

7.2.3.7.1.2 Where degassing of cargo tanks having previously contained the dangerous goods referred to in 7.2.3.7.1.1 above is not practicable at the locations approved for this purpose by the competent authority, degassing may be carried out while the vessel is under way, provided that:

- The requirements of the first paragraph of 7.2.3.7.1.3 are complied with; the concentration of flammable gases and vapours given off by the cargo in the vented mixture at the outlet shall, however, be not more than 10% of the LEL;
- The crew is not exposed to a concentration of gases and vapours which exceeds national accepted exposure levels;
- 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.

7.2.3.7.1.3 Degassing of empty or unloaded cargo tanks having contained dangerous goods other than those referred to under 7.2.3.7.1.1, when the concentration of flammable gases and vapours given off by the cargo is 10% of the LEL or 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 (Explosion group / subgroup according to column (16) of Table C of Chapter 3.2). The gas/air mixture from cargo tanks may only be discharged into the atmosphere:

- (a) through the device for the safe depressurization of cargo tanks (see 9.3.2.22.4 (a), 9.3.2.22.4 (b), 9.3.3.22.4 (a), 9.3.3.22.4 (b)); or
- (b) through the sampling opening (see 9.3.2.21.1 (g), 9.3.3.21.1 (g)); or
- (c) through the open housing of the flame arrester at the connection point of the cargo tank and the venting piping (see 9.3.2.22.4 (b), 9.3.3.22.4 (d)); or
- (d) through a suitable hose that is connected to the venting piping and equipped with a flame arrester preceding the hose (explosion group/subgroup according to column (16) of Table C of Chapter 3.2).

The concentration of flammable gases and vapours in the vented mixture at the outlet shall be less than 50% of the LEL. The suitable venting equipment may be used for degassing by extraction only when a flame-arrester is fitted immediately before the ventilation fan on the extraction side (Explosion group /subgroup according to column (16) of Table C of Chapter 3.2). The concentration of flammable gases and vapours shall be measured once each hour during the two first hours after the beginning of the degassing operation by forced ventilation or by extraction, by an expert referred to in 8.2.1.2. The results of these measurements shall be recorded in writing.

Degassing is, however, prohibited within the area of locks including their lay-bys, under bridges or within densely populated areas.

Degassing of empty or unloaded cargo tanks having contained dangerous goods other than those referred to in 7.2.3.7.1.1, when the concentration of gases and vapours given off by the cargo is below 10% of the LEL, is allowed, and also additional openings of the cargo tank are allowed to be opened as long as the crew is not exposed to a concentration of gases and vapour which exceeds national accepted exposure levels. Also, there is no obligation to use a flame arrester.

It is prohibited within the area of locks, including their lay-bys, under bridges or within densely populated areas.

- 7.2.3.7.1.4 Degassing operations shall be interrupted during a thunderstorm or when, due to unfavourable wind conditions, dangerous concentrations of flammable or toxic gases and vapours are to be expected outside the cargo area in front of the accommodation, the wheelhouse and service spaces. The critical state is reached as soon as concentrations given off by the cargo of flammable gases and vapours of more than 20% of the LEL or of toxic gases and vapours exceeding the national accepted exposure levels have been detected in those areas by measurements by means of portable measurement devices.
- 7.2.3.7.1.5 The marking prescribed in 7.2.5.0.1 may be withdrawn by order of the master when, after degassing of the cargo tanks, it has been ascertained, using the equipment described in column (18) of Table C of Chapter 3.2, that none of the cargo tanks contain flammable gases and vapours in concentrations of more than 20% of the LEL or contain a concentration of toxic gases and vapours which exceeds national accepted exposure levels. The result of the measurement shall be recorded in writing.
- 7.2.3.7.1.6 Before taking measures which could cause hazards as described in 8.3.5, all cargo tanks and pipes in the cargo area shall be made gas-free. This shall be documented in a gas-free certificate, valid on the day the works commence. The condition of being gas-free may only be declared and certified by a person approved by the competent authority.
- 7.2.3.7.2 *Degassing of empty or unloaded cargo tanks and piping for loading and unloading to reception facilities*
- 7.2.3.7.2.1 Empty or unloaded cargo tanks may only be degassed by an expert according to 8.2.1.2. If required by international or national law, it may only be carried out at the locations approved by the competent authority. Degassing to a mobile reception facility while the vessel is underway, is prohibited. Degassing to a mobile reception facility is prohibited while another vessel degasses to the same facility. Degassing to an on board mobile reception facility is prohibited.
- 7.2.3.7.2.2 Before the degassing operation commences, the degassing vessel shall be earthed. The master of the degassing vessel or an expert according to 8.2.1.2 mandated by him and the operator of the reception facility shall have filled in and signed a checklist confirming with 8.6.4 of ADN.
- The checklist shall be provided at least in languages understood by the master or the expert and the operator of the reception facility. The checklist can be provided electronically if both sides agree, are able to use advanced e-signatures and both sides get a copy.
- If a positive response to all the questions is not possible, degassing to a reception facility is only permitted with the consent of the competent authority.
- 7.2.3.7.2.3 Degassing to reception facilities may be carried out by using the piping for loading and unloading or the venting piping to remove the gases and vapours from the cargo tanks while using the other piping respectively to prevent exceedance of the maximum permissible overpressure or vacuum of the cargo tanks.

Piping shall be part of a closed system or, if used to prevent exceedance of the maximum permissible vacuum in the cargo tanks, be equipped with an additional permanently installed or portable vacuum valve in accordance with 9.3.2.62 or 9.3.3.62, with a flame-arrester (Explosion group/subgroup according to column (16) of Table C of Chapter 3.2) if explosion protection is required (column (17) of Table C of Chapter 3.2). A permanently installed valve or the opening to which a portable valve is connected, must remain closed with a blind flange when the vessel is not degassing to a reception facility.

If explosion protection is required in column (17) of Table C of Chapter 3.2 then all piping connected between the degassing vessel and the reception facility shall be equipped with an appropriate flame arrester. The requirements for piping on board shall be: Explosion group/subgroup according to column (16) of Table C of Chapter 3.2.

- 7.2.3.7.2.4 It shall be possible to interrupt degassing operations by means of switches installed at two locations on the vessel (fore and aft) and at two locations at the reception facility (directly at the access to the vessel and at the location from where the reception facility is operated). Interruption of degassing shall be effected by the means of a quick closing valve which shall be directly fitted in the connection between the degassing vessel and the reception facility. The system of disconnection shall be designed in accordance with the closed circuit principle and may be integrated in the emergency shutdown system of the cargo pumps and overfill protections prescribed in 9.3.1.21.5, 9.3.2.21.5 and 9.3.3.21.5.

Degassing operations shall be interrupted during a thunderstorm.

- 7.2.3.7.2.5 The marking prescribed in column (19) of Table C of Chapter 3.2 may be withdrawn by order of the master when, after degassing of the cargo tanks, it has been ascertained, using the equipment described in column (18) of Table C of Chapter 3.2, that none of the cargo tanks contain flammable gases and vapours in concentrations of more than 20% of the LEL or contain a concentration of toxic gases and vapours which exceeds national accepted exposure levels. The result of the measurement shall be recorded in writing.

- 7.2.3.7.2.6 Before taking measures which could cause hazards as described in 8.3.5, all cargo tanks and pipes in the cargo area shall be made gas-free. This shall be documented in a gas-free certificate, valid on the day the works commence. The condition of being gas-free may only be declared and certified by a person approved by the competent authority.

7.2.3.7.3 to 7.2.3.7.6 (Deleted)

7.2.3.8 to 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 degassing; and
- after the gas detection system has been activated.

7.2.3.13 and 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 tank 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      All measurements on board the vessel shall be performed by an expert according to 8.2.1.2, unless provided otherwise in the Regulations annexed to ADN. The results of the measurements shall be recorded in writing in the book according to 8.1.2.1 (g).

7.2.3.17 to 7.2.3.19      *(Reserved)*

**7.2.3.20      *Water ballast***

7.2.3.20.1      Cofferdams fitted out as service spaces, and hold spaces containing insulated cargo tanks shall not be filled with water.

Cofferdams, not fitted out as service spaces, may be filled with water, provided that:

- (a) the adjacent cargo tanks are empty;
- (b) this has been taken into account in the intact and damage stability calculations; and
- (c) filling is not prohibited in column (20) of Table C of Chapter 3.2.

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

- (a) this has been taken into account in the intact and damage stability calculations; and
- (b) 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:

- (a) fixed level indicators shall be installed; or
- (b) 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 and 7.2.3.24 *(Reserved)*

**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 and 7.2.3.27 (Reserved)

7.2.3.28 *Instruction on maximum loading temperature*

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

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 areas. If the vessel substance list according to 1.16.1.2.5 contains substances for which explosion protection is required in column (17) of Table C of Chapter 3.2,

- Petrol operated outboard motors and their fuel tanks shall be carried on board only outside the cargo area; and
- Mechanical inflation devices, outboard motors and their electrical installations shall be put into operation only outside the cargo 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 flashpoint equal to or lower than 55 °C (e.g. petrol engines) is prohibited. This provision does not apply to:

- the petrol-operated outboard motors of lifeboats;
- the propulsion and auxiliary systems which meet the requirements of Chapter 30 and Annex 8, Section II, Chapter 1, and Section III, Chapter 2 of the European Standard laying down Technical Requirements for Inland Navigation vessels (ES-TRIN) as amended.<sup>1</sup>

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 0.60 m may be used as oil fuel tanks, provided they have been constructed in accordance with Part 9.

7.2.3.33 to 7.2.3.40 (Reserved)

<sup>1</sup> As available on the website of the Comité Européen pour l'Élaboration de Standards dans le Domaine de Navigation Intérieure – CESNI, <https://www.cesni.eu/en/documents/es-trin/>.

**7.2.3.41      *Smoking, fire or naked light***

- 7.2.3.41.1      Smoking, including electronic cigarettes and other similar devices, fire and naked light are prohibited on board the vessel.

This prohibition shall be displayed on notice boards at appropriate places.

The prohibition on smoking does not apply in the accommodation or the wheelhouse, provided that their windows, doors, skylights and hatches are closed or the ventilation system is adjusted to guarantee an overpressure of at least 0.1 kPa.

- 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 explosion hazardous area.

- 7.2.3.45 to 7.2.3.50      (*Reserved*)

**7.2.3.51      *Electrical and non-electrical installations and equipment***

- 7.2.3.51.1      The electrical and non-electrical installations and equipment shall be properly maintained in a faultless condition.

- 7.2.3.51.2      The use of movable electric cables is prohibited in the explosion hazardous area. This provision does not apply to the movable electric cables referred to in 9.3.1.53.3, 9.3.2.53.3, and 9.3.3.53.3.

Movable electric cables must undergo visual inspection each time before use. They must be installed in such a way as to ensure that they are not at risk of damage. Connectors must be located outside of the explosion danger area.

The use of electric cables to connect the power network of a vessel to a land-based power network is not permitted:

- During the loading or unloading of substances for which explosion protection is required in column (17) of Table C of Chapter 3.2; or
- When the vessel is located immediately adjacent to or within an onshore assigned zone.

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.

7.2.3.51.4 During a stay in the immediate vicinity of or within an onshore assigned zone, electrical and non-electrical installations and equipment not complying with the requirements of 9.3.x.51 (a), 9.3.x.51 (b), 9.3.x.51 (c) or 9.3.x.52.1 (marked in red according to 9.3.x.51 and 9.3.x.52.3) shall be switched off, cooled down to below the temperature mentioned in 9.3.x.51 (a) or 9.3.x.51 (b), or the measures mentioned in 7.2.3.51.6 shall be taken.

When the list of substances on the vessel according to 1.16.1.2.5 contains substances for which explosion protection is required in column (17) of Table C of Chapter 3.2, this provision applies also during loading and unloading and degassing at berth.

7.2.3.51.5 When the list of substances on the vessel according to 1.16.1.2.5 contains substances for which the temperature classes T4, T5 or T6 are indicated in column (15) of Table C of Chapter 3.2, the corresponding surface temperatures within the assigned zones shall not exceed 135 °C (T4), 100 °C (T5) or 85 °C (T6), respectively.

7.2.3.51.6 7.2.3.51.4 and 7.2.3.51.5 do not apply in the accommodation, the wheelhouse or service spaces located outside the cargo area if:

- (a) The ventilation system is adjusted to guarantee an overpressure of at least 0.1 kPa; and
- (b) The gas detection system is switched on, taking measurements continuously.

7.2.3.51.7 Installations and equipment according to 7.2.3.51.4 that have been switched off during loading and unloading, degassing at berth or a stay in the vicinity of or within an onshore assigned zone may only be switched on again:

- Once the vessel is no longer in the vicinity of or within the onshore assigned zone; or
- When values below 10% of the LEL of n-Hexane or of the calibration gas prescribed by the manufacturer are reached in the wheelhouse, accommodation and service spaces located outside the cargo area.

The results of the measurements shall be recorded in writing.

7.2.3.51.8 If vessels are not able to meet the requirements of 7.2.3.51.4 and 7.2.3.51.6, they are not permitted to remain in the immediate vicinity of or within an onshore assigned zone.

7.2.3.52 to 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 no more than six approved receptacles for residual products and receptacles for slops having a maximum total capacity of not more than 12 m<sup>3</sup>. The receptacles for residual products and the receptacles for slops shall be properly secured in the cargo area, be located at a minimum distance from the hull equal to one quarter of the vessel's breadth and comply with the provisions of 9.3.2.26.3 or 9.3.3.26.3 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 vessels or other vessels delivering products for the operation of vessels, packages of dangerous goods and non-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 maximum content per receptacle of cargo samples referred to in 7.2.4.1.1 may be increased to a maximum of 1 litre per receptacle with a maximum of 500 receptacles. The total quantity of cargo samples in litres must not exceed 250 litres on board of the vessel.

**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 from inland navigation vessels of unpackaged liquid oily and greasy wastes resulting from the operation of vessels shall be ensured by suction; the reception from seagoing vessels may also be ensured by pressurization provided that:

- the quantity to be transferred and the maximum loading rate is determined and agreed between the seagoing vessel and the inland navigation vessel;
- if feasible, the pressure pump on the seagoing vessel can be switched off from the receiving inland navigation vessel;
- there is permanent and continuous supervision on the operation from both vessels; and
- communication between both vessels is ensured at all times during the operation.

7.2.4.2.2 Mooring 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 degasing 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 Mooring 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 degasing 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 to 7.2.4.6 (Reserved)

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

7.2.4.7.1 Tank vessels shall be loaded or unloaded only at the places designated or approved for this purpose by the competent authority. If a zone is assigned onshore at the loading or unloading station, the vessel is only authorized to stay in its immediate vicinity or within the zone if it meets the requirements of 9.3.x.12.4 (b) or (c), 9.3.x.51, 9.3.x.52.1 and 9.3.x.52.3. The competent authority may allow exceptions in individual cases.

7.2.4.7.2 The reception from other vessels of unpackaged oily and greasy liquid wastes resulting from the operation of vessels and the handing over of products for the operation of vessels into the bunkers of other vessels shall not be taken to be loading or unloading within the meaning of 7.2.4.7.1 above or transhipment within the meaning of 7.2.4.9.

7.2.4.8 (Reserved)

#### **7.2.4.9 Cargo transfer operations**

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

**NOTE 1:** For transhipment to means of transport of another mode see 7.2.4.7.1.

**NOTE 2:** This prohibition also applies to transhipment between supply vessels.

#### **7.2.4.10 Checklist**

7.2.4.10.1 Loading or unloading shall start only once a checklist conforming with section 8.6.3 of ADN has been completed for the cargo in question and questions 1 to 19 of the list have been checked off with an “X”. Irrelevant questions should be deleted. The list shall be completed, after the pipes intended for the handling are connected and prior to the handling, in duplicate and signed by the master or a person mandated by him 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 prior 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 provided at least in languages understood by the master and the person responsible for the handling at the shore facilities. The checklist can be provided electronically if both sides agree, are able to use advanced e-signatures and both sides get a copy.

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;

Degasing of UN No. 1203 petrol: Degasing 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 residues of previous cargo 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 residual tanks and receptacles for residual products, released gases shall be safely evacuated. They shall only be connected to the venting piping for the time necessary to fill them.

Capacity to collect any leaking liquids shall be placed under the connections used during filling.

- 7.2.4.15.3 The degasing 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 if available, as well as of the pipes of the stripping systems shall remain closed except during loading, unloading, stripping, cleaning or degasing operations.

- 7.2.4.16.4 *(Deleted)*

- 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. Before coupling and after uncoupling the connections and in between if necessary, the receptacles shall be emptied. These requirements shall not apply to the carriage of substance 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 connecting-point of the vapour return piping and the venting piping shall not be more than the opening pressure of the pressure relief device/high-velocity vent valve.

- 7.2.4.16.7 When a tank vessel conforms to 9.3.2.22.4 (b) or 9.3.3.22.4 (b), the individual cargo tanks shall be closed off during carriage and opened during loading, unloading and degassing.

- 7.2.4.16.8 Persons entering the premises located in the cargo area below deck during loading or unloading shall wear the PP protective 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 venting piping, relieving pressure in cargo tanks, taking samples, carrying out measurements or cleaning or replacing the flame arrester plate stack (see 7.2.4.22), shall wear the PP protective 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 (a) During loading or unloading in a closed tank vessel of substances for which 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).

(b) During loading or unloading in a closed tank vessel of substances for which an open type N vessel 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) or using another suitable opening in the venting piping if any accumulation of water and its penetration into the cargo tanks is prevented and the opening is appropriately closed again after loading or unloading.

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 shut-off device referred to in 9.3.1.21.1 (g), 9.3.2.21.1 (g) or 9.3.3.21.1 (g) shall be opened only after a gastight connection for a sampling device 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 venting piping to the shore installation shall be such that the vessel is protected against detonations and the passage of flames from the shore (explosion group/subgroup according to column (16) of table C of Chapter 3.2). 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.

7.2.4.16.16 Measures to be taken before loading refrigerated liquefied gases

Unless the temperature of the cargo is controlled in accordance with 9.3.1.24.1 (a) or 9.3.1.24.1 (c) guaranteeing the use of the maximal boil-off in any service conditions, the holding time has to be determined by the master or another person on his behalf before loading and validated by the master or another person on his behalf during loading and shall be documented on board.

7.2.4.16.17 Determination of the holding time

A table, approved by the recognized classification society that certified the vessel, giving the relation between holding time and filling conditions, incorporating the parameters below shall be kept on board.

The holding time of the cargo shall be determined on the basis of the following parameters:

- The heat transmission coefficient as defined in 9.3.1.27.9;
- The set pressure of the safety valves;
- The initial filling conditions (temperature of cargo during loading and degree of filling of the cargo tank);
- The ambient temperatures as given in 9.3.1.24.2;
- When using the boil-off vapours, the minimum guaranteed use of the boil-off vapours (that is the amount of boil-off vapours used under any service conditions), may be taken into account.

*Adequate safety margin*

To leave an adequate margin to ensure safety, the holding time is at least three times the expected duration of the journey of the vessel, including the following:

- To ensure safety for short journeys of (as expected) no more than 5 days, the minimum holding time for any vessel with refrigerated liquefied gases is 15 days.
- For long journeys of (as expected) more than 10 days, the minimum holding time shall be 30 days, adding two days for each day the journeys takes more than 10 days.

As soon as it becomes clear that the cargo will not be unloaded within the holding time, the master shall inform the nearest emergency services according to 1.4.1.2.

**7.2.4.17**      ***Closing of windows and doors***

7.2.4.17.1      During loading, unloading, degasing operations, or a stay in the vicinity of or within an onshore assigned zone, 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 ventilation system referred to in 9.3.1.12.4, 9.3.2.12.4 or 9.3.3.12.4;
- air intakes of air conditioning installations if these openings are fitted with a gas detection system referred to in 9.3.1.12.4, 9.3.2.12.4 or 9.3.3.12.4.

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 degasing 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. The provision of 7.2.4.17.1 and 7.2.4.17.2 however, shall apply to the handing over of liquefied natural gas (LNG) 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 of the cargo tank indicated in column (11) of Table C of Chapter 3.2 or calculated in accordance with 7.2.4.21.3 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 of the cargo tank at the beginning of carriage and control of the temperature shall be such that, during carriage, the maximum allowable degree of filling of the cargo tank 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      7.2.4.22 applies only to type N and type C tank vessels.

By way of derogation from 7.2.3.22 and provided that this is not prohibited by other legal requirements, the opening of cargo tank openings, including when the tanks have not been unloaded, degassed or are not gas-free,

- for cleaning and replacement of flame arrester plate stacks;
- for visual inspection from the deck;
- for sampling;
- for the connection of a tank washing system;
- for gas measurement,
- for the determination of the filling quantity in a cargo tank in exceptional cases; and
- for the subsequent addition of stabilizer in exceptional cases;

is authorized in the following conditions.

7.2.4.22.2      Opening of cargo tanks is permitted only if the vessel is not connected to the shore facility or if the shut-off devices of the vessel and the shore facility are closed.

Opening of openings of cargo tanks is permitted only after the depressurization of the relevant cargo tanks by means of the device for the safe depressurization of cargo tanks prescribed in 9.3.2.22.4 (a) and 9.3.2.22.4 (b) or 9.3.3.22.4 (a) and 9.3.3.22.4 (b).

When explosion protection is required under column (17) of Table C of Chapter 3.2, the opening of cargo tank hatches shall be permitted only if the cargo tanks in question are discharged and the concentration of flammable gases in the tank is less than 10% of the lower explosive limit of the cargo/previous cargo. The results of the measurements shall be recorded in writing. Entry into these cargo tanks is not permitted for the purpose of measuring.

7.2.4.22.3      Opening of 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      For the replacement of flame arrester plate stacks for the purpose of cleaning or replacement with flame arrester plate stacks of the same design, the following conditions shall be met:

- (a) Cleaning and replacing of the flame arrester plate stack shall be carried out only by trained and qualified personnel;
- (b) Opening is permitted only when the relevant cargo tanks are discharged and the concentration of flammable gases in the cargo tank is less than 10% of the lower explosive limit of the cargo/previous cargo;
- (c) The results of the measurements shall be recorded in writing.

7.2.4.22.5      For repairs on the flame arrester housing, 8.1.7.3 shall apply.

7.2.4.22.6      Visual inspection of the cargo tank from the deck, determination of the cargo tank filling level and subsequent addition of stabilizer are only permitted via the sampling outlet.

- 7.2.4.22.7 Sampling shall be permitted only by means of the sampling device prescribed in column (13) of Table C of Chapter 3.2 or a device ensuring a higher level of safety.
- 7.2.4.22.8 In the event of a proven and unexpected failure of the closed or partially closed sampling device connection (see 9.3.x.21.1 (g)), which cannot be remedied immediately, sampling shall be permitted via the open sampling outlet. The occurrence of a fault and the use of the sampling outlet must be recorded in writing or electronically by the master and confirmed in writing by the person appointed by the filler or unloader.
- 7.2.4.22.9 The operations for the opening of openings shall be carried out using only appropriate low-sparking hand tools.
- On board vessels covered by the classification of zones as defined in section 1.2.1, all electrical and non-electrical appliances and devices used for activities on open cargo tanks shall meet the requirements for use in zone 0.
- 7.2.4.22.10 The duration of opening shall be strictly limited to the time necessary for the activities listed in 7.2.4.22.1. Opening the cargo tanks immediately before and after a thunderstorm as well as during a thunderstorm shall be prohibited.
- 7.2.4.22.11 The working instructions concerning explosion protection in accordance with 1.3.2.5 shall be available and applied on board.
- 7.2.4.22.12 Persons who open openings or who are in the immediate vicinity of an opening shall use the equipment prescribed in column (18) of Table C of Chapter 3.2.
- 7.2.4.22.13 The requirements of 7.2.4.16.8 apply by analogy to visual inspection, filling level determination, gas measurement or stabilizer addition operations after loading.
- 7.2.4.22.14 If the quantity of the cargo measured by the filler differs from the quantity determined on board by means of measuring instruments, the filling quantity in the cargo tank may be determined manually via the sampling opening using a measuring tape and a thermometer.
- The measuring instruments used for determining the filling quantity in cargo tanks shall consist of electrostatically conductive material and shall be electrically connected to the vessel's hull during measuring. The measuring instrument shall be suitable for use in zone 0.
- 7.2.4.22.15 If an unforeseen extension of the navigation time requires the addition of extra stabilizer to one or more cargo tanks during transport, this is only permitted through the sampling opening. Electrostatic charges shall be prevented.
- 7.2.4.22.16 The requirements in accordance with 7.2.3.1.4 shall apply additionally for gas measurement.
- 7.2.4.22.17 The sampling receptacles including all accessories such as ropes, etc., shall consist of electrostatically conductive material and shall be electrically connected to the vessel's hull.
- 7.2.4.22.18 When closing the sampling opening or the flame arrester housing, the flame arrester should be checked for damage, soiling and correct installation and be repaired, where necessary, before the journey is continued.
- 7.2.4.22.19 The requirements of 7.2.4.22.1 to 7.2.4.22.11 shall not apply to oil separator or supply vessels.
- 7.2.4.22.20 To wash cargo tanks, only the special connection opening for tank washing systems provided for this purpose or built-in tank washing systems on the cargo tank may be used.
- If these special openings or built-in tank washing systems are not available, other measures should be taken to avoid vapours escaping from the cargo tanks.

7.2.4.22.21 The competent authority may permit the opening of openings for reasons not listed in 7.2.4.22.1 under equivalent conditions.

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 *Loading and unloading piping and venting 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 *(Reserved)*

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 released during loading operations shall be returned ashore through a vapour return piping if:

- A closed cargo tank is required according to column (7) of Table C of Chapter 3.2; or
- A closed cargo tank was required for the previous cargo in column (7) of Table C of Chapter 3.2 and before the loading the concentration of flammable gases of the previous cargo in the cargo tank is above 10% of the LEL or the cargo tank contains toxic gases, corrosive gases (packing group I or II) or gases with CMR-characteristics (Categories 1A or 1B) in a concentration above national accepted exposure levels. If these conditions are not met and the vapour return piping is not used, the measured concentrations shall be recorded in writing.

If the substance to be loaded requires explosion protection according to column (17) of Table C of Chapter 3.2, and the use of the vapour return piping is prescribed, the connection of the vapour return piping shall be designed 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.

7.2.4.25.6 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.

7.2.4.25.7 For connecting or disconnecting loading or unloading piping and venting piping, only low-sparking hand tools (e.g. chromium vanadium steel screwdrivers and wrenches) shall be used.

7.2.4.26 and 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 pressure relief devices/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      *Transport of refrigerated liquefied gases***

During loading or unloading the drip tray as mentioned in 9.3.1.21.11 shall be placed under the shore connection of the piping for loading and unloading in use, and a water film as mentioned in 9.3.1.21.11 shall be activated.

7.2.4.30 to 7.2.4.39      *(Reserved)*

**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      *Smoking, fire or naked light***

During loading, unloading or degassing operations, fires, naked lights, and smoking, including electronical cigarettes 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 to 7.2.4.50      *(Reserved)*

**7.2.4.51      *Electrical installations and equipment***

7.2.4.51.1 and 7.2.4.51.2      *(Deleted)*

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 electrical lighting appliances which shall be positioned in such a way that they cannot be damaged.

7.2.4.54 to 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. If an unmanned pushed barge whose list of substances does not include substances with danger 8 in column (5) of Table C of Chapter 3.2, is not equipped with built in shower and eye and face bath, a mobile shower and mobile eye and face bath have to be provided on board the pushed barge during loading and unloading operations and cargo operations by pumping.

7.2.4.61 to 7.2.4.73      *(Reserved)*

7.2.4.74      *(Deleted)*

**7.2.4.75      *Risk of sparking***

All electrically continuous connections between the vessel and the shore shall be so designed that they do not present a source of ignition. If the vessel substance list as referred to in 1.16.1.2.5 includes substances that require anti-explosion protection in accordance with column (17) of Table C of Chapter 3.2, taking off clothes not sufficiently dissipative shall be prohibited in zone 1.

**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 Possible means of evacuation in case of an emergency**

		Tank vessel/tank barge				
		Class				
		2, 3 (except second and third entries of UN No. 1202, packing group III, in Table C)	3 (only for the second and third entries of UN No. 1202, packing group III, in Table C), 4.1	5.1, 6.1	8	9
1	Two escape routes inside or outside the cargo area in opposite directions	•	•	•	•	•
2	One escape route outside the cargo area and one safe haven outside the vessel including the escape route towards it from the opposite end	•	•	•	•	•
3	One escape route outside the cargo area and one safe haven on the vessel at the opposite end	•	•	•**	•	•
4	One escape route outside the cargo area and one life boat at the opposite end		•		•	•
5	One escape route outside the cargo area and one escape boat at the opposite end	•	•	•	•	•
6	One escape route inside the cargo area and one escape route outside the cargo area at the opposite end	•	•	•	•	•
7	One escape route inside the cargo area and one safe haven outside the vessel in the opposite direction	•	•	•	•	•
8	One escape route inside the cargo area and one safe haven on the vessel in the opposite direction	•	•	•**	•	•
9	One escape route inside the cargo area and one life boat at the opposite end		•		•	•
10	One escape route inside the cargo area and one escape boat at the opposite end	•	•	•	•	•
11	One escape route inside or outside the cargo area and two safe havens on the vessel at opposite ends	•	•	•**	•	•
12	One escape route inside or outside the cargo area and two safe areas on the vessel at opposite ends	•	•	•**	•	•
13	One escape route outside the cargo area		•		*•	•
14	One escape route inside the cargo area		•		*•	•
15	One or more safe havens outside the vessel, including the escape route towards it	•	•	•	*•	•

• = Possible option.

\* = Not accepted in case of classification codes TFC, CF or CFT.

\*\*= Not accepted if there is a risk that oxidizing substances in combination with flammable liquids may cause an explosion.

Based on local circumstances, competent authorities may prescribe additional requirements for the availability of means of evacuation.

7.2.4.78 to 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 or toxic gases and vapours in the cargo tanks, given off by the last cargo for which marking was required, is higher than 20% of the LEL or exceeds the national accepted exposure levels, 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 they can be released quickly in an emergency and the electric cables and hose assemblies are not compressed, folded or subject to tensile strain.

### **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 in accordance with 8.2.1.2 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 to 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 to 7.2.5.8.4 *(Deleted)*

7.2.5.9 to 7.2.9.99 *(Reserved)*

## **PART 8**

### **Provisions for vessel crews, equipment, operation and documentation**



**CHAPTER 8.1****GENERAL REQUIREMENTS APPLICABLE TO VESSELS AND EQUIPMENT**

8.1.1 *(Reserved)*

**8.1.2 Documents**

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

- (a) The vessel's certificate of approval referred to in 1.16.1.1 or the vessel's provisional certificate of approval referred to in 1.16.1.3 and the annex referred to in 1.16.1.4;
- (b) Transport documents referred to in 5.4.1 for all dangerous goods carried as cargo on board;
- (c) The instructions in writing prescribed in 5.4.3;
- (d) A copy of the ADN with the latest version of its annexed Regulations;
- (e) The inspection certificate of the insulation resistance of the electrical installations and equipment prescribed in 8.1.7.1 and the certificates prescribed in 8.1.7.2 concerning the inspection of all installations, equipment and autonomous protection systems and the conformity of the documents required in 8.1.2.2 (e) to (h) and 8.1.2.3 (r) to (v) with the circumstances on board;
- (f) A certificate concerning the inspection of the fire-extinguishing hoses prescribed in 8.1.6.1 and a certificate concerning the inspection of the special equipment prescribed in 8.1.6.3;
- (g) A book in which all required measurement results are recorded;
- (h) A copy of the relevant text of the special authorizations referred to in 1.5 if the transport operation is performed under this/these special authorization(s);
- (i) Means of identification, which include a photograph, for each crew member, in accordance with 1.10.1.4; and
- (j) *(Deleted)*
- (k) For vessels which carry hose assemblies used for loading, unloading or delivering liquefied natural gas for the operation of the vessel, the inspection certificate and the documentation of the calculated maximum load stress prescribed in 8.1.6.2;
- (l) For vessels which required repair of explosion-protected installations and equipment and autonomous protection systems, the certificate referred to in 8.1.7.3.

The documents listed in subparagraphs (c), (d) and (h) may be kept on board electronically in a human-readable format.

8.1.2.2 In addition to the documents prescribed in 8.1.2.1, the following documents shall be carried on board dry cargo vessels:

- (a) The stowage plan prescribed in 7.1.4.11;
- (b) The ADN specialized knowledge certificate prescribed in 8.2.1.2;

- (c) For vessels complying with the additional requirements for double-hull vessels:
  - a damage-control plan;
  - the documents concerning intact stability as well as all conditions of intact stability taken into account for the damaged stability calculation in a form the master understands;
  - the certificate of the recognized classification society (see 9.1.0.88 or 9.2.0.88);
- (d) The inspection certificates concerning the fixed fire extinguishing systems prescribed in 9.1.0.40.2.9;
- (e) A list of or a general plan indicating the fixed installations and equipment suitable for use at least in zone 1 and the installations and equipment complying with 9.1.0.51;
- (f) A list of or a general plan indicating the fixed installations and equipment which are not authorized for use during loading and unloading, during a stay in the immediate vicinity of or within an onshore assigned zone (marked in red according to 9.1.0.52.2);
- (g) A plan indicating the boundaries of the zones and the location of the electrical and non-electrical equipment installed in the relevant zones intended for use in explosion hazardous areas;
- (h) A list of the installations and equipment referred to under (g) with the following information:
  - Installation/equipment, location, marking (explosion protection level according to IEC 60079-0, equipment category according to Directive 2014/34/EU<sup>1</sup> or equivalent protection level, explosion group, temperature class, type of protection, test body<sup>2</sup>) in case of electrical equipment for use in zone 1 (alternatively, a copy of the certificate of conformity according to Directive 2014/34/EU<sup>1</sup>);
  - Installation/equipment, location, marking (explosion protection level according to IEC 60079-0, equipment category according to Directive 2014/34/EU<sup>1</sup> or equivalent protection level, including explosion group and temperature class, type of protection, identification number) in case of electrical equipment for use in zone 2 and in the case of non-electrical equipment for use in zone 1 and zone 2 (alternatively, a copy of the certificate of conformity according to Directive 2014/34/EU<sup>1</sup>);

The document listed in subparagraph (a) may be kept on board electronically in a human-readable format.

The documents listed in subparagraphs (e) to (h) shall bear the stamp of the competent authority issuing the certificate of approval.

8.1.2.3 In addition to the documents prescribed in 8.1.2.1, the following documents shall be carried on board tank vessels:

- (a) The cargo stowage plan prescribed in 7.2.4.11.2;
- (b) The ADN specialized knowledge certificate prescribed in 8.2.1.2;

<sup>1</sup> Official Journal of the European Union No. L 96 of 29 March 2014, p. 309.

<sup>2</sup> Notified body, in the frame of Directive 2014/34/EU, or equivalent.

- (c) For vessels which have to conform to the conditions of damage-control (see 9.3.1.15, 9.3.2.15 or 9.3.3.15)
  - a damage-control plan;
  - the documents concerning intact stability as well as all conditions of intact stability taken into account for the damaged stability calculation in a form the master understands; the stability booklet and the proof of the loading instrument having been approved by the recognized classification society;
- (d) *(Deleted)*
- (e) The certificate of class issued by the recognized classification society prescribed in 9.3.1.8.1, 9.3.2.8.1 or 9.3.3.8.1;
- (f) The certificates concerning the inspection of the gas detection systems and the oxygen measuring system prescribed in 8.1.6.3;
- (g) The vessel substance list prescribed in 1.16.1.2.5;
- (h) The inspection certificate for the hose assemblies for loading and unloading prescribed in 8.1.6.2;
- (i) The instructions relating to the loading and unloading flows prescribed in 9.3.2.25.9 or 9.3.3.25.9;
- (j) The inspection certificate of the cargo pump rooms prescribed in 8.1.8;
- (k) In the event of the carriage of goods having a melting point  $\geq 0^{\circ}\text{C}$ , heating instructions;
- (l) *(Deleted)*
- (m) The registration document referred to in 8.1.11;
- (n) For the carriage of refrigerated substances, the instruction required in 7.2.3.28;
- (o) The certificate concerning the refrigeration system, prescribed in 9.3.1.27.10, 9.3.2.27.10 or 9.3.3.27.10;
- (p) The inspection certificates concerning the fixed fire extinguishing systems prescribed in 9.3.1.40.2.9, 9.3.2.40.2.9 or 9.3.3.40.2.9; and
- (q) When carrying refrigerated liquefied gases and the temperature is not controlled in accordance with 9.3.1.24.1 (a) and 9.3.1.24.1 (c), the determination of the holding time (7.2.4.16.16, 7.2.4.16.17 and documentation on the heat transmission coefficient);
- (r) A list of or a general plan indicating the fixed installations and equipment suitable to be used at least in zone 1 and the installations and equipment complying with 9.3.x.51;
- (s) A list of or a general plan indicating the fixed installations and equipment which are not authorized for use during loading and unloading, degassing at berth or during a stay in the immediate vicinity of or within an onshore assigned zone (marked in red according to 9.3.1.52.3, 9.3.2.52.3 or 9.3.3.52.3);
- (t) A plan approved by a recognized classification society indicating the boundaries of the zones and the location of the electrical and non-electrical equipment installed in the relevant zone intended to be used in explosion hazardous areas, as well as autonomous protection systems;

- (u) A list of the installations/equipment referred to under (t) and of the autonomous protection systems, with the following information:
- Installations/equipment, location, marking (explosion protection level according to IEC 60079-0, equipment category according to Directive 2014/34/EU<sup>1</sup> or at least equivalent), including explosion group and temperature class, type of protection and test body<sup>2</sup>, in the case of electrical equipment for use in zone 0 or zone 1 and, in the case of non-electrical equipment for use in zone 0; (alternatively, a copy of the inspection certificate, for example the declaration of conformity under Directive 2014/34/EU<sup>1</sup>);
  - Installation/equipment, location, marking (explosion protection level according to IEC 60079-0, equipment category according to Directive 2014/34/EU<sup>1</sup> or equivalent protection level, including explosion group and temperature class, type of protection, identification number) in the case of electrical equipment for use in zone 2 and in the case of non-electrical equipment for use in zone 1 and zone 2 (alternatively, a copy of the inspection certificate, for example, the certificate of conformity according to Directive 2014/34/EU<sup>1</sup>);
  - Self-protection system, place of installation, marking (explosion group/subgroup):
- (v) A list of or general plan indicating the fixed installations and equipment installed outside the explosion hazardous areas that may be used during loading, unloading, degassing at berth or during a stay in the immediate vicinity of or within an onshore assigned zone, if not referred to in (r) and (u).

The documents listed in (r) to (v) shall bear the stamp of the competent authority issuing the certificate of approval.”.

- (w) The certificates required under 3.2.3.1, Explanations concerning Table C, explanatory note for column (20), remark 12 subparagraphs (p) and (q), if appropriate;
- (x) The certificates required under 3.2.3.1, Explanations concerning Table C, explanatory note for column (20), remark 33 subparagraphs (i), (n) and (o), if appropriate.

The documents listed in subparagraphs (a), (g), (j), (k), (m), (n) and (q) may be kept on board electronically in a human-readable format.

The documents listed in subparagraph (c) may be kept on board electronically in PDF format according to standard ISO 32000-1, accompanied by an advanced electronic signature according to Regulation (EU) 910/2014, or at least equivalent.

8.1.2.4 The instructions in writing referred to in 5.4.3 shall be made available to the master before loading. They shall be kept readily available in the wheelhouse.

On board dry cargo vessels, the transport documents shall be made available to the master before loading and on board tank vessels they shall be made available to him after loading and before the journey commences.

8.1.2.5 (Reserved)

<sup>1</sup> Official Journal of the European Union No. L 96 of 29 March 2014, p. 309.

<sup>2</sup> Notified body, in the frame of Directive 2014/34/EU, or equivalent.

- 8.1.2.6 The presence on board of the certificate of approval is not required in the case of pushed barges which are not carrying dangerous goods, provided that the following additional particulars are indicated, in identical lettering, on the plate furnished by CEVNI:

Number of the certificate of approval: ...

issued by: ...

valid until: ...

The barge-owner shall thereafter keep the certificate of approval and the annex covered by 1.16.1.4 in his possession.

The similarity of the particulars on the plate and those contained in the certificate of approval shall be certified by a competent authority which shall affix its stamp to the plate.

- 8.1.2.7 The presence on board of the certificate of approval is not required in the case of dry cargo barges or tank barges carrying dangerous goods provided that the plate furnished by CEVNI is supplemented by a second metal or plastic plate reproducing by photo-optical means a copy of the entire certificate of approval. A photo-optical copy of the annex referred to in 1.16.1.4 is not required.

The barge-owner shall thereafter keep the certificate of approval and the annex referred to in 1.16.1.4 in his possession.

The similarity of the particulars on the plate and the certificate of approval shall be certified by a competent authority which shall affix its stamp to the plate.

- 8.1.2.8 All documents shall be on board in a language the master is able to read and understand. If that language is not English, French or German, all documents, with the exception of the copy of ADN with its annexed Regulations and those for which the Regulations include special provisions concerning languages, shall be on board also in English, French or German, unless agreements concluded between the countries concerned in the transport operation provide otherwise.

- 8.1.2.9 8.1.2.1 (b), 8.1.2.1 (g) and 8.1.2.4 do not apply to oil separator vessels or supply vessels. 8.1.2.1 (c) does not apply to oil separator vessels.

- 8.1.3 (*Reserved*)

#### **8.1.4 Fire-extinguishing arrangements**

In addition to the fire-extinguishing appliances prescribed in the Regulations referred to in 1.1.4.6, each vessel shall be equipped with at least two additional hand fire-extinguishers having the same capacity. The fire-extinguishing agent contained in these additional hand fire-extinguishers shall be suitable for fighting fires involving the dangerous goods carried.

#### **8.1.5 Special equipment**

- 8.1.5.1 Insofar as the provisions of Chapter 3.2, Tables A or C require, the following equipment shall be available on board:

PP: for each member of the crew, a pair of protective goggles, a pair of protective gloves, a protective suit and a suitable pair of protective shoes (or protective boots, if necessary).  
On board tank vessels, protective boots are required in all cases;

EP: a suitable escape device for each person on board;

EX: a gas detector;

TOX: a toximeter appropriate for the current and previous cargo, with the accessories and instructions<sup>3</sup> for its use;

A: a breathing apparatus ambient air-dependent.

8.1.5.2 For operations carried out in explosion hazardous areas or during stay in the vicinity of or within a shoreside assigned zone only low-sparking hand-tools (e.g. chromium vanadium steel screwdrivers and wrenches) shall be used.

8.1.5.3 For pushed convoys or side-by-side formations under way, it shall be sufficient, however, if the pusher tug or the vessel propelling the formation is equipped with the special equipment referred to in 8.1.5.1 above, when this is required in Chapter 3.2, Tables A or C.

#### **8.1.6 Checking and inspection of equipment**

8.1.6.1 Hand fire-extinguishers and fire-extinguishing hoses shall be inspected at least once every two years by persons authorized for this purpose by the competent authority. Proof of inspection shall be affixed to the hand fire-extinguishers. A certificate concerning the inspection of fire extinguishing hoses shall be carried on board.

8.1.6.2 Hose assemblies used for loading, unloading or delivering products for the operation of the vessel (other than liquified natural gas) and residual cargo shall comply with European standard EN 12115:2011-04 (Rubber and thermoplastics hoses and hose assemblies) or EN 13765:2018 (Thermoplastic multilayer (non-vulcanized) hoses and hose assemblies) or ISO 10380:2012 (Corrugated metal hoses and hose assemblies). They shall be checked and inspected in accordance with table A.1 of standard EN 12115:2011-04 or section 8 and annex K of standard EN 13765:2018 (routine tests) at least once a year, according to the manufacturer's instructions, by persons authorized for this purpose by the competent authority. A certificate concerning this inspection shall be carried on board.

Hose assemblies used for loading, unloading or delivering liquefied natural gas for the operation of the vessel shall comply with part 5.5.2 of ISO 20519:2021 (Ships and marine technology – Specification for bunkering of liquefied natural gas fuelled vessels) and shall be checked and inspected at least once a year according to the manufacturer's instructions. A certificate concerning this inspection and the documentation of the calculated maximum load stress shall be carried on board.

8.1.6.3 The proper functioning of the special equipment referred to in 8.1.5.1, the gas detection systems referred to in 9.3.1.12.4, 9.3.2.12.4 and 9.3.3.12.4 and the oxygen measuring system referred to in 9.3.1.17.6, 9.3.2.17.6 and 9.3.3.17.6 must be checked in accordance with the instructions of the manufacturer by persons authorized for this purpose by the manufacturer. A certificate concerning the latest inspection of the special equipment must be carried on board. The certificate must provide details of the result and date of the checks.

The gas detection systems and the oxygen measuring systems must also be inspected by a recognized classification society whenever the certificate of approval is renewed and during the third year of validity of the certificate. This inspection must include at least a general visual inspection of the installations and confirmation that the checks mentioned in the preceding sentence have been carried out.

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<sup>3</sup> The instructions could be kept on board electronically in a human-readable format.

An inspection certificate from the recognized classification society concerning the latest inspection conducted must be carried on board. All inspection certificates must provide at least the abovementioned details regarding the inspection, its results and the date on which it was conducted.

8.1.6.4 The measuring instruments prescribed in 8.1.5.1 shall be checked each time before use by the expert in accordance with the instructions for use.

8.1.6.5 and 8.1.6.6 *(Deleted)*

## **8.1.7 Installations, equipment and autonomous protection systems**

### **8.1.7.1 *Electrical installations and equipment***

The insulation resistance of the fixed electrical installations and equipment and their earthing shall be inspected whenever the certificate of approval is renewed and, in addition, within the third year from the date of issue of the certificate of approval by a person authorized for this purpose by the competent authority.

A certificate concerning this inspection shall be carried on board.

### **8.1.7.2 *Installations and equipment intended for use in explosion hazardous areas, “limited explosion risk” type equipment, installations and equipment complying with 9.3.1.51, 9.3.2.51 and 9.3.3.51 and autonomous protective systems***

Such installations, equipment and autonomous protective systems and their compliance with the documents referred to in 8.1.2.2 (e) to (h) or 8.1.2.3 (r) to (v) in respect of the situation on board shall be inspected whenever the certificate of approval is renewed and, in addition, within the third year from the date of issue of the certificate of approval, by the classification society that classified the vessel or by a person authorized for this purpose by the competent authority. A certificate concerning this inspection shall be carried on board.

The marking on the installations and equipment intended for use in explosion hazardous areas showing that they are appropriate for use in explosion hazardous areas and marking on autonomous protection systems with their conditions of use should remain in place throughout the period of use on board.

The manufacturer’s instruction on flame arresters or high-velocity vent valves/safety valves may require a more regular frequency of inspection.

### **8.1.7.3 *Repair of explosion-protected installations and equipment and autonomous protection systems***

Repair of explosion-protected installations and equipment and autonomous protection systems is permitted only by an expert from a specialized company. Following repairs, a certificate must be issued attesting to their reusability in explosion hazardous areas. The certificate must be available on board.

**8.1.8 Inspection of the cargo pump rooms of tank vessels**

The cargo pump room must be inspected by a recognized classification society whenever the certificate of approval is renewed and during the third year of validity of the certificate.

The inspection must include at least the following:

- An inspection of the entire system, focusing on its state, corrosion, leaks and any unauthorized modifications;
- A general visual inspection of the state of the gas detection system in the cargo pump room;
- Confirmation of the presence of the certificate referred to in 8.1.6.3 issued by the manufacturer or an authorized person.

The inspection certificates signed by the recognized classification society concerning the inspection of the cargo pump room must be carried on board and provide at least the abovementioned details regarding the inspection, its results and the date on which it was conducted.

8.1.9 and 8.1.10 *(Deleted)*

**8.1.11 Register of operations during carriage relating to the carriage of UN 1203**

Tank vessels accepted for the carriage of UN No. 1203 petrol shall have on board a register of operations during carriage. This register may consist of other documents containing the information required. This register or these other documents shall be kept on board for not less than three months and cover at least the last three cargoes.

## CHAPTER 8.2

### REQUIREMENTS CONCERNING TRAINING

#### 8.2.1 General requirements concerning training of experts

8.2.1.1 An expert shall not be less than 18 years of age.

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

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

8.2.1.3 The experts referred to in 8.2.1.2 shall take part in a basic training course. Training shall take place in the context of classes approved by the competent authority. The primordial objective of the training is to make the experts aware of the hazards of the carriage of dangerous goods and provide them with the necessary basic knowledge to reduce the dangers of an incident to a minimum, to enable them to take the necessary measures to ensure their own safety, general safety and the protection of the environment and to limit the consequences of the incident. This training, which shall include individual practical exercises, takes the form of a basic course; it shall cover at least the objectives referred to in 8.2.2.3.1.1 and in 8.2.2.3.1.2 or 8.2.2.3.1.3.

8.2.1.4 After five years, the certificate shall be renewed by the competent authority or by a body recognized by it if the expert furnishes proof, of successful completion of a refresher course taken in the last year prior to the expiry of the certificate, covering at least the objectives referred to in 8.2.2.3.1.1 and in 8.2.2.3.1.2 or 8.2.2.3.1.3 and comprising current new developments in particular. A refresher course shall be considered to have been successfully completed if a final written test conducted by the course organizer under 8.2.2.2 has been passed. The test can be retaken two times during the validity of the certificate. If the test is not passed after it is retaken two times then, within the period of validity of the certificate, the refresher course may be taken again.

8.2.1.5 Experts for the carriage of gases shall take part in a specialization course covering at least the objectives referred to in 8.2.2.3.3.1. Training shall take place in the context of classes approved by the competent authority. An expert certificate shall be issued to persons who, after training, have successfully passed an examination concerning the carriage of gases and have produced evidence of not less than one year's work on board a type G vessel during a period of two years prior to or following the examination.

8.2.1.6 After five years, the certificate shall be renewed by the competent authority or by a body recognized by it if the expert on the carriage of gases furnishes proof:

- that during the year preceding the expiry of the certificate, he has participated in a refresher course covering at least the objectives referred to in 8.2.2.3.3.1 and comprising current new developments in particular; or
- that during the previous two years he has performed a period of work of not less than one year on board a type G tank vessel.

8.2.1.7 Experts for the carriage of chemicals shall take part in a specialization course covering at least the objectives referred to in 8.2.2.3.3.2. Training shall take place in the context of classes approved by the competent authority. An expert certificate shall be issued to persons who, after training, have successfully passed an examination concerning the carriage of chemicals and have produced evidence of not less than one year's work on board a type C vessel during a period of two years prior to or following the examination.

- 8.2.1.8 After five years, the certificate shall be renewed by the competent authority or by a body recognized by it if the expert on the carriage of chemicals furnishes proof;
- that during the year preceding the expiry of the certificate, he has participated in a refresher course covering at least the objectives referred to in 8.2.2.3.3.2 and comprising current new developments in particular, or
  - that during the previous two years he had performed a period of work of not less than one year on board a type C tank vessel.

8.2.1.9 The document attesting training and experience in accordance with the requirements of Chapter V of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers of 7 July 1978 (STCW Convention), as amended; on liquefied gas tankers shall be equivalent to the certificate referred to in 8.2.1.5, provided it has been recognized by a competent authority. No more than five years shall have passed since the date of issue or renewal of such a document.

8.2.1.10 The document attesting training and experience in accordance with the requirements of Chapter V of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers of 7 July 1978 (STCW Convention), as amended; on chemical tankers shall be equivalent to the certificate referred to in 8.2.1.7, provided it has been recognized by a competent authority. No more than five years shall have passed since the date of issue or renewal of such a document.

8.2.1.11 *(Deleted)*

## **8.2.2 Special requirements for the training of experts**

8.2.2.1 Theoretical knowledge and practical abilities shall be acquired as a result of training in theory and practical exercises. The theoretical knowledge shall be tested by an examination. During the refresher course exercises and tests shall ensure that the participant takes an active role in the training.

8.2.2.2 The training organizer shall ensure that training instructors have a good knowledge of the subject and shall take into account the latest developments concerning the Regulations and the requirements for training in the transport of dangerous goods. Teaching shall relate closely to practice. In accordance with the approval, the teaching syllabus shall be drawn up on the basis of the objectives referred to in 8.2.2.3.1.1 to 8.2.2.3.1.3 and in 8.2.2.3.3.1 or 8.2.2.3.3.2. Basic training and their refresher courses shall comprise individual practical exercises (see 8.2.2.3.1.1).

### **8.2.2.3 Organization of training**

Initial basic training and the refresher courses shall be organized in the context of basic courses (see 8.2.2.3.1) and if necessary specialization courses (see 8.2.2.3.3). The courses referred to in 8.2.2.3.1 may comprise three variants: transport of dry cargo, transport in tank vessels and a combination of transport of dry cargo and transport in tank vessels.

#### **8.2.2.3.1 Basic course**

##### *Basic course on the transport of dry cargo*

Prior training: none

Knowledge: ADN in general, except Chapter 3.2, Table C, Chapters 7.2 and 9.3

Authorized for: dry cargo vessel

Training: general 8.2.2.3.1.1 and dry cargo vessels 8.2.2.3.1.2

*Basic course on transport by tank vessels*

Prior training:	none
Knowledge:	ADN in general, except Chapter 3.2, Table A, Chapters 7.1, 9.1 and 9.2
Authorized for:	tank vessels for the transport of substances for which a type N tank vessel is prescribed
Training:	general 8.2.2.3.1.1 and tank vessels 8.2.2.3.1.3

*Basic course – combination of transport of dry cargo and transport in tank vessels*

Prior training:	none
Knowledge:	ADN in general
Authorized for:	dry cargo vessels and tank vessels for the transport of substances for which a type N tank vessel is prescribed
Training:	general 8.2.2.3.1.1, dry cargo vessels 8.2.2.3.1.2 and tank vessels 8.2.2.3.1.3

8.2.2.3.1.1 The general part of the basic training course shall comprise at least the following objectives:

## General:

- Objectives and structure of ADN.

## Construction and equipment:

- Construction and equipment of vessels subject to ADN.

## Measurement techniques:

- Measurements of toxicity, oxygen content and the concentration of flammable gases.

## Knowledge of products:

- Classification and hazard characteristics of the dangerous goods.

## Loading, unloading and transport:

- Loading, unloading, general service requirements and requirements relating to transport.

## Documents:

- Documents which must be on board during transport.

## Hazards and measures of prevention:

- General safety measures.

Practical exercises:

- Practical exercises, in particular with respect to entry into spaces, use of fire-extinguishers, fire-fighting equipment and personal protective equipment as well as gas detectors, oxygen meters and toximeters.

Stability:

- parameters of relevance to stability;
- heeling moments;
- exemplary calculations;
- damage stability, intermediate states and final state of flooding;
- influence of free surfaces;
- evaluation of stability on the basis of existing stability criteria (text of Regulations);
- evaluation of intact stability with the help of the lever arm curve
- application of loading instruments;
- use of loading instruments;
- application of the stability booklet according to 9.3.x.13.3.

Basics of explosion protection:

- according to the definition of ‘explosion protection’;
- selection of appropriate devices and installations.

8.2.2.3.1.2 The “dry cargo vessels” part of the basic training course shall comprise at least the following objectives:

Construction and equipment:

- Construction and equipment of dry cargo vessels.

Treatment of holds and adjacent spaces:

- degassing, cleaning, maintenance,
- ventilation of holds and spaces outside the protected area.

Loading, unloading and transport:

- loading, unloading, general service and transport requirements,
- labelling of packages.

Documents:

- documents which must be on board during transport.

Hazards and measures of prevention:

- general safety measures,
- personal protective and safety equipment.

8.2.2.3.1.3 The “tank vessel” part of the basic training course shall comprise at least the following objectives:

Construction and equipment:

- construction and equipment of tank vessels,
- ventilation,
- loading and unloading systems.

Treatment of cargo tanks and adjacent spaces:

- degassing into the atmosphere and to reception facilities, cleaning, maintenance,
- heating and cooling of cargo,
- handling of receptacles for residual products.

Measurement and sampling techniques:

- measurements of toxicity, oxygen content and the concentration of flammable gases.
- sampling.

Loading, unloading and transport:

- loading, unloading, general service and transport requirements.

Documents:

- documents which must be on board during transport.

Hazards and measures of prevention:

- prevention and general safety measures,
- spark formation,
- personal protective and safety equipment,
- fires and fire-fighting.

Basics of explosion protection:

- according to the definition of ‘explosion protection’;
- selection of appropriate devices and installations.

8.2.2.3.2 *Refresher training courses**Refresher training course on transport of dry cargo*

Prior training:	valid ADN “dry cargo vessels” or combined “dry cargo vessels/tank vessels” certificate
Knowledge:	ADN in general, except Chapter 3.2, Table C, Chapters 7.2 and 9.3
Authorized for:	dry cargo vessel
Training:	general 8.2.2.3.1.1 and dry cargo vessels 8.2.2.3.1.2

*Refresher training course on transport in tank vessels*

Prior training:	valid ADN “tank vessels” or combined “dry cargo vessels/tank vessels” certificate
Knowledge:	ADN in general, except Chapter 3.2, Table A, Chapters 7.1, 9.1 and 9.2
Authorized for:	tank vessels for the transport of substances for which a type N tank vessel is prescribed
Training:	general 8.2.2.3.1.1 and tank vessels 8.2.2.3.1.3

*Refresher training course – combination of transport of dry cargo and transport in tank vessels*

Prior training:	valid ADN combined “dry cargo vessels and tank vessels” certificate
Knowledge:	ADN in general
Authorized for:	dry cargo vessels and tank vessels for the transport of substances for which a type N tank vessel is prescribed
Training:	general 8.2.2.3.1.1, dry cargo vessels 8.2.2.3.1.2 and tank vessels 8.2.2.3.1.3

8.2.2.3.3 *Specialization courses**Specialization course on gases*

Prior training:	Examination passed after “tank vessels” or combined “dry cargo vessels/tank vessels” ADN basic training
Knowledge:	ADN, in particular knowledge relating to loading, transport, unloading and handling of gases
Authorization for:	tank vessels for the transport of substances for which a type G tank vessel is required and transport in type G of substances for which a type C is required with cargo tank design 1 required in column (7) of Table C of Chapter 3.2
Training:	gases 8.2.2.3.3.1

*Specialization course on chemicals*

Prior training:	Examination passed after “tank vessels” or combined “dry cargo vessels/tank vessels” ADN basic training
Knowledge:	ADN, in particular knowledge relating to loading, transport, unloading and handling of chemicals
Authorized for:	tank vessels for the transport of substances for which a type C tank vessel is required
Training:	chemicals 8.2.2.3.3.2

8.2.2.3.3.1 The specialization course on gases shall comprise at least the following objectives:

*Knowledge of physics and chemistry:*

- laws of gases, e.g. Boyle, Gay–Lussac and fundamental law
- partial pressures and mixtures, e.g. definitions and simple calculations, pressure increase and gas release from cargo tanks
- Avogadro’s number and calculation of masses of ideal gas and application of the mass formula
- mass density, relative density and volume of liquids, e.g. mass density, relative density, volume in terms of temperature increase and maximum degree of filling of the cargo tank
- critical pressure and temperature
- polymerization, e.g. theoretical and practical questions, conditions of carriage
- vaporization, condensation, e.g. definition, liquid volume and vapour volume ratio
- mixtures, e.g. vapour pressure, composition and hazard characteristics
- chemical bonds and formulae.

*Practice:*

- flushing of cargo tanks, e.g. flushing in the event of a change of cargo, addition of air to the cargo, methods of flushing (degassing) before entering cargo tanks
- sampling
- danger of explosion
- health risks
- gas concentration measures, e.g. which apparatus to use and how to use it
- monitoring of closed spaces and entry to these spaces
- certificates for the status of being gas free and permitted work
- degree of filling of the cargo tank and over–filling

- safety installations
- pumps and compressors
- handling refrigerated liquefied gases.

*Emergency measures:*

- physical injury, e.g. substances on the skin, breathing in gas, assistance
- irregularities relating to the cargo, e.g. leak in a connection, over-filling, polymerization and hazards in the vicinity of the vessel.

8.2.2.3.3.2 The specialization course on chemicals shall comprise at least the following objectives:

*Knowledge of physics and chemistry:*

- chemical products, e.g. molecules, atoms, physical state, acids, bases, oxidation
- mass density, relative density, pressure and volume of liquids, e.g. mass density, relative density, volume and pressure in terms of temperature increase, maximum degree of filling of the cargo tank
- critical temperature
- polymerization, e.g. theoretical and practical questions, conditions of carriage
- mixtures, e.g. vapour pressure, composition and hazard characteristics
- chemical bonds and formulae.

*Practice:*

- cleaning of cargo tanks, e.g. degasing, washing, residual cargo and receptacles for residual products
- loading and unloading, e.g. venting piping systems, rapid closing devices, effects of temperature
- sampling
- danger of explosion
- health risks
- gas concentration measures, e.g. which apparatus to use and how to use it
- monitoring of closed spaces and entry to these spaces
- certificates for the status of being gas free and permitted work
- degree of filling of the cargo tank and over-filling
- safety installations
- pumps and compressors.

*Emergency measures:*

- physical injury, e.g. contact with the cargo, breathing in gas, assistance
- irregularities relating to the cargo, e.g. leak in a connection, over-filling, polymerization and hazards in the vicinity of the vessel.

**8.2.2.3.4** *Refresher courses**Refresher course on gases*

Prior training:	valid ADN "gases" and "tank vessels" certificate or combined "dry cargo/tank vessels" certificate
Knowledge:	ADN, in particular, loading, transport, unloading and handling of gases
Authorization for:	tank vessels for the transport of substances for which a type G tank vessel is required and transport in type G of substances for which a type C is required with cargo tank design 1 required in column (7) of Table C of Chapter 3.2
Training:	gases 8.2.2.3.3.1

*Refresher course on chemicals*

Prior training:	valid ADN "chemicals" and "tank vessels" certificate or combined "dry cargo/tank vessels" certificate
Knowledge:	ADN, in particular, loading, transport, unloading and handling of gases
Authorization for:	tank vessels for the transport of substances for which a type C tank vessel is required
Training:	chemicals 8.2.2.3.3.2

**8.2.2.4** *Planning of basic and specialization courses*

The following minimum periods of training shall be observed:

Basic "dry cargo vessels course"	32 lessons of 45 minutes each
Basic "tank vessels" course	32 lessons of 45 minutes each
Basic combined course	40 lessons of 45 minutes each
Specialization course on gases	16 lessons of 45 minutes each
Specialization course on chemicals	16 lessons of 45 minutes each

Each day of training may comprise not more than eight lessons.

If the theoretical training is by correspondence, equivalences to the above-mentioned lessons shall be determined. Training by correspondence shall be completed within a period of nine months.

Approximately 30% of basic training shall be devoted to practical exercises. Practical exercises shall, where possible, be undertaken during the period of theoretical training; in any event, they shall be completed not later than three months following the completion of theoretical training.

#### **8.2.2.5**      *Planning of refresher course*

The refresher course shall take place before the expiry of the deadline referred to in 8.2.1.4, 8.2.1.6 or 8.2.1.8.

The following minimum periods of training shall be observed:

Basic refresher course:

–	dry cargo vessels	16 lessons of 45 minutes each
–	tank vessels	16 lessons of 45 minutes each
–	combined dry cargo vessels and tank vessels	16 lessons of 45 minutes each
	Specialization refresher course on gases	8 lessons of 45 minutes each
	Specialization refresher course on chemicals	8 lessons of 45 minutes each

Each day of training may comprise not more than eight lessons.

Approximately 30% of basic training shall be devoted to practical exercises. Practical exercises shall, where possible, be undertaken during the period of theoretical training; in any event, they shall be completed not later than three months following the completion of theoretical training. The proportion of stability training in the refresher course shall amount to at least 2 lessons.

#### **8.2.2.6**      *Approval of training courses*

8.2.2.6.1      Training courses shall be approved by the competent authority.

8.2.2.6.2      Approval shall be granted only on written application.

8.2.2.6.3      Applications for approval shall be accompanied by:

- (a)      the detailed course curriculum showing the course topics and the length of time to be devoted to them, as well as the teaching methods envisaged;
- (b)      the roster of training instructors, listing their qualifications and the subjects to be taught by each one;
- (c)      information on classrooms and teaching materials, as well as on the facilities available for practical exercises;
- (d)      enrolment requirements, e.g. the number of participants;
- (e)      detailed plan for final tests, including, if necessary, the infrastructure and organisation of electronic examinations in accordance with 8.2.2.7.1.7, if these are to be carried out.

8.2.2.6.4      The competent authority shall be responsible for monitoring training courses and examinations.

8.2.2.6.5 The approval comprises the following conditions, inter alia:

- (a) training courses shall conform to the information accompanying the application for approval;
- (b) the competent authority may send inspectors to attend training courses and examinations;
- (c) the timetables for the various training courses shall be notified in advance to the competent authority.

Approval shall be granted in writing for a limited period. It may be withdrawn in the event of failure to comply with the conditions of approval.

8.2.2.6.6 The approval document shall indicate whether the course in question is a basic training course, a specialization course or a refresher course.

8.2.2.6.7 If, after approval is granted, the training body wishes to change conditions affecting the approval, it shall seek the prior agreement of the competent authority. This provision shall apply in particular to amendments to syllabuses.

8.2.2.6.8 Training courses shall take account of the current developments in the various subjects taught. The course organizer shall be responsible for ensuring that recent developments are brought to the attention of, and properly understood by, training instructors.

#### **8.2.2.7 *Examinations and final tests***

8.2.2.7.0 The examination shall be organized by the competent authority or by an examining body designated by the competent authority. The examining body shall not be a training provider.

The examining body shall be designated in writing. This approval may be of limited duration and should be based on the following criteria:

- Competence of the examining body;
- Specifications of the form of the examinations the examining body is proposing, including, if necessary, the infrastructure and organisation of electronic examinations in accordance with 8.2.2.7.1.7, if these are to be carried out;
- Measures intended to ensure that examinations are impartial;
- Independence of the body from all natural or legal persons employing ADN experts.

##### **8.2.2.7.1 *Basic training courses***

8.2.2.7.1.1 After basic training, an examination shall be taken within six months following the completion of such training. If a candidate fails the examination, he or she may retake it twice during this six-month period without attending another basic training course.

8.2.2.7.1.2 In the examination the candidate shall furnish evidence that, in accordance with the basic training course, he has the knowledge, understanding and capabilities required of an expert on board a vessel.

- 8.2.2.7.1.3 The Administrative Committee shall establish a catalogue of questions comprising the objectives set out in 8.2.2.3.1.1 to 8.2.2.3.1.3 and a directive on the use of the catalogue of questions.<sup>1</sup> The examination questions shall be selected from this list. The candidate shall not have advance knowledge of the questions selected.
- 8.2.2.7.1.4 The model attached to the directive on the use of the catalogue of questions is to be used to compile the examination questions.
- 8.2.2.7.1.5 The examination shall be written. Candidates shall be asked 30 questions. The examination shall last 60 minutes. It is deemed to have been passed if at least 25 of the 30 questions have been answered correctly.
- 8.2.2.7.1.6 The competent authority or an examining body designated by the competent authority shall invigilate every examination. Any manipulation and deception shall be ruled out as far as possible. Authentication of candidates shall be ensured.

The use in the written test of documentation other than the texts of regulations on dangerous goods, CEVNI and related police regulations, is not permitted. Non-programmable pocket calculators are authorized for use during specialization courses and shall be supplied by the competent authority or by the examining body designated by the competent authority.

Examination documents (questions and answers) shall be recorded and kept as a print-out or electronically as a file.

- 8.2.2.7.1.7 Written examinations may be performed, in whole or in part, as electronic examinations, where the answers are recorded and evaluated using electronic data processing (EDP) processes, provided the following conditions are met:
- (a) The hardware and software shall be checked and accepted by the competent authority or by the examining body designated by the competent authority.
  - (b) Electronic media may be used only if provided by the competent authority or by the examining body designated by the competent authority.
  - (c) Proper technical functioning shall be ensured. Arrangements as to whether and how the examination can be continued shall be made in the case of a failure of the devices and applications. No aids shall be available on the input devices (e.g. electronic search function); the electronic data processing equipment provided shall not allow the candidates to communicate with any other device during the examination.
  - (d) There shall be no means of a candidate introducing further data to the electronic media provided; the candidate may only answer the questions posed.
  - (e) The final inputs of each candidate shall be logged. The determination of the results shall be transparent.

8.2.2.7.2 *Specialization course on gases and chemicals*

- 8.2.2.7.2.1 Candidates who are successful in the ADN basic training examination may apply for enrolment in a “gases” and/or “chemicals” specialization course, to be followed by an examination. This examination shall be held either immediately after the training or within six months following the completion of such training.

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<sup>1</sup> Note by the secretariat: the catalogue of questions and the directive for its application are available on the website of the secretariat of the United Nations Economic Commission for Europe (<https://unece.org/catalogue-questions>).

8.2.2.7.2.2 During the examination the candidate shall furnish proof that, in accordance with the “gases” and/or “chemicals” specialization course, he has the knowledge, understanding and capabilities required of the expert on board vessels carrying gases or chemicals, respectively.

8.2.2.7.2.3 The Administrative Committee shall prepare a catalogue of questions for the examination, comprising the objectives set out in 8.2.2.3.3.1 or 8.2.2.3.3.2 and a directive on the use of the catalogue of questions.<sup>1</sup> The examination questions shall be selected from the list. The candidate shall not have advance knowledge of the questions selected.

8.2.2.7.2.4 The model attached to the directive on the use of the catalogue of questions is to be used to compile the examination questions.

8.2.2.7.2.5 The examination shall be written.

The candidate is to be asked 30 multiple-choice questions and one substantive question. The examination shall last a total of 150 minutes, of which 60 minutes for the multiple-choice questions and 90 minutes for the substantive questions.

The examination shall be marked out of a total of 60, of which 30 marks will go to the multiple-choice questions (one mark per question) and 30 to the substantive question (the distribution of marks is left to the appreciation of the competent authority). A total of 44 marks must be achieved to pass. However, not less than 20 marks must be obtained in each part. If a candidate fails the examination, he or she may retake it, fully or partially, twice during this six-month period without attending another specialization course. If the 44 marks are not achieved, the exam may be taken again in its entirety. If the candidate obtains 44 but does not achieve 20 in one part, only the part in question may be taken again.

The provisions of 8.2.2.7.1.6 and 8.2.2.7.1.7 shall apply by analogy.

8.2.2.7.3 *Refresher training course*

8.2.2.7.3.1 At the end of the refresher course in accordance with paragraph 8.2.1.4, the course organizer shall conduct a test.

8.2.2.7.3.2 The test shall be in writing. Candidates shall be asked 20 multiple-choice questions. At the end of every refresher course, a fresh question paper shall be prepared. The test shall last 40 minutes. It shall be deemed to have been passed if at least 16 of the 20 questions have been answered correctly.

8.2.2.7.3.3 The provisions of 8.2.2.7.1.2, 8.2.2.7.1.3, 8.2.2.1.7.6 and 8.2.2.1.7.7 shall apply to the administration of the tests (outside the provisions of the directive on the use of the catalogue of questions for examining authorities and bodies).

8.2.2.7.3.4 The course organizer shall deliver to successful candidates a written certificate for presentation to the competent authority under paragraph 8.2.2.8.

8.2.2.7.3.5 The course organizer shall keep test papers of candidates for five years from the date of the test.

#### **8.2.2.8 *ADN specialized knowledge certificate***

8.2.2.8.1 The issue and renewal of the ADN specialized knowledge certificate conforming to the model in 8.6.2 shall be the responsibility of the competent authority or a body authorized by such authority.

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<sup>1</sup> Note by the secretariat: the catalogue of questions and the directive for its application are available on the website of the secretariat of the United Nations Economic Commission for Europe (<https://unece.org/catalogue-questions>).

8.2.2.8.2 The certificate's dimensions shall be in accordance with ISO/IEC 7810:2019, card size ID-1, and it shall be made of plastic. The colour shall be white, with black lettering. The certificate shall include an additional security feature such as a hologram, UV printing or engraved patterns. Its text shall be in the language(s) or in one of the languages of the State whose competent authority has issued it. If none of these languages is English, French or German, the title of the certificate, the title of item 8 and the titles on the back, and if applicable the additions under "tank vessels" or "dry cargo vessels" shall also be drawn up in English, French or German.

8.2.2.8.3 Certificates shall be issued to:

- (a) candidates who have met the conditions of the second sentence of 8.2.1.2 and 8.2.1.3 (basic training course); they shall be valid for five years from the date when the examination has been passed following basic training;
- (b) Candidates who meet the conditions of 8.2.1.5 or of 8.2.1.7 ("gas" or "chemicals" specialization course); in this case, a new certificate shall be issued containing certificates for the basic training and specialization courses. The new certificate to be issued shall be valid for five years from the date when the examination has been passed following basic training.

8.2.2.8.4 The certificate shall be renewed:

- (a) when the proof required under 8.2.1.4 is provided (basic training); the new duration of validity shall begin on the expiry date of the previous certificate. If the test has been taken more than one year before the certificate's expiry date, it shall begin on the date of the certificate of participation in the course;
- (b) when the proof required under 8.2.1.6 and 8.2.1.8 are provided ("gas" or "chemicals" specialization courses). In this case, a new certificate containing all the certificates relating to the basic training and specialization courses shall be issued. The new certificate to be issued shall have a period of validity of five years from the date of the successfully completed refresher course for basic training. When the refresher course is taken in the year before the certificate's expiry date, the new period of validity shall begin on the expiry date of the previous certificate; otherwise it shall begin on the date of the certificate of participation in the course.

8.2.2.8.5 If the refresher course for the renewal of the certificate has not been fully and successfully completed before the expiry of the period of validity of the certificate, or if the work on board a vessel for one year has not been certified during the two years preceding the certificate's expiry, a new certificate shall be issued, for which participation in a further initial basic training course and an examination in accordance with 8.2.2.7 shall be required.

8.2.2.8.6 If a new certificate is issued in accordance with 8.2.2.8.3 (b) or a certificate is renewed in accordance with 8.2.2.8.4 and the previous certificate had been issued by another authority or by a body authorized to do so by such an authority, the issuing authority or body approved by that authority that has issued the previous certificate shall be informed without delay.

8.2.2.8.7 Contracting Parties shall provide the UNECE secretariat with an example of the national model for any certificate intended for issue in accordance with this section. Contracting Parties shall also provide explanatory notes to enable the verification of conformity of certificates with the examples provided. The secretariat shall make this information available on its website.

**CHAPTER 8.3****MISCELLANEOUS REQUIREMENTS TO BE COMPLIED WITH  
BY THE CREW OF THE VESSEL****8.3.1 Persons authorized on board**

8.3.1.1 Unless otherwise provided for in Part 7, only the following persons are authorized to be on board:

- (a) members of the crew;
- (b) persons who, although not being members of the crew, normally live on board; and
- (c) persons who are on board for duty reasons.

8.3.1.2 The persons referred to in 8.3.1.1 (b) are not authorized to remain in the protected area of dry cargo vessels or in the cargo area of tank vessels except for short periods.

8.3.1.3 When the vessel is required to carry two blue cones or two blue lights in accordance with column (19) of Table C of Chapter 3.2, persons under 14 years of age are not permitted on board.

**8.3.2 Portable lighting apparatus**

On board, only portable lighting appliances with their own source of power are permitted in explosion hazardous areas and on deck.

In explosion hazardous areas, they shall meet at least the requirements for use in the relevant area.

**8.3.3 Admittance on board**

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

**8.3.4 Prohibition on smoking, fire and naked light**

Smoking, including of electronic cigarettes and similar devices, fire and naked light are prohibited on board. However, the provisions of 7.1.3.41.1 and 7.2.3.41.1 are applicable.

This prohibition shall be displayed on notice boards at appropriate places.

The prohibition does not apply in the accommodation or the wheelhouse, provided that their windows, doors, skylights and hatches are closed or the ventilation system is adjusted to guarantee an overpressure of at least 0.1 kPa.

### 8.3.5 Work on board

No work requiring the use of an open flame or electric current or liable to cause sparks may be carried out on board.

This provision does not apply:

- to berthing operations;
- in the service spaces outside the protected area or the cargo area, provided the doors and openings of those areas are closed for the duration of the work and the vessel is not being loaded, unloaded or degassed; or
- when the vessel is not in the vicinity of or within an onshore assigned zone and, in the case of a tank vessel, has a certificate attesting to the totally gas-free condition of the vessel in accordance with 7.2.3.7.1.6 or 7.2.3.7.2.6 or an authorization from the competent authority or in the case of a dry cargo vessel, has a certificate attesting to the totally gas-free condition of the protected area or an authorization from the competent authority.

The use of low-sparking hand-tools (chromium vanadium steel screwdrivers and wrenches or screwdrivers and wrenches of equivalent material from the point of view of spark formation) and appropriate equipment at least for the zone concerned is permitted.

**NOTE:** *In addition, all other applicable regulations regarding workplace safety and safety of operations must be observed.*

**CHAPTER 8.4**

*(Reserved)*