

**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 CHEMICALS IN BULK,  
1983, AS AMENDED 2004**

**SECTION 3 HULL EQUIPMENT**

CHAPTERS

- A    FIRE PROTECTION AND FIRE  
      EXTINGUISHING
- B    PERSONNEL PROTECTION



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## CHAPTER A (11) FIRE PROTECTION AND FIRE EXTINCTION

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#### A1. FIRE PROTECTION AND FIRE EXTINCTION

#### A1. 11 FIRE PROTECTION AND FIRE EXTINCTION

##### 100. 11.1 Application

101. 11.1.1 The requirements for tankers in SOLAS chapter II-2 shall apply to ships covered by the Code, irrespective of tonnage, including ships of less than 500 tons gross tonnage, except that:

- a. .1 regulations 4.5.5, 10.8 and 10.9 shall not apply;
- b. .2 regulation 4.5.1.2 (i.e. the requirements for location of the main cargo control station) need not apply;
- c. .3 regulations 10.2, 10.4, and 10.5 shall apply as they would apply to cargo ships of 2 000 tons gross tonnage and over;
- d. .4 regulation 10.5.6 shall apply to ships of 2 000 gross tonnage and over;
- e. .5 the provisions of 11.3 shall apply in lieu of regulation 10.8;
- f. .6 the provisions of 11.2 shall apply in lieu of regulation 10.9;
- g. .7 regulation 4.5.10 shall apply to ships of 500 gross tonnage and over, replacing "*hydrocarbon gases*" by "*flammable vapours*" in the regulation; and
- h. .8 regulations 13.3.4 and 13.4.3 shall apply to ships of 500 gross tonnage and over.

102. 11.1.2 Notwithstanding the provisions of A1.101 (11.1.1), ships engaged solely in the carriage of products which are non-flammable (entry NF in column i of the table of minimum requirements) need not comply with requirements for tankers specified in SOLAS chapter II-2, provided that they comply with the requirements for cargo ships of that chapter, except that regulation 10.7 need not apply to such ships and A1.200 and 300 (11.2 and 11.3), hereunder, need not apply.

103. 11.1.3 For ships engaged solely in the carriage of products with a flashpoint of 60°C and above (entry "Yes" in column i of the table of minimum requirements), the requirements of SOLAS chapter II-2 may apply as

specified in regulation II-2/1.6.4 in lieu of the provisions of this chapter.

104. 11.1.4 In lieu of the provisions of SOLAS regulation II-2/1.6.7, the requirements of regulations II-2/4.5.10.1.1 and II-2/4.5.10.1.4 shall apply and a system for continuous monitoring of the concentration of flammable vapours shall be fitted on ships of 500 gross tonnage and over which were constructed before 1 January 2009 by the date of the first scheduled dry-docking after 1 January 2009, but not later than 1 January 2012. Sampling points or detector heads should be located in suitable positions in order that potentially dangerous leakages are readily detected. When the flammable vapour concentration reaches a pre-set level which shall not be higher than 10% of the lower flammable limit, a continuous audible and visual alarm signal shall be automatically effected in the pump-room and cargo control room to alert personnel to the potential hazard. However, existing monitoring systems already fitted having a pre-set level not greater than 30% of the lower flammable limit may be accepted. Notwithstanding the above provisions, the Administration may exempt ships not engaged on international voyages from those requirements.

##### 200. 11.2 Cargo pump-rooms

201. 11.2.1 The cargo pump-room of any ship shall be provided with a fixed carbon dioxide fire extinguishing system as specified in SOLAS regulation II-2/10.9.1.1. A notice shall be exhibited at the controls stating that the system is only to be used for fire-extinguishing and not for inerting purposes, due to the electrostatic ignition hazard. The alarms referred to in SOLAS regulation II-2/10.9.1.1.1 shall be safe for use in a flammable cargo vapour/air mixture. For the purpose of this requirement, an extinguishing system shall be provided which would be suitable for machinery spaces. However, the amount of gas carried shall be sufficient to provide a quantity of free gas equal to 45% of the gross volume of the cargo pump-room in all cases.

202. 11.2.2 Cargo pump-rooms of ships which are dedicated to the carriage of a restricted number of cargoes shall be protected by an appropriate fire-extinguishing system approved by the Administration.

203. 11.2.3 If cargoes are to be carried which are not suited to extinguishment by carbon dioxide or equivalent media, the cargo pump room shall be protected by a fire extinguishing system consisting of either a fixed pressure water spray or high expansion foam system. The International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk shall reflect this conditional requirement.

##### 300. 11.3 Cargo area

301. 11.3.1 Every ship shall be provided with a fixed deck foam system in accordance with the requirements of A1.302 to 312 (11.3.2 to 11.3.12).

302. 11.3.2 Only one type of foam concentrate shall be supplied, and it shall be effective for the maximum possible number of cargoes intended to be carried. For other cargoes for which foam is not effective or is incompatible, additional arrangements to the satisfaction of the Administration shall be provided. Regular protein foam shall not be used.

303. 11.3.3 The arrangements for providing foam shall be capable of delivering foam to the entire cargo tanks deck area as well as into any cargo tank, the deck of which is assumed to be ruptured.

304. 11.3.4 The deck foam system shall be capable of simple and rapid operation. The main control station for the system shall be suitably located outside of the cargo area, adjacent to the accommodation spaces and readily accessible and operable in the event of fires in the areas protected.

305. 11.3.5 The rate of supply of foam solution shall be not less than the greatest of the following:

- a. .1 2 l/min per square metre of the cargo tanks deck area, where cargo tanks deck area means the maximum breadth of the ship times the total longitudinal extent of the cargo tank spaces;
- b. .2 20 l/min per square metre of the horizontal sectional area of the single tank having the largest such area;
- c. .3 10 l/min per square metre of the area protected by the largest monitor, such area being entirely forward of the monitor, but not less than 1,250 l/min. For ships less than 4 000 tonnes deadweight, the minimum capacity of the monitor shall be to the satisfaction of the Administration.

306. 11.3.6 Sufficient foam concentrate shall be supplied to ensure at least 30 min of foam generation when using the highest of the solution rates stipulated in A1.305.a to c (11.3.5.1, 11.3.5.2 and 11.3.5.3).

307. 11.3.7 Foam from the fixed foam system shall be supplied by means of monitors and foam applicators. At least 50% of the foam rate required in A1.305.a (11.3.5.1) or A1.305.b (11.3.5.2) shall be delivered from each monitor. The capacity of any monitor shall be at least 10 l/min of foam solution per square metre of deck area protected by that monitor, such area being entirely forward of the monitor. Such capacity shall be not less than 1 250 l/min. For ships less than 4,000 tonnes deadweight, the minimum capacity of the monitor shall be to the satisfaction of the Administration.

308. 11.3.8 The distance from the monitor to the farthest extremity of the protected area forward of that monitor shall be not more than 75% of the monitor throw in still air conditions.

309. 11.3.9 A monitor and hose connection for a foam applicator shall be situated both port and starboard at the poop front or accommodation spaces facing the cargo area.

310. 11.3.10 Applicators shall be provided for flexibility of action during fire-fighting operations and to cover areas screened from the monitors. The capacity of any applicator shall be not less than 400 l/min and the applicator throw in still air conditions shall be not less than 15 m. The number of foam applicators provided shall be not less than four. The number and disposition of foam main outlets shall be such that foam from at least two applicators can be directed to any part of the cargo tanks deck area.

311. 11.3.11 Valves shall be provided in the foam main, and in the fire main where this is an integral part of the deck foam system, immediately forward of any monitor position to isolate damaged sections of those mains.

312. 11.3.12 Operation of a deck foam system at its required output shall permit the simultaneous use of the minimum required number of jets of water at the required pressure from the fire main.

313. 11.3.13 Ships which are dedicated to the carriage of a restricted number of cargoes shall be protected by alternative provisions to the satisfaction of the Administration when they are just as effective for the products concerned as the deck foam system required for the generality of flammable cargoes.

314. 11.3.14 Suitable portable fire-extinguishing equipment for the products to be carried shall be provided and kept in good operating order.

315. 11.3.15 Where flammable cargoes are to be carried, all sources of ignition shall be excluded from hazardous locations unless such sources conform with Section 7, A1.104 (10.1.4).

316. 11.3.16 Ships fitted with bow or stern loading and unloading arrangements shall be provided with one additional foam monitor meeting the requirements of A1.307 (11.3.7) and one additional applicator meeting the requirements of A1.310 (11.3.10). The additional monitor shall be located to protect the bow or stern loading and unloading arrangements. The area of the cargo line forward or aft of the cargo area shall be protected by the above-mentioned applicator.

#### **400. 11.4 Special requirements**

401. All fire-extinguishing media determined to be effective for each product are listed in column I in the table of ANNEX III ([chapter 17](#)).

## CHAPTER B (14) PERSONNEL PROTECTION

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#### C1. PERSONNEL PROTECTION

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### B1. PERSONNEL PROTECTION

#### 100. 14.1 Protective equipment

101. 14.1.1 For the protection of crew members who are engaged in loading and discharging operations, the ship shall have on board suitable protective equipment consisting of large aprons, special gloves with long sleeves, suitable footwear, coveralls of chemical-resistant material, and tight-fitting goggles or face shields or both. The protective clothing and equipment shall cover all skin so that no part of the body is unprotected.

102. 14.1.2 Work clothes and protective equipment shall be kept in easily accessible places and in special lockers. Such equipment shall not be kept within accommodation spaces, with the exception of new, unused equipment and equipment which has not been used since undergoing a thorough cleaning process. The Administration may, however, approve storage rooms for such equipment within accommodation spaces if adequately segregated from living spaces such as cabins, passageways, dining rooms, bathrooms, etc.

103. 14.1.3 Protective equipment shall be used in any operation, which may entail danger to personnel.

#### 200. 14.2 Safety equipment

201. 14.2.1 Ships carrying cargoes for which ANNEX I, A2.300, A2.301 or A2.303 (15.12, 15.12.1 or 15.12.3) is listed in column o in the table of ANNEX III (chapter 17) shall have on board sufficient but not less than three complete sets of safety equipment, each permitting personnel to enter a gas-filled compartment and perform work there for at least 20 min. Such equipment shall be in addition to that required by SOLAS regulation II-2/10.10.

202. 14.2.2 One complete set of safety equipment shall consist of:

- a. .1 one self-contained air-breathing apparatus (not using stored oxygen);
- b. .2 protective clothing, boots, gloves and tight-fitting goggles;
- c. .3 fireproof lifeline with belt resistant to the cargoes carried; and
- d. .4 explosion-proof lamp.

203. 14.2.3 For the safety equipment required in B1.201 (14.2.1), all ships shall carry either:

- a. .1 one set of fully charged spare air bottles for each breathing apparatus;
- b. .2 a special air compressor suitable for the supply of high-pressure air of the required purity;
- c. .3 a charging manifold capable of dealing with sufficient spare air bottles for the breathing apparatus; or
- d. .4 fully charged spare air bottles with a total free air capacity of at least 6,000 l for each breathing apparatus on board in excess of the requirements of SOLAS regulation II-2/10.10.

204. 14.2.4 A cargo pump-room on ships carrying cargoes which are subject to the requirements of ANNEX I, A2.800 (15.18) or cargoes for which in column k in the table of ANNEX III (chapter 17) toxic-vapour-detection equipment is required but is not available shall have either:

- a. .1 a low-pressure line system with hose connections suitable for use with the breathing apparatus required by B1.201 (14.2.1). This system shall provide sufficient high pressure air capacity to supply, through pressure-reduction devices, enough low pressure air to enable two men to work in a gas-dangerous space for at least 1 h without using the air bottles of the breathing apparatus. Means shall be provided for recharging the fixed air bottles and the breathing apparatus air bottles from a special air compressor suitable for the supply of high-pressure air of the required purity; or
- b. .2 an equivalent quantity of spare bottled air in lieu of the low-pressure air line.

205. 14.2.5 At least one set of safety equipment as required by B1.202 (14.2.2) shall be kept in a suitable clearly marked locker in a readily accessible place near the cargo pump-room. The other sets of safety equipment shall also be kept in suitable, clearly marked, easily accessible places.

206. 14.2.6 The breathing apparatus shall be inspected at least once a month by a responsible officer, and the inspection recorded in the ship's log-book. The equipment shall be inspected and tested by an expert at least once a year.

#### 300. 14.3 Emergency equipment

301. 14.3.1 Ships carrying cargoes, for which "Yes" is indicated in column n of ANNEX III (chapter 17), shall be provided with suitable respiratory and eye protection sufficient for every person on board for emergency escape purposes, subject to the following:

- a. .1 filter-type respiratory protection is unacceptable;
- b. .2 self-contained breathing apparatus shall have at least a duration of service of 15 min;
- c. .3 emergency escape respiratory protection shall not be used for fire-fighting or cargo handling purposes and shall be marked to that effect.

302. 14.3.2 The ship shall have on board medical first-aid equipment, including oxygen resuscitation equipment and antidotes for cargoes to be carried, based on the guidelines developed by the Organization

Reference is made to the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG), which provides advice on the treatment of casualties in accordance with the symptoms exhibited as well as equipment and antidotes that may be appropriate for treating the casualty.

303. 14.3.3 A stretcher which is suitable for hoisting an injured person up from spaces such as the cargo pump-room shall be placed in a readily accessible location.

304. 14.3.4 Suitably marked decontamination showers and an eyewash shall be available on deck in convenient locations. The showers and eyewash shall be operable in all ambient conditions.

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