PART II RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF SHIPS IDENTIFIED BY THEIR MISSION

TITLE 33 CHEMICAL TANKERS

INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICASL IN BULK, 1983, AS AMENDED 2004

ANNEX 1 – SPECIAL REQUIREMENTS

CHAPTERS

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CHAPTER CONTENTS

A1. 15 SPECIAL REQUIREMENTS – *PART I*

100. 15.1 General

101. 15.1.1 The provisions of this chapter are applicable where specific reference is made in column o in the table of ANNEX III (chapter 17). These requirements are additional to the general requirements of the Code.

200. 15.2 Ammonium nitrate solution (93% or less)

201. 15.2.1 The ammonium nitrate solution shall contain at least 7% by weight of water. The acidity (pH) of the cargo when diluted with ten parts of water to one part of cargo by weight shall be between 5.0 and 7.0. The solution shall not contain more than 10 ppm chloride ions, 10 ppm ferric ions and shall be free of other contaminants.

202. 15.2.2 Tanks and equipment for ammonium nitrate solution shall be independent of tanks and equipment containing other cargoes or combustible products. Equipment which may, in service or when defective, release combustible products into the cargo (e.g. lubricants), shall not be used. Tanks shall not be used for seawater ballast.

203. 15.2.3 Except where expressly approved by the Administration, ammonium nitrate solutions shall not be transported in tanks which have previously contained other cargoes unless tanks and associated equipment have been cleaned to the satisfaction of the Administration.

204. 15.2.4 The temperature of the heat-exchanging medium in the tank heating system shall not exceed 160°C. The heating system shall be provided with a control system to keep the cargo at a bulk mean temperature of 140°C. High-temperature alarms at 145°C and 150°C and a low temperature alarm at 125°C shall be provided. Where the temperature of the heat-exchanging medium exceeds 160°C, an alarm shall also be given. Temperature alarms and controls shall be located on the navigating bridge.

205. 15.2.5 If the bulk mean cargo temperature reaches 145°C, a cargo sample shall be diluted with ten parts of distilled or demineralized water to one part of cargo by weight and the pH shall be determined by means of a narrow-range indicator paper or stick. Acidity measurements shall then be taken every 24 hours. If the pH is found to be below 4.2, ammonia gas shall be injected into the cargo until the pH of 5.0 is reached.

206. 15.2.6 A fixed installation shall be provided to inject ammonia gas into the cargo. Controls for this system shall be located on the navigation bridge. For this purpose, 300 kg of ammonia per 1,000 tonnes of ammonium nitrate solution shall be available on board.

207. 15.2.7 Cargo pumps shall be of the centrifugal deepwell type or of the centrifugal type with water flushed seals

208. 15.2.8 Vent piping shall be fitted with approved weatherhoods to prevent clogging. Such weatherhoods shall be accessible for inspection and cleaning.

209. 15.2.9 Hot work on tanks, piping and equipment which have been in contact with ammonium nitrate solution shall only be done after all traces of ammonium nitrate have been removed, inside as well as outside.

300. 15.3 Carbon disulphide

Note 1: Carbon disulphide may be carried either under a water pad or under a suitable inert gas pad as specified in the following paragraphs.

Note 2: Carriage under water pad

301. 15.3.1 Provision shall be made to maintain a water pad in the cargo tank during loading, unloading and transit. In addition, an inert-gas pad shall be maintained in the ullage space during transit.

302. 15.3.2 All openings shall be in the top of the tank, above the deck.

303. 15.3.3 Loading lines shall terminate near the bottom of the tank.

304. 15.3.4 A standard ullage opening shall be provided for emerge

305. 15.3.5 Cargo piping and vent lines shall be independent of piping and vent lines used for other cargo.

306. 15.3.6 Pumps may be used for discharging cargo, provided they are of the deepwell or hydraulically driven submersible types. The means of driving a deepwell pump shall not present a source of ignition for carbon disulphide and shall not employ equipment that may exceed a temperature of 80°C.

307. 15.3.7 If a cargo discharge pump is used, it shall be inserted through a cylindrical well extending from the tank top to a point near the tank bottom. A water pad shall be formed in this well before attempting pump removal unless the tank has been certified as gas-free

308. 15.3.8 Water or inert-gas displacement may be used for discharging cargo, provided the cargo system is designed for the expected pressure and temperature.

309. 15.3.9 Safety relief valves shall be of stainless steel construction

310. 15.3.10 Because of its low ignition temperature and close clearances required to arrest its flame propagation, only intrinsically safe systems and circuits are permitted in the hazardous locations.

Note 3: Carriage under suitable inert gas pad

311. 15.3.11 Carbon disulphide shall be carried in independent tanks with a design pressure of not less than 0.06 MPa gauge.

312. 15.3.12 All openings shall be located on the top of the tank, above the deck.

313. 15.3.13 Gaskets used in the containment system shall be of a material which does not react with, or dissolve in, carbon disulphide.

314. 15.3.14 Threaded joints shall not be permitted in the cargo containment system, including the vapour lines.

315. 15.3.15 Prior to loading, the tank(s) shall be inerted with suitable inert gas until the oxygen level is 2% by volume or lower. Means shall be provided to automatically maintain a positive pressure in the tank using suitable inert gas during loading, transport and discharge. The system shall be able to maintain this positive pressure between 0.01 and 0.2 bar, and shall be remotely monitored and fitted with over/underpressure alarms.

316. 15.3.16 Hold spaces surrounding an independent tank carrying carbon disulphide shall be inerted by a suitable inert gas until the oxygen level is 2% or less. Means shall be provided to monitor and maintain this condition throughout the voyage. Means shall also be provided to sample these spaces for carbon disulphide vapour.

317. 15.3.17 Carbon disulphide shall be loaded, transported and discharged in such a manner that venting to the atmosphere does not occur. If carbon disulphide vapour is returned to shore during loading or to the ship during discharge, the vapour return system shall be independent of all other containment systems.

318. 15.3.18 Carbon disulphide shall be discharged only by submerged deepwell pumps or by a suitable inert gas displacement. The submerged deepwell pumps shall be operated in a way that prevents heat build-up in the pump. The pump shall also be equipped with a temperature sensor in the pump housing with remote readout and alarm in the cargo control room. The alarm shall be set at 80°C. The pump shall also be fitted with an automatic shut-down device to be activated if the tank pressure falls below atmospheric pressure during the discharge.

319. 15.3.19 Air shall not be allowed to enter the cargo tank, cargo pump or lines while carbon disulphide is contained in the system.

320. 15.3.20 No other cargo handling, tank cleaning or deballasting shall take place concurrent with loading or discharge of carbon disulphide.

321. 15.3.21 A water spray system of sufficient capacity shall be provided to blanket effectively the area surrounding the loading manifold, the exposed deck piping associated with product handling and the tank domes. The arrangement of piping and nozzles shall be such as to give an uniform distribution rate of 10 l/m2/min. Remote manual operation shall be arranged such that remote starting of pumps supplying the water-spray system and remote operation of any normally closed valves in the system can be carried out from a suitable location outside the cargo area adjacent to the accommodation spaces and readily accessible and operable in the event of fire in the areas protected. The water spray system shall be capable of both local and remote manual operation, and the arrangement shall ensure that any spilled cargo is washed away. Additionally, a water hose with pressure to the nozzle when atmospheric temperature permits, shall be connected ready for immediate use during loading and unloading operations.

322. 15.3.22 No cargo tanks shall be more than 98% liquid-full at the reference temperature (R).

323. 15.3.23 The maximum volume (VL) of cargo to be loaded in a tank shall be:

$V_L = 0.98\ V \times [\rho_R / \rho_L]$

where:

V = volume of the tank

ρ_R = density of cargo at the reference temperature (R)

ρ_L = density of cargo at the loading temperature

R = reference temperature

324. 15.3.24 The maximum allowable tank filling limits for each cargo shall be indicated for each loading temperature which may be applied, and for the applicable maximum reference temperature, on a list approved by the Administration. A copy of the list shall be permanently kept on board by the master.

325. 15.3.25 Zones on open deck, or semi-enclosed spaces on open deck within three metres of a tank outlet, gas or vapour outlet, cargo pipe flange or cargo valve of a tank certified to carry carbon disulphide, shall comply with the electrical equipment requirements specified for carbon disulphide in column i, chapter 17.

Also, within the specified zone, no other heat sources, like steam piping with surface temperatures in excess of 80°C shall be allowed.

326. 15.3.26 Means shall be provided to ullage and sample the cargo without opening the tank or disturbing the positive suitable inert gas blanket.

327. 15.3.27 The product shall be transported only in accordance with a cargo handling plan that has been approved by the Administration. Cargo handling plans shall show the entire cargo piping system. A copy of the approved cargo handling plan shall be available on board. The International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk shall be endorsed to include reference to the approved cargo handling plan.

400. 15.4 Diethyl ether

401. 15.4.1 Unless inerted, natural ventilation shall be provided for the voids around the cargo tanks while the vessel is under way. If a mechanical ventilation system is installed, all blowers shall be of non-sparking construction. Mechanical ventilation equipment shall not be located in the void spaces surrounding the cargo tanks.

402. 15.4.2 Pressure-relief-valve settings shall not be less than 0.2 bar gauge for gravity tanks.

403. 15.4.3 Inert-gas displacement may be used for discharging cargo from pressure tanks provided the cargo system is designed for the expected pressure.

404. 15.4.4 In view of the fire hazard, provision shall be made to avoid any ignition source or heat generation or both in the cargo area.

405. 15.4.5 Pumps may be used for discharging cargo, provided that they are of a type designed to avoid liquid pressure against the shaft gland or are of a hydraulically operated submerged type and are suitable for use with the cargo.

406. 15.4.6 Provision shall be made to maintain the inert-gas pad in the cargo tank during loading, unloading and transit.

500. 15.5 Hydrogen peroxide solutions

501. 15.5.1 **Hydrogen peroxide solutions over 60% but not over 70% by mass**

a. 15.5.1.1 Hydrogen peroxide solutions over 60% but not over 70% by mass shall be carried in dedicated ships only and no other cargoes shall be carried.

b. 15.5.1.2 Cargo tanks and associated equipment shall be either pure aluminium (99.5%) or solid stainless steel (304L, 316, 316L or 316Ti), and passivated in accordance with approved procedures. Aluminium shall not be used for piping on deck. All nonmetallic materials of construction for the containment system shall neither be attacked by hydrogen peroxide nor contribute to its decomposition.

c. 15.5.1.3 Pump-rooms shall not be used for cargo-transfer operations.

d. 15.5.1.4 Cargo tanks shall be separated by cofferdams from oil fuel tanks or any other space containing flammable or combustible materials.

e. 15.5.1.5 Tanks intended for the carriage of hydrogen peroxide shall not be used for seawater ballast.

f. 15.5.1.6 Temperature sensors shall be installed at the top and bottom of the tank. Remote temperature readouts and continuous monitoring shall be located on the navigating bridge. If the temperature in the tanks rises above 35°C, visible and audible alarms shall be activated on the navigating bridge.

g. 15.5.1.7 Fixed oxygen monitors (or gas-sampling lines) shall be provided in void spaces adjacent to tanks to detect leakage of the cargo into these spaces. Remote readouts, continuous monitoring (if gas-sampling lines are used, intermittent sampling is satisfactory) and visible and audible alarms similar to those for the temperature sensors shall also be located on the navigating bridge. The visible and audible alarms shall be activated if the oxygen concentration in these void spaces exceeds 30% by volume. Two portable oxygen monitors shall also be available as back-up systems.

h. 15.5.1.8 As a safeguard against uncontrolled decomposition, a cargo-jettisoning system shall be installed to discharge the cargo overboard. The cargo shall be jettisoned if the temperature rise of the cargo exceeds a rate of 2°C per hour over a 5-hour period or when the temperature in the tank exceeds 40°C.

i. 15.5.1.9 Cargo tank venting systems shall have pressure/vacuum-relief valves for normal controlled venting, and rupture discs or a similar device for emergency venting, should tank pressure rise rapidly as a result of uncontrolled decomposition. Rupture discs shall be sized on the basis of tank design pressure, tank size and anticipated decomposition rate.

j. 15.5.1.10 A fixed water-spray system shall be provided for diluting and washing away any concentrated hydrogen peroxide solution spilled on deck. The areas covered by the water-spray shall include the manifold/hose connections and the tank

tops of those tanks designated for carrying hydrogen peroxide solutions. The minimum application rate shall satisfy the following criteria:

j.1. .1 The product shall be diluted from the original concentration to 35% by mass within 5 minutes of the spill.

j.2. .2 The rate and estimated size of the spill shall be based

k. upon maximum anticipated loading and discharge rates, the time required to stop flow of cargo in the event of tank overfill or a piping/hose failure, and the time necessary to begin application of dilution water with actuation at the cargo control location or on the navigating bridge.

l. 15.5.1.11 Only those hydrogen peroxide solutions which have a maximum decomposition rate of 1% per year at 25°C shall be carried. Certification from the shipper that the product meets this standard shall be presented to the master and kept on board. A technical representative of the manufacturer shall be on board to monitor the transfer operations and have the capability to test the stability of the hydrogen peroxide. He shall certify to the master that the cargo has been loaded in a stable condition.

m. 15.5.1.12 Protective clothing that is resistant to hydrogen peroxide solutions shall be provided for each crew member involved in cargo-transfer operations. Protective clothing shall include nonflammable coveralls, suitable gloves, boots and eye protection.

502. 15.5.2 **Hydrogen peroxide solutions over 8% but not over 60% by mass**

a. 15.5.2.1 The ship's shell plating shall not form any boundaries of tanks containing this product.

b. 15.5.2.2 Hydrogen peroxide shall be carried in tanks thoroughly and effectively cleaned of all traces of previous cargoes and their vapours or ballast. Procedures for inspection, cleaning, passivation and loading of tanks shall be in accordance with MSC/Circ.394. A certificate shall be on board the vessel indicating that the procedures in the circular have been followed. The passivation requirement may be waived by an Administration for domestic shipments of short duration. Particular care in this respect is essential to ensure the safe carriage of hydrogen peroxide:

b.1. .1 When hydrogen peroxide is carried no other cargoes shall be carried simultaneously.

b.2. .2 Tanks which have contained hydrogen peroxide may be .used for other cargoes after cleaning in accordance with the procedures outlined in MSC/Circ.394.

b.3. .3 Consideration in design shall provide minimum internal tank structure, free draining, no entrapment and ease of visual inspection.

c. 15.5.2.3 Cargo tanks and associated equipment shall be either pure aluminium (99.5%) or solid stainless steel of types suitable for use with hydrogen peroxide (e.g. 304, 304L, 316, 316L, 316Ti). Aluminium shall not be used for piping on deck. All non-metallic materials of construction for the containment system shall neither be attacked by hydrogen peroxide nor contribute to its decomposition.

d. 15.5.2.4 Cargo tanks shall be separated by a cofferdam from fuel oil tanks or any other space containing materials incompatible with hydrogen peroxide.

e. 15.5.2.5 Temperature sensors shall be installed at the top and bottom of the tank. Remote temperature readouts and continuous monitoring shall be located on the navigating bridge. If the temperature in the tank rises above 35°C, visible and audible alarms shall activate on the navigating bridge.

f. 15.5.2.6 Fixed oxygen monitors (or gas-sampling lines) shall be provided in void spaces adjacent to tanks to detect leakage of the cargo into these spaces. The enhancement of flammability by oxygen enrichment shall be recognized. Remote readouts, continuous monitoring (if gas-sampling lines are used, intermittent sampling is satisfactory) and visible and audible alarms similar to those for the temperature sensors shall also be located on the navigating bridge. The visible and audible alarms shall activate if the oxygen concentration in these void spaces exceeds 30% by volume. Two portable oxygen monitors shall also be available as back up systems.

g. 15.5.2.7 As a safeguard against uncontrolled decomposition, a cargo-jettisoning system shall be installed to discharge the cargo overboard. The cargo shall be jettisoned if the temperature rise of the cargo exceeds a rate of 2°C per hour over a 5-hour period or when the temperature in the tank exceeds 40°C.

h. 15.5.2.8 Cargo tank venting systems with filtration shall have pressure/vacuum-relief valves for normal controlled venting, and a device for emergency venting, should tank pressure rise rapidly as a result of an uncontrolled decomposition rate, as stipulated in A1.502.g (15.5.2.7). These venting systems shall be designed in such a manner that there is no introduction of seawater into the cargo tank even under heavy sea conditions. Emergency venting shall be sized on the basis of tank design pressure and tank size.

i. 15.5.2.9 A fixed water-spray system shall be provided for diluting and washing away any concentrated solution spilled on deck. The areas covered by the water-spray shall include the manifold/hose connections and the tank tops of those tanks designated for the carriage of hydrogen peroxide solutions. The minimum application rate shall satisfy the following criteria:

j. .1 The product shall be diluted from the original concentration to 35% by mass within 5 minutes of the spill.

k. .2 The rate and estimated size of the spill shall be based upon maximum anticipated loading and discharge rates, the time required to stop flow of the cargo in the event of tank overfill or a piping/hose failure, and the time necessary to begin application of dilution water with actuation at the cargo control location or on the navigating bridge.

l. 15.5.2.10 Only those hydrogen peroxide solutions which have a maximum decomposition rate of 1% per year at 25°C shall be carried. Certification from the shipper that the product meets this standard shall be presented to the master and kept on board. A technical representative of the manufacturer shall be on board to monitor the transfer operations and have the capability to test the stability of the hydrogen peroxide. He shall certify to the master that the cargo has been loaded in a stable condition.

m. 15.5.2.11 Protective clothing that is resistant to hydrogen peroxide shall be provided for each crew member involved in cargo-transfer operations. Protective clothing shall include coveralls that are nonflammable, suitable gloves, boots and eye protection.

n. 15.5.2.12 During transfer of hydrogen peroxide the related piping system shall be separated from all other systems. Cargo hoses used for transfer of hydrogen peroxide shall be marked "FOR HYDROGEN PEROXIDE TRANSFER ONLY".

503. 15.5.3 Procedures for inspection, cleaning, passivation and loading of tanks for the carriage of hydrogen peroxide solutions 8-60%, which have contained other cargoes, or for the carriage of other cargoes after the carriage of hydrogen peroxide

a. 15.5.3.1 Tanks having contained cargoes other than hydrogen peroxide shall be inspected, cleaned and passivated before re-use for the transport of hydrogen peroxide solutions. The procedures for inspection and cleaning, as given in paragraphs A1.503.b to A1.503.h (15.5.3.2 to 15.5.3.8) below, apply to both stainless steel and pure aluminium tanks (see paragraph A1.502.b). Procedures for passivation are given in paragraph A1.503.i (15.5.3.9) for stainless steel and A1.503.j (15.5.3.10) for aluminium. Unless otherwise specified, all steps apply to the tanks and to all associated equipment having been in contact with the other cargo.

b. 15.5.3.2 After unloading the previous cargo the tank shall be rendered safe and inspected for any residues, scale and rust.

c. 15.5.3.3 Tanks and associated equipment shall be washed with clean filtered water. The water to be used shall at least have the quality of potable water with a low chlorine content.

d. 15.5.3.4 Trace residues and vapours of the previous cargo shall be removed by steaming of tank and equipment.

e. 15.5.3.5 Tank and equipment are washed again with clean water (quality as above) and dried, using filtered, oil-free air.

f. 15.5.3.6 The atmosphere in the tank shall be sampled and investigated for the presence of organic vapours and oxygen concentration.

g. 15.5.3.7 The tank shall be checked again by visual inspection for residues of the previous cargo, scale and rust as well as for any smell of the previous cargo.

h. 15.5.3.8 If inspection or measurements indicate the presence of residues of the previous cargo or its vapours, actions described in paragraphs A1.503.c to A1.503.e (15.5.3.3 to 15.5.3.5) shall be repeated.

i. 15.5.3.9 Tank and equipment made from stainless steel which have contained other cargoes than hydrogen peroxide or which have been under repair shall be cleaned and passivated, regardless of any previous passivation, according to the following procedure:

i.1. .1 New welds and other repaired parts shall be cleaned and finished using stainless steel wire brush, chisel, sandpaper or buff.

Rough surfaces shall be given a smooth finish. A final polishing is necessary.

i.2. .2 Fatty and oily residues shall be removed by the use of appropriate organic solvents or detergent solutions in water. The use of chlorine-containing compounds shall be avoided as they can seriously interfere with passivation.

i.3. .3 The residues of the degreasing agent shall be removed, followed by a washing with water.

i.4. .4 In the next step, scale and rust shall be removed by the application of acid (e.g. a mixture of nitric and hydrofluoric acids), followed again by a washing with clean water.

i.5. .5 All the metal surfaces which can come into contact with hydrogen peroxide shall be passivated by the application of nitric acid of a concentration between 10 and 35% by mass. The nitric acid must be free from heavy metals, other oxidizing agents or hydrogen fluoride. The passivation process shall continue for 8 to 24 h, depending upon the concentration of acid, the ambient temperature and other factors. During this time a continuous contact between the surfaces to be passivated and the nitric acid shall be ensured. In the case of large surfaces this may be achieved by recirculating the acid. Hydrogen gas may be evolved in the passivation process, leading to the presence of an explosive atmosphere in the tanks. Therefore, appropriate measures must be taken to avoid the build-up or the ignition of such an atmosphere.

i.6. .6 After passivation the surfaces shall be thoroughly washed with clean filtered water. The washing process shall be repeated until the effluent water has the same pH value as the incoming water.

i.7. .7 Surfaces treated according to the above steps may cause some decomposition when coming into contact with hydrogen peroxide for the first time. This decomposition will cease after a short time (usually within two or three days). Therefore an additional flushing with hydrogen peroxide for a period of at least two days is recommended.

i.8. .8 Only degreasing agents and acid cleaning agents which have been recommended for this purpose by the manufacturer of the hydrogen peroxide shall be used in the process.

j. 15.5.3.10 Tanks and equipment made from aluminium and which have contained cargoes other than hydrogen peroxide, or which have been under repair, shall be cleaned and passivated. The following is an example of a recommended procedure:

j.1. .1 The tank shall be washed with a solution of a sulphonated detergent in hot water, followed by a washing with water.

j.2. .2 The surface shall then be treated for 15 to 20 min with a solution of sodium hydroxide of a concentration of 7% by mass or treated for a longer period with a less concentrated solution (e.g. for 12 h with 0.4 to 0.5% sodium hydroxide). To prevent excessive corrosion at the bottom of the tank when treating with more concentrated solutions of sodium hydroxide, water shall be added continuously to dilute the sodium hydroxide solution which collects there.

j.3. .3 The tank shall be thoroughly washed with clean, filtered water. As soon as possible after washing, the surface shall be passivated by the application of nitric acid of a concentration between 30 and 35% by mass. The passivation process shall continue for 16 to 24 h. During this time a continuous contact between the surfaces to be passivated and the nitric acid shall be ensured.

j.4. .4 After passivation the surfaces shall be thoroughly washed with clean, filtered water. The washing process shall be repeated until the effluent water has the same pH value as the incoming water.

j.5. .5 A visual inspection shall be made to ensure that all surfaces have been treated. It is recommended that an additional flushing is carried out for a minimum of 24 h with dilute hydrogen peroxide solution of a concentration approximately 3% by mass.

k. 15.5.3.11 The concentration and stability of the hydrogen peroxide solution to be loaded shall be determined.

l. 15.5.3.12 The hydrogen peroxide is loaded under intermittent visual supervision of the interior of the tank from an appropriate opening.

m. 15.5.3.13 If substantial bubbling is observed which does not disappear within 15 min after the completion of loading, the contents of the tank shall be unloaded and disposed of in an environmentally safe manner. The tank and equipment shall then be repassivated as described above.

n. 15.5.3.14 The concentration and stability of the hydrogen peroxide solution shall be determined again. If the same values are obtained within the

limits of error as in paragraph A1.503.j (15.5.3.10), the tank is considered to be properly passivated and the cargo ready for shipment.

o. 15.5.3.15 Actions described in paragraphs A1.503.b to A1.503.h (15.5.3.2 to 15.5.3.8) shall be carried out under the supervision of the master or shipper. Actions described in paragraphs A1.503.i to A1.503.o (15.5.3.9 to 15.5.3.15) shall be carried out under the on-site supervision and responsibility of a representative of the hydrogen peroxide manufacturer or under supervision and responsibility of another person familiar with the safety-relevant properties of hydrogen peroxide

p. 15.5.3.16 The following procedure shall be applied when tanks having contained hydrogen peroxide solution are to be used for other products (unless otherwise specified, all steps apply to the tanks and to all associated equipment having been in contact with hydrogen peroxide):

p.1. .1 Hydrogen peroxide cargo residue shall be drained as completely as possible from tanks and equipment.

p.2. .2 Tanks and equipment shall be rinsed with clean water, and subsequently thoroughly washed with clean water.

p.3. .3 The interior of the tank shall be dried and inspected for any residues.

Steps .1 to .3, in A1.503.p (15.5.3.16), shall be carried out under the supervision of the master or the shipper. Step. 3 in paragraph A1.503.p (15.5.3.16) shall be carried out by a person familiar with the safety-relevant properties of the chemical to be transported and of hydrogen peroxide.

SPECIAL CAUTIONS:

1 Hydrogen peroxide decomposition may enrich the tank atmosphere with oxygen and appropriate precautions shall be observed.

2 Hydrogen gas may be evolved in the passivation processes described in paragraphs 15.5.3.9.5, 15.5.3.10.2 and A1.503.j.4 (15.5.3.10.4), leading to the presence of an explosive atmosphere in the tank. Therefore, appropriate measures must be taken to avoid the build-up of this gas in the tank atmosphere.

600. 15.6 Motor fuel anti-knock compounds (containing lead alkyls)

601. 15.6.1 Tanks used for these cargoes shall not be used for the transportation of any other cargo except those commodities to be used in the manufacture of motor fuel anti-knock compounds containing lead alkyls.

602. 15.6.2 If a cargo pump-room is located on deck level according to A2.800 (15.18), the ventilation arrangements shall be in compliance with A2.700 (15.17).

603. 15.6.3 Entry into cargo tanks used for the transportation of these cargoes is not permitted unless approved by the Administration.

604. 15.6.4 Air analysis shall be made for lead content to determine if the atmosphere is satisfactory prior to allowing personnel to enter the cargo pump-room or void spaces surrounding the cargo tank.

700. 15.7 Phosphorus, yellow or white

701. 15.7.1 Phosphorus shall, at all times, be loaded, carried and discharged under a water pad of 760 mm minimum depth. During discharge operations, arrangements shall be made to ensure that water occupies the volume of phosphorus discharged. Any water discharged from a phosphorus tank shall be returned only to a shore installation.

702. 15.7.2 Tanks shall be designed and tested to a minimum equivalent water head of 2.4 m above the top of the tank, under designed loading conditions, taking into account the depth, relative density and method of loading and discharge of the phosphorus.

703. 15.7.3 Tanks shall be so designed as to minimize the interfacial area between the liquid phosphorus and its water pad

704. 15.7.4 A minimum ullage space of 1% shall be maintained above the water pad. The ullage space shall be filled with inert gas or naturally ventilated by two cowled standpipes terminating at different heights but at least 6 m above the deck and at least 2 m above the pump-house top.

705. 15.7.5 All openings shall be at the top of cargo tanks, and fittings and joints attached thereto shall be of materials resistant to phosphorus pentoxide.

706. 15.7.6 Phosphorus shall be loaded at a temperature not exceeding 60°C

707. 15.7.7 Tank heating arrangements shall be external to the tanks and have a suitable method of temperature control to ensure that the temperature of the phosphorus does not exceed 60°C. A high temperature alarm shall be fitted.

708. 15.7.8 A water drench system capable of covering all exposed surfaces of the tanks shall be installed in the void spaces surrounding the tanks. The system shall operate automatically in the event of an escape of phosphorus.

709. 15.7.9 Void spaces referred to in A1.708 (15.7.8) shall be provided with effective means of mechanical ventilation which shall be capable of being sealed off quickly in an emergency.

710. 15.7.10 Loading and discharge of phosphorus shall be governed by a central system on the ship which, in addition to incorporating high-level alarms, shall ensure that no overflow of tanks is possible and that such operations can be stopped quickly in an emergency from either ship or shore.

711. 15.7.11 During cargo transfer, a water hose on deck shall be connected to a water supply and kept flowing throughout the operation so that any spillage of phosphorus may be washed down with water immediately.

712. 15.7.12 Ship-to-shore loading and discharge connections shall be of a type approved by the Administration.

800. 15.8 Propylene oxide or ethylene oxide/propylene oxide mixtures with an ethylene oxide content of not more than 30% by mass

801. 15.8.1 Products transported under the provisions of this section shall be acetylene-free

802. 15.8.2 Unless cargo tanks are properly cleaned, these products shall not be carried in tanks which have contained as one of the three previous cargoes any products known to catalyse polymerization, such as:

a. .1 mineral acids (e.g. sulphuric, hydrochloric, nitric);

b. .2 carboxylic acids and anhydrides (e.g. formic, acetic);

c. .3 halogenated carboxylic acids (e.g. chloracetic);

d. .4 sulphonic acids (e.g. benzenesulphonic);

e. .5 caustic alkalis (e.g. sodium hydroxide, potassium hydroxide);

f. .6 ammonia and ammonia solutions;

g. .7 amines and amine solutions; and

h. .8 oxidizing substances.

803. 15.8.3 Before loading, tanks shall be thoroughly and effectively cleaned, to remove all traces of previous cargoes from tanks and associated pipework, except where the immediately prior cargo has been propylene oxide or ethylene oxide/propylene oxide mixtures. Particular care shall be taken in the case of ammonia in tanks made of steel other than stainless steel.

804. 15.8.4 In all cases, the effectiveness of cleaning procedures for tanks and associated pipework shall be checked by suitable testing or inspection, to ascertain that no traces of acidic or alkaline materials remain that might create a hazardous situation in the presence of these products.

805. 15.8.5 Tanks shall be entered and inspected prior to each initial loading of these products to ensure freedom from contamination, heavy rust deposits and visible structural defects. When cargo tanks are in continuous service for these products, such inspections shall be performed at intervals of not more than two years.

806. 15.8.6 Tanks for the carriage of these products shall be of steel or stainless steel construction.

807. 15.8.7 Tanks for the carriage of these products may be used for other cargoes after thorough cleaning of tanks and associated pipework systems by washing or purging.

808. 15.8.8 All valves, flanges, fittings and accessory equipment shall be of a type suitable for use with the products and shall be constructed of steel or stainless steel in accordance with recognized standards. Discs or disc faces, seats and other wearing parts of valves shall be made of stainless steel containing not less than 11% chromium.

809. 15.8.9 Gaskets shall be constructed of materials which do not react with, dissolve in, or lower the autoignition temperature of these products and which are fire-resistant and possess adequate mechanical behaviour. The surface presented to the cargo shall be polytetrafluoroethylene (PTFE), or materials giving a similar degree of safety by their inertness. Spirally wound stainless steel, with a filler of PTFE or similar fluorinated polymer, may be accepted.

810. 15.8.10 Insulation and packing, if used, shall be of a material which does not react with, dissolve in, or lower the autoignition temperature of these products.

811. 15.8.11 The following materials are generally found unsatisfactory for gaskets, packing and similar uses in containment systems for these products and would require testing before being approved by the Administration:

a. .1 neoprene or natural rubber, if it comes into contact with the products.

b. .2 asbestos, or binders used with asbestos.

c. .3 materials containing oxides of magnesium, such as mineral wools.

812. 15.8.12 Threaded joints shall not be permitted in the cargo liquid and vapour lines.

813. 15.8.13 Filling and discharge piping shall extend to within 100 mm of the bottom of the tank or any sump pit.

814. 15.8.14.1 The containment system for a tank containing these products shall have a valved vapour return connection.

815. 15.8.14.2 The products shall be loaded and discharged in such a manner that venting of the tanks to atmosphere does not occur. If vapour return to shore is used during tank loading, the vapour-return system connected to a containment system for the product shall be independent of all other containment systems.

816. 15.8.14.3 During discharge operations, the pressure in the cargo tank must be maintained above 0.007 MPa gauge.

817. 15.8.15 The cargo may be discharged only by deepwell pumps, hydraulically operated submerged pumps, or inert-gas displacement. Each cargo pump shall be arranged to ensure that the product does not heat significantly if the discharge line from the pump is shut off or otherwise blocked.

818. 15.8.16 Tanks carrying these products shall be vented independently of tanks carrying other products. Facilities shall be provided for sampling the tank contents without opening the tank to atmosphere.

819. 15.8.17 Cargo hoses used for transfer of these products shall be marked "FOR ALKYLENE OXIDE TRANSFER ONLY".

820. 15.8.18 Cargo tanks, void spaces and other enclosed spaces adjacent to an integral gravity cargo tank carrying propylene oxide shall either contain a compatible cargo (those cargoes specified in A1.802 (15.8.2) are examples of substances considered incompatible) or be inerted by injection of a suitable inert gas. Any hold space in which an independent cargo tank is located shall be inerted. Such inerted spaces and tanks shall be monitored for these products and oxygen. The oxygen content of these spaces shall be maintained below 2%. Portable sampling equipment is satisfactory.

821. 15.8.19 In no case shall air be allowed to enter the cargo pump or piping system while these products are contained within the system.

822. 15.8.20 Prior to disconnecting shore-lines, the pressure in liquid and vapour lines shall be relieved through suitable valves installed at the loading header. Liquid and vapour from these lines shall not be discharged to atmosphere.

823. 15.8.21 Propylene oxide may be carried in pressure tanks or in independent or integral gravity tanks. Ethylene oxide/propylene oxide mixtures shall be carried in independent gravity tanks or pressure tanks. Tanks shall be designed for the maximum pressure expected to be encountered during loading, conveying and discharging cargo.

824. 15.8.22.1 Tanks for the carriage of propylene oxide with a design pressure less than 0.06 MPa gauge and tanks for the carriage of ethylene oxide/propylene oxide mixtures with a design pressure of less than 0.12 MPa gauge shall have a cooling system to maintain the cargo below the reference temperature.

825. 15.8.22.2 The refrigeration requirement for tanks with a design pressure less than 0.06 MPa gauge may be waived by the Administration for ships operating in restricted areas or on voyages of restricted duration, and account may be taken in such cases of any insulation of the tanks. The area and times of year for which such carriage would be permitted shall be included in the conditions of carriage of the International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk.

826. 15.8.23.1 Any cooling system shall maintain the liquid temperature below the boiling temperature at the containment pressure. At least two complete cooling plants, automatically regulated by variations within the tanks, shall be provided. Each cooling plant shall be complete with the necessary auxiliaries for proper operation. The control system shall also be capable of being manually operated. An alarm shall be provided to indicate malfunctioning of the temperature controls. The capacity of each cooling system shall be sufficient to maintain the temperature of the liquid cargo below the reference temperature of the system.

827. 15.8.23.2 An alternative arrangement may consist of three cooling plants, any two of which shall be sufficient to maintain the liquid temperature below the reference temperature.

828. 15.8.23.3 Cooling media which are separated from the products by a single wall only shall be nonreactive with the products.

829. 15.8.23.4 Cooling systems requiring compression of the products shall not be used.

830. 15.8.24 Pressure-relief-valve settings shall not be less than 0.2 bar gauge and for pressure tanks not greater than 0.7 MPa gauge for the carriage of propylene oxide and not greater than 0.53 MPa gauge for the carriage of propylene oxide/ethylene oxide mixtures.

831. 15.8.25.1 The piping system for tanks to be loaded with these products shall be separated (as defined in 3.1.4) from piping systems for all other tanks, including empty tanks. If the piping system for the tanks to be loaded is not independent, as defined in Part II, Title 33, Section 1, A1.318 (1.3.18), the required piping separation shall be accomplished by the removal of spool-pieces, valves, or other pipe section and the installation of blank flanges at these locations. The required separation applies to all liquid and vapour piping, liquid and vapour vent lines and any other possible connections, such as common inert-gas supply lines.

832. 15.8.25.2 These products may be transported only in accordance with cargo-handling plans that have been approved by the Administration. Each intended loading arrangement shall be shown on a separate cargo-handling plan. Cargo-handling plans shall show the entire cargo piping system and the locations for installation of blank flanges needed to meet the above piping separation requirements. A copy of each approved cargo-handling plan shall be maintained on board the ship. The International Certificate of Fitness for the Carriage of

Dangerous Chemicals in Bulk shall be endorsed to include reference to the approved cargo-handling plans.

833. 15.8.25.3 Before each initial loading of these products and before every subsequent return to such service, certification verifying that the required piping separation has been achieved shall be obtained from a responsible person acceptable to the port Administration and carried on board the ship. Each connection between a blank flange and a pipeline flange shall be fitted with a wire and seal by the responsible person to ensure that in-advertent removal of the blank flange is impossible.

834. 15.8.26.1 No cargo tanks shall be more than 98% liquid-full at the reference temperature.

835. 15.8.26.2 The maximum volume to which a cargo tank shall be loaded is:

$$V_L = 0.98\ V \times [\rho_R / \rho_L]$$

where:

V_L = maximum volume to which the tank may be loaded

V = volume of the tank

ρ_R = density of cargo at the reference temperature (R)

ρ_L = density of cargo at the loading temperature

836. 15.8.26.3 The maximum allowable tank filling limits for each cargo tank shall be indicated for each loading temperature which may be applied and for the applicable maximum reference temperature, on a list to be approved by the Administration. A copy of the list shall be permanently kept on board by the master.

837. 15.8.27 The cargo shall be carried under a suitable protective padding of nitrogen gas. An automatic nitrogen make-up system shall be installed to prevent the tank pressure falling below 0.007 MPa gauge in the event of product temperature fall due to ambient conditions or maloperation of refrigeration systems. Sufficient nitrogen shall be available on board to satisfy the demand of the automatic pressure control. Nitrogen of commercially pure quality (99.9% by volume) shall be used for padding. A battery of nitrogen bottles connected to the cargo tanks through a pressure-reduction valve satisfies the intention of the expression "automatic" in this context.

838. 15.8.28 The cargo tank vapour space shall be tested prior to and after loading to ensure that the oxygen content is 2% by volume or less.

839. 15.8.29 A water-spray system of sufficient capacity shall be provided to blanket effectively the area surrounding the loading manifold, the exposed deck piping associated with product handling, and the tank domes. The arrangement of piping and nozzles shall be such as to give a uniform distribution rate of 10 l/m2/min. Remote manual operation shall be arranged such that remote starting of pumps supplying the water-spray system and remote operation of any normally closed valves in the system can be carried out from a suitable location outside the cargo area, adjacent to the accommodation spaces and readily accessible and operable in the event of fire in the areas protected. The water spray system shall be capable of both local and remote manual operation, and the arrangement shall ensure that any spilled cargo is washed away. Additionally, a water hose with pressure to the nozzle, when atmospheric temperatures permit, shall be connected ready for immediate use during loading and unloading operations.

840. 15.8.30 A remotely operated, controlled closing-rate, shutoff valve shall be provided at each cargo hose connection used during cargo transfer.

900. 15.9 Sodium chlorate solution (50% or less by mass)

901. 15.9.1 Tanks and associated equipment, which have contained this product may be used for other cargoes after thorough cleaning by washing or purging.

902. 15.9.2 In the event of spillage of this product, all spilled liquid shall be thoroughly washed away without delay. To minimize fire risk, spillage shall not be allowed to dry out.

A2. SPECIAL REQUIREMENTS – *PART II*

100. 15.10 Sulphur (molten)

101. 15.10.1 Cargo tank ventilation shall be provided to maintain the concentration of hydrogen sulphide below one half of its lower explosive limit through-out the cargo tank vapour space for all conditions of carriage (i.e. below 1.85% by volume).

102. 15.10.2 Where mechanical ventilation systems are used for maintaining low gas concentrations in cargo tanks, an alarm system shall be provided to give warning if the system fails.

103. 15.10.3 Ventilation systems shall be so designed and arranged as to preclude depositing of sulphur within the system.

104. 15.10.4 Openings to void spaces adjacent to cargo tanks shall be so designed and fitted as to prevent the entry of water, sulphur or cargo vapour.

105. 15.10.5 Connections shall be provided to permit sampling and analysing of vapour in void spaces

106. 15.10.6 Cargo temperature controls shall be provided to ensure that the temperature of the sulphur does not exceed 155°C

107. 15.10.7 Sulphur (molten) has a flashpoint above 60°C ; however, electrical equipment shall be certified safe for gases evolved.

200. 15.11 Acids

201. 15.11.1 The ship's shell plating shall not form any boundaries of tanks containing mineral acids.

202. 15.11.2 Proposals for lining steel tanks and related piping systems with corrosion-resistant materials may be considered by the Administration. The elasticity of the lining shall not be less than that of the supporting boundary plating.

203. 15.11.3 Unless constructed wholly of corrosion-resistant materials or fitted with an approved lining, the plating thickness shall take into account the corrosivity of the cargo

204. 15.11.4 Flanges of the loading and discharge manifold connections shall be provided with shields, which may be portable, to guard against the danger of the cargo being sprayed; and in addition, drip trays shall also be provided to guard against leakage on to the deck.

205. 15.11.5 Because of the danger of evolution of hydrogen when these substances are being carried, the electrical arrangements shall comply with Part II, Title 33, Section 7, A2.104 (10.1.4). The certified safe type equipment shall be suitable for use in hydrogen/air mixtures. Other sources of ignition shall not be permitted in such spaces.

206. 15.11.6 Substances subjected to the requirements of this section shall be segregated from oil fuel tanks, in addition to the segregation requirements in 3.1.1.

207. 15.11.7 Provision shall be made for suitable apparatus to detect leakage of cargo into adjacent spaces.

208. 15.11.8 The cargo pump-room bilge pumping and drainage arrangements shall be of corrosion resistant materials.

300. 15.12 Toxic products

301. 15.12.1 Exhaust openings of tank vent systems shall be located:

a. .1 at a height of B/3 or 6 m, whichever is greater, above the weather deck or, in the case of a deck tank, the access gangway;

b. .2 not less than 6 m above the fore-and-aft gangway, if fitted within 6 m of the gangway;

c. .3 15 m from any opening or air intake to any accommodation and service spaces; and

d. .4 the vent height may be reduced to 3 m above the deck or fore-and-aft gangway, as applicable, provided high-velocity vent valves of an approved type, directing the vapour/air mixture upwards in an unimpeded jet with an exit velocity of at least 30 m/s, are fitted.

302. 15.12.2 Tank venting systems shall be provided with a connection for a vapour-return line to the shore installation.

Guidance

5.12.2/15.14.4 *(IACS' unified interpretation CC2 Interpretation of paragraph 4.9.2, BCH Code (corresponds to paragraph 15.12.2 of the IBC Code) (1977) (Rev.1 Feb 2007), and IACS' unified interpretation CC3 Interpretation of paragraph 4.11.2, BCH Code (corresponds to paragraph 15.14.4 of the IBC Code) (1977) (Rev.1 Feb 2007):*

This paragraph may be interpreted as follows in respect of the provision of a stop valve for the connection of tank venting systems with lines for the return of vapours to shore plants:

'Tank venting systems should be provided with a stop valve for vapour return line to shore.'

End of guidance

303. 15.12.3 Products shall:

a. .1 not be stowed adjacent to oil fuel tanks;

b. .2 have separate piping systems; and

c. .3 have tank vent systems separate from tanks containing non toxic products.

304. 15.12.4 Cargo tank relief-valve settings shall be a minimum of 0.2 bar gauge.

400. 15.13 Cargoes protected by additives

401. 15.13.1 Certain cargoes with a reference in column o in the table of ANNEX 17 (chapter 17), by the nature of their chemical make-up, tend, under certain conditions of temperature, exposure to air or contact with a catalyst, to undergo polymerization, decomposition, oxidation or other chemical changes. Mitigation of this tendency is carried out by introducing small amounts of chemical additives into the liquid cargo or controlling the cargo tank environment.

402. 15.13.2 Ships carrying these cargoes shall be so designed as to eliminate from the cargo tanks and cargo-handling system any material of construction or contaminants which could act as a catalyst or destroy the inhibitor.

403. 15.13.3 Care shall be taken to ensure that these cargoes are sufficiently protected to prevent deleterious chemical change at all times during the voyage. Ships carrying such cargoes shall be provided with a certificate of protection from the manufacturer, and kept during the voyage, specifying:

a. .1 the name and amount of additive present;

b. .2 whether the additive is oxygen-dependent;

c. .3 date additive was put in the product and duration of effectiveness;

d. .4 any temperature limitations qualifying the additives' effective lifetime; and

e. .5 the action to be taken shall the length of voyage exceed the effective lifetime of the additives.

404. 15.13.4 Ships using the exclusion of air as the method of preventing oxidation of the cargo shall comply with 9.1.3.

405. 15.13.5 A product containing an oxygen-dependent additive shall be carried without inertion (in tanks of a size not greater than 3,000 m3). Such cargoes shall not be carried in a tank requiring inertion under the requirements of SOLAS chapter II-2. For equivalency arrangements for the carriage of styrene monomer, see MSC/Circ.879 and MSC/Circ.879/Corr.1

406. 15.13.6 Venting systems shall be of a design that eliminates blockage from polymer build-up. Venting equipment shall be of a type that can be checked periodically for adequacy of operation.

407. 15.13.7 Crystallization or solidification of cargoes normally carried in the molten state can lead to depletion of inhibitor in parts of the tank's contents. Subsequent remelting can thus yield pockets of uninhibited liquid, with the accompanying risk of dangerous polymerization. To prevent this, care shall be taken to ensure that at no time are such cargoes allowed to crystallize or solidify, either wholly or partially, in any part of the tank. Any required heating arrangements shall be such as to ensure that in no part of the tank does cargo become overheated to such an extent that any dangerous polymerization can be initiated. If the temperature from steam coils would induce overheating, an indirect low-temperature heating system shall be used

500. 15.14 argoes with a vapour pressure greater than 0.1013 MPa absolute at 37.8°C

501. 15.14.1 For a cargo referenced in column o in the table of ANNEX 17 (chapter 17) to this section, a mechanical refrigeration system shall be provided unless the cargo system is designed to withstand the vapour pressure of the cargo at 45°C . Where the cargo system is designed to withstand the vapour pressure of the cargo at 45°C , and no refrigeration system is provided, a notation shall be made in the conditions of carriage on the International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk to indicate the required relief-valve setting for the tanks.

502. 15.14.2 A mechanical refrigeration system shall maintain the liquid temperature below the boiling temperature at the cargo tank design pressure.

503. 15.14.3 When ships operate in restricted areas and at restricted times of the year, or on voyages of limited duration, the Administration involved may agree to waive requirements for a refrigeration system. A notation of any such agreement, listing geographic area restrictions and times of the year, or voyage duration limitations, shall be included in the conditions of carriage on the International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk.

504. 15.14.4 Connections shall be provided for returning expelled gases to shore during loading.

505. 15.14.5 Each tank shall be provided with a pressure gauge which indicates the pressure in the vapour space above the cargo.

506. 15.14.6 Where the cargo needs to be cooled, thermometers shall be provided at the top and bottom of each tank.

507. 15.14.7.1 No cargo tanks shall be more than 98% liquid-full at the reference temperature (R).

a. 15.14.7.2 The maximum volume (VL) of cargo to be loaded in a tank shall be:

$$V_L = 0.98\ V \times [\rho_R / \rho_L]$$

where:

V = volume of the tank

ρ_R = density of cargo at the reference temperature (R)

ρ_L = density of cargo at the loading temperature

b. 15.14.7.3 The maximum allowable tank filling limits for each cargo tank shall be indicated for each loading temperature which may be applied, and for the applicable maximum reference temperature, on a list approved by the Administration. A copy of the list shall be permanently kept on board by the master.

600. 15.16 argo contamination

601. 15.16.2 Where column o in the table of chapter 17 refers to this section, water shall not be allowed to contaminate this cargo. In addition, the following provisions apply:

a. .1 Air inlets to pressure/vacuum-relief valves of tanks containing the cargo shall be situated at least 2 m above the weather deck.

b. .2 Water or steam shall not be used as the heat-transfer media in a cargo temperature control system required by Part II, Title 33, Section 6, Chapter C (chapter 7).

c. .3 The cargo shall not be carried in cargo tanks adjacent to permanent ballast or water tanks unless the tanks are empty and dry.

d. .4 The cargo shall not be carried in tanks adjacent to slop tanks or cargo tanks containing ballast or slops or other cargoes containing water which may react in a dangerous manner. Pumps, pipes or vent lines serving such tanks shall be separate from similar equipment serving tanks containing the cargo. Pipelines from slop tanks or ballast lines shall not pass through tanks containing the cargo unless encased in a tunnel.

700. 15.17 Increased ventilation requirements

701. For certain products, the ventilation system as described in Part II, Title 33, Section 6, F1.103 (12.1.3) shall have a minimum capacity of at least 45 changes of air per hour, based upon the total volume of space. The ventilation system exhaust ducts shall discharge at least 10 m away from openings into
accommodation spaces, work areas or other similar spaces, and intakes to ventilation systems, and at least 4 m above the tank deck.

800. 15.18 Special cargo pump-room requirements

801. For certain products, the cargo pump-room shall be located on the deck level or cargo pumps shall be located in the cargo tank. The Administration may give special consideration to cargo pump-rooms below deck.

900. 15.19 Overflow control

901. 15.19.1 The provisions of this section are applicable where specific reference is made in column o in the table of ANNEX III (chapter 17), and are in addition to the requirements for gauging devices.

902. 15.19.2 In the event of a power failure on any system essential for safe loading, an alarm shall be given to the operators concerned.

903. 15.19.3 Loading operations shall be terminated at once in the event of any system essential for safe loading becoming inoperative.

904. 15.19.4 Level alarms shall be capable of being tested prior to loading

905. 15.19.5 The high-level alarm system required under A2.906 (15.19.6) shall be independent of the overflow control system required by A2.907 (15.19.7) and shall be independent of the equipment required by Part II, Title 33, Section 6, G1.100 (13.1).

906. 15.19.6 Cargo tanks shall be fitted with a visual and audible high-level alarm which complies with 15.19.1 to 15.19.5 and which indicates when the liquid level in the cargo tank approaches the normal full condition.

907. 15.19.7 A tank overflow-control system required by this section shall:

a. .1 come into operation when the normal tank loading procedures fail to stop the tank liquid level exceeding the normal full condition;

b. .2 give a visual and audible tank-overflow alarm to the ship's operator; and

c. .3 provide an agreed signal for sequential shutdown of onshore pumps or valves or both and of the ship's valves. The signal, as well as the pump and valve shutdown, may be dependent on operator's intervention. The use of shipboard automatic closing valves shall be permitted only when specific approval has been obtained from the Administration and the port State authority concerned.

908. 15.19.8 The loading rate (LR) of the tank shall not exceed:

$L_R = 3600U/t$ (m³/h)

where:

U = ullage volume (m³) at operating signal level;

t = time(s) needed from the initiating signal to fully stopping the cargo flow into the tank, being the sum of times needed for each step in sequential operations such as operator's responses to signals, stopping pumps and closing valves;

and shall also take into account the pipeline system design pressure.

A3. SPECIAL REQUIREMENTS – PART III

100. 15.20 Alkyl (C7-C9) nitrates, all isomers

101. 15.20.1 The carriage temperature of the cargo shall be maintained below 100°C to prevent the occurrence of a self- sustaining, exothermic decomposition reaction

102. 15.20.2 The cargo may not be carried in independent pressure vessels permanently affixed to the vessel's deck unless:

a. .1 the tanks are sufficiently insulated from fire; and

b. .2 the vessel has a water deluge system for the tanks such that the cargo temperature is maintained below 100°C and the temperature rise in the tanks does not exceed 1.5°C per hour for a fire of 650°C .

200. 15.21 Temperature sensors

201. Temperature sensors shall be used to monitor the cargo pump temperature to detect overheating due to pump failures.

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