INF.8

Economic Commission for Europe

Inland Transport Committee

Working Party on the Transport of Dangerous Goods

Joint Meeting of Experts on the Regulations annexed to the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN)

Twenty-seventh session
Geneva, 24-28 August 2015
Agenda item 6
Reports of informal working groups

English

16 July 2015

Report of the 8th and 9th Meeting of the Informal Working Group ‚Explosion Protection on Tank Vessels‘

Transmitted by the Central Commission for the Navigation of the Rhine

Introduction

The 8th meeting of the informal working group “explosion protection on tank vessels” was held on 18 and 19 March 2015 in Staßburg, CCNR. The 9th meeting was held on 20 and 21 May in Berlin, Bundesanstalt für Materialforschung und –prüfung (BAM).

Participants:

8th meeting: Y. Adebahr-Lindner, BAM; B. Beldman, MINIENM; B. Birkelhuber, BMVIT; K. den Braven, BLN; H. Klopp, DNVGL; U. Körschgen, BAV; F. Krischok, BAM; N. Remers, RIVM; T. Speermann, BDB; R. Vermeulen. FUEL EUROP; K. Vinke, LR; E. Brandes, PTB
9th meeting: Y. Adebahr-Lindner, BAM; H.-J. Braun, CIPA; B. Beldman, MINIENM; K. den Braven, BLN; H. Klopp, DNVGL; U. Körschgen, BAV; F. Krischok, BAM; M. Pötzsch, BAM; N. Remers, RIVM; T. Speermann, BDB; K. Vinke, LR; E. Brandes, PTB

The informal working group dealed with the topic ‘modification of the explosion concept of the recent ADN.
The informal working group complied also the request of the IWG “Degassing of cargo tanks” to check the consistency of the paragraphs 7.2.4.41 „Fire or naked light “, 7.2.4.74 „Prohibition of smoking, fire and naked light “and 8.3.4 ‘Prohibition on smoking, fire and naked light’. The respective proposal is included in the Annex at the appropriate place.

Result

Based on the discussions during the 26th meeting of the ADN Safety Committee (CCNR_ZKR_ADN_WP15_AC2_54de, VII. Berichte informeller Arbeitsgruppen (TOP 6)
CCNR_ZKR_ADN_WP15_AC2_54e, VII. Reports of informal working groups (agenda item 6),
CCNR_ZKR_ADN_WP15_AC2_54fr, VII. Rapports des groupes de travail informels (point 6 de l'ordre du jour)
CCNR_ZKR_ADN_WP15_AC2_54ru, VII. Доклады неофициальных рабочих групп (пункт 6 повестки дня))

the informal working group has developed proposals for the modification of the ADN with the aim to implement into the ADN the basic concept for a modified, that means improved explosion protection which was accepted during the 26th Meeting of the ADN Safety Committee.

The basic concept of the modified explosion protection consists of the following principals:

A. Basic-safety measures which have to be met in case the vessel stays in an onshore assigned zone (for example terminals, locks)

All vessels – dry cargo vessels, tank vessels, - having an ADN certificate of approval have to be equipped as follows:

1. Surface temperatures have to be below 200 °C
2. Electrical equipment has to be of the type "limited explosion risk" (comparable zone 2) as defined in ADN 1.2.1 whereas the surface temperature is limited to 200 °C
3. If vessels – dry cargo vessels, tank vessels, pushed convoys and side-by-side formations- the equipment of which does not fulfill these requirements mentioned in 1. and 2., such equipment has
   - either to be switched off or
   - in rooms where such equipment is installed an overpressure of 0.1 kPa has to be assured accompanied by a continuous control of the concentration of flammable substances (as just required in **9.3.x.52.3**) if the tank vessel stays in or near to an onshore zone 2. The gas detection system has to be calibrated with n-Hexane. The limiting value for switching off the ventilators etc. **(see 9.3.2.52.3**) is 20% of the lower explosion limit of n-Hexane.

With pushed convoys and side-by-side formations a vessel which is required to be in possession of a certificate of approval for the carriage of dangerous goods is equal to an onshore assigned zone.

B. Extended and modified safety measures (in addition to A) for tank vessels, pushed convoys and side-by-side formations of type G, C, N **to be complied with in case the product list of the ship contains substances which need explosion safety measures** (see also WP15-AC2-22-inf23g)

1. Specifying a zone 2 on board the ship
2. Explosion protection requirements also for non-electrical equipment within the zones on board the ship
3. The electrical and the non-electrical equipment used within the respective zone on board the ship has to fulfill the requirements applicable for that zone
4. If the product list contains substances of temperature class T4, T5 or T6 the respective maximum surface temperature is applicable
5. Autonomous protective systems (flame arresters, high velocity vent valves etc.) have to be chosen according to the requirements specified in Table C.
6. Additional measures to prevent that explosive vapour/air mixtures from the cargo enter the area of accommodation, wheelhouse etc. outside the cargo area.

This concept for a modified explosion protection on inland waterway vessels requires changes of the paragraphs 1.2.1, 3.2.3.2, 9.1.0.12.3, 9.1.0.51, 9.1.0.52, 9.3.x.10, 9.3.x.12, 9.3.x.51, 9.3.x.52, 9.3.x.53
and consequential changes of the paragraphs
1.4.3.3, 1.4.3.7.1, 3.2.3.1, 3.2.3.2, 3.2.3.3, 3.2.4.3, 5.4.3.4, 7.1 (7.1.2.19.1**,** 7.1.3.51.1, 7.1.3.51.2, 7.1.3.51.4, 7.1.3.51.5, 7.1.3.52.1, 7.1.3.52.2, 7.1.4.13.1, 7.1.4.13.2, 7.1.4.13.3, 7.1.4.41, 7.1.4.53, 7.1.4.75), 7.2 (7.2.2.6, 7.2.2.19.3, 7.2.3.1.6, 7.2.3.6, 7.2.3.51, 7.2.3.51.1, 7.2.3.51.2, 7.2.3.51.3, 7.2.3.51.4, 7.2.3.52, 7.2.3.52.1, 7.2.3.52.2, 7.2.4.11, 7.2.4.11.1, 7.2.4.13, 7.2.4.13.1, 7.2.4.13.2, 7.2.4.13.3, 7.2.4.14, 7.2.4.14.1, 7.2.4.14.2, 7.2.4.14.3, 7.2.4.14.4, 7.2.4.15, 7.2.4.16, 7.2.4.16.1, 7.2.4.16.2**,** 7.2.4.16.3, 7.2.4.16.4, 7.2.4.16.7, 7.2.4.17, 7.2.4.17.2, bis 7.2.4.17.14, 7.2.4.22.2 bis 7.2.4.22.6, 7.2.4.41, 7.2.4.53, 7.2.4.74,) 8.1 (8.1.2.1, 8.1.6.3, 8.1.7, 8.1.7.1, 8.1.7.2, 8.1.7.3), 8.1.8.3, 8.3 (8.3.2, 8.3.4, 8.3.5) 8.6 (8.6.1.1 bis 8.6.1.4, 8.6.3), **9.1 (**9.1.0.12.3 bis 9.1.0.12.5, 9.1.0.50, 9.1.0.50.1, 9.1.0.50.2, , 9.1.0.53, 9.1.0.53.1 bis 9.1.0.53.5, 9.1.0.56), 9.3 (9.3.x.8.2, bis 9.3.x.8.4, 9.3.x.11.2, 9.3.x.17.6, 9.3.x.21.7, 9.3.2.22.4, 9.3.2.22.5, 9.3.3.22.4, 9.3.3.22.5, 9.3.x.25.3 bis

9.3.x.25.6, 9.3.2.26, 9.3.2.26.1 bis 9.3.2.26.4, 9.3.3.26, 9.3.3.26.1 bis 9.3.3.26.4, 9.3.2.28, 9.3.3.28, 9.3.2.31.3, 9.3.3.31.3, 9.3.x.50, 9.3.x.50.1, 9.3.x.50.2, 9.3.x.50.2, 9.3.x.54.1 bis 9.3.x.54.4, 9.3.1.56).

The IWG proposes to use the wording of the ATEX Directives (1999/92 EU und 2014/34 EU) regarding the explosion protection topics, if acceptable. A comparison between the wording in ADN and the wording in ATEX is summarized in the following table.

Comparison of the wording ADN – ATEX

ADN	ATEX
cable	electrical cable
… has been tested and approved… regarding its safety of operation in an explosive atmosphere.	…. It has to be proven that the applicable requirements are fulfilled
Anti-explosion protection	Explosion protection
Explosive limit	Explosion limit

The proposals are summarized in the annexes.

The informal working group sees this proposed basic concept feasible for new vessels.

The IWG will propose necessary transitional provisions after discussion and decision of the safety committee.

The informal working group asks the safety committee to discuss this proposal.

Annex

Proposals to implement the new zone concept into ADN

1.4 Safety obligations of the prticipants

Paragraphs	Modification	Reason / Explanation
1.4.3.3	***Filler***	
1.4.3.3 s)	He shall ascertain that the loading flows conform to the loading instructions referred to in 9.3.2.25.9 or 9.3.3.25.9 and that the pressure at the crossing-point of the gas discharge pipe or the compensation pipe is not greater than the opening pressure of the pressure relief device / high velocity vent valve	New zone concept
1.4.3.7.1	*Additional obligations concerning the unloading of cargo tanks:*	
1.4.3.7.1 j)	Ascertain that the unloading flows conform to the loading instructions referred to in 9.3.2.25.9 or 9.3.3.25.9 and that the pressure at the connecting-point of the gas discharge pipe or the gas return pipe does not exceed the opening pressure of the pressure relief device / high velocity vent valve;	New zone concept

1.2 Definitions

Paragraphs	Reason / Explanation
Autonomous protective systems: means all devices which are intended to halt incipient explosions immediately and/or to limit the effective range of an explosion and which are separately made available on the market for use as autonomous systems. This includes flame arresters, high velocity vent valves and deflagration safe vacuum valves. Such protective systems shall be tested according to the European standard EN ISO 16852:2010 and it has to be proven that the applicable requirements are fulfilled (e.g. conformity assessment procedure according to Directive 2014/34/EU, or IEC/ISO-Regulations or at least equivalent).	
~~*Cargo area (additional part above deck) (when anti-explosion protection is required, comparable to zone 1)* means the spaces not included in the main part of the cargo area above deck comprising 1.00 m radius spherical segments centred over the ventilation openings of the cofferdams and the service spaces located in the cargo area part below the deck and 2.00 m spherical segments centred over the ventilation openings of the cargo tanks and the opening of the pump rooms;~~	No longer necessary New zone concept
Cargo area: the whole of the following spaces on bord of tank vessels *below deck:* the space between two vertical planes perpendicular to the centre-line plane of the vessel, which comprises cargo tanks, hold spaces, cofferdams, double-hull spaces and double bottoms; these planes normally coincide with the outer cofferdam bulkheads or hold end bulkheads~~. Their intersection line with the deck is referred to as the boundary of the cargo area part below deck~~ ~~*Cargo area (main part above deck) (when anti-explosion protection is required - comparable to zone 1)* means the space which is bounded:~~ ~~- at the sides, by the shell plating extending upwards from the decks sides;~~ ~~- fore and aft, by planes inclined at 45° towards the cargo area, starting at the boundary of the cargo area part below deck;~~ ~~- vertically, 3 m above the deck;~~ above deck: the space - athwart ships, by vertical planes corresponding to the side plating - fore and aft, by vertical planes coinciding with the outer cofferdam bulkheads or the hold end bulkheads and - upwards, by a horizontal plane 2.50 m above deck The boundary plane for and aft is referred to as the boundary plane of the cargo area.	New zone concept Editorial Like wording of ,Protected area
Cargo pump-room ~~(when anti-explosion protection is required, comparable to zone 1)~~ means a service space where the cargo pumps and stripping pumps are installed together with their operational equipment;	New zone concept
Cargo tank ~~(when anti-explosion protection is required, comparable to zone 0)~~ means a tank which is permanently attached to the vessel and intended for the carriage of dangerous goods.	New zone concept
~~*Certified safe type electrical apparatus* means an electrical apparatus which has been tested and approved by the competent authority regarding its safety of operation in an explosive atmosphere, e.g.~~ ~~- intrinsically safe apparatus;~~ ~~- flameproof enclosure apparatus;~~ ~~- apparatus protected by pressurization;~~ ~~- powder filling apparatus;~~ ~~- apparatus protected by encapsulation;~~ ~~- increased safety apparatus.~~ ~~***NOTE:** Limited explosion risk apparatus is not covered by this definition~~	New zone concept
Cofferdam ~~(when anti-explosion protection is required, comparable to zone 1)~~ means an athwartship compartment which is bounded by watertight bulkheads and which can be inspected. The cofferdam shall extend over the whole area of the end bulkheads of the cargo tanks. The bulkhead not facing the cargo area (outer cofferdam bulkhead) shall extend from one side of the	New zone concept

vessel to the other and from the bottom to the deck in one frame plane;	
Equipment means electrical or non-electrical machines, apparatus, fixed or mobile devices, control components and instrumentation thereof and detection or prevention systems which, separately or jointly, are intended for the generation, transfer, storage, measurement, control and conversion of energy and/or the processing of material and which are capable of causing an explosion through their own potential sources of ignition; Equipment having an UN or ID number are not included	New zone concept
Equipment intended for use in potentially explosive atmospheres means Electrical and non-electrical equipment where measures are taken to prevent that equipment own ignition sources become effective. Such equipment has to fulfil the requirements to be used within the respective zone. They have to be tested according to EN 60079-1, EN 60079-2, EN 60079-5, EN 60079-7, EN 60079-11 or EN 60079-18 in case of electrical equipment and according to EN 13463-2, EN 13463-3, EN 13463-5, EN 13463-6 und EN 13463-8 in case of non-electrical equipment or equivalent (e.g.. IEC 60079-1, IEC 60079-2, IEC 60079-5, IEC 60079-7, IEC 60079-11 or IEC 60079-18 in case of electrical equipment and ISO IEC 80079-36 und ISO IEC 80079-37 in case of non-electrical equipment) and it has to be proven that the applicable requirements are fulfilled. (e.g. conformity assessment procedure according to Directive 2014/34/EU, or IEC/ISO-Regulations or at least equivalent).	New zone concept
Equipment category (see also Directive 2014/34 EU) means the classification of equipment to be used within potentially explosive atmosphere determining the requisite level of protection to be ensured Equipment category 1 comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection. Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or by air/dust mixtures are present continuously, for long periods or frequently. Equipment in this category must ensure the requisite level of protection, even in the event of rare incidents relating to equipment, and is characterised by means of protection such that: - either, in the event of failure of one means of protection, at least an independent second means provides the requisite level of protection, - or the requisite level of protection is assured in the event of two faults occurring independently of each other. Equipment Category 1 according to Directive 2014/34/EU are marked as II 1 G. Such equipment corresponds to EPL ‚Ga' according to IEC 60079-0. Equipment Category 1 is suitable to be used in zone 0, 1 and 2 Equipment category 2 comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and of ensuring a high level of protection. Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or air/dust mixtures are likely to occur occasionally. The means of protection relating to equipment in this category ensure the requisite level of protection, even in the event of frequently occurring disturbances or equipment faults which normally have to be taken into account. Equipment Category 2 according to Directive 2014/34/EU are marked as II 2 G. Such equipment corresponds to EPL ‚Gb' according to IEC 60079-0. Equipment Category 2 is suitable to be used in zone 1 and 2 Equipment category 3 comprises equipment designed to be capable of functioning in conformity with the operating parameters established by the manufacturer and ensuring a normal level of protection. Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists, or air/dust mixtures are unlikely to occur or, if they do occur, are likely to do so only infrequently and for a short period only. Equipment in this category ensures the requisite level of protection during normal operation. Equipment Category 3 according to Directive 2014/34/EU are marked as II 3 G. Such equipment	New zone concept

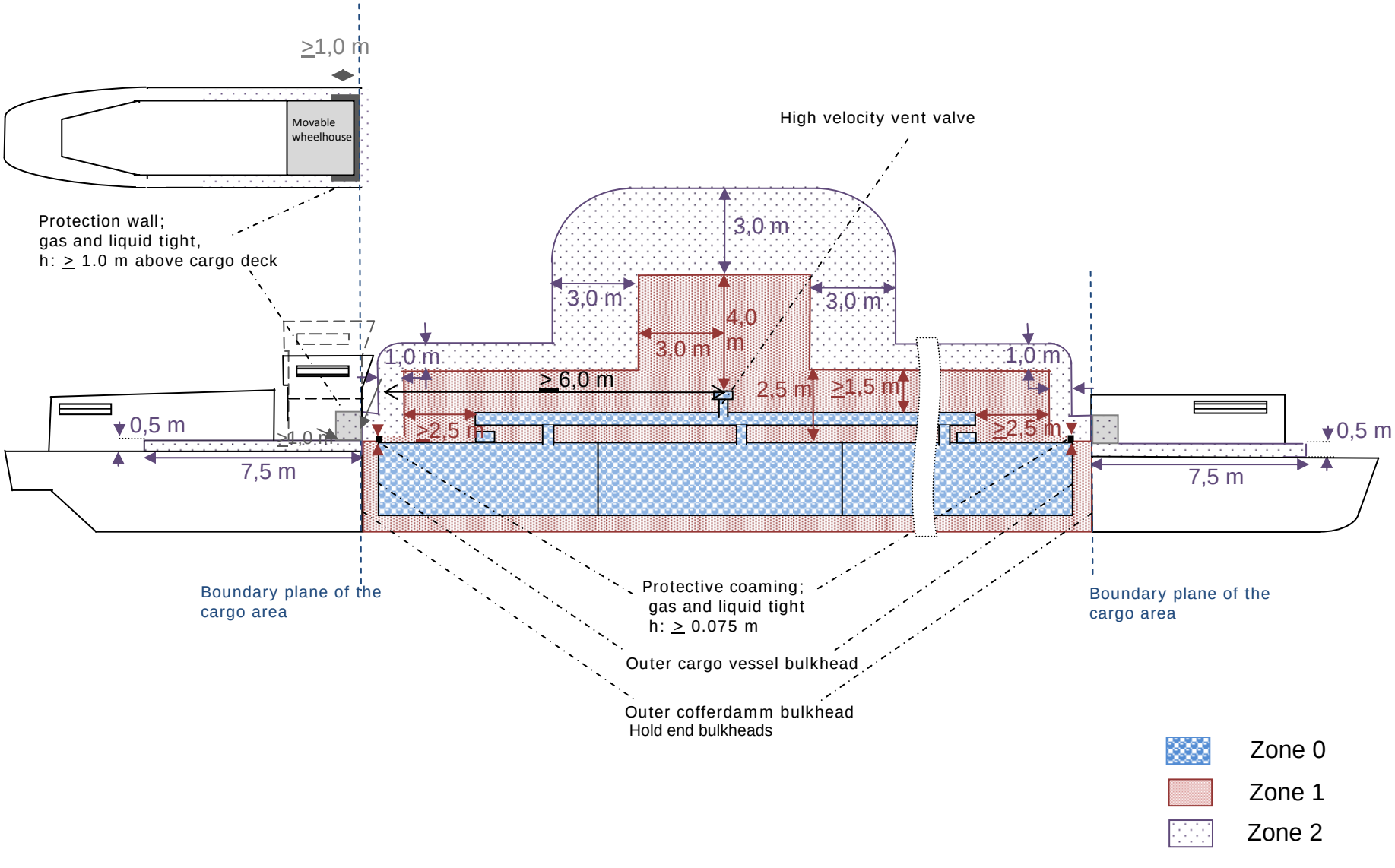
corresponds to EPL ‚Gc' according to IEC 60079-0. Equipment Category 3 is suitable to be used in zone 2	
Equipment protection level (EPL) (see IEC 60079-0) means level of protection assigned to equipment based on its likelihood of becoming a source of ignition. EPL Ga equipment for explosive gas atmospheres (gas, vapour, mist), having a "very high" level of protection, which is not a source of ignition in normal operation, during expected malfunctions or during rare malfunctions. Such equipment corresponds to equipment category II 1 G according to Directive 2014/34/EU. Equipment EPL Ga is suitable to be used in zone 0, 1 and 2 **EPL Gb** equipment for explosive gas atmospheres (gas, vapour, mist), having a "high" level of protection, which is not a source of ignition in normal operation or during expected malfunctions. Such equipment corresponds to equipment category II 2 G according to Directive 2014/34/EU. Equipment EPL Gb is suitable to be used in zone 1 and 2 EPL Gc equipment for explosive gas atmospheres (gas, vapour, mist), having a "enhanced" level of protection, which is not a source of ignition in normal operation and which may have some additional protection to ensure that it remains inactive as an ignition source in the case of regular expected occurrences (for example failure of a lamp). Such equipment corresponds to equipment category II 3 G according to Directive 2014/34/EU. Equipment EPL Gc is suitable to be used in zone 2.	New zone concept
Explosion ~~danger~~ hazardous areas means areas in which an explosive atmosphere may occur in such quantities as to require ~~of such a scale that~~ special protection measures ~~are necessary~~ to ensure the safety and health of the persons affected (see Directive 1999/92/EC*) See zoning	New zone concept
Explosion protection The whole of the requirements which have to be fulfilled and means which have to be taken to provide This enclosed: Assigning explosion hazardous areas (zoning): in which dangerous explosive atmospheres of gases, vapours or sprays are likely to occur (see Directive 1999/94 EU) a) permanently or during long periods (Zone 0) b) occasionally in normal operation (Zone 1) c) rarely and if so for short periods only (Zone 2) - Use of equipment for which it is proven, that it can be used in the respective explosion hazardous area. - Use of autonomous protective systems - Monitoring of potentially explosive atmospheres by the use of gas detection systems and flammable gas detectors automatically or manually.	New zone concept
Flame arrester means a device mounted in the vent of part of an installation or in the interconnecting piping of a system of installations, the purpose of which is to permit flow but prevent the propagation of a flame front. This device shall be tested according to the European standard EN ISO 16852:2010; and it has to be proven that the applicable requirements are fulfilled (e.g. conformity assessment procedure according to Directive 2014/34/EU, or IEC/ISO-Regulations or at least equivalent).	Wording according to 2014/34 EU
Flammable gas detector means a device allowing measuring of any significant concentration of flammable gases ~~given off by the cargo~~ below the lower explosive limit and which clearly indicates the presence of higher concentrations of such gases. Flammable gas detectors may be designed for measuring flammable gases only but also for measuring both flammable gases and oxygen.	Basic safety concept
Gas detection system means a ~~fixed~~ monitoring system capable of detecting in time significant concentrations of flammable gases ~~given off by the cargoes at concentrations~~ below the lower explosion limit and capable of activating the alarms. It has to be calibrated at least according to n-Hexane. The detection level of the sensors is 10 % of the LEL at a maximum.	Basic safety concept

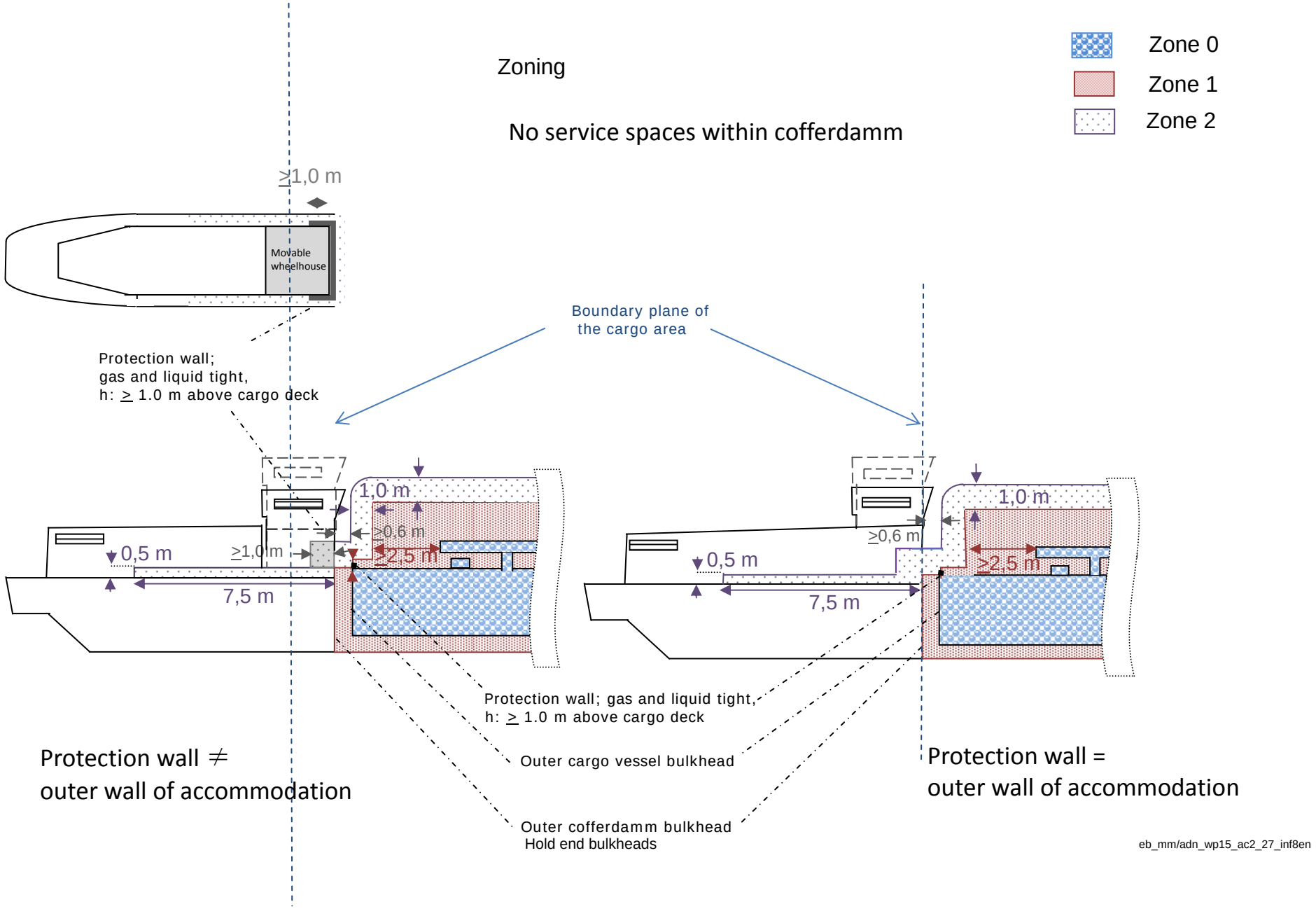
High-velocity vent valve means a pressure relief valve designed to have nominal flow velocities which exceed the flame velocity of the flammable mixture, thus preventing flame transmission. This pressure relief device shall be tested in accordance with standard EN ISO 16852:2010 and it has to be proven that the applicable requirements are fulfilled (e.g. conformity assessment procedure according to Directive 2014/34/EU, or IEC/ISO-Regulations or at least equivalent).;	Clarification
Hold (when anti-explosion protection is required, comparable to zone 1 – see *Classifi-cation of zones*)-means a part of the vessel which, whether covered by hatchway covers or not, is bounded fore and aft by bulkheads and which is intended to carry goods in packages or in bulk. The upper boundary of the hold is the upper edge of the hatchway coaming. Cargo extending above the hatchway coaming shall be considered as loaded on deck;	New zone concept
Hold space *(when anti-explosion protection is required, comparable to zone 1)* means an enclosed part of the vessel which is bounded fore and aft by watertight bulkheads and which is intended only to carry cargo tanks independent of the vessel's hull.	New zone concept
Limited explosion risk electrical apparatus means an electrical apparatus which, during normal operation, does not cause sparks or exhibits surface temperatures which are above 200 °C the required temperature class, including e.g.: - three-phase squirrel cage rotor motors; – brushless generators with contactless excitation; – fuses with an enclosed fuse element; – contactless electronic apparatus; or means an electrical apparatus with an enclosure protected against water jets (degree of protection IP55) which during normal operation does not exhibit surface temperatures which are above the required temperature class;200 °C	Basic safety concept
Opening pressure means the pressure referred to in a list of substances in Chapter 3.2, Table C at which the pressure relief device / high velocity vent valves open. For pressure tanks the opening pressure of the safety valve shall be established in accordance with the requirements of the competent authority or a recognized classification society;	Clarification
Oxygen measuring system means a monitoring system capable of detecting in time significant decrease of oxygen and capable of activating the alarms in case the oxygen concentration reaches 19,5 Vol%. It has to be approved by the competent authority or a recognized classification society.	Basic safety concept
Pressure relief device means a spring-loaded device which is activated automatically by pressure the purpose of which is to protect the cargo tank against unacceptable excess internal pressure;	
Protected area **means** the whole of the following spaces on bord of cargo vessels (a) the hold or holds (when anti-explosion protection is required, comparable to zone 1); (b) the space situated above the deck (when anti-explosion protection is required, comparable to zone 2), bounded: (i) athwartships, by vertical planes corresponding to the side plating; (ii) fore and aft, by vertical planes corresponding to the end bulkheads of the hold; and- (iii) upwards, by a horizontal plane 2.00 m above the upper level of the load, but at least by a horizontal plane 3.00 m above the deck.	Clarification
Protective coaming, liquid tight means a liquid tight coaming on deck at the height of the outer cargo tank bulkhead (see drawing zoning) but maximum at a distance of 0.6 m to the outer cofferdam bulkhead or hold end bulkheads which prevents that liquid enters the fore and aft parts of the ship. The protective coaming has either to extend from one side of the vessel to the other or to be fixed between the spill coamings. The height of the protective coaming and the spill coamings has to be at least 0.075 m and the connection between the protective coamings and the spill coaming has to be liquid tight.	

Protection wall, gas and liquid tight means a gas and liquid tight wall on deck at the height of the boundary plane of the cargo area having a height of at least 1.0 m above the deck of the cargo area preventing gases to enter areas outside the cargo area. It has either to extend from one side of the vessel to the other or surround the areas to protect in a U-shaped form. The wall has to cover the whole width of the area to protect and at least 1.0 m in the direction opposite to the cargo area. (see drawing). The wall of the accommodation facing the cargo area, may be considered to act as a protection wall if this wall of the accommodation falls into line with the boundary plane of the cargo area and the dimension of the protection walls are met.	
Receptacle for residual products means an ~~tank,~~ intermediate bulk container (IBC) or tank-container or portable tank intended to collect residual cargo, washing water, cargo residues or slops which are suitable for pumping. The maximum permissible capacity of an intermediate bulk container is 2 m³, that of a tank-container or portable tank is 12 m³;	
Receptacle for slops means a fire resistant steel recipient capable of being closed with lids intended to collect slops which are unsuitable for pumping (drums with removable heads, code 1A2, ADR). The maximum permissible capacity is 400 l	
Safety valve means a ~~spring-loaded~~ device which is activated automatically by pressure the purpose of which is to protect the cargo tank against unacceptable excess internal pressure or negative internal pressure (see also, *High velocity vent valve*, *Safety valve of pressure cargo tanks*, *Pressure relief device* and *Vacuum valve*);	
Safety valve of pressure cargo tanks means a pressure relief valve which is activated automatically by pressure the purpose of which is to protect the cargo tank against unacceptable excess internal pressure	
Sampling opening means a closable opening of the cargo tanks with a diameter of not more than 0.30 m. When the list of substances on the vessel according to 1.16.1.2.5 contains substances for which explosion protection ~~against explosion~~ is required in column (17) of Table C of Chapter 3.2, it shall be fitted with a flame arrester ~~plate stack,~~ capable of withstanding steady burning and so designed that the opening period will be as short as possible and that the flame arrester ~~plate stack~~ cannot remain open without external intervention. ~~The flame arrester plate stack shall be of a type approved by the competent authority for this purpose;~~	Clarification
Tank for residual products means a permanently built-in tank intended to collect residual cargo, washing water, cargo residues or slops which are suitable for pumping. The maximum permissible capacity is 30 m³ ;	
Ullage opening means a closable opening of the cargo vessel or the residual cargo tanks with a diameter of maximum 0.1 m. The ullage opening is to be designed in such a way that it is possible to determine the degree of filling by the use of gauging rods.	
Vacuum valve means a ~~spring-loaded device~~ safety valve which is activated automatically by pressure the purpose of which is to protect the cargo tank against unacceptable negative internal pressure. 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 it has to be deflagration safe against atmospheric explosions of the most critical substance. The deflagration safety shall be tested according to the European standard EN ISO 16852:2010; and it has to be proven that the applicable requirements are fulfilled (e.g. conformity assessment procedure according to Directive 2014/34/EU, or IEC/ISO-Regulations or at least equivalent).	

Zoning This zoning is valid for tank vessels whose 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 (see drawing) **Zone 0**: comprises:  - Inside all cargo tanks, tank-containers or portable tanks, pipings containing cargoes or cargo vapours including their equipment as well as pumps and compressors. **Zone 1:** comprises:  - All compartments within the part of the cargo area below deck being not part of zone 0. - Compartments on deck within the cargo area. - The deck from one side of the vessel to the other within the cargo area up to the cofferdam bulkheads. Up to a distance of at least 1.6 m to the boundary plane of the cargo area the height is 2.5 m above deck, at least, however, 1.5 m above the highest piping carrying cargoes or cargo vapours. Adjacent (fore and aft) till the outermost cargo tank shots the height is 0.25 m above deck. If there is a pump room installed inside the cofferdam the adjacent height (fore and aft) is 1.0 m above deck (see drawing). Adjacent (fore and aft) till the outer cargo tank bulkhead the height is 0.25 m. In case there are service spaces within the cofferdam or the vessel is build having hold end bulkheads the adjacent height (fore and aft) till the boundary plane of the cargo area is 1.0 m Whereas every opening in zone 0 except the high velocity vent valve has to be surrounded cylindrically by at least 2.5 m zone 1 - An area surrounding cylindrically the high velocity vent valve/safety valve of cargo tanks of type G vessels with a radius of 3.0 m up to a height of 4.0 m above the opening of the high velocity vent valve/safety valve of cargo tanks of type G. - A spherical segment surrounding the ventilation openings of the service spaces located within the cargo area which are actively ventilated, comprising a radius of 1.0 m centred over the opening. **Zone 2:** comprises:  - An area on deck of 1.0 m in height and length following zone 1. - On the fore deck and the aftdeck an area of the entire width of the vessel adjacent to boundary plane of the cargo area, with a complete length of 7.5 m. Between the lateral side of the vessel and the protection wall this area equals the length and height of the dimensions of the lateral side of the protection wall. The protection wall may coincide with the wall of the accommodation facing the cargo area, if this wall falls into line with the boundary plane of the cargo area and the dimension of the protection walls are met. Apart from that, the height is 0.5 m. This part is not part of zone 2 in case the protection wall extends from one side of the vessel to the other and there are no openings. - An area following zone 1 around the high velocity vent valve/safety valve of pressure cargo tanks having an expansion of 3.0 m. - A spherical segment following zone 1 which surrounds the ventilation openings of the service spaces located within the cargo area which are actively ventilated, comprising a radius of 1.0 m centred over the opening. - The interior of closed compartments extending into zone 2 and being constructed in such a way that the penetration of gases from zone 2 is avoided, will not be part of the explosion hazardous area.	New zone concept

Zoning

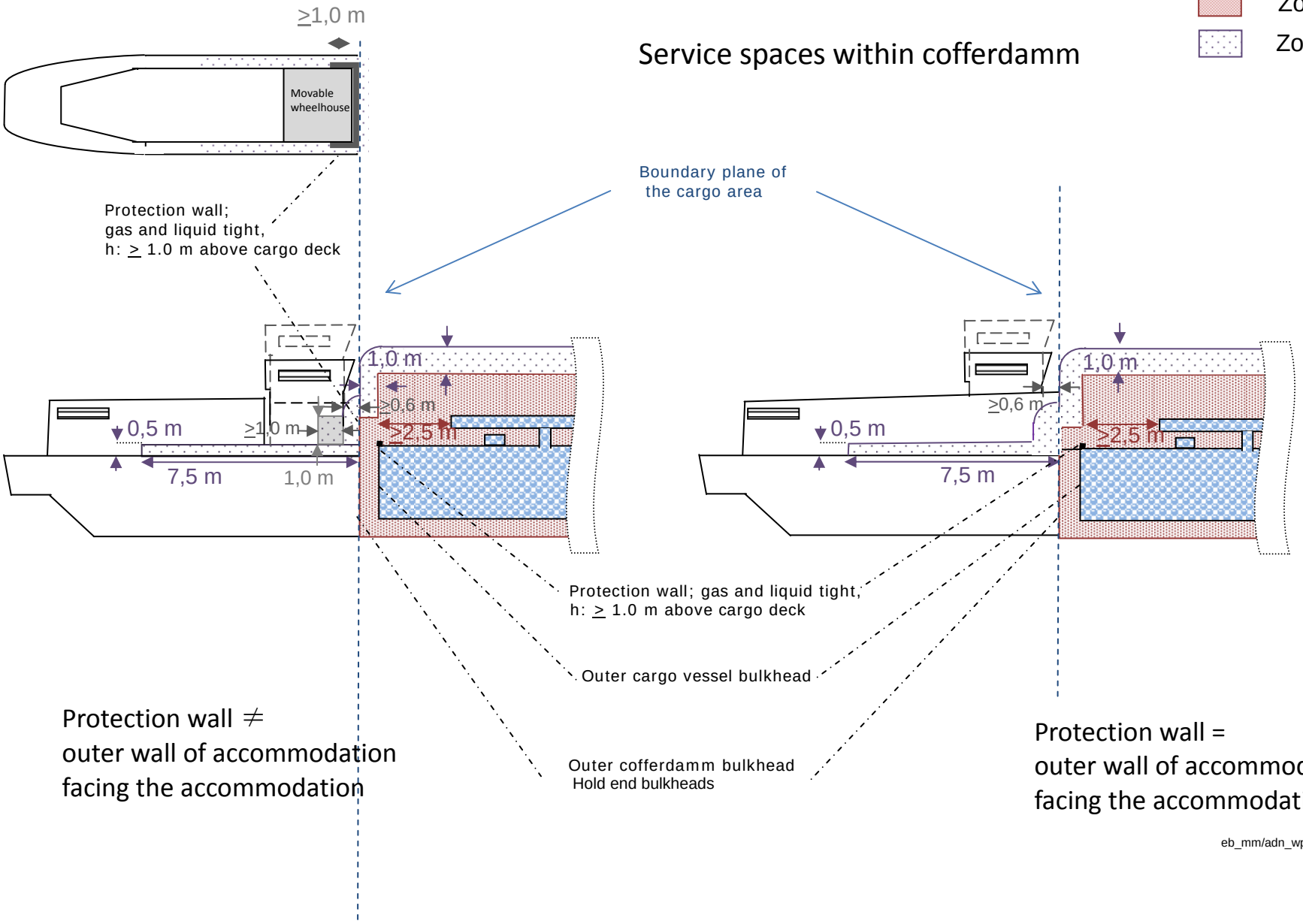

≥1,0 m
Movable wheelhouse
High velocity vent valve
Protection wall;
gas and liquid tight,
h: ≥ 1.0 m above cargo deck
3,0 m
3,0 m
3,0 m
4,0 m
3,0 m
1,0 m
1,0 m
≥ 6,0 m
2,5 m
≥1,5 m
≥2,5 m
≥2,5 m
0,5 m
≥1,0 m
7,5 m
0,5 m
7,5 m
Boundary plane of the cargo area
Protective coaming;
gas and liquid tight
h: ≥ 0.075 m
Outer cargo vessel bulkhead
Outer cofferdamm bulkhead
Hold end bulkheads
Boundary plane of the cargo area
Zone 0
Zone 1
Zone 2


Zoning
No service spaces within cofferdamm
Zone 0
Zone 1
Zone 2
≥1,0 m
Movable wheelhouse
Boundary plane of the cargo area
Protection wall; gas and liquid tight, h: ≥ 1.0 m above cargo deck
1,0 m
≥0,6 m
≥2,5 m
0,5 m
≥1,0m
7,5 m
Protection wall; gas and liquid tight, h: ≥ 1.0 m above cargo deck
Outer cargo vessel bulkhead
Outer cofferdamm bulkhead
Hold end bulkheads
Protection wall ≠ outer wall of accommodation
Protection wall = outer wall of accommodation
eb_mm/adn_wp15_ac2_27_inf8en

Zoning

Zone 0
Zone 1
Zone 2

Service spaces within cofferdamm



Protection wall ≠
outer wall of accommodation
facing the accommodation

Protection wall =
outer wall of accommodation
facing the accommodation

3 Table C

Paragraphs	Modification	Reason / Explanation
3.2.3.1 *Explanations concerning Table C:* Column (10)	"Opening pressure of the pressure relief device / high-velocity vent valve in kPa" Contains information concerning the opening pressure of the pressure relief device / high velocity vent valve in kPa.	Clarification
3.2.3.1 *Explanations concerning Table C:* Column (20) "Additional requirements/ Remarks" 5.	This substance is liable to clog the venting piping and its fittings. Careful surveillance should be ensured. If a closed-type tank vessel.is required for the carriage of this substance the venting piping.shall conform to 9.3.2.22.5 (a) ~~(i), (ii), (iv),~~ and 9.3..2.22.5 (b)~~, (c) or (d)~~ or to 9.3.3.22.5 (a) ~~(i), (ii), (iv),~~and 9.3.3.22.5 (b)~~, (c) or (d).~~ This requirement does not apply when the cargo tanks and the corresponding piping are inerted in accordance with 7.2.4.18 nor when protection against explosions is not required in column (17) and when flame-arresters have not been installed.	Reference adapted
3.2.3.1 *Explanations concerning Table C:* Column (20) "Additional requirements/ Remarks" 6.	When external temperatures are below or equal to that indicated in column (20), the substance may only be carried in tank vessels equipped with a possibility of heating the cargo. In addition, in the event of carriage in a closed-type vessel, the pressure relief device / high-velocity vent valve, the vacuum valve, the flame arresters as well as the venting pipe has to be heatable. ~~if the tank vessel:~~ ~~– is fitted out in accordance with 9.3.2.22.5 (a) (i) or (d) or 9.3.3.22.5 (a) (i) or (d), it shall be equipped with pressure/vacuum valves capable of being heated; or~~ ~~– is fitted out in accordance with 9.3.2.22.5 (a) (ii), (v), (b) or (c) or 9.3.3.22.5 (a) (ii), (v), (b) or (c), it shall be equipped with heatable venting piping and heatable pressure/vacuum valves; or~~ ~~– is fitted out in accordance with 9.3.2.22.5 (a) (iii) or (iv) or 9.3.3.22.5 (a) (iii) or (iv), it shall be equipped with heatable venting piping and with heatable pressure/vacuum valves and heatable flame-arresters.~~ The temperature of the venting piping, ~~pressure relief device/high velocity valve, vacuum valves~~ safety valves and flame-arresters shall be kept at least above the melting point of the substance	Reference simplified
3.2.3.1 *Explanations concerning Table C:* Column (20) "Additional requirements/ Remarks" 7.	If a closed-type tank vessel is required to carry this substance or if the substance is carried in a closed-type tank vessel, the pressure relief device/ high-velocity vent valve, the vacuum valve, the flame arresters as well as the venting pipe has to be heatable. The temperature of the venting piping, pressure relief device/high velocity valve, vacuum valves and flame-arresters shall be kept at least above the melting point of the substance. ~~– he temperature of the venting piping, pressure relief devic or 9.3.3.22.5 (a) (i) or (d), it shall be equipped with heatable pressure/vacuum valves, or – ressure/vacuum valves, ord), it shall be equipped with heatable or (c) or 9.3.3.22.5 (a) (ii), (v), (b) or (c), it shall be equipped with heatable venting piping and heatable pressure/vacuum valves, or – alves, orble venting piping and heatable pressure/vacuumbe equ or 9.3.3.22.5 (a) (iii) or (iv), it shall be equipped with heatable venting piping and with heatable pressure/vacuum valves and heatable flame-arresters.~~ The temperature of the venting piping~~, pressure relief device/high velocity valve, vacuum valves~~ safety valves and flame-arresters shall be kept at least above the melting point of the substance.	Reference simplified Clarification

3.2.3.2 Table C Column (10)	Opening pressure of the pressure relief device / high-velocity vent valve in kPa	Clarification
3.2.3.2 Table C	Footnotes Footnote to all entrances T1 and T2 in column (15) 12) This temperature class is not valid for the selection of the explosion protected equipment. The surface temperature of the explosion protected equipment shall not exceed 200 °C	Basic safety concept
3.2.3.3 Flowchart Scheme A:	Pressure relief device/ High-velocity vent valve opening pressure: 4 x	Clarification
3.2.3.3 Flowchart Scheme B:	Pressure relief device/ High-velocity vent valve opening pressure: 3 x	Clarification
3.2.3.3 Column (17):	**Determination of whether ~~anti-~~explosion protection is required ~~for electrical equipment and systems~~**	New zone concept
3.2.4.3 **A. Columns (6), (7) and (8):**	with pressure relief device / high-velocity vent valve opening pressure 10 x	Clarification
3.2.4.3 Column (17):	**Determination of whether ~~anti-~~explosion protection is required ~~for electrical equipment and systems~~**	New zone concept

5 Consignment procedures

Paragraphs	Modification	Reason / Explanation
5.4.3.4	In the event of an accident or incident that may occur during carriage, the members of the crew shall take the following actions where safe and practicable to do so: – Inform all other persons on board about the emergency and keep them away as much as possible from the danger zone. Alert other vessels in the vicinity; – Avoid sources of ignition, in particular, do not smoke, use electronic cigarettes or similar devices or switch on or off any ~~electrical~~ equipment that ~~is not the "certified safe" type~~ does not fulfill the requirements to be used in zone 1 and is not designed for use in emergency response	New zone concept Wording of directive 2014/34/EU

7.1 Dry cargo vessels

Paragraphs	Modification	Reason / Explanation
7.1.2.19	***Pushed convoys and side-by-side formations***	
7.1.2.19.1	Where at least one vessel of a convoy or side-by-side formation is required to be in possession of a certificate of approval for the carriage of dangerous goods, this vessel equals an onshore assigned zone and all vessels of such convoy or side-by-side formation shall be provided with an appropriate certificate of approval. Vessels not carrying dangerous goods shall comply with the requirements of the following paragraphs: 7.1.2.5, 8.1.4, 8.1.5, 8.1.6.1, 8.1.6.3, 8.1.7, 8.1.8, 8.1.9**,** 8.3.5, 9.1.0.0, 9.1.0.12.3, 9.1.0.17.2, 9.1.0.17.3, 9.1.0.31, 9.1.0.32, 9.1.0.34, 9.1.0.40.2, 9.1.0.41, 9.1.0.50, 9.1..0.51, 9.1.0.52 ~~9.1.0.52.2, 9.1.0.52.3, 9.1.0.56,~~ 9.1.0.71 and 9.1.0.74.	Basic safety concept
7.1.3.51	***Electrical installations and equipment***	Clarification
7.1.3.51.1	The electrical installations and equipment shall be properly maintained.	Clarification
7.1.3.51.4 new	During loading and unloading or during a stay near to or within a shoreside assigned zone electrical installations and equipment not fulfilling the requirements mentioned in 9.1.0.52.1 or generating surface temperatures higher than 200 °C have to be switched off, resp. cooled accordingly or the measures mentioned in 9.1.0.12.3 b) have to be taken.	Basic safety concept
7.1.3.51.5 new	The electrical installations in the holds shall be kept switched off and protected against unintentional connection. This provision does not apply to permanently installed cables passing through the holds, to movable cables connecting containers, or to electrical apparatus fulfilling the requirements for being used in zone 1 ~~of a "certified safe type"~~.	Wording according to Directive 2014/34/EU In ADN 2015 **7.1.3.51.4**
7.1.3.52 new	***Non-electrical installations and equipment***	Basic safety concept
7.1.3.52.1 new	Non-electrical installation and equipment have to be kept in satis-factory conditions	Like tank vessel
7.1.3.52.2 new	During loading and unloading or during a stay near to or within a shoreside assigned zone equipment generating surface tempera-tures higher than 200 °C have to be switched off, resp. cooled analogously or the measures referred to in 9.1.0.12.3 b) have to be taken.	Like tank vessel
7.1.4.13	***Measures to be taken before and during loading, unloading as well as during a stay near to or within a shoreside assigned zone***	Basic safety concept Like tank vessel
7.1.4.13.1 new	Installations and equipment not fulfilling the requirements of 9.1.0.51, 9.1.0.52.1 (marked in red) have to be switched off resp. cooled accordingly	Basic safety concept

7.1.4.13.2 new	7.2.4.13.1 is not valid in the accommodation, wheelhouse and service spaces in case a) the ventilation system is adjusted to guaranty an overpressure of at least 0,1 kPa and b) the gas detection system is switched on and is measuring continuously	Basic safety concept
7.1.4.13.3 new	~~Measures to be taken before loading~~ The holds and cargo areas shall be cleaned prior to loading. The holds shall be ventilated	In ADN 2015 7.2.4.13
7.1.4.41	~~***Fire and naked light***~~ ~~The use of fire or naked light is prohibited while substances or articles of Divisions 1.1, 1.2, 1.3, 1.5 or 1.6 of Class 1 are on board and the holds are open or the goods to be loaded are located at a distance of less than 50 m from the vessel.~~ **Smoking, fire and naked light** Smoking, fire and naked light on board the vessel is prohibited. The prohibition of smoking also applies to electronic cigarettes and other similar devices. This prohibition shall be displayed on notice boards at appropriate places. The prohibition of smoking does not apply in accommodation or wheelhouses in case the ventilation system is ensuring an overpressure of 0.1 kPa	New wording identical to 7.2.4.41
7.1.4.53	…… Where these lamps are positioned on deck in ~~the protected area~~ zone 2, they shall fulfil the requirements for being used in zone 2 ~~2 be of "limited explosion risk" type.~~	Wording according to ATEX Directive
7.1.4.75	Risk of sparking All electrically continuous connections between the vessel and the shore ~~as well as appliances used in the protected area~~ shall be so designed that they do not present a source of ignition.	New Zone concept

7.2 Tank vessels

Paragraphs	Modification	Reason / Explanation
7.2.2.0	***Permitted vessels*** ***NOTE****1: The relief pressure of the safety valves* of the pressure cargo tanks *or of high-velocity vent valves shall be indicated in the certificate of approval (see 8.6.1.3).*	Clarification
7.2.2.6	***Gas detection system*** ~~The sensors of the gas detection system shall be set at not more than 20% of the lower explosive limit of the substances allowed for carriage in the vessel.~~ ~~The system shall have been approved by the competent authority or a recognizedclassification society.~~ When the list of substances on the vessel according to 1.16.1.2.5 contains substances for which n-Hexane is not representative the gas detection system has to be calibrated in addition according to the most critical substance in the list of substances.	Now in definition Basic safety concept
7.2.2.19	***Pushed convoys and side-by-side formations***	
7.2.2.19.3	When a pushed convoy or a side-by-side formation comprises a tank vessel carrying dangerous substances, this vessel equals an onshore assigned zone and vessels used for propulsion shall meet the requirements of the following paragraphs: 7.2.2.5, 8.1.4, 8.1.5, 8.1.6.1, 8.1.6.3, 8.1.7, 8.1.8, 8.1.9, 8.3.5, 9.3.3.0.1, 9.3.3.0.3 (d), 9.3.3.0.5, 9.3.3.10.1, 9.3.3.10.2, 9.3.3.10.4, 9.3.3.12.4, 9.3.3.12.6, 9.3.3.16.1, 9.3.3.16.2, 9.3.3.17.1 to 9.3.3.17.4, 9.3.3.31.1 to 9.3.3.31.5, 9.3.3.32.2, 9.3.3.34.1, 9.3.3.34.2, 9.3.3.40.1 (however, one single fire or ballast pump shall be sufficient), 9.3.3.40.2, 9.3.3.41, 9.3.3.50.1, 9.3.3.50.2 c), 9.3.3.51, 9.3.3.52.1 to 9.3.3.52.8, ~~9.3.3.50.1 (c), 9.3.3.50.2, 9.3.3.51, 9.3.3.52.3 to 9.3.3.52.6, 9.3.3.56.5,~~ 9.3.3.71 and 9.3.3.74. Vessels moving only type N open tank vessels do not have to meet the requirements of paragraphs 9.3.3.10.1, 9.3.3.10.4, ~~9.3.3.10.2~~ and 9.3.3.12.6. In this case the following entry shall be made in the certificate of approval or provisional certificate of approval under number 5, permitted derogations: "Derogation from 9.3.3.10.1, 9.3.3.10.4, 9.3.3.10.5 ~~9.3.3.10.2~~ and 9.3.3.12.6; the vessel may only move tank vessels of type N open".	Basic safety concept Reference
7.2.2.22	***Cargo tank openings*** When substances for which a type C vessel is required in column (6) of Table C of Chapter 3.2 are carried, the pressure relief device/ high-velocity vent valves shall be set so that blowing-off does not normally occur while the vessel is under way.	clarification
7.2.3.1.6	Entry into empty cargo tanks, the cargo pump-rooms below deck, cofferdams, double-hull spaces, double bottoms and hold spaces is not permitted, except where: – the oxygen concentration is equal to or higher than 20.0 Vol% ~~there is no lack of oxygen~~ and no measurable amount of dangerous substances in dangerous concentrations; or ……	
7.2.3.6	Cross out	
7.2.3.51	***Electrical installations and equipment***	clarification
7.2.3.51.1	The electrical installations and equipment shall be properly maintained	clarification
7.2.3.51.2	The use of movable electric cables is prohibited in the ~~protected~~ explosion hazardous area. This provision does not apply to: – intrinsically safe electric circuits; – electric cables for connecting signal lights or gangway lighting, provided the	Wording according to ATEX Directive

	socket is permanently fitted to the vessel close to the signal mast or gangway; – electric cables for connecting containers; – electric cables for electrically operated hatch cover gantries; – electric cables for connecting submerged pumps; – electric cables for connecting hold ventilators.	
7.2.3.51.3 new	During a stay near to or within a shoreside assigned zone electrical installation and equipment not complying with the requirements than mentioned in 9.3.1.52.1, 9.3.2.52.1, 9.3.3.52.1, or generating surface temperatures higher than mentioned in 9.3.1.51 a) resp. 9.3.1.51 b), 9.3.2.51 a) resp. 9.3.2.51 b), or 9.3.3.51 a) resp. 9.3.3.51 b) have to be switched off, resp. cooled analogously or the measures referred to in 7.2.4.13.2 have to 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 is also valid during loading and unloading and when gas-freeing during berthing	Basic safety concept
7.2.3.51.4	7.2.3.51.3 in ADN 2015	
7.2.3.52	***Non-electrical installations and equipment***	New zone concept
7.2.3.52.1	The non-electrical installations and equipment shall be properly maintained	New zone concept
7.2.3.52.2	During a stay near to or within a shoreside assigned zone installations and equipment generating surface temperatures higher than mentioned in 9.3.1.51 a) resp. 9.3.1.51 b), 9.3.2.51 a) resp. 9.3.2.51 b), or 9.3.3.51 a) resp. 9.3.3.51 b) have to be switched off, resp. cooled analogously or the measures referred to in 7.2.4.13.2 have to 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 is also valid during loading and unloading or when gas-freeing during berthing.	New zone concept
7.2.4.11	***Loading plan, handling and stowage of cargo***	In ADN 2015 7.2.4.14
7.2.4.11.1	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.	In ADN 2015 7.2.4.14
7.2.4.13	***Measures to be taken before and during loading, unloading as well as during a stay near to or within a shoreside assigned zone***	Basic safety concept
7.2.4.13.1 new	Installations and equipment not fulfilling the requirements of 9.3.1.51 c), 9.3.2.51c), 9.3.3.51c), 9.3.1.52.1, 9.3.2.52.1 or 9.3.3.52.1 (marked in red) have to be switched off	Basic safety concept
7.1.4.13.2 new	7.2.4.13.1 is not valid in the accommodation, wheelhouse and service spaces in case a) the ventilation system is adjusted to guaranty an overpressure of at least 0,1 kPa and b) the gas detection system is switched on is measuring automatically	Basic safety concept

7.2.4.13.3	All entrances or openings of spaces which are accessible from the deck and all openings of spaces facing the outside shall remain closed. This provision does not apply to: – air intakes of running engines; – ventilation inlets of engine rooms while the engines are running; – air intakes of the overpressure ventilation system referred to in 9.3.1~~.~~ ~~52.3.~~12.4, 9.3.2.~~52.3~~ 12.4 or 9.3.3.~~52.3~~ 12.4; – air intakes ~~of air conditioning in installations~~ if these openings are fitted with a gas detection system referred to in 9.3.1~~.52.3~~.12.4, 9.3.2.~~52.3~~ 12.4 or 9.3.3.~~52.3~~ 12.4 These entrances and openings may only be opened when necessary and for a short time, after the master has given his permission. This ~~e 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	In ADN 2015 7.2.4.17.1 und 7.2.4.17.3
7.2.4.14	7.2.4.13 of ADN 2015	
7.2.4.14.1 new	7.2.4.13.1 of ADN 2015	
7.2.4.14.2 new	7.2.4.13.2 of ADN 2015	
7.2.4.14.3 new	7.2.4.13.3 des ADN 2015	
7.2.4.14.4 new	7.2.4.17.1 und 7.2.4.17.3 des ADN 2015	
7.2.4.15	Measures to be taken before unloading Before starting unloading all safety and control devices as well as all items of equipment have to be checked and their proper functioning has to be controlled as far as possible	
7.2.4.16	***Measures to be taken after unloading*** ~~***(Stripping system)***~~	Clarification
7.2.4.16.1	***Stripping system*** **…….**	Clarification
7.2.4.16.2	During the filling of the residual tanks and receptacle for residual products, released gases shall be safely evacuated. Residual tanks and receptacles for residual products shall be connected to the venting piping of cargo tanks only for the time necessary to fill them. During filling, means for collecting any leakage shall be placed under the filling connections.	Clarification In ADN 2015 7.2.4.15.2 9.3.2.26.4 and 9.3.2.26.1
7.2.4.16.3	The gas-freeing of cargo tanks and piping for loading and unloading shall be carried out if necessary in compliance with the conditions of 7.2.3.7.	In ADN 2015 7.2.4.15.3
7.2.4.16.4 new	The spaces which are accessible from the deck shall be ventilated. This shall not apply to the reception of oily and greasy wastes resulting from the operation of vessels nor to the handing over of products for the operation of vessels.	
7.2.4.16.6	In case of recovery of the gas-air mixture from shore into the vessel, the pressure at the connection point shall not be more than the opening pressure of the pressure relief device/ high velocity vent valve.	
7.2.4.16.7	Persons entering the premises located in the cargo area below deck during loading or unloading shall wear the PP equipment referred to in 8.1.5 if this equipment is prescribed in column (18) of Table C of Chapter 3.2. Persons connecting or disconnecting the loading and unloading piping or the venting piping, or taking samples, carrying out measurements, ~~replacing the flame arrester plate stack~~ or relieving pressure in cargo tanks shall wear the PP equipment referred to in 8.1.5 if this equipment is prescribed in column (18) of Table C of Chapter 3.2. They shall also wear protective equipment A if a toximeter (TOX) is prescribed in column (18) of Table C of Chapter 3.2.	In ADN 2015 7.2.4.16.8 No longer allowed

7.2.4.17	***Measures to be taken during loading, carriage, unloading and handling***	
7.2.4.17.2	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.~~	Now in 7.2.4.13.1 und 7.2.4.15
7.2.4.17.4	Cross out Replace by **7.2.4.17.5 of ADN 2015**	
7.2.4.17.5	7.2.4.16.6 des ADN 2015	
7.2.4.17.6	When a tank vessel is equipped with a common venting piping, connecting cargo tanks, ~~conforms to 9.3.2.25.5 (d) or 9.3.3.22.5 (d),~~ the individual cargo tanks shall be closed off during transport and opened during loading, unloading and gas-freeing. Only substances which do not ~~mix and which do not~~ react dangerously with each other may be carried simultaneously in cargo tanks connected to a common venting piping;	In ADN 2015 7.2.4.16.7 Similar to wording in chapter 9 In ADN 2015 part of 9.3.2.22.5 a)
7.2.4.17.7	Persons entering the premises located in the cargo area below deck during loading or unloading shall wear the PP equipment referred to in 8.1.5 if this equipment is prescribed in column (18) of Table C of Chapter 3.2. Persons connecting or disconnecting the loading and unloading piping or the venting piping, or taking samples, carrying out measurements, ~~replacing the flame arrester plate stack~~ or relieving pressure in cargo tanks shall wear the PP equipment referred to in 8.1.5 if this equipment is prescribed in column (18) of Table C of Chapter 3.2. They shall also wear protective equipment A if a toximeter (TOX) is prescribed in column (18) of Table C of Chapter 3.2.	In ADN 2015 7.2.4.16.8 No longer allowed
And so on		
7.2.4.22	***Opening of openings of cargo tanks***	
	Pressure relief of cargo tanks is permitted only when carried out by means of the device for safe pressure relief prescribed in 9.3.2.22.4 (a) and 9.3.2.22.4 (b) or 9.3.3.22.4 (a) and 9.3.3.22.4 (b).	In ADN 2015 7.2.4.22.6 reference adjusted
7.2.4.22.3	Opening of sampling outlets and ullage openings and opening of the housing of the flame arrester shall not be permitted except for the purpose of inspecting or cleaning empty cargo tanks. When in column (17) of Table C of Chapter 3.2 ~~anti~~ explosion protection is required, the opening of cargo tank covers ~~or of the housing of the flame arrester for the purpose of mounting or removing the flame arrester plate stack~~ in unloaded cargo tanks shall be permitted only if the cargo tanks in question have been gas-freed and the concentration of flammable gases in the tanks is less than 10% of the lower explosive limit.	
7.2.4.22.4	7.2.4.22.3 of ADN 2015	
7.2.4.22.5	7.2.4.22.4 of ADN 2015	
7.2.4.22.6	7.2.4.22.5 of ADN 2015	

7.2.4.22.7	7.2.4.22.7 of ADN 2015	
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 valve/ 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.	Clarification
7.2.4.41	~~***Fire or naked light***~~ ~~During loading, unloading or gas-freeing operations fires and naked lights are prohibited on board the vessel.~~ ~~However, the provisions of 7.2.3.42.3 and 7.2.3.42.4 are applicable.~~ ***Smoking, Fire or naked light*** Smoking including electronic cigarettes and other similar devices, fire and naked light on board the vessel are prohibited. However, the provisions of 7.2.3.42.3 and 7.2.3.42.4 are applicable. This prohibition shall be displayed on notice boards at appropriate places. The prohibition of smoking does not apply to the accommodation or the wheelhouse provided the ventilation system is regulated to maintain an overpressure of 0.1 kPa.	Identical to **7.2.4.41**
7.2.4.53	***Lighting*** If loading or unloading is performed at night or in conditions of poor visibility, effective lighting shall be provided. If provided from the deck, it shall be effected by properly secured electric lamps which shall be positioned in such a way that they cannot be damaged. ~~Where these lamps are positioned in the cargo area, they shall be of the "certified safe" type.~~They have to be certified for being used within the respective zone.	New zone concept
~~**7.2.4.74**~~	~~***Prohibition of smoking, fire and naked light***~~ ~~The prohibition of smoking does not apply in accommodation or wheelhouses conforming to the provisions of 9.3.1.52.3, 9.3.2.52.3 or 9.3.3.52.3.~~	Now combined in 7.2.4.41

8. Provisions for vessel crews, equipment, operation and documentation

Paragraphs	Modification	Reason / Explanation
8.1.2.1	j) the documents mentioned in 9.1.0.50, 9.3.1.50, 9.3.2.50 or 9.3.3.50	Basic concept New zone concept
8.1.6.3	The special equipment referred to in 8.1.5.1 ~~and~~ the gas detection system as well as the oxygen measuring system shall be checked and inspected in accordance with the instructions of the manufacturer by the manufacturer concerned or by persons authorized for this purpose by the competent authority. A certificate concerning this inspection shall be carried on board.	Clarification
8.1.7	Installations, equipment and autonomous protective systems	
8.1.7.1	Electrical Installations and equipment The insulation resistance of the electrical installations and~~,~~ the earthing ~~and the certified safe type electrical equipment and the conformity of the documents required in 9.3.1.50.1, 9.3.2.50.1 or 9.3.3.50.1 with the circumstances 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 a person authorized for this purpose by the competent authority. An appropriate inspection certificate shall be kept on board.	
8.1.7.2 new	**Installations and Equipment intended to be used in explosion hazardous areas, limited explosion risk type equipment installations and equipment complying with 9.1.0.51 and autonomous protective systems** Such equipment and autonomous protective systems as well as the compliance with the documents mentioned 9.3.1.50, 9.3.2.50 or 9.3.3.50 in correlation to the situation on bord 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. An appropriate inspection certificate shall be kept on board. Manufacturer's instruction on flame arrestors or safety valves may ask for a shorter inspection period.	Basic concept New zone concept
8.1.8.3	…… For tank vessels, the relief pressure of the safety valves of pressure cargo tanks, pressure relief device or of the high-velocity vent valves shall be entered in the certificate of approval. ….	Clarification
8.3.2	On board ~~dry cargo vessels,~~ the only portable lamps permitted in the ~~protected~~ explosion hazardous area and on deck are lamps having their own source of power. ~~On board tank vessels, the only portable lamps permitted in the cargo area and on the deck outside the cargo area are lamps having their own source of power~~ They have at least to comply with the necessary requirements valid for the respective zone	Basic safety concept
~~**8.3.4**~~	~~**Prohibition on smoking, fire and naked light**~~ ~~Smoking on board the vessel is prohibited. The prohibition of smo~~king ~~also applies to electronic cigarettes and other similar devices. This prohibition shall be displayed on notice boards at appropriate places.~~ ~~This prohibition does not apply to the accommodation or the wheel-house provided their windows, doors, skylights and hatches are closed.~~	No longer necessary now in 7.1.4.41/7.2.4.41

8.3.5	**Danger caused by work on board** No repair or maintenance work requiring the use of an open flame or electric current or liable to cause sparks may be carried out - on board dry cargo vessels in the protected area or on the deck less than 3m forward or aft of that area as well as - on board tank vessels. This requirement does not apply: - when ~~dry cargo vessels are furnished with~~ an authorization from the competent authority or a certificate attesting to the totally gas-free condition of the ~~protected area~~ ship exists; ~~- when tank vessels are furnished with an authorization from the competent authority or a certificate attesting to the totally gas-free condition of the vessel;~~ - to berthing operations. Such work ~~on board tank vessels~~ may be undertaken without permission ~~in the service spaces outside the cargo area, provided the doors and openings are closed and~~ the vessel - does not stay in or nearby a shoreside assigned zone, - is not being loaded, unloaded or gas-freed - in the service spaces outside the cargo area, provided the doors and openings are closed - after having carried dangerous goods for which explosion protection is **not** required in column (17) of Table C of Chapter 3.2. - after having carried dangerous goods for which explosion protection was required in column (17) of Table C of Chapter 3.2. but the concentration of flammable gases in the cargo tanks is below [10%] of the lower explosion limit The use of chromium vanadium steel screwdrivers and wrenches or screwdrivers and wrenches of equivalent material from the point of view of spark formation is permitted.	Clarification Basic safety concept [] IWG 'degassing of cargo tanks
8.6.1.1	5. Equipment to be used within the - temperature class - explosion group The following numbers to be changed	Clarification
8.6.1.2	5. Equipment to be used within the - temperature class - explosion group The following numbers to be changed	Clarification
8.6.1.3 and 8.6.1.4	9. Equipment to be used in in explosion hazardous areas	Clarification
8.6.1.3 and 8.6.1.4	opening pressure of the pressure relief device / high-velocity vent valve in kPa	
8.6.3 ADN Checklist 18	To be filled in only in the case of loading or unloading of substances for the carriage of which a vessel of the closed type or a vessel of the open type with flame arrester is required. Are the cargo tank hatches and cargo tank inspection, gauging and sampling openings closed or protected by suitable flame arresters ~~in good condition~~?	
8.6.3 ADN Checklist 12.2	Is it ensured that the shore installation is such that the pressure at the connecting point cannot exceed the opening pressure of the pressure relief device / high-velocity vent valves (pressure at connecting point __ kPa)?	

9.1 Dry Cargo Vessels

Paragraphs	Modification	Reason / Explanation
9.1.0.12	Ventilation	
9.1.0.12.3	Ventilation shall be provided for the accommodation, wheelhouse and for service spaces. If in the rooms during loading and unloading or during a stay near to or within a shoreside assigned zone higher temperatures as mentioned in 9.1.0.51 occur, this equipment has a) to be switched off, except b) these spaces are equipped with 1. a ventilation system ensuring an overpressure of 0.1 kPa (0.001 bar). he air intakes of the ventilation system shall be located as far away as possible, however, not less than 6.00 m from the cargo area and not less than 2.00 m above the deck; 2. a gas detection system with sensors: - at the suction inlets of the ventilation system; - directly at the top edge of the sill of the entrance doors of the accommodation and service spaces; This gas detection system has to fulfil the following requirements: - The t90-time has to be lower or equal to 4 s - The measurements have to be continuous. When the gas concentration reaches 20 % of the lower explosion limit, the ventilators are switched off. In such a case and when the overpressure is not maintained or in the event of failure of the gas detection system, the equipment and installations not fully complying with the requirements mentioned in 9.1.0.51 und 9.1.0.52.1 have to be switched off. These operations shall be performed immediately and automatically and activate the emergency lighting in the accommodation, the wheelhouse and the service spaces, which shall comply at least with the requirements mentioned in 9.1.0.52.1. The switching-off shall be indicated in the accommodation and wheelhouse by visual and audible signals. 3. The ventilation system, the gas detection system and the alarm of the switch-off device have to fully comply with the requirements mentioned in 9.1.0.52.1; 4. The automatic switching-off device is set so that no automatic switch off may occur while the vessel is under way. 5. The failure of the gas detection system of the accommodation shall be indicated by visual and audible signals in the accom-madation, wheelhouse and on deck. The failure of the gas detection system of the wheelhouse and service spaces shall be indicated by visual and audible signals in the wheelhouse and on deck when not cleared	Basic safety concept
9.1.0.12.4 new	Notice boards shall be fitted at the ventilation inlets indicating the conditions when they shall be closed. All ventilation inlets of accom-modation and service spaces leading outside shall be located not less than 2.00 m from the protected area. Any ventilation inlets shall be fitted with devices according to 9.3.2.40.2.2 (c) enabling them to be closed rapidly. It shall be clear whether they are open or closed.	Similar to tank vessel
9.1.0.12.5 new	The ventilator fan shall be designed so that no sparks may be emitted on contact of the impeller blades with the housing and no static electricity may be generated.	Basic safety concept

9.1.0.50	***Documents which have to be available on bord***	Similar to tank vessel
9.1.0.50.1	In addition to the documents required in accordance with the regulations referred to in 1.1.4.6, the following documents shall be available on board: (a) a list or a drawing indicating the electrical installations and equipment of *Limited explosion risk* type and the installations and equipment complying with 9.1.0.51a) (b) a list or a drawing of the equipment which is not allowed to be used during loading and unloading or during a stay near to or within a shoreside assigned zone. These have to be marked in red. (c) a drawing showing the borders of the zones indicating the electrical and non-electrical equipment installed. (d) a list of the equipment referred to under (c) with the following information: - Equipment, location, marking (Explosion protection level accor-ding to 60079-0, Equipment category according to Directive 2014/34 EU or at least equivalent protection level including explosion group and temperature class, type of protection, test body) in case of electrical equipment to be used in zone 1 (alter-native a copy of the test certificate e.g. certificate of conformity - Equipment, location, marking (Explosion protection level accor-ding to 60079-0, Equipment category according to Directive 2014/34 EU or at least equivalent protection level including explosion group and temperature class, type of protection, identi-fication number) in case of electrical equipment to be used in zone 2 as well as in case of non-electrical equipment to be used in zone 1 and zone 2 (alternative a copy of the test certificate e.g. certificate of conformity	Similar to tank vessel
9.1.0.50.2	The documents listed above shall bear the stamp of the competent authority issuing the certificate of approval.	Similar to tank vessel
9.1.0.51 new	Surface temperatures of installations and equipment a) surface temperatures shall not be more than 200 °C b) This provision does not apply if the following requirements are fulfilled: Equipment and installations, which generate surface temperatures higher than 200 °C (marked in red) have to be switched off during loading and unloading or during a stay near to or within a shore-side assigned zone or accommodation, wheelhouse and service spaces where surface temperatures higher than 200 °C occur are equipped with a ventilation system according to 9.1.0.12.4 Within the protected area 9.1.0.53.1 applies.	Basic safety concept
9.1.0.52	***Type and location of electrical installation and equipment***	
9.1.0.52.1	~~It shall be possible to isolate the electrical equipment in the protected area by means of centrally located switches except where:~~ ~~□ in the holds it is of a certified safe type corresponding at least to temperature class T4 and explosion group II B; and~~ ~~□ in the protected area on the deck it is of the limited explosion risk type.~~ ~~The corresponding electrical circuits shall have control lamps to indicate whether or not the circuits are live.~~ ~~The switches shall be protected against unintended unauthorized operation.~~ ~~The sockets used in this area shall be so designed as to prevent connections being made except when they are not live. Submerged pumps installed or used in the holds shall be of the certified safe type at least for temperature class T4 and explosion group II B.~~ Electrical equipment outside the protected area shall be at least of the "limited explosion risk" type.	Basic safety concept

	This provision does not apply to: (i) lighting installations in the accommodation, except for switches near entrances to accommodation; (ii) radiotelephone installations in the accommodation or the wheel-house; (iii) mobile and fixed telephone installations in the accommodation or the wheelhouse; (iv) electrical installations which during loading and unloading or during a stay near to or within a shoreside assigned zone are - switched off or - installed in spaces which are equipped with a ventilation system according to 9.1.0.12.4. (v) Inland AIS (automatic identification systems) stations in the accommodation and in the wheelhouse if no part of an aerial for electronic apparatus is situated above the cargo area and if no part of a VHF antenna for AIS stations is situated within 2 m from the cargo area.	
9.1.0.52.2	~~Electric motors for hold ventilators which are arranged in the air flow shall be of the certified safe type.~~ Electrical installations and equipment not complying with the require-ments according to 9.1.0.52.1 as well as its switches have to be marked in red. The disconnection of such equipment shall be operated from a centralised location on board.	Basic safety concept
9.1.0.52.3	Accumulators shall be located outside the protected area.	In ADN 2015 **9.1.0.52.4**
9.1.0.52.4 new	The failure of the power supply for the safety and control equipment shall be immediately indicated by visual and audible signals at the locations where the alarms are usually actuated.	Similar to tank vessel
9.1.0.52.5 new	Switches, sockets and electrical cables on deck shall be protected against mechanical damage.	In ADN 2015 **9.1.0.56.1**
9.1.0.52.6 new	Sockets for the connection of signal lights and gangway lighting shall be solidly fitted to the vessel close to the signal mast or the gangway. Sockets intended to supply the submerged pumps, hold ventilators and containers shall be permanently fitted to the vessel in the vicinity of the hatches.	In ADN 2015 **9.1.0.52.3**
9.1.0.52.7	Electric motors for hold ventilators which are arranged in the air flow shall be at least valid to be used in zone 1 temperature class T4 and explosion group IIB ~~of the certified safe type~~.	In ADN 2015 **9.1.0.52.2** Similar to tank vessel
9.1.0.53	**Type and location of the electrical and non-electrical installations and equipment to be used within the protected area**	Similar to tank vessel
9.1.0.53.1	The electrical and non-electrical installations and equipment to be used within the protected area have to valid at least for the use within the respective zone. It has to correspond at least to temperature class T4 and explosion group II B.	In ADN 2015 **9.1.0.52.1** Similar to tank vessel
9.1.0.53.2	The sockets used in the protected area shall be so designed as to prevent connections being made except when they are not live.	In ADN 2015 **9.1.0.52.1**
9.1.0.53.3	Electrical cables within the protected area have to be reinforced or protected by a metallic shield or mounted using cable conduit, except optical fibers.	Similar to tank vessel

9.1.0.53.4	Movable electrical cables are prohibited in the protected area, except for intrinsically safe electric circuits or for the supply of signal lights and gangway lighting, for containers, for submerged pumps, hold ventilators and for electrically operated cover gantries.	In ADN 2015 **9.1.0.56.2**
9.1.0.53.5	For movable electrical cables permitted in accordance with 9.1.0.~~56.2~~ 53.4 above, only rubber-sheathed electrical cables of type H07 RN-F in accordance with standard IEC-60 245-4:1994 or cables of at least equivalent design having conductors with a cross-section of not less than 1.5 mm2, shall be used. These cables shall be as short as possible and installed so that damage is not likely to occur.	In ADN 2015 **9.1.0.56.3** Similar to tank vessel
9.1.0.56	Redundant; now in **9.1.0.51 and 9.1.0.52**	

9.3. x Tank vessels……..

Paragraphs	Modification	Reason / Explanation
9.3.1.8 **9.3.3.8** **9.3.3.8**	**Classification**	
9.3.1.8.2 **9.3.2.8.2** **9.3.3.8.2**	The cargo pump-rooms shall be inspected by a recognised classification society whenever the certificate of approval has to be renewed as well as during the third year of validity of the certificate of approval. The inspection shall comprise at least: – an inspection of the whole system for its condition, for corrosion, leakage or conversion works which have not been approved; – a checking of the ~~condition~~ proper functioning of the gas detection system in the cargo pump-rooms, if installed. Inspection certificates signed by the recognised classification society with respect to the inspection of the cargo pump-rooms shall be kept on board. The inspection certificates shall at least include particulars of the above inspection and the results obtained as well as the date of the inspection.	Clarification
9.3.1.8.3 **9.3.2.8.3** **9.3.3.8.3**	The condition of the gas detection system referred to in ~~9.3.2.52.3~~ 9.3.x.12.4 und 9.3.x.17.6 as well as the oxygen measuring system according to **9.3.x.17.6** shall be checked by a recognised classification society whenever the certificate of approval has to be renewed and during the third year of validity of the certificate of approval. A certificate signed by the recognised classification society shall be kept on board.	Clarification Reference adjusted
9.3.1.8.4 **9.3.2.8.4** **9.3.3.8.4**	The compliance of the documents refered, to in 9.3.x.50 with the reality on bord shall be checked by a recognised classification society whenever the certificate of approval has to be renewed and during the third year of validity of the certificate of approval. A certificate signed by the recognised classification society shall be kept on board.	
9.3.1.10 **9.3.2.10** **9.3.3.10**	***Protection against the penetration of dangerous gases and the spreading of dangerous liquids***[1]	Clarification
9.3.1.10.1 **9.3.2.10.1** **9.3.3.10.1**	The vessel shall be designed so as to prevent dangerous gases and liquids from penetrating into the accommodation, wheelhouse and the service spaces. None of the windows of this rooms is capable of being opened except its intended use is as an emergency exit and it is marked as such.	Clarification 2. sentence in ADN 2015 9.3.1.52.3
9.3.2.10.2 **9.3.3.10.2** **new**	Liquid tight protective coamings have to be mounted on deck at the height of the outer cargo tank bulkhead but maximum at a distance of 0.6 m to the outer cofferdam bulkhead or hold end bulkheads. The height has to be at least 0.075 m.	New zone concept

[1] Depending on ADN safety committees decision on the proposal of the informal working group „degassing of cargo tanks“ (CCNR-ZKR/ADN/WP.15/AC.2/2015/29), the term „dangerous“ needs to be changed to „flammable or toxic“.

9.3.2.10.3 **9.3.3.10.3** **new**	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, areas on deck outside the explosion hazardous area where non explosion protected equipment is used, have to be protected by a gas and liquid tight protection wall to avoid gases and liquid to enter. It has either to extend from one side of the vessel to the other or surround the areas to protect in an U-shaped form. The wall has to cover the whole width of the area to protect and at least 1.0 m in the direction opposite to the cargo area. The height has to be of at least 1.0 m above the deck of the cargo area (see drawing). The protection wall may coincide with the wall of the accommodation facing the cargo area, if this wall of the accom-modation falls into line with the boundary plane of the cargo area and the dimensions of the protection wall are met.	New zone concept
9.3.1.10.4 **9.3.2.10.4** **9.3.3.10.4**	On deck the lower edges of door-openings in the sidewalls of superstructures and the coamings of access hatches and ventilation openings to under-deck spaces shall have a height of not less than 0.50 m above the deck. This requirement does not apply to access openings to double-hull and double bottom spaces	Clarification In ADN 2015 9.3.1.10.2+ .3 9.3.2.10.2 + 3 9.3.3.10.2 + 3
9.3.1.10.5 **9.3.2.10.5** **9.3.3.10.5**	The bulwarks, foot-rails, etc. shall be provided with sufficiently large openings which are located directly above the deck.	In ADN 2015 9.3.1.10.4 9.3.2.10.4 9.3.3.10.4
9.3.1.11 **9.3.2.11** **9.3.3.11**	***Hold spaces and cargo tanks***	
9.3.1.11.2 **9.3.2.11.2** **9.3.3.11.2**	(a) In the cargo area (except cofferdams) the vessel shall be designed as a flush-deck double-hull vessel, with double-hull spaces and double bottoms, but without a trunk. Cargo tanks independent of the vessel's hull and refrigerated cargo tanks may only be installed in a hold space which is bounded by double-hull spaces and double bottoms in accordance with 9.3.2.11.7 below. The cargo tanks shall not extend beyond the deck. ~~Refrigerated cargo tank fastenings shall meet the requirements of a recognised classification society.~~ (b) The cargo tanks independent of the vessel's hull shall be fixed so that they cannot float. Refrigerated cargo tank fastenings shall meet the requirements of a recognised classification society. (c) The capacity of a suction well shall be limited to not more than 0.10 m3. (d) Side-struts linking or supporting the load-bearing components of the sides of the vessel with the load-bearing components of the longitudinal walls of cargo tanks and side-struts linking the load-bearing components of the vessel's bottom with the tank bottom are prohibited. (e) A local recess in the cargo deck, contained on all sides, with a depth greater than 0.1 m, designed to house the loading and unloading pump, is permitted if it fulfils the following conditions: - The recess shall not be greater than 1 m in depth. - The recess shall be located not less than 6 m from entrances and openings to accommodation and service spaces outside the cargo area. - The recess shall be located at a minimum distance from the side plating equal to one quarter of the vessel's breadth. - All pipes linking the recess to the cargo tanks shall be fitted with shut-off devices fitted directly on the bulkhead.	Clarification

	- All the controls required for the equipment located in the recess shall be activated from the deck. - 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 and the recess is deeper than 0.5 m, it shall be provided with a permanent gas detection system which automatically indicates the presence of explosive gases by means of direct-measuring sensors and actuates a visual and audible alarm when the gas concentration has reached 20 % of the lower explosion limit. The sensors of this system shall be placed at suitable positions at the bottom of the recess. Measurement shall be continuous. - Visual and audible alarms shall be installed in the wheelhouse and on deck and, when the alarm is actuated, the vessel loading and unloading system shall be shut down. Failure of the gas detection system shall be immediately signalled in the wheelhouse and on deck by means of visual and audible alarms. - It shall be possible to drain the recess using a system installed on deck in the cargo area and independent of any other system. - The recess shall be provided with a level alarm device which activates the draining system and triggers a visual and audible alarm in the wheelhouse and on deck when liquid accumulates at the bottom. - When the recess is located above the cofferdam, the engine room bulkhead shall have an 'A-60' fire protection insulation according to SOLAS 74, Chapter II-2, Regulation 3. - When the cargo area is fitted with a water-spray system, electrical equipment located in the recess shall be protected against infiltration of water. - Pipes connecting the recess to the hull shall not pass through the cargo tanks.	Clarification
9.3.1.12 **9.3.2.12** **9.3.3.12**	***Ventilation***	
9.3.1.12.3 **9.3.2.12.3** **9.3.3.12.3**	Any service spaces located in the cargo area below deck shall be provided with a system of forced ventilation with sufficient power for ensuring at least 20 changes of air per hour based on the volume of the space. The ventilation exhaust ducts shall be located up to 50 mm above the bottom of the service space. 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 the fresh air inlets shall be located in the upper part; they shall be not less than 2.00 m above the deck, not less than 2.00 m from the openings of the cargo tanks and not less than 6.00 m from the outlets of safety valves. The extension pipes which may be necessary may be of the hinged type. **9.3.3.12.3**	Clarification

9.3.1.12.4 **9.3.2.12.4** **9.3.3.12.4**	Ventilation of accommodation, wheelhouse and service spaces shall be possible When in this spaces during loading and unloading as well as during a stay near to or within a shoreside assigned zone higher surface temperature occur as referred to in 9.3.x.51 a) resp. 9.3.x.51 b) or electrical installations and equipment is used which did not comply with the requirements mentioned in 9.3.x.52.1 resp. 9.3.x.53.1 this space have to be equipped with: a) a ventilation system ensuring an overpressure of 0.1 kPa (0.001 bar). The air intakes of the ventilation system shall be located as far away as possible, however, not less than 6.00 m from the cargo area and not less than 2.00 m above the deck b) Gas detection system with sensors: – at the suction inlets of the ventilation system; – directly at the top edge of the sill of the entrance doors This gas detection system has to fulfill the following requirements: - The t90-time is equal to or lower than 4 s - The gas concentration measurement is continuous - the ventilators are switched off in case the gas concentration reaches 20 % of the lower explosion limit. In such a case and when the overpressure is not maintained or in the event of failure of the gas detection system, the electrical installations and equipment which do not comply with the requirements mentioned in 9.3.x.52.1 resp. 9.3.x.53.1 shall be switched off. c) The ventilation system, the gas detection system and the alarm of the switch-off device fully comply with the requirements of 9.3.x.52.1 resp. 9.3.x.53.1 d) The automatic switch-off device is set so that no automatic switching-off may occur while the vessel is under way. The failure of the gas detection system of the accommodation shall be indicated by visual and audible signals in the accommodation, wheelhouse and on deck. [a) to d) is not necessary if it is assured that installation and equipment not fulfilling the requirements mentioned in 9.3.x.51 a) resp. 9.3.x.51 b) und 9.3.x.52.1 resp. 9.3.x.53.1 during loading and unloading as well as during a stay near to or within a shoreside assigned zone are switch off.]	Basic safety concept
9.3.1.12.6 **9.3.2.12.6** **9.3.3.12.6**	Notice boards shall be fitted at the ventilation inlets indicating the conditions under which they shall be closed. Any ventilation inlets of accommodation and service spaces leading outside shall be fitted with fixed devices according to 9.3.x.40.2.2 c. which can be closed rapidly. It shall be clear whether they are open or closed. Such ventilation inlets shall be located not less than 2.00 m from the cargo area. Ventilation inlets of service spaces in the cargo area below deck may be located within such area.	Clarification
[**9.3.2.12.7** **9.3.3.12.7**	The flame arresters prescribed in 9.3.2.20.4, 9.3.2.22.4, 9.3.2.22.5 and 9.3.2.26.4 shall be of a type approved for this purpose by the competent authority.]	Superfluous?

9.3.1.17 **9.3.2.17** **9.3.3.17**	***Accommodation and service spaces***	
9.3.1.17.6 **9.3.2.17.6** **9.3.3.17.6**	A service space located within the cargo area below deck shall not be used as a cargo pump room for the loading and unloading system, except where: – the pump room is separated from the engine room or from service spaces outside the cargo area by a cofferdam or a bulkhead with an "A-60" fire protection insulation according to SOLAS 74, Chapter II-2, Regulation 3, or by a service space or a hold space; – the "A-60" bulkhead required above does not include penetrations referred to in 9.3.2.17.5 (a); – ventilation exhaust outlets are located not less than 6.00 m from entrances and openings of the accommodation, wheelhouse and service spaces outside the cargo area; – the access hatches and ventilation inlets can be closed from the outside; – all piping for loading and unloading as well as those of stripping systems are provided with shut-off devices at the pump suction side in the cargo pump-room immediately at the bulkhead. The necessary operation of the control devices in the pump-room, starting of pumps and necessary control of the liquid flow rate shall be effected from the deck; – the bilge of the cargo pump-room is equipped with a gauging device for measuring the filling level which activates a visual and audible alarm in the wheelhouse when liquid is accumulating in the cargo pump-room bilge; - the cargo pump room is provided with a permanent oxygen detection system which automatically indicates the amount of oxygen by means of direct-measuring sensors and which actuates a visual and audible alarm when the oxygen concentration has reached 19,5 Vol%. The sensors of this system shall be placed at suitable positions at the bottom and directly below the deck. Measurement shall be continuous. The audible and visual alarms are installed in the wheelhouse and in the cargo pump-room and, when the alarm is actuated, the loading and unloading system is shut down. Failure of the oxygen detection system shall be immediately signalled in the wheelhouse and on deck by means of audible and visual alarms. The alarm has to be lead to the accommodation automatically if not cleared – the ventilation system prescribed in 9.3.2.12.3 has a capacity of not less than 30 changes of air per hour based on the total volume of the service space. – 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, the cargo pump-room is provided in addition with a permanent gas-detection system which automatically indicates the presence of flammable gases by means of direct-measuring sensors and which actuates a visual and audible alarm when the gas concentration has reached 20% of the lower ~~explosive~~ explosion limit. The sensors of this gas detection system shall be placed at suitable positions at the bottom and directly below the deck. Measurement shall be continuous. The audible and visual alarms are installed in the wheelhouse and in the cargo pump-room and, when the alarm is actuated, the loading and unloading system is shut down. Failure of the gas detection system shall be immediately signalled in the wheelhouse and on deck by means of audible and visual alarms. The alarm has to be lead to the accommodation automatically if not cleared.	Basic safety concept

9.3.2.21 **9.3.3.21**	***Safety and control installations***	
9.3.2.21.1 **9.3.3.21.1**	Cargo tanks shall be provided with the following equipment: (a) a mark inside the tank indicating the liquid level of 95 %; (b) a level gauge; (c) a level alarm device which is activated at the latest when a degree of filling of 90 % is reached; (d) a high level sensor for actuating the facility against overflowing at the latest when a degree of filling of 97.5 % is reached; (e) an instrument for measuring the pressure of the vapour phase inside the cargo tank; (f) an instrument for measuring the temperature of the cargo, if in column (9) of Table C of Chapter 3.2 a heating installation is required, or if a maximum temperature is indicated in column (20) of that list; (g) a closable connection for a closed-type or partly closed-type sampling device, and/or at least one sampling opening as required in column (13) of Table C of Chapter 3.2.	clarification
9.3.2.21.7 **9.3.3.21.7**	When the pressure or temperature exceeds a set value, instruments for measuring the vacuum or overpressure of the gaseous phase in the cargo tank or the temperature of the cargo, shall activate a visual and audible alarm in the wheelhouse and on deck. The alarm has to be lead to the accommodation automatically if not cleared When the pressure exceeds the set value during loading and unloading, the instrument for measuring the pressure shall, by means of the plug referred to in 9.3.2.21.5 above, initiate immediately an electrical contact which shall put into effect measures to interrupt the loading or unloading operation. If the vessel's own discharge pump is used, it shall be switched off automatically. The instrument for measuring the overpressure or vacuum shall activate the alarm at latest when a) the overpressure reaches 1.15 times the opening pressure of the pressure relief device / high velocity vent valve, or b) the lower limit of the construction vacuum pressure but not exceeding a vacuum of 5 kPa (0.05 bar). The maximum allowable temperature is indicated in column (20) of Table C of Chapter 3.2. The sensors for the alarms mentioned in this paragraph may be connected to the alarm device of the sensor. When it is prescribed in column (20) of Table C of Chapter 3.2, the instrument for measuring the overpressure of the gaseous phase shall activate a visible and audible alarm in the wheelhouse when the overpressure exceeds 40 kPa (0.4 bar) during the voyage. The alarm has to be lead to the accommodation automatically if not cleared.	clarification editorial clarification
9.3.2.22 **9.3.2.22**	***Cargo tank openings***	
9.3.2.22.4	(a) Each cargo tank or group of cargo tanks connected to a common venting piping shall be fitted with: – safety devices for preventing unacceptable overpressures or vacuums. – a device for the safe depressurization of the tanks which clearly indicates whether it is open or shut... – a connection for the safe return ashore of gases expelled during loading; The opening pressure of the high-velocity vent valve and the opening pressure of the vacuum valve shall be indelibly indicated on the valves;	Clarification

	The setting of the pressure relief device shall be such that during the transport operation they do not blow off until the maximum permissible working pressure of the cargo tanks is reached. The outlets of the pressure relief device shall be located not less than 1.00 m above the deck and at a distance of not less than 6.00 m from the accommodation, wheelhouse and from the service spaces outside the cargo area. Within a radius of 1.00 m round the outlet of the pressure relief device, there is no equipment allowed, and no work is being carried out and signs indicate the area. b) 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, - the venting piping at the connection to the cargo tank has to be equipped with a flame arrester capable of withstanding a ~~deflagration~~ detonation and - the vacuum valve as well as the device for the safe depressurization is deflagration safe. The deflagration safety can be assured by the use of a flame arrester capable of withstanding a deflagration, c) 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, or there is a T mentioned in column 3b the pressure relief device shall be a high velocity vent valve. The gases shall be discharged upwards. d) The safety devices mentioned in a) and b) have to be chosen according to the explosion group of the substances listed in the list of substances on the vessel (see 3.2 table C, column 15). In case it is necessary that the pressure relief device / high-velocity vent valve, the vacuum valve, the flame arresters as well as the venting pipe has to be heatable for carriage in closed vessels the mentioned safety devices have to be suited for the respective temperature and pressure. e) The outlets of high-velocity vent valves shall be located not less than 2.00 m above the deck and at a distance of not less than 6.00 m from the accommodation and from the service spaces outside the cargo area. This height may be reduced when within a radius of 1.00 m round the outlet of the high-velocity vent valve, there is no equipment, no work is being carried out and signs indicate the area. The setting of the high-velocity vent valves shall be such that during the transport operation they do not blow off until the maximum permissible working pressure of the cargo tanks is reached. f) The setting of the high-velocity vent valves shall be such that during the transport operation they do not blow off until the maximum permissible working pressure of the cargo tanks is reached.	
9.3.3.22.4	Each cargo tank or group of cargo tanks connected to a common venting piping shall be fitted with safety devices for preventing unacceptable overpressures or vacuums. These safety devices shall be as follows: for the open N type: – safety devices designed to prevent any accumulation of water and its penetration into the cargo tanks; for the open N type with flame-arresters: – safety equipment fitted with flame-arresters capable of withstanding steady burning and designed to prevent any accumulation of water and its penetration into the cargo tank;	

	for the closed N type: a) – safety devices for preventing unacceptable overpressure or vacuum. – a device for the safe depressurization of the tanks which clearly indicates whether it is open or shut. – a connection for the safe return ashore of gases expelled during loading; The opening pressure of the pressure relief device and the opening pressure of the vacuum valve shall be permanently marked on the valves. b) 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 - the venting piping at the connection to the cargo tank has to be equipped with a flame arrester capable of withstanding a ~~deflagration~~ detonation - the vacuum valve as well as the device for the safe depressurization is deflagration safe. The deflagration safety can be assured by the use of a flame arrester capable of withstanding a deflagration, and - the pressure relief device shall be a high velocity vent valve. The gases shall be discharged upwards. The outlets of high-velocity vent valves shall be located not less than 2.00 m above the deck and at a distance of not less than 6.00 m from the accommodation and from the service spaces outside the cargo area. This height may be reduced when within a radius of 1.00 m round the outlet of the high-velocity vent valve, there is no equipment, no work is being carried out and signs indicate the area. The setting of the high-velocity vent valves shall be such that during the transport operation they do not blow off until the maximum permissible working pressure of the cargo tanks is reached. c) the safety devices mentioned in b) have to be chosen accor-ding to the explosion group of the substances listed in the list of substances on the vessel (see 3.2 table C, column 15). The safety devices shall be suited for the intended temperature and pressure range.	Similar to Type C vessels
9.3.2.22.5 **9.3.3.22.5**	**Venting piping** a) When two or more cargo tanks are connected by a joint venting piping, it is sufficient that the equipment according to 9.3.x.22.4 is installed at the joint venting piping (see also 7.2.4.16.7) **b)** When each cargo tank is connected to a won venting piping, each cargo tank or the associated venting piping has to be equipped according to 9.3.x.22.4	Clarification 9.3.2.22.5 d) in ADN 2015 moved to 7.2.4.16.7
9.3.1.25 **9.3.2.25** **9.3.3.25**	***Pumps and piping***	
9.3.1.25.3 **9.3.2.25.3** **9.3.3.25.3**	Cross out	

	The following number will change	
9.3.2.25.8 **9.3.3.25.8**	The permissible loading and unloading flows shall be calculated. Calculations concern the permissible maximum loading and unloading flow for each cargo tank or each group of cargo tanks, taking into account the design of the ventilation system. These calculations shall take into consideration the fact that in the event of an unforeseen cut-off of the vapour return piping of the shore facility, the safety devices of the cargo tanks will prevent pressure in the cargo tanks from exceeding the following values: over-pressure: 115% of the opening pressure of the pressure relief device/ high-velocity vent valve;	Clarification
9.3.2.26 **9.3.3.26**	***Tanks and receptacles for residual products and receptacles for slops***	
9.3.2.26.1 **9.3.3.26.1**	If vessels are provided with ~~a~~ tanks or a receptacle for residual products or a receptacle for slops, it shall comply with the provisions of 9.3.x.26.2 and 9.3.x.26.3. Receptacles for residual products and receptacles for slops shall be located only in the cargo area. During the filling of the receptacles for residual products, means for collecting any leakage shall be placed under the filling connections.	
9.3.2.26.2	Tanks for residual product shall be equipped with - a level indicator - connections with shut-off devices, for pipes and hose assemblies - pressure-relief device and vacuum ~~relief~~ valves. The setting of the pressure relief device shall be such that during the transport operation they do not blow off. This condition is met when the opening pressure of the valve meets the conditions set out in column (10) of Table C of Chapter 3.2. 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, the vacuum valve has to be deflagration safe. The deflagration safety may also be ensured by a flame arrester. 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, or there is a T mentioned in column 3b the pressure relief device shall be a high velocity vent valve. The high velocity vent valve shall be so regulated as not to open during carriage. This condition is met when the opening pressure of the valve meets the conditions set out in column (10) of Table C of Chapter 3.2; The high velocity vent valve and the deflagration safe vacuum valve have to be chosen according to the explosion group of the substances listed in the list of substances on the vessel (see 3.2 table C, column 15)	**9.3.2.26.2 in** ADN 2015 now in definitions
9.3.3.26.2	The tank for residual products shall be equipped with: – in the case of an open system: – a device for ensuring pressure equilibrium; – an ullage opening; – connections, with stop valves, for pipes and hose assemblies – in the case of a protected system: – a device for ensuring pressure equilibrium, fitted with a flame-arrester capable of withstanding steady burning; – an ullage opening; – connections, with stop valves, for pipes and hose assemblies; – in the case of a closed system: - a level indicator - connections with shut-off devices, for pipes and hose assemblies - pressure-relief device and vacuum relief valves.	9.3.3.26.2 of ADN 2015 moved to 9.3.3.26.4

	The setting of the pressure relief device shall be such that during the transport operation they do not blow off. This condition is met when the opening pressure of the valve meets the conditions set out in column (10) of Table C of Chapter 3.2. 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, the pressure relief device shall be a high velocity vent valve and-the vacuum valve has to be deflagration safe. The deflagration safety may also be ensured by a flame arrester The high velocity vent valve and the deflagration safe vacuum valve have to be chosen according to the explosion group of the substances listed in the list of substances on the vessel (see 3.2 table C, column 15)	Similar to Type C vessels
9.3.2.26.3 **9.3.3.26.3**	~~The maximum capacity of a tank for residual products is 30 m3.~~ ***Receptacles for residual products*** shall be equipped with - a possibility of indicating the degree of filling; - connections with shut-off devices, for pipes and hose assemblies - a connection enabling gases released during filling to be evacuated safely ~~Receptacles for residual products shall be connected to the venting piping of cargo tanks only for the time necessary to fill them in accordance with 7.2.4.15.2.~~ ~~Receptacles for residual products and receptacles for slops placed on the deck shall be located at a minimum distance from the hull equal to one quarter of the vessel's breadth~~.	Now in definition In ADN 2015 9.3.2.26.4 moved to 7.2.4.16.2 moved to 9.3.x.26.1
9.3.2.28 9.3.3.28	***Water-spray system*** When water-spraying is required in column (9) of Table C of Chapter 3.2, a water-spray system shall be installed in the cargo area on deck to enable gas emissions from loading to be precipitated and to cool the tops of cargo tanks by spraying water over the whole surface to avoid safely the activation of the pressure relief device / high-velocity vent valve at 50 kPa (0.5 bar). ……..	Clarification
9.3.1.31.3 **9.3.2.31.3** **9.3.3.31.3**	~~Sparking shall not be possible within the cargo area.~~	New zone concept
9.3.1.50 **9.3.2.50** **9.3.3.50**	***Documents which have to be available on bord***	
9.3.1.50.1 **9.3.2.50.1** **9.3.3.50.1**	In addition to the documents required in accordance with the regulations referred to in 1.1.4.6, the following documents shall be available on board: (a) a list or a drawing indicating the Limited explosion risk electrical installations and equipment and the installations and equipment complying with 9.3.x.51a) ***(b)*** a list or a drawing of the equipment which during loading and unloading or during a stay near to or within a shoreside assigned zone. These have to be marked in red.	Basic safety concept

9.3.2.50.2 **9.3.3.50.2** **9.3.1.50.2**	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, the following documents shall be available on board in addition: (a) a drawing showing the boundaries of the zones and the location of the explosion protected equipment and the autonomous protective systems installed in the respective zone; (b) a list of the equipment referred to under (a) with the following information: - Equipment, location, marking (Explosion protection level ac-cording to 60079-0, Equipment category according to Directive 2014/34 EU or at least equivalent protection level including explosion group and temperature class, type of protection, test body) in case of electrical equipment to be used in zone 1 (alternative a copy of the test certificate e.g. certificate of conformity - Equipment, location, marking (Explosion protection level ac-cording to 60079-0, Equipment category according to Directive 2014/34 EU or at least equivalent protection level including explosion group and temperature class, type of protection, identification number) in case of electrical equipment to be used in zone 2 as well as in case of non-electrical equipment to be used in zone 1 and zone 2 (alternative a copy of the test certificate e.g. certificate of conformity (c) a list of or general plan indicating the equipment installed outside the explosion hazardous area which are allowed be operated during loading, unloading or gas-freeing during berthing as well as during a stay near to or within a shoreside assigned zone.	Clarification Basic safety concept New zone concept
9.3.1.51 new **9.3.2.51 new** **9.3.3.51 new**	Surface temperatures of installations and equipment a) surface temperatures have to be not more than 200 °C b) When the list of substances on the vessel according to 1.16.1.2.5 contains substances for which in column (15) of Table C of Chapter 3.2, T4, T5 or T6 is indicated the allowed respective surface temperatures have to be not more than 135 °C (T4), 100 °C (T5) 85 °C (T6) c) This provision does not apply if the following requirements are fulfilled: - Equipment and installations, which generate surface temperatures higher than mentioned in a) and b) have to be marked in red and switched off operated during loading, unloading or gas-freeing during berthing as well as during a stay near to or within a shoreside assigned zone. Or - Accommodation, wheelhouse and service spaces where surface temperatures higher than mentioned in a) or b) occur are equipped with a ventilation system according to 9.3.x.12.4	Basic safety concept

9.3.1.52 **9.3.2.52** **9.3.3.52**	***Type and location of electrical installations and equipment***	Basic safety concept
9.3.1.52.1 **new** **9.3.2.52.1** **new** **9.3.3.52.1** **new**	Electrical installations and equipment ~~used during loading, unloading and gas-freeing during berthing and which are located outside the cargo area (comparable to zone 2)~~ shall be at least of the "limited explosion risk" type. This provision does not apply to: (i) lighting installations in the accommodation, except for switches near entrances to accommodation; (ii) radiotelephone installations in the accommodation or the wheelhouse; (iii) mobile and fixed telephone installations in the accommodation or the wheelhouse; (iv) electrical installations or equipment which during a stay near to or within a shoreside assigned zone - a) are switched off or - b) are installed in spaces which are equipped with a ventilation system according to 9.3.x.12.4 (v) Inland AIS (automatic identification systems) stations in the accommodation and in the wheelhouse if no part of an aerial for electronic apparatus is situated above the cargo area and if no part of a VHF antenna for AIS stations is situated within 2 m from the cargo area.	Basic safety concept Content of 9.3.x.52.1 in ADN 2015 now in 9.3.x.53.1
9.3.1.52.2 **9.3.2.52.2** **9.3.3.52.2** in ADN 2015 9.3.1.51.1 9.3.2.51.1 9.3.3.51.1	Only distribution systems without return connection to the hull are permitted: This provision does not apply to: – active cathodic corrosion protection; – local installations outside the cargo area (e.g. connections of starters of diesel engines); – the device for checking the insulation level referred to in 9.3.x.51.3 below.	9.3.x.52.2 of ADN 2015 moved to 9.3.x.52.9
9.3.1.52.3 **9.3.2.52.3** **9.3.3.52.3** in ADN 2015 9.3.1.51.2 9.3.2.51.2 9.3.3.51.2	Every insulated distribution network shall be fitted with an automatic device with a visual and audible alarm for checking the insulation level.	Parts of 9.3.1x.52.3, of ADN 2015 moved to 9.3.x.52.13
9.3.1.52.4 **9.3.2.52.4** **9.3.3.52.4**	The electrical installations and equipment which does not meet the requirements set out in 9.3.2.52.1 (IV b) ~~above~~ together with its switches shall be marked in red. The disconnection of such equipment shall be operated from a centralised location on board.	Reference adjusted
9.3.2.56.4	~~Cables of intrinsically safe circuits shall only be used for such circuits and shall be separated from other cables not intended for being used in such circuits (e.g. they shall not be installed together in the same string of cables and they shall not be fixed by the same cable clamps).~~	
9.3.1.52.5 **9.3.2.52.5** **9.3.3.52.5** In ADN 2015 9.3.1.56.5 9.3.2.56.5, 9.3.2.56.5	~~An electric generator which is permanently driven by an engine and which does not meet the requirements of 9.3.1.52.3 above, shall be fitted with a switch capable of shutting down the excitation of the generator. A notice board with the operating instructions shall be displayed near the switch.~~ For movable electrical cables intended for signal lights and gangway lighting, only sheathed cables of type H 07 RN-F in accordance with standard IEC 60 245-4:2011 or electric cables of at least equivalent design having conductors with a cross-section of not less than 1.5 mm2 shall be used. These electrical cables shall be as short as possible and installed so that damage is not likely to occur.	Basic safety concept

9.3.1.52.6 **9.3.2.52.6** **9.3.3.52.6** In ADN 2015 9.3.1.52.7 9.3.2.52.7 9.3.2.52.7	The failure of the power supply for the safety and control equipment shall be immediately indicated by visual and audible signals at the locations where the alarms are usually actuated.	9.3.x.52.6 of ADN 2015 moved to 9.3.x.52.7
9.3.1.52.7 **9.3.2.52.7** **9.3.3.52.7** In ADN 2015 9.3.1.56.2 9.3.2.56.2 9.3.3.56.2	Switches, cables and sockets on deck shall be protected against mechanical damage.	Clarification 9.3.x.52.7 of ADN 2015 moved to 9.3.x.52.6
9.3.1.52.8 new **9.3.2.52.8 new** **9.3.3.52.8 new** In ADN 2015 9.3.1.52.6 9.3.2.52.6 9.3.3.52.6	Sockets for the connection of signal lights and gangway lighting shall be permanently fitted to the vessel close to the signal mast or the gangway. Connecting and disconnecting shall not be possible except when the sockets are not live.	
9.3.1.52.9 new **9.3.2.52.9 new** **9.3.3.52.9 new** in ADN 2015 9.3.1.52.2 9.3.2.52.2 9.3.3.52.2	Accumulators shall be located outside the cargo area.	
9.3.1.53 **9.3.2.53** **9.3.3.53**	***Type and location of electrical and non-electrical installations and equipment intended to be used in explosion hazardous areas***	New zone concept
9.3.1.53.1 **9.3.2.53.1** **9.3.3.53.1**	Electrical and non-electrical installations and equipment intended to be used in explosion hazardous areas shall fulfill at least the requirements for being used in the respective zone. They have to be chosen according to the explosion group and temperature class of the substances listed in the list of substances on the vessel (see 3.2 table C, column 15 and 16) When the list of substances on the vessel according to 1.16.1.2.5 contains substances for which in column (15) of Table C of Chapter 3.2, T4, T5 or T6 is indicated the allowed respective surface temperatures have to be not more than 135 °C (T4), 100 °C (T5), 85 °C (T6)	New zone concept Basic safety concept In ADN 2015 9.3.x.51.3
9.3.1.53.2 **9.3.2.53.2** **9.3.3.53.2**	Electrical cables have to be reinforced or protected by a metallic shield or mounted using cable conduit, except optical fibers	Clarification In ADN 2015 9.3.x.56.1
9.3.1.53.3 **9.3.2.53.3** **9.3.3.53.3**	Movable cables are prohibited in the cargo area, except for intrinsically safe electric circuits or for the supply of signal lights and gangway lighting.	In ADN 2015 9.3.x.56.3

9.3.1.53.4 **9.3.2.53.4** **9.3.3.53.4**	Electrical cables of intrinsically safe circuits shall only be used for such circuits and shall be separated from other cables not intended for being used in such circuits (e.g. they shall not be installed together in the same string of cables and they shall not be fixed by the same cable clamps).	In ADN 2015 9.3.x.56.4
9.3.1.54 **9.3.2.54** **9.3.3.54**	***Earthing***	In ADN 2015 9.3.2.53
9.3.2.56 **9.3.3.56** **9.3.1.56**	**No longer necessary**	
9.3.2.56.1 **9.3.3.56.1** **9.3.1.56.1** of ADN 2015	moved to 9.3.2.53.2 moved to 9.3.3.53.2 moved to 9.3.1.53.2	
9.3.2.56.2 **9.3.3.56.2** **9.3.1.56.2** of ADN 2015	moved to 9.3.2.52.6 und 9.3.2.53.4 moved to 9.3.3.52.6 und 9.3.3.53.4 moved to 9.3.1.52.6 und 9.3.1.53.4	
9.3.2.56.3 **9.3.3.56.3** **9.3.1.56.3** of ADN 2015	moved to 9.3.2.53.3 moved to 9.3.3.53.3 moved to 9.3.1.53.3	
9.3.2.56.4 **9.3.3.56.4** **9.3.1.56.4** of ADN 2015	moved to 9.3.2. 53.5 moved to 9.3.3. 53.5 moved to 9.3.1. 53.5	
9.3.2.56.5 **9.3.3.56.5** **9.3.1.56.5** of ADN 2015	moved to 9.3.2.52.4 moved to 9.3.3.52.4 moved to 9.3.1.52.4	
9.3.2.56.6 **9.3.3.56.6** **9.3.1.56.6** of ADN 2015	No longer necessary; Covered by **9.3.x.53.1**	

***