas-freeing operations shall be interrupted during a thunderstorm or when, due to unfavourable wind conditions, dangerous concentrations of gases are to be expected outside the cargo area in front of accommodation, the wheelhouse and service spaces. The critical state is reached as soon as concentrations of more than 20% of the lower explosive limit have been detected in those areas by measurements by means of portable equipment.

7.2.3.7.5 The marking prescribed in column (19) of Table C of Chapter 3.2 may be withdrawn by the master when, after gas-freeing of the cargo tanks, it has been ascertained, using the equipment described in column (18) of Table C of Chapter 3.2, that the cargo tanks no longer contain flammable gases in concentrations of more than 20% of the lower explosive limit or do not contain any significant concentration of toxic gases.

7.2.3.7.6 Before taking measures which could cause hazards as described in section 8.3.5, cargo tanks and pipes in the cargo area shall be cleaned and gas-freed. The result of the gas-freeing shall be documented in a gas-free certificate. The condition of being gas-free may only be declared and certified by a person approved by the competent authority.

7.2.3.8-  
7.2.3.11 *(Reserved)*

#### **7.2.3.12 *Ventilation***

7.2.3.12.1 While the machinery in the service spaces is operating, the extension ducts connected to the air inlets, if any, shall be in the upright position; otherwise the inlets shall be closed. This provision does not apply to air inlets of service spaces outside the cargo area, provided the inlets without extension duct are located not less than 0.50 m above the deck.

7.2.3.12.2 The ventilation of pump rooms shall be in operation:

- at least 30 minutes before entry and during occupation;
- during loading, unloading and gas-freeing; and
- after the gas detection system has been activated.

7.2.3.13-  
7.2.3.14 *(Reserved)*

#### **7.2.3.15 *Expert on board the vessel***

When dangerous substances are carried, the responsible master shall at the same time be an expert according to 8.2.1.2. In addition this expert shall be:

- An expert as referred to in 8.2.1.5 when dangerous goods are carried for which a type G tank vessel is prescribed in column (6) of Table C of Chapter 3.2; and

- An expert as referred to in 8.2.1.7 when dangerous goods are carried for which a type C tank vessel is prescribed in column (6) of Table C of Chapter 3.2.

*NOTE: Which master of the vessel's crew is the responsible master shall be determined and documented on board by the carrier. If there is no such determination, the requirement applies to every master.*

*By derogation from this, for the loading and unloading of dangerous goods in a tank barge, it is sufficient that the person who is responsible for loading and unloading and for ballasting of the tank barge has the expertise required according to 8.2.1.2.*

During the carriage of goods for which a type C vessel is prescribed in column (6) of Table C of Chapter 3.2 and cargo tank type 1 in column (8), an expert referred to in 8.2.1.5 for carriage in type G vessels is sufficient.

7.2.3.16- (Reserved)  
7.2.3.19

### **7.2.3.20 Water ballast**

7.2.3.20.1 Cofferdams and hold spaces containing insulated cargo tanks shall not be filled with water. Double-hull spaces, double bottoms and hold spaces which do not contain insulated cargo tanks may be filled with ballast water provided:

- this has been taken into account in the intact and damage stability calculations; and
- the filling is not prohibited in column (20) of Table C of Chapter 3.2.

If the water in the ballast tanks and compartments leads to the vessel no longer respecting these stability criteria:

- fixed level indicators shall be installed; or
- the filling level of the ballast tanks and compartments shall be checked daily before departure and during operations.

In case of the existence of level indicators, ballast tanks may also be partially filled. Otherwise they shall be completely full or empty.

7.2.3.20.2 (Deleted)

7.2.3.21 (Reserved)

### **7.2.3.22 Entrances to hold spaces, cargo pump-rooms below deck and cofferdams, openings of cargo tanks and residual cargo tanks; closing devices**

The cargo tanks, residual cargo tanks and entrances to cargo pump-rooms below deck, cofferdams and hold spaces shall remain closed. This requirement shall not apply to cargo pump-rooms on board oil separator and supply vessels or to the other exceptions set out in this Part.

7.2.3.23- (Reserved)  
7.2.3.24

**7.2.3.25**      *Connections between pipes*

7.2.3.25.1      Connecting two or more of the following groups of pipes is prohibited:

- (a)    piping for loading and unloading;
- (b)    pipes for ballasting and draining cargo tanks, cofferdams, hold spaces, double-hull spaces and double bottoms;
- (c)    pipes located outside the cargo area.

7.2.3.25.2      The provision of 7.2.3.25.1 above does not apply to removable pipe connections between cofferdam pipes and

- piping for loading and unloading;
- pipes located outside the cargo area while the cofferdams have to be filled with water in an emergency.

In these cases the connections shall be designed so as to prevent water from being drawn from the cargo tanks. The cofferdams shall be emptied only by means of ejectors or an independent system within the cargo area.

7.2.3.25.3      The provisions of 7.2.3.25.1 (b) and (c) above do not apply to:

- pipes intended for ballasting and draining double-hull spaces and double bottoms which do not have a common boundary with the cargo tanks;
- pipes intended for ballasting hold spaces where the pipes of the fire-fighting system within the cargo area are used for this purpose. Double-hull and double bottom spaces and hold spaces shall be stripped only by means of ejectors or an independent system within the cargo area.

7.2.3.26-  
7.2.3.27      (*Reserved*)

7.2.3.28      *Refrigeration system*

For the carriage of refrigerated substances, an instruction shall be on board mentioning the permissible maximum loading temperature in relation to the capacity of the refrigeration system and the insulation design of the cargo tanks.

**7.2.3.29**      *Lifeboats*

7.2.3.29.1      The lifeboat required in accordance with the Regulations referred to in 1.1.4.6 shall be stowed outside the cargo area. The lifeboat may, however, be stowed in the cargo area provided an easily accessible collective life-saving appliance conforming to the Regulations referred to in 1.1.4.6 is available within the accommodation area.

7.2.3.29.2      7.2.3.29.1 above does not apply to oil separator or supply vessels.

7.2.3.30      (*Reserved*)

### **7.2.3.31**      *Engines*

7.2.3.31.1      The use of engines running on fuels having a flash-point below 55° C (e.g. petrol engines) is prohibited. This requirement does not apply to the outboard motors of lifeboats.

7.2.3.31.2      The carriage of power-driven conveyances such as passenger cars and motor boats in the cargo area is prohibited.

### **7.2.3.32**      *Oil fuel tanks*

Double bottoms with a height of at least 0.6 m may be used as oil fuel tanks, provided they have been constructed in accordance with Part 9.

7.2.3.33-  
7.2.3.40      (*Reserved*)

### **7.2.3.41**      *Fire and naked light*

7.2.3.41.1      The use of fire or naked light is prohibited.

This provision does not apply to the accommodation and the wheelhouse.

7.2.3.41.2      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.

7.2.3.41.3      Heating appliances or boilers fuelled with liquid fuels having a flash-point above 55° C which are installed in the engine room or in another suitable space may, however, be used.

### **7.2.3.42**      *Cargo heating system*

7.2.3.42.1      Heating of the cargo is not permitted except where there is risk of solidification of the cargo or where the cargo, because of its viscosity, cannot be unloaded in the usual manner.

In general, a liquid shall not be heated up to a temperature above its flash-point.

Special provisions are included in column 20 of Table C of Chapter 3.2.

7.2.3.42.2      Cargo tanks containing substances which are heated during transport shall be equipped with devices for measuring the temperature of the cargo.

7.2.3.42.3      During unloading, the cargo heating system may be used provided that the space where it has been installed meets in all respects the provisions of 9.3.2.52.3 or 9.3.3.52.3.

7.2.3.42.4      The provisions of 7.2.3.42.3 above do not apply when the cargo heating system is supplied with steam from shore and only the circulation pump is in operation, as well as when the flash-point of the cargo being unloaded is not less than 60° C.

7.2.3.43      (*Reserved*)

### **7.2.3.44**      *Cleaning operations*

The use of liquids having a flash-point below 55° C for cleaning purposes is permitted only in the cargo area.

7.2.3.45-  
7.2.3.50 (Reserved)

### **7.2.3.51 *Electrical installations***

7.2.3.51.1 The electrical installations shall be properly maintained in a faultless condition.

7.2.3.51.2 The use of movable electric cables is prohibited in the cargo 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 vessel close to the signal mast or gangway;
- electric cables for connecting submerged pumps on board oil separator vessels.

7.2.3.51.3 The sockets for connecting the signal lights and gangway lighting or for submerged pumps on board oil separator vessels shall not be live except when the signal lights or the gangway lighting or the submerged pumps on board oil separator vessels are switched on.

Connecting or disconnecting shall not be possible except when the sockets are not live.

7.2.3.52-  
7.2.3.99 (Reserved)

## **7.2.4 Additional requirements concerning loading, carriage, unloading and other handling of cargo**

### **7.2.4.1 *Limitation of the quantities carried***

7.2.4.1.1 The carriage of packages in the cargo area is prohibited. This prohibition does not apply to:

- residual cargo, washing water, cargo residues and slops contained in not more than six approved receptacles for residual products and receptacles for slops having a maximum individual capacity of not more than 2 m<sup>3</sup>. These receptacles for residual products shall meet the requirements of international regulations applicable to the substance concerned. The receptacles for residual products and the receptacles for slops shall be properly secured in the cargo area and comply with the provisions of 9.3.2.26.4 or 9.3.3.26.4 concerning them;
- to cargo samples, up to a maximum of 30, of substances accepted for carriage in the tank vessel, where the maximum contents are 500 ml per receptacle. Receptacles shall meet the packing requirements referred to in Part 4 of ADR and shall be placed on board, at a specific point in the cargo area, such that under normal conditions of carriage they cannot break or be punctured and their contents cannot spill in the hold space. Fragile receptacles shall be suitably padded.

7.2.4.1.2 On board oil separator vessel receptacles with a maximum capacity of 2.00 m<sup>3</sup> oily and greasy wastes resulting from the operation of vessels may be placed in the cargo area provided that these receptacles are properly secured.

7.2.4.1.3 On board supply vessel packages of dangerous goods may be carried in the cargo area up to a gross quantity of 5,000 kg provided that this possibility is mentioned in the certificate of

approval. The packages shall be properly secured and shall be protected against heat, sun and bad weather.

7.2.4.1.4 On board supply vessels or other vessels delivering products for the operation of vessels, the number of cargo samples referred to in 7.2.4.1.1 may be increased from 30 to a maximum of 500.

**7.2.4.2 *Reception of oily and greasy wastes resulting from the operation of vessels and delivery of products for the operation of vessels***

7.2.4.2.1 The reception of unpackaged liquid oily and greasy wastes resulting from the operation of vessels may only be effected by suction.

7.2.4.2.2 The landing and reception of oily and greasy wastes may not take place during the loading and unloading of substances for which protection against explosion is required in column (17) of Table C of Chapter 3.2 nor during the gas-freeing of tank vessels. This requirement does not apply to oil separator vessels provided that the provisions for protection against explosion applicable to the dangerous substance are complied with.

7.2.4.2.3 Berthing and handing over of products for the operation of vessels shall not take place during the loading or unloading of substances for which protection against explosions is required in column (17) of Table C of Chapter 3.2 nor during the gas-freeing of tank vessels. This requirement does not apply to supply vessels provided that the provisions for protection against explosion applicable to the dangerous substance are complied with.

7.2.4.2.4 The competent authority may issue derogations to the requirements of 7.2.4.2.1 and 7.2.4.2.2 above. During unloading it may also issue derogations to 7.2.4.2.3 above.

7.2.4.3-  
7.2.4.6 *(Reserved)*

**7.2.4.7 *Places of loading and unloading***

7.2.4.7.1 Tank vessels shall be loaded, unloaded or gas-freed only at the places designated or approved for this purpose by the competent authority.

7.2.4.7.2 The reception of unpackaged oily and greasy liquid wastes resulting from the operation of vessels and the handing over of products for the operation of vessels shall not be taken to be loading or unloading within the meaning of 7.2.4.7.1 above.

7.2.4.8 *(Reserved)*

**7.2.4.9 *Cargo transfer operations***

Partial or complete cargo transfer without permission from the competent authority is prohibited outside a cargo transfer place approved for this purpose.

**7.2.4.10 *Checklist***

7.2.4.10.1 Loading or unloading shall not be started before a check list for the cargo in question has been completed and questions 1 to 18 of the list have been checked off with an "X". Irrelevant questions should be deleted. The list shall be completed in duplicate and signed by the master or a person mandated by himself and the person responsible for the handling at the shore facilities. If a positive response to all the questions is not possible loading or unloading is only permitted with the consent of the competent authority.

- 7.2.4.10.2 The list shall conform to the model in 8.6.3.
- 7.2.4.10.3 The checklist shall be printed at least in languages understood by the master and the person responsible for the handling at the shore facilities.
- 7.2.4.10.4 The provisions of 7.2.4.10.1 to 7.2.4.10.3 above shall not apply to the reception of oily and greasy wastes by oil separator vessels nor to the handing over of products for the operation of vessels by supply vessels.

**7.2.4.11 *Loading plan***

7.2.4.11.1 *(Deleted)*

7.2.4.11.2 The master shall enter on a cargo stowage plan the goods carried in the individual cargo tanks. The goods shall be described as in the transport document (information according to 5.4.1.1.2 (a) to (d)).

**7.2.4.12 *Registration during the voyage***

The following particulars shall immediately be entered in the register referred to in 8.1.11:

Loading: Place of loading and loading berth, date and time, UN number or identification number of the substance, proper shipping name of the substance, the class and packing group if any;

Unloading: Place of unloading and unloading berth, date and time;

Gas-freeing of UN No. 1203 petrol: Gas-freeing place and facility or sector, date and time.

These particulars shall be provided for each cargo tank.

**7.2.4.13 *Measures to be taken before loading***

7.2.4.13.1 When residues of the previous cargo may cause dangerous reactions with the next cargo, any such residues shall be properly removed.

Substances which react dangerously with other dangerous goods shall be separated by a cofferdam, an empty space, a pump-room, an empty cargo tank or a cargo tank loaded with a substance which does not react with the cargo.

Where an empty, uncleaned cargo tank, or a cargo tank containing cargo residues of a substance liable to react dangerously with other dangerous goods, this separation is not required if the master has taken appropriate measures to avoid a dangerous reaction.

If the vessel is equipped with piping for loading and unloading below the deck passing through the cargo tanks, the mixed loading or carriage of substances likely to react dangerously with each other is prohibited.

7.2.4.13.2 Before the start of loading operations, any prescribed safety and control devices and any items of equipment shall, if possible, be checked and controlled for proper functioning.

7.2.4.13.3 Before the start of loading operations the overflow control device switch shall be connected to the shore installation.



#### **7.2.4.14**      *Cargo handling and stowage*

Dangerous goods shall be loaded in the cargo area in cargo tanks, in cargo residue tanks or in packages permitted under 7.2.4.1.1.

#### **7.2.4.15**      *Measures to be taken after unloading (stripping system)*

7.2.4.15.1      If the provisions listed in 1.1.4.6.1 foresee the application of a stripping system, the cargo tanks and the cargo piping shall be emptied by means of the stripping system in accordance with the conditions laid down in the testing procedure after each unloading operation. This provision need not be complied with if the new cargo is the same as the previous cargo or a different cargo, the carriage of which does not require a prior cleaning of the cargo tanks.

Residual cargo shall be discharged ashore by means of the equipment provided for that effect (article 7.04 Nr. 1 and appendix II model 1 of CDNI) or shall be stored in the vessel's own tank for residual products or in receptacles for residual products according to 7.2.4.1.1.

7.2.4.15.2      During the filling of the receptacle for residual products, released gases shall be safely evacuated.

7.2.4.15.3      The gas-freeing of cargo tanks and piping for loading and unloading shall be carried out in compliance with the conditions of 7.2.3.7.

#### **7.2.4.16**      *Measures to be taken during loading, carriage, unloading and handling*

7.2.4.16.1      The loading rate and the maximum operational pressure of the cargo pumps shall be determined in agreement with the personnel of the shore installation.

7.2.4.16.2      All safety or control devices required in the cargo tanks shall remain switched on. During carriage this provision is only applicable for the installations mentioned in 9.3.1.21.1 (e) and (f), 9.3.2.21.1 (e) and (f) or 9.3.3.21.1 (e) and (f).

In the event of a failure of a safety or control device, loading or unloading shall be suspended immediately.

When a cargo pump-room is located below deck, the prescribed safety and control devices in the cargo pump-room shall remain permanently switched on.

Any failure of the gas detection system shall be immediately signalled in the wheelhouse and on deck by a visual and audible warning.

7.2.4.16.3      The shut-off devices of the loading and unloading piping as well as of the pipes of the stripping systems shall remain closed except during loading, unloading, stripping, cleaning or gas-freeing operations.

7.2.4.16.4      If the vessel is fitted with a transverse bulkhead according to 9.3.1.25.3, 9.3.2.25.3 or 9.3.3.25.3, the doors in this bulkhead shall be closed during loading and unloading.

7.2.4.16.5      Receptacles intended for recovering possible liquid spillage shall be placed under connections to shore installations used for loading and unloading. This requirement shall not apply to the carriage of substances of Class 2.

7.2.4.16.6      In case of recovery of the gas-air mixture from shore into the vessel, the pressure at the connection point shall not be more than the opening pressure of the high velocity vent valve.

- 7.2.4.16.7 When a tank vessel conforms to 9.3.2.25.5 (d) or 9.3.3.22.5 (d), the individual cargo tanks shall be closed off during transport and opened during loading, unloading and gas-freeing.
- 7.2.4.16.8 Persons entering the premises located in the cargo area below deck during loading or unloading shall wear the PP equipment referred to in 8.1.5 if this equipment is prescribed in column (18) of Table C of Chapter 3.2.
- Persons connecting or disconnecting the loading and unloading piping or the vapour pipes or gas discharge pipes, or taking samples, carrying out measurements, replacing the flame arrester plate stack or relieving pressure in cargo tanks shall wear the PP equipment referred to in 8.1.5 if this equipment is prescribed in column (18) of Table C of Chapter 3.2. They shall also wear protective equipment A if a toximeter (TOX) is prescribed in column (18) of Table C of Chapter 3.2.
- 7.2.4.16.9 During loading or unloading in a closed tank vessel of substances for which an open type N vessel or an open type N vessel with a flame arrester is sufficient according to columns (6) and (7) of Table C of Chapter 3.2, the cargo tanks may be opened using the safe pressure-relief device referred to in 9.3.2.22.4 (a) or 9.3.3.22.4 (a).
- 7.2.4.16.10 7.2.4.16.9 shall not apply when the cargo tanks contain gases or vapour from substances for the carriage of which a closed-type tank vessel is required in column (7) of Table C of Chapter 3.2.
- 7.2.4.16.11 The nozzle closure referred to in 9.3.1.21.1 (g), 9.3.2.21.1 (g) or 9.3.3.21.1 (g) can be opened only after a gastight connection has been made to the closed or partly closed sampling device.
- 7.2.4.16.12 For substances requiring protection against explosions according to column (17) of Table C of Chapter 3.2, the connection of the vapour pipe or the gas discharge piping to the shore installation shall be such that the vessel is protected against detonations and the passage of flames from the shore. The protection of the vessel against detonations and the passage of flames from the shore is not required when the cargo tanks are inerted in accordance with 7.2.4.18.
- 7.2.4.16.13 For the carriage of substances of UN No. 2448, or of goods of Class 5.1 or 8, the bulwark ports, openings in the foot rail, etc., shall not be closed off. Nor shall they be closed off, during the voyage, in the event of carriage of other dangerous goods.
- 7.2.4.16.14 If supervision is required in column (20) of Table C of Chapter 3.2 for substances of Classes 2 or 6.1, loading and unloading shall be carried out under the supervision of a person who is not a member of the crew and has been mandated for the task by the consignor or the consignee.
- 7.2.4.16.15 The initial cargo throughput established in the loading instructions shall be such as to ensure that no electrostatic charge exists at the start of loading.
- 7.2.4.17 *Closing of windows and doors***
- 7.2.4.17.1 During loading, unloading and gas-freeing operations, all entrances or openings of spaces which are accessible from the deck and all openings of spaces facing the outside shall remain closed.

This provision does not apply to:

- air intakes of running engines;

- ventilation inlets of engine rooms while the engines are running;
- air intakes of the overpressure ventilation system referred to in 9.3.1.52.3, 9.3.2.52.3 or 9.3.3.52.3;
- air intakes of air conditioning in installations if these openings are fitted with a gas detection system referred to in 9.3.1.52.3, 9.3.2.52.3 or 9.3.3.52.3.

These entrances and openings may only be opened when necessary and for a short time, after the master has given his permission.

7.2.4.17.2 After the loading, unloading and gas-freeing operations, the spaces which are accessible from the deck shall be ventilated.

7.2.4.17.3 The provisions of 7.2.4.17.1 and 7.2.4.17.2 above shall not apply to the reception of oily and greasy wastes resulting from the operation of vessels nor to the handing over of products for the operation of vessels.

**7.2.4.18 *Blanketing of the cargo and inerting***

7.2.4.18.1 In cargo tanks and the corresponding piping, inerting in the gaseous phase or blanketing of the cargo may be necessary. Inerting and blanketing of the cargo are defined as follows:

- Inerting: cargo tanks and the corresponding piping and other spaces for which this process is prescribed in column (20) of Table C of Chapter 3.2 are filled with gases or vapours which prevent combustion, do not react with the cargo and maintain this state;
- Blanketing of the cargo: spaces in the cargo tanks above the cargo and the corresponding piping are filled with a liquid, gas or vapour so that the cargo is separated from the air and this state is maintained.

7.2.4.18.2 For certain substances the requirements for inerting and blanketing of the cargo in cargo tanks, in the corresponding piping and in adjacent empty spaces are given in column (20) of Table C of Chapter 3.2.

7.2.4.18.3 *(Reserved)*

7.2.4.18.4 Inerting or blanketing of flammable cargoes shall be carried out in such a way as to reduce the electrostatic charge as far as possible when the inerting agent is added.

**7.2.4.19** *(Deleted)*

**7.2.4.20** *(Reserved)*

**7.2.4.21 *Filling of cargo tanks***

7.2.4.21.1 The degree of filling given in column (11) of Table C of Chapter 3.2 or calculated in accordance with 7.2.4.21.3 for the individual cargo tank shall not be exceeded.

7.2.4.21.2 The provisions of 7.2.4.21.1 above do not apply to cargo tanks the contents of which are maintained at the filling temperature during carriage by means of heating equipment. In this case calculation of the degree of filling at the beginning of carriage and control of the temperature shall be such that, during carriage, the maximum allowable degree of filling is not exceeded.

7.2.4.21.3 For carriage of substances having a relative density higher than that stated in the certificate of approval, the maximum permissible degree of filling of the cargo tanks shall be calculated in accordance with the following formula:

maximum permissible degree of filling (%) =  $a * 100/b$   
a = relative density stated in the certificate of approval,  
b = relative density of the substance.

The degree of filling given in column (11) of Table C of Chapter 3.2 shall, however, not be exceeded.

*NOTE: Furthermore, the requirements concerning stability, longitudinal strength and the deepest permissible draught of the vessel shall be observed when filling the cargo tanks.*

7.2.4.21.4 If the degree of filling of 97.5% is exceeded a technical installation shall be authorized to pump off the overflow. During such an operation an automatic visual alarm shall be activated on deck.

#### **7.2.4.22 Opening of openings of cargo tanks**

7.2.4.22.1 Opening of cargo tanks apertures shall be permitted only after the tanks have been relieved of pressure.

7.2.4.22.2 Opening of sampling outlets and ullage openings and opening of the housing of the flame arrester shall not be permitted except for the purpose of inspecting or cleaning empty cargo tanks.

When in column (17) of Table C of Chapter 3.2 anti-explosion protection is required, the opening of cargo tank covers or of the housing of the flame arrester for the purpose of mounting or removing the flame arrester plate stack in unloaded cargo tanks shall be permitted only if the cargo tanks in question have been gas-freed and the concentration of flammable gases in the tanks is less than 10% of the lower explosive limit.

7.2.4.22.3 Sampling shall be permitted only if a device prescribed in column (13) of Table C of Chapter 3.2 or a device ensuring a higher level of safety is used.

Opening of sampling outlets and ullage openings of cargo tanks loaded with substances for which marking with one or two blue cones or one or two blue lights is prescribed in column (19) of Table C of Chapter 3.2 shall be permitted only when loading has been interrupted for not less than 10 minutes.

7.2.4.22.4 The sampling receptacles including all accessories such as ropes, etc., shall consist of electrostatically conductive material and shall, during sampling, be electrically connected to the vessel's hull.

7.2.4.22.5 The duration of opening shall be limited to the time necessary for control, cleaning, replacing the flame arrester, gauging or sampling.

7.2.4.22.6 Pressure relief of cargo tanks is permitted only when carried out by means of the device for safe pressure relief prescribed in 9.3.2.22.4 (a) or 9.3.3.22.4 (a).

7.2.4.22.7 The provisions of 7.2.4.22.1 to 7.2.4.22.6 above shall not apply to oil separator or supply vessels.

7.2.4.23 *(Reserved)*

#### **7.2.4.24**      *Simultaneous loading and unloading*

During loading or unloading of cargo tanks, no other cargo shall be loaded or unloaded. The competent authority may grant exceptions during unloading.

#### **7.2.4.25**      *Cargo piping*

7.2.4.25.1      Loading and unloading as well as stripping of cargo tanks shall be carried out by means of the fixed cargo piping of the vessel.

The metal fittings of the connections to the shore piping shall be electrically earthed so as to prevent the accumulation of electrostatic charges.

7.2.4.25.2      The loading and unloading piping shall not be extended by pipes or hose assemblies fore or aft beyond the cofferdams.

This requirement shall not apply to hose assemblies used for the reception of oily and greasy wastes resulting from the operation of vessels and the delivery of products for the operation of vessels.

7.2.4.25.3      The shut-off devices of the loading and unloading cargo piping shall not be open except as necessary during loading, unloading or gas-freeing operations.

7.2.4.25.4      The liquid remaining in the piping shall be completely drained into the cargo tanks, if possible, or safely removed. This requirement shall not apply to supply vessels.

7.2.4.25.5      The gas/air mixtures shall be returned ashore through a gas recovery or compensation pipe during loading operations when a closed type vessel is required in column (7) of Table C of Chapter 3.2.

7.2.4.25.6      When substances of Class 2 are carried the requirements of 7.2.4.25.4 shall be deemed to have been satisfied if the piping for loading and unloading have been purged with the cargo gas or with nitrogen.

7.2.4.26-  
7.2.4.27      (*Reserved*)

#### **7.2.4.28**      *Water-spray system*

7.2.4.28.1      If a gas or vapour water-spray system is required in column (9) of Table C of Chapter 3.2, it shall be kept ready for operation during loading, unloading and carriage. If a water-spray system is required to cool the tank-deck, it shall be kept ready for operation during the carriage.

7.2.4.28.2      When water-spraying is required in column (9) of Table C of Chapter 3.2 and the pressure of the gaseous phase in the cargo tanks may reach 80% of the relief pressure of the high velocity vent valves, the master shall take all measures compatible with safety to prevent the pressure from reaching that value. He shall in particular activate the water-spray system.

7.2.4.28.3      If a water-spray system is required in column (9) of Table C of Chapter 3.2 and remark 23 is indicated in column (20) of Table C of Chapter 3.2, the instrument measuring the internal pressure shall activate an alarm when the internal pressure reaches 40 kPa (0.4 bar). The water-spray system shall immediately be activated and remain in operation until the internal pressure drops to 30 kPa (0.3 bar).

7.2.4.29-      (*Reserved*)

7.2.4.39

**7.2.4.40**      ***Fire-extinguishing arrangements***

During loading and unloading, the fire extinguishing systems, the fire main with hydrants complete with couplings and jet/spray nozzles or with couplings and hose assemblies with couplings and jet/spray nozzles shall be kept ready for operation in the cargo area on deck.

The freezing of fire-mains and hydrants shall be prevented.

**7.2.4.41**      ***Fire or naked light***

During loading, unloading or gas-freeing operations fires and naked lights are prohibited on board the vessel.

However, the provisions of 7.2.3.42.3 and 7.2.3.42.4 are applicable.

**7.2.4.42**      ***Cargo heating system***

The maximum allowable temperature for carriage indicated in column (20) of Table C of Chapter 3.2 shall not be exceeded.

7.2.4.43-  
7.2.4.50      *(Reserved)*

**7.2.4.51**      ***Electrical installations***

7.2.4.51.1      During loading, unloading or gas-freeing operations, only electrical equipment conforming to the rules for construction in Part 9 or which are installed in spaces complying with the conditions of 9.3.1.52.3, 9.3.2.52.3 or 9.3.3.52.3, may be used. All other electrical equipment marked in red shall be switched off.

7.2.4.51.2      Electrical equipment which has been switched off by the device referred to in 9.3.1.52.3, 9.3.2.52.3 or 9.3.3.52.3 shall only be switched on after the gas-free condition has been established in these spaces.

7.2.4.51.3      Equipment for active cathodic corrosion protection shall be disconnected before berthing and may not be re-connected until after the departure of the vessel, at earliest.

7.2.4.52      *(Reserved)*

**7.2.4.53**      ***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 cargo area, they shall be of the “certified safe” type.

7.2.4.54-  
7.2.4.59      *(Reserved)*

**7.2.4.60**      ***Special equipment***

The shower and the eye and face bath prescribed in the rules for construction shall be kept ready in all weather conditions for use during loading and unloading operations and cargo transfer operations by pumping.

7.2.4.61-  
7.2.4.73 (Reserved)

**7.2.4.74 Prohibition of smoking, fire and naked light**

The prohibition of smoking does not apply in accommodation or wheelhouses conforming to the provisions of 9.3.1.52.3, 9.3.2.52.3 or 9.3.3.52.3.

**7.2.4.75 Risk of sparking**

All electrical connections between the vessel and the shore shall be so designed that they do not present a source of ignition.

**7.2.4.76 Synthetic ropes**

During loading and 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.

Steel cables sheathed in synthetic material or natural fibres are considered as equivalent when the minimum tensile strength required in accordance with the Regulations referred to in 1.1.4.6 is obtained from the steel strands.

Oil separator vessels may, however, be moored by means of appropriate synthetic ropes during the reception of oily and greasy wastes resulting from the operation of vessels, as may supply vessels and other vessels during the delivery of products for the operation of vessels.

7.2.4.77-  
7.2.4.99 (Reserved)

**7.2.5 Additional requirements concerning the operation of vessels**

**7.2.5.0 Marking**

7.2.5.0.1 Vessels carrying dangerous goods listed in Table C of Chapter 3.2 shall display the number of blue cones or blue lights indicated in column (19) and in accordance with CEVNI. When because of the cargo carried no marking with blue cones or blue lights is prescribed but the concentration of flammable gases in the cargo tanks is 20% higher than the lower explosion limit, the number of blue cones or blue lights to be carried is determined by the last cargo for which this marking was required.

7.2.5.0.2 When more than one marking should apply to a vessel, the first of the options below shall apply:

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

7.2.5.0.3 By derogation from 7.2.5.0.1 above, and in accordance with the footnotes to article 3.14 of the CEVNI, the competent authority of a Contracting Party may authorize seagoing vessels temporarily operating in an inland navigation area on the territory of this Contracting Party, the use of the day and night signals prescribed in the Recommendations on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas adopted by the Maritime Safety Committee of the International Maritime Organization (by night an all-round fixed red light and by day flag "B" of the International Code of Signals), instead of the signals prescribed in 7.2.5.0.1. The competent authority which has taken the initiative

with respect to the derogation granted shall notify the Executive Secretary of the UNECE, who shall bring this derogation to the attention of the Administrative Committee.

#### **7.2.5.1 Mode of navigation**

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

7.2.5.2 *(Reserved)*

#### **7.2.5.3 Mooring**

Vessels shall be moored securely, but in such a way that electrical power cables and hose assemblies are not subject to tensile strain and the vessels can be released quickly in an emergency.

#### **7.2.5.4 Berthing**

7.2.5.4.1 The distances from other vessels to be kept by berthed vessels carrying dangerous goods shall be not less than those prescribed by the Regulations referred to in 1.1.4.6.

7.2.5.4.2 An expert, as required by 7.2.3.15 shall be permanently on board berthed vessels carrying dangerous substances. The competent authority may, however, exempt from this obligation those vessels which are berthed in the harbour basin or in a permitted berthing position.

7.2.5.4.3 Outside the berthing areas specifically designated by the 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 blue light in accordance with column (19) of Table C of Chapter 3.2;
- 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 column (19) of Table C of Chapter 3.2.

While waiting in front of locks or bridges, vessels are allowed to keep distances less than those given above. In no case shall the distance be less than 100 m.

7.2.5.4.4 The competent authority may prescribe distances less than those given in 7.2.5.4.3 above.

7.2.5.5-  
7.2.5.7 *(Reserved)*

#### **7.2.5.8 Reporting duty**

7.2.5.8.1 In the States where the reporting duty is in force, the master of the vessel shall provide information in accordance with paragraph 1.1.4.6.1.

7.2.5.8.2-  
7.2.5.8.4 *(Deleted)*

7.2.5.9-  
7.2.9.99 *(Reserved)*