Translation: Only the Danish document has legal validity.

Order no. 1519 of 07/12/2023

issued by the Danish Maritime Authority

Order on the construction and equipment of ships, etc., implementing the International Convention on Safety of Life at Sea (SOLAS) 1974

Pursuant to sections 1(2) and (3), 3, 4(1) and (2), 5 and 32(8), (9) and (10) of the Act on Safety at Sea, cf. Consolidated Act no. 221 of 11 February 2022, and section 1(2) and (3), section 3, section 4(1) and (2), section 5 and section 32(1-3) of the Order on entry into force for Greenland of the Act on Safety at Sea, cf. Consolidated Order no. 1674 of 16 December 2015, is laid down by authorisation pursuant to section 1(1)(3) of Order no. 261 of 23 March 2020 on the delegation of certain powers to the Danish Maritime Authority and on the right of appeal etc, and section 1(2) of Order no. 279 of 23 March 2020 for Greenland on the delegation of certain powers to the Danish Maritime Authority and on the right of appeal, etc:

Section 1. Unless otherwise specified in the annexes, this Order shall apply to

1) passenger ships on international trade, regardless of size,
2) cargo ships with a length of 15 metres or more or with a scantling number of 100 or more, whether engaged on domestic or international trade, and
3) recreational vessels with a hull length over 24 metres.

Subsection 2. Cargo ships with a length of 15 metres or more or with a scantling number of 100 or more but with a length of less than 24 metres and which operate within 100 nautical miles of the nearest coast may, as an alternative to this Order, apply the provisions laid down in the Order on the construction and equipment, etc., of small commercial vessels and cargo ships.

Subsection 3. The detailed regulations on the ships' construction and equipment, etc., are set out in the annex to this Order.

Section 2. The provisions are based on the International Convention on Safety of Life at Sea (SOLAS) 1974, as amended and its protocols.

Subsection 2. The provisions of annex 6, chapter IV implement a revision of the GMDSS radio communication regulations.

Subsection 3. The provisions of annex 18, chapter XV implement the International Labour Code for Industrial Personnel.

Section 3. The shipping company must ensure that the crew is familiar with the parts of this Order that are relevant to the performance of their work on board.

Penalty provisions and measures, etc.

Section 4. Violation of section 3 and the annexes of this Order is punishable by a fine or imprisonment for up to 1 year.

Subsection 2. The penalty can increase to imprisonment for up to 2 years if:

1) The infringement, including in connection with causing a marine casualty at sea or sailing in breach of good seamanship, has caused injury to life or health or has created a danger thereof,
2) A prohibition or an order has previously been issued in respect of the same or a similar matter; or
3) The violation has resulted in or is intended to result in a financial benefit for the person concerned or others.

Subsection 3. Where no confiscation of the proceeds of the infringement is ordered, the amount of any

financial advantage obtained or intended shall be taken into account, in particular, in the assessment of any fine, including any additional fine.

Subsection 4. Criminal liability may be imposed on companies or other legal persons in accordance with the regulations laid down in chapter 5 of the Criminal Code.

Section 5. If the matter is covered by an order on the entry into force for Greenland of the Act on Safety at Sea, measures may be taken in accordance with the Criminal Code for Greenland.

Subsection 2. The circumstances mentioned in section 4(2) shall be regarded as aggravating circumstances.

Subsection 3. If no confiscation of proceeds is made, cf. section 37 of the Criminal Code for Greenland, the amount of any financial benefit obtained or intended shall be taken into account, in particular, when imposing a fine, including an additional fine.

Subsection 4. Where an infringement is committed by companies, etc., or other legal persons, the legal person as such may be held liable to pay a fine. If the offence is committed by the State, the Government of Greenland, a municipality, a municipal community covered by section 64 of the Greenland Act on Municipal Councils and District Councils, etc., or a district council, the public authority in question may be held liable for fines.

Subsection 5. If a person is not resident in Greenland, or if the person's connection with Greenlandic society is of such a loose nature that the conditions for the application of measures are not met, the case may be brought or referred for prosecution in Denmark, cf. section 7 of the Greenland Criminal Code.

Entry into force, etc.

Section 6. The Order will enter into force on 1 January 2024, cf. subject to subsection 2.

Subsection 2. Annex 18, chapter XV, Security measures for ships carrying industrial personnel will enter into force on 1 July 2024.

Subsection 3. Order no. 1154 of 19 November 2019 on the construction and equipment of ships, etc., implementing the International Convention on Safety of Life at Sea (SOLAS) 1974, is repealed.

Subsection 4. The design requirements in Order no. 1154 of 19 November 2019 on the construction and equipment of ships, etc., implementing the International Convention on Safety of Life at Sea (SOLAS) 1974, continue to apply to existing ships, unless otherwise provided in this Order.

The Danish Maritime Authority, 7 December 2023

Martin Hvid John

/ Malene Loftager Mundt

Annex 1

Introduction

These regulations consist of a short Order and a number of annexes in the form of chapters. The Order contains legal basis, application, penalty and entry into force. The Order implements the latest amendments of the International Convention on Safety of Life at Sea (SOLAS) 1974 and adapts a number of Danish additional requirements.

B I		General provisions
B II-1	A	Construction - Building, division and stability, machinery and electrical systems - General provisions and construction
B II-1	B	Construction - building, division and stability, machinery and electrical systems - Division and stability
B II-1	C	Construction - building, division and stability, machinery and electrical systems - Machine installations
B II-1	D	Construction - building, division and stability, machinery and electrical systems - Electrical installations
B II-1	E	Construction - building, division and stability, machinery and electrical systems - Additional requirements for periodically unattended machinery spaces
B II-1	F	Construction - building, division and stability, machinery and electrical systems - Alternative design and alternative arrangements
B II-1	G	Construction - building, division and stability, machinery and electrical systems - Ships using low flashpoint fuels
B II-2	A	Construction - Fire protection, fire detection and extinguishing - General provisions
B II-2	B	Construction - Fire protection, fire detection and extinguishing - Fire and explosion prevention
B II-2	C	Construction - Fire protection, fire detection and extinguishing - Preventing the start and spread of fire
B II-2	D	Construction - Fire protection, fire detection and extinguishing - Escape routes
B II-2	E	Construction - Fire protection, fire detection and extinguishing - Operational requirements
B II-2	F	Construction - fire protection, fire detection and extinguishing - Alternative constructions and arrangements
B II-2	G	Construction - Fire protection, fire detection and extinguishing - Specific requirements
B III	A	Rescue equipment and arrangements - General
B III	B	Life-saving appliances and arrangements - Regulations for ships and life-saving appliances
B III	C	Alternative design and alternative arrangements
B IV		GMDSS radio communication
B V		Safety of navigation
B VI		Transporting cargo

B VII		Transporting dangerous goods
B VIII		Nuclear ships
B IX		Safe ship operation

B X		High-speed craft
B XI-1		Special measures to enhance maritime safety
B XI-2		Special measures to enhance maritime safety
B XII		Additional security measures for bulk carriers
B XIII		Verification of compliance
B XIV		Security measures for ships in polar waters
B XV		Security measures for ships carrying industrial personnel

The most important amendments

Chapter II-1, Construction - building, subdivision and stability, machinery and electrical systems

New regulations on mooring arrangements are introduced to promote safe working conditions. This should be done through better design at the (new) construction stage and with scheduled inspections of hawsers and mooring arrangements.

In addition, there are several amendments of the stability requirements aimed at adapting certain requirements where it has become apparent that the regulations have not been formulated consistently and where the wording has not accurately reflected the original purpose of the regulations. Furthermore, the existing regulations for watertight doors did not adequately take into account the use of IT in safety systems, which has now been remedied. Finally, the valve to be located in the ship's forepeak bulkhead can be of a butterfly type and placed on any side of the bulkhead.

Chapter III, Rescue equipment and arrangements

The requirements for free-fall lifeboats are relaxed so that they can no longer be launched, if necessary, by using safety lines, while the ship is travelling forward at a speed of up to 5 knots on calm water. The reason for the relaxation is that the requirement only contributes to the safety of davit-launched lifeboats, while it has no safety significance for free-fall lifeboats.

Chapter IV, Radio communication GMDSS

The chapter on radio communication was reissued. This is the result of modernising the regulations of the international radio systems for maritime distress and safety communications (GMDSS), making them more technology-neutral. Additionally, the specific requirement to receive radiotelex has been removed, as numerous new technological alternatives are now available.

Chapter XV Security measures for ships carrying industrial personnel

A new mandatory international code for "Industrial Personnel (IPs)" is implemented, based on the realisation that the current maritime delineation between crew and passengers is insufficient. The change enables the transport and stay of industrial personnel, i.e. specialists who have nothing to do with the operation or safety of the ship.

Certificates

An overview of updated SOLAS certificates is available on the Danish Maritime Authority's website.

Annex 2

Chapter I - General provisions

Section A	**Scope of application, definitions, etc.**
Regulation 1	Scope of application
Regulation 2	Definitions
Regulation 3	Exceptions
Regulation 4	Exemptions
Regulation 5	Equivalence
Section B	**Inspections and certificates**
Regulation 6	Inspection and survey
Reguation 6-1	Special inspection and inspection dates
Regulation 7	Passenger ship surveys
Regulation 8	Surveys of life-saving appliances and other equipment on cargo ships with a gross tonnage of 500 and above
Regulation 8-1	Surveys of life-saving appliances and other equipment on cargo ships with a gross tonnage under 500
Regulation 9	Inspection of radio installations on cargo ships of 300 gross tonnage and above
Regulation 9-1	Inspection of radio installations on cargo ships of less than 300 gross tonnage
Regulation 10	Inspection of the ship's structure, machinery and equipment on cargo ships of 500 gross tonnage and above
Regulation 10-1	Inspection of the ship's structure, machinery and equipment on cargo ships of less than 500 gross tonnage
Regulation 11	Maintaining the state after a survey
Regulation 12	Issuing or endorsing certificates
Regulation 12-1	Issuing certificates for cargo ships of less than 500 gross tonnage
Regulation 13	Issuing or endorsing certificates by another Government
Regulation 14	Validity and period of validity of certificates
Regulation 14-1	Validity and period of validity of certificates on cargo ships with a gross tonnage under 500
Regulation 15	Form of certificates and equipment lists
Regulation 16	Availability of certificates
Regulation 17	Recognition of certificates
Regulation 18	Limitation of certificates
Regulation 19	Control
Regulation 20	Privileges
Section C	**Maritime casualties**
Regulation 21	Maritime casualties
Section D	**Miscellaneous**
Regulation 22	General safety

Section A Scope of application, definitions, etc.

Regulation 1 Scope of application[1)]

(a) Unless expressly provided otherwise, this *regulation applies to passenger ships irrespective of size in international trade and cargo ships of 15 metres in length (L) and upwards or a scantling number of 100 or more, whether engaged on domestic or* international trade, *subject to the exceptions in regulation 3.*

(b) Each chapter specifies which classes of ships are covered by that chapter and to what extent the provisions apply.

(c) *Chapter I applies to new and existing ships (as defined in regulation 2(k) and (l)).*

(d) *If the design or use of a ship deviates from the principles on which these regulations are based, or if the number of persons working on board the ship or working on an installation serviced by the ship exceeds the crew responsible for the ship's normal navigation, ongoing maintenance, operation of machinery, catering, etc., by more than 12 persons, the ship's construction, equipment and operation must take this into account to ensure that the ship complies with the provisions of section 2 of the Act on Safety at Sea.*

In this regard, the Danish Maritime Authority may require that the ship fully or partially fulfil the regulations that apply to certification in accordance with, e.g. IMO Code of safety for Special Purpose Ships, 2008 (2008 SPS Code).

Regulation 2 Definitions

For the purposes of these regulations, unless expressly provided otherwise, the following definitions shall apply:

(a) "Regulations" means the regulations contained in the anex to this Convention *(SOLAS 74)*.

(b) "Administration" means the government of the State whose flagship is authorised to fly. *For Danish ships, the Administration means the Danish Maritime Authority, unless otherwise specified.*

(c) "Approved" means approved by the Administration.[2)]

(d) "international voyage" means a voyage from a country covered by this *Convention (SOLAS 74)* to a port outside that country or vice versa. *Journeys between Denmark and the Faroe Islands and between Denmark and Greenland, as well as journeys between the Faroe Islands and Greenland or between two foreign ports are considered international journeys.*

(e) "A passenger" is any person apart from:

(e)(i) the master and the members of the crew or other persons employed or engaged for service on board in any capacity; and

(e)(ii) a child under 1 year of age.

(f) A 'passenger ship' is a ship that carries more than 12 passengers.

(g) A 'cargo ship' is any ship that is not a passenger ship *or a fishing vessel.*

(h) A 'tanker' is a cargo ship built or adapted for the carriage in bulk of liquid cargo of a flammable nature.

(i) A "fishing vessel" is a vessel used for catching fish, whales, seals, walruses or other living resources from the sea, *or which is covered by Notices from the Danish Maritime Authority E.*

(j) A "nuclear ship" is a ship that is equipped with a nuclear power plant.

(k) "New ship" means *a passenger or cargo* ship the keel of which is laid or which is at a similar stage of construction on or after 25 May 1980. *For cargo ships of less than 500 gross tonnage, a new ship is a ship whose keel was laid on or after 1 January 2002.*

(l) "Existing ship" means a ship that is not new.

(m) A "nautical mile" is 1852 metres or 6080 feet.

(n) "Anniversary" means the day and month of each year corresponding to the expiry date of the relevant certificate.

(o) *"Organisation" means the International Maritime Organisation (IMO).*

(p) *"Parties" means countries that have acceded to SOLAS 74 and its 1978 Protocol.*

(q) *"Classification society" means an organisation recognised by the Danish Maritime Authority in accordance with the provisions of chapter XI-1, regulation 1.*[3)]

(r) *"Length L1" is the length measured from the forward edge of the intersection of the plating with the upper surface of the deck at the bow to the aft edge of the intersection of the plating with the deck at the stern.*

(s) *"Scantling number" means the length L1 multiplied by the maximum width W of the vessel as stated in the vessel's measurement certificate.*[4)]

(t) *" Gross tonnage" is the gross tonnage (GT) measured according to the applicable provisions on the measurement of ships; for ships with a length of 24 metres and over, according to the provisions of the International Convention on Tonnage Measurement of Ships, 1969. For ships built before 18 July 1994, which have been measured according to the tonnage measurement regulations in force before the entry into force of the International Convention on Tonnage Measurement of Ships, 1969, and where this tonnage is endorsed on the International Tonnage Certificate (1969), this gross tonnage shall be used for the purposes of these provisions. For ships with a length of less than 24 metres, measured solely according to the previously applicable measurement regulations (1947), the gross registered tonnage (GRT) is used.*

(u) *"Recreational craft" A vessel used for sport or recreational purposes, regardless of the means of propulsion.*

(v) *"Length (L)v calculated as 96% of the total length of a waterline at 85% of the minimum depth (moulded) measured from the keel line, or as the length from the bow to the axis of the stem of the rudder calculated on the said waterline, if this length is the greater. In vessels with steering speed, the waterline on which the length is measured shall be parallel to the drawn waterline.*[5)]

(w) *A "Special Purpose Ship (SPS)" is a mechanically propelled cargo ship with a gross tonnage of 500 and above that, due to its special tasks, carries more than 12 Special Purpose Personnel (SP) in addition to the ship's crew.*

(x) *"Special Personnel (SP)" means all persons who are not passengers or crew members who are on board in connection with the ship's special functions or due to special work performed on board.*

Regulation 3 Exceptions

(a) Unless expressly provided otherwise, these regulations *(see regulation 2(a))* do not apply to:

(a)(i) warships and troop carriers;

(a)(ii) cargo ships with *a length (L) of less than 15 metres and with a scantling number of less than 100;*

(a)(iii) ships that are not mechanically propelled;

(a)(iv) wooden ships of primitive build;

(a)(v) recreational craft *laid down before 1 January 2004 and recreational craft with a hull length of 24 metres or less laid down on or after 1 January 2004,* which are not used for commercial purposes;

(a)(vi) fishing vessels.

(b) Except as expressly provided in chapter V, nothing in these regulations shall apply to ships engaged solely on the Great Lakes of North America and St. Lawrence River as far east as a straight line drawn from Cap des Rosiers to West Point, Anticosti and - on the north side of Anticosti - the 63rd meridian.

Regulation 4 Exemptions[6)]

(a) A ship which does not normally engage on international trade but which in exceptional circumstances, is required to make a single international voyage may be exempted by the Administration from complying with the requirements of these regulations provided that it fulfils the safety requirements which, in the judgement of the Administration, are adequate for the voyage the ship is to undertake.

(b) The Administration may exempt from the provisions of chapters II-1, II-2, III and IV a ship fitted with completely new devices when the application of these provisions would seriously hamper research work on the development of these devices and their installation on ships engaged on international trade. However, any such ship shall fulfil such safety requirements as, in the judgement of the Administration, are adequate for the service for which the ship is intended and which will ensure the general safety of the ship and which are also acceptable to the Government of the States which the ship will visit. An Administration granting such an exemption shall communicate to the Organisation particulars thereof and the reasons for this, and the Organisation shall forward this information to the Contracting Governments for their information.

(c) *The Danish Maritime Authority may, in connection with drawing approval and first survey of ships with a length of less than 24 metres, exempt ships from one or more provisions of these regulations, based on a specific assessment. The prerequisite for this is that the ship fulfils equivalent safety requirements which, in the Administration's judgement, are adequate for ships of this size and at the speed for which the ship is intended.*

(d) *The Danish Maritime Authority may fully or partially exempt individual ships from carrying out surveys not stipulated in the international conventions applicable to Denmark. This is subject to the condition that it is demonstrated that the use of materials, structures, arrangements, modes of operation or control systems other than those prescribed provides a level of safety at least as effective as if the survey in question had been carried out.*

Regulation 5 Equivalence

(a) Where these regulations require that a particular accessory, material, device or appliance or type thereof shall be fitted or present in a ship, or that a particular measure shall be taken, they may

The Administration shall authorise the fitting or presence of any other accessory, material, device or appliance, or type thereof, or the taking of any other measure in the ship if it is satisfied by testing or otherwise that such accessory, material, device or appliance, or type thereof, or measure is at least as effective as that required by the regulations.

(b) Any Administration which so authorises as a substitute another accessory, material, device or appliance, or type thereof, or measure, shall communicate details thereof to the Organisation, together with a report of any tests made, and the Organisation shall forward this information to the other Contracting Governments for the purpose of informing their officials.

Section B Survey and certificates[7)8)]

Regulation 6 Inspection and survey

(a) The inspection and survey of ships for the enforcement of the provisions of these regulations and the granting of exemptions from these shall be carried out by officers of the Administration. However, the Administration may entrust inspections and surveys to nominated surveyors or recognised organisations.

(b) An Administration which nominates surveyors or recognised organisations to conduct inspections and surveys referred to in paragraph (a) shall at least authorise any nominated surveyor or recognised organisation to:

(b)(i) To require repairs to be made to a ship; and

(b)(ii) To carry out surveys and inspections at the request of the competent authorities of a port State.

The Administration shall inform the Organisation of the specific tasks and conditions of the authorisation to nominated surveyors or recognised organisations.[9)]

c) When a nominated surveyor or recognised organisation establishes that the ship or its equipment does not substantially conform to the particulars in the certificate or that the ship is in such condition that it is unfit to proceed to seas without danger to the ship or persons on board, the surveyor or organisation concerned shall immediately ensure that corrective action is taken and shall notify the Administration in due time. If such steps are not taken to rectify the situation, the relevant certificate should be withdrawn and the Administration informed immediately; if the ship is in a port of another party, the relevant authorities of the port State should also be informed immediately. When an officer of the Administration or a nominated surveyor or a recognised organisation has notified the relevant authorities of the port State, the Government of that port State shall give that officer, surveyor or organisation all necessary assistance in the performance of their duties under this regulation. The Government of the port State concerned shall, where appropriate, ensure that the ship does not sail until it can proceed to sea or leave the port to proceed to the appropriate repair yard without danger to the ship or persons on board.

(d) The Administration must in all cases fully guarantee that the inspection and survey have been carried out effectively and thoroughly and must ensure that the necessary measures are taken to fulfil this obligation.

(e)(i) *Every ship must, before it enters service as a new build, be approved by the Danish Maritime Authority following a prior survey.*

(e)(ii) *Any ship must, before it enters service as purchased from abroad, be approved by the Danish Maritime Authority following a prior survey. In this regard, the Danish Maritime Authority must also assess whether the ship fulfils*

the general provisions of section 2 of the Act. However, this assessment does not have to be made for matters covered by regulation no. 789 of 21 April 2004 on the transfer of cargo and passenger ships between registers within the Community.

(f) *No passenger ship shall proceed without the authorisation specified in regulation 12(a)(i) to carry passengers or outside the trade area specified in the authorisation or with more passengers than specified therein.*

(g) *Sailing may not take place if the validity of a certificate issued by or on behalf of the Danish Maritime Authority has expired or if a prescribed inspection has not been carried out.*

Regulation 6-1 Special inspections and inspection intervals

(a) *The Danish Maritime Authority may at any time order a ship to undergo an extraordinary survey, and in special circumstances it may fix survey dates deviating from those laid down in regulations 8-1, 9-1 7 and 10-1 of this chapter.*

(b) *For laid-up vessels, the Danish Maritime Authority may allow prescribed periodic surveys to be omitted in whole or in part for as long as the vessel remains laid-up.*

Regulation 7 Survey of passenger ships[10)]

(a) A passenger ship shall be subject to the following surveys:

(a)(i) A first survey before the ship is put into service.

(a)(ii) A renewal survey once every 12 months, except where regulation 14(b), (e), (f) and (g) apply.

(a)(iii) Additional surveys as required.

(b) The above-mentioned surveys must be carried out in the following manner:

(b)(i) The first survey shall include a complete inspection of the ship's structure, machinery and equipment, including the external bottom of the ship and the interior and exterior boilers. This survey shall be carried out so as to ensure that the arrangements, material and material dimensions of structures, boilers and other pressure vessels with accessories, main and auxiliary machinery, electrical installations, radio installations including those used in life-saving appliances, fire protection, fire safety systems and extinguishing systems, rescue appliances and measures, ship navigation equipment, nautical publications, pilotage equipment and other equipment fully comply with the requirements of these regulations and of the laws, decrees and administrative regulations issued by the Administration in consequence thereof for ships engaged on the voyages for which they are intended. The survey shall also ensure that the workmanship of all parts of the ship and its equipment is satisfactory in all respects and that the ship is equipped with the lanterns, signalling devices, means of sounding signals and distress signals required by the provisions of these regulations and the applicable international navigation regulations.

(b)(ii) The renewal survey must include an inspection of the structure, boilers and other pressure vessels, machinery and equipment, including the external bottom of the ship. The survey shall be carried out so as to ensure that the ship, in respect of construction, boilers and other pressure vessels with accessories, main and auxiliary machinery, electrical installations, radio installations, including those used in life-saving appliances, fire protection, fire safety systems and fire extinguishing systems, rescue appliances and measures, ship navigation equipment, nautical publications, pilotage and other equipment, are in satisfactory condition and fit for the service for which they are intended, and that they fulfil the requirements of these regulations and the laws, decrees, orders and administrative regulations issued by the Administration in consequence thereof. The lanterns,

signalling devices and means of sounding signals and distress signals carried by the ship shall also be subject to the said survey to ensure that they meet the requirements of these regulations and of the applicable international navigation regulations.

(b)(ii) An additional survey, either a main survey or a partial survey, as appropriate, shall be carried out after a repair prompted by surveys as prescribed in regulation 11 or when major repairs or renewals are carried out. The survey shall be carried out in such a manner as to ensure that the necessary repairs or renewals have been carried out effectively, that the materials used and the workmanship of such repairs and renewals are satisfactory in all respects and that the ship complies in all respects with the provisions of these regulations and of the applicable international navigation regulations and the laws, regulations, orders and administrative provisions issued by the Administration pursuant thereto.

(c)(i) The laws, regulations, orders and administrative provisions referred to in paragraph (b) of this regulation shall be such as to ensure in all respects that the ship is fit, from a safety point of view, for the service for which it is intended.

(c)(ii) The provisions shall, among other things, prescribe the requirements for the first and subsequent hydraulic tests or other approved alternative tests to which the main and auxiliary boilers with connections, vapour lines, high-pressure tanks and fuel tanks of internal combustion engines shall be subjected, including the test procedure to be followed and the interval between two consecutive tests.

Regulation 8 Survey of life-saving appliances and other equipment on cargo ships of 500 gross tonnage and above

(a) Life-saving appliances and other equipment on cargo ships of 500 gross tonnage and above referred to in paragraph (b)(i) shall be subject to the following survey:

(a)(i) A first survey before the ship is put into service.

(a)(ii) A renewal survey as determined by the Administration, but not less frequently than every 5 years except where regulation 14(b), (e), (f) and (g) apply.

(a)(iii) A periodical survey within three months before or after the second anniversary or within three months before or after the third anniversary of the cargo ship equipment safety certificate shall replace one of the annual surveys referred to in paragraph (a)(iv).

(a)(iv) An annual survey within 3 months before or after each anniversary of the Cargo Ship Equipment Safety Certificate.

(a)(v) An additional survey as prescribed for passenger ships in regulation 7(b)(iii).

(b) The surveys referred to in paragraph (a) shall be carried out as follows:

(b)(i) The first survey shall include a complete inspection of fire safety and fire-extinguishing systems, life-saving appliances and arrangements other than radios, ship navigation equipment, pilotage equipment and other equipment covered by chapters II-1, II-2, III and V to ensure that they fulfil the requirements of these regulations, are in satisfactory condition and are suitable for the intended voyage. Nautical publications, lanterns, signal figures and means for sounding signals and distress signals shall be similarly subjected to the above-mentioned surveys to ensure that they fulfil the requirements of these regulations and of the applicable international navigation regulations where these are applied;[11)]

(b)(ii) Renewal and periodic surveys shall include an inspection of the equipment referred to in paragraph (b)(i) to ensure that it fulfils the relevant requirements of these regulations and of the international navigation regulations, is in satisfactory condition and fit for the service for which the ship is intended;

(b)(iii) The annual survey shall include a general inspection of the equipment referred to in paragraph (b)(i) to ensure that it has been maintained in accordance with regulation 11(a) and that it remains satisfactory for the service for which the ship is intended.

(c) The periodic and annual surveys referred to in paragraphs (a)(iii) and (a)(iv) shall be endorsed on the cargo ship equipment safety certificate.

Regulation 8-1 Survey of life-saving appliances and other equipment on cargo ships of less than 500 gross tonnage

(a) *Life-saving appliances and other equipment on cargo ships of 250 gross tonnage and above but less than 500 gross tonnage, as referred to in paragraph (c)(i), shall be subject to the following survey:*

(a)(i) *A first survey before the ship is put into service.*

(a)(ii) *A renewal survey at least every 5 years.*

(a)(iii) *An intermediate survey after the 2nd anniversary and before the 3rd anniversary of the ship's Cargo Ship Safety Certificate (not less than 24 months and not more than 36 months after the first survey or last renewal survey).*

(b) *On cargo ships of 15 metres in length (L) or with a scantling number of 100 or more but less than 250 gross tonnage, life-saving appliances and other equipment referred to in paragraph (c)(i), shall be subject to the following survey:*

(b)(i) *A first survey before the ship is put into service.*

(b)(ii) *A renewal survey at least every 5 years.*

(c) *The inspections referred to in paragraphs (a) and (b) shall be carried out as follows:*

(c)(i) *The first survey shall include a complete inspection of fire safety and fire-extinguishing systems, life-saving appliances and measures other than radio equipment, ship navigation equipment, pilotage equipment and other equipment covered by chapters II-1, II-2, III and V to ensure that they fulfil the requirements of these regulations and are in satisfactory condition and fit for the intended voyage. Nautical publications, lanterns, signal figures and means for sounding signals and distress signals shall be similarly subjected to the above-mentioned surveys to ensure that they fulfil the requirements of these regulations and of the applicable international navigation regulations where these are applied.*

(c)(ii) *Renewal and periodic surveys shall include an inspection of the equipment referred to in paragraph (c)(i) to ensure that it fulfils the relevant requirements of these regulations*[12)] *and of the international navigation regulations, is in satisfactory condition and fit for the service for which the ship is intended.*

(d) *The intermediate surveys referred to in paragraph (a)(iii) shall be endorsed on the safety certificate for cargo ships of less than 500 gross tonnage.*

Regulation 9 Survey of radio installations in cargo ships of 300 gross tonnage and above

(a) Radio equipment, including that used in life-saving appliances in cargo ships to which chapters III and IV apply, shall be subject to the surveys mentioned below:

(a)(i) A first survey before the ship is put into service;

(a)(ii) A renewal survey as determined by the Administration, but not less frequently than every 5 years except where regulations 14(b), (e), (f) and (g) apply;

(a)(iii) A periodical survey within 3 months before or after each anniversary date of the Cargo Ship Safety Radio Certificate;

(a)(iv) An additional survey as prescribed for passenger ships in regulation 7(b)(iii).

(b) The surveys referred to in paragraph (a) shall be carried out as follows:

(b)(i) The first survey shall include a complete inspection of the cargo ship radio installations, including those used in life-saving appliances, to ensure that they fulfil the requirements of these regulations;

(b)(ii) Renewal and periodic surveys shall include an inspection of cargo ship radio installations, including those used in life-saving appliances, to ensure that they fulfil the requirements of these regulations.

(c) The periodic surveys referred to in paragraph (a)(iii) shall be endorsed on the cargo ship's radio safety certificate.

Regulation 9-1 Survey of radio equipment in cargo ships of less than 300 gross tonnage

The annual surveys referred to in paragraph (a)(iii) shall not apply to ships engaged exclusively in domestic trade.

(a) *Radio equipment, including that used in life-saving appliances in cargo ships to which chapters III and IV apply, shall be subject to the surveys mentioned below:*

(a)(i) *A first survey before the ship is put into service.*

(a)(ii) *A renewal survey at least every 5 years.*

(a)(iii) *An annual survey within 3 months before or after each anniversary of the ship's Cargo Ship Safety Certificate.*

(b) *The surveys referred to in paragraph (a) shall be carried out as follows:*

(b)(*i) The firstsurvey shall include a complete inspection of the cargo ship radio installations, including those used in life-saving appliances, to ensure that they fulfil the requirements of these regulations.*

(b)(*ii) Renewal and annual surveys shall include an inspection of cargo ship radio installations, including those used in life-saving appliances, to ensure that they fulfil the requirements of these regulations.*

(c) *The annual surveys referred to in paragraph (a)(iii) shall be endorsed on the safety certificate for cargo ships of less than 500 gross tonnage.*

Regulation 10 Survey of ship structure, machinery and equipment in cargo ships of 500 gross tonnage and above[13)]

(a) The structure, machinery and equipment of a cargo ship (other than matters for which a Cargo Ship Safety Equipment Certificate and Cargo Ship Safety Radio Certificate have been issued) referred to in paragraph (b)(i), shall be subject to surveys and inspections as specified below:

(a)(i) A first survey before the ship is put in service, including an inspection of the ship's external bottom;[14)]

(a)(ii) A renewal survey as prescribed by the Administration, but not more frequently than every 5 years, except where regulations 14(b), (e), (f) and (g) apply;

(a)(iii) An intermediate survey within 3 months before or after the 2nd anniversary or within 3 months before or after the 3rd anniversary of the Cargo Ship Design Safety Certificate. The survey shall replace one of the annual surveys referred to in paragraph (a)(iv);

(a)(iv) An annual survey within 3 months before or after each anniversary of the Cargo Ship Design Safety Certificate;

(a)(v) At least two inspections of the ship's external bottom in any 5-year period during which the cargo ship's Design Safety Certificate or Safety Certificate is valid, except where regulations 14(e) or (f) applies. Where regulations 14(e) or (f) applies, the 5-year period may be extended to coincide with the extended validity period of the certificate. In no case shall the interval between two such surveys exceed 36 months.

(a)(vi) An additional survey as prescribed for passenger ships in regulation 7(b)(iii).

(b) The surveys and inspections referred to in paragraph (a) shall be carried out as follows:

(b)(i) The first survey shall include a complete inspection of the structure, machinery and equipment. The survey must be carried out so as to ensure that the arrangements, materials, material dimensions and workmanship of the structure, boilers and other pressure vessels with accessories, main and auxiliary machinery, including steering gear and associated control systems, electrical installations and other equipment fulfil the requirements of the applicable regulations, are in satisfactory condition and are suitable for the speed for which the vessel is intended. In the case of tankers, a survey must also include inspection of pump rooms, cargo, bunker pipe and vent piping systems and associated safety devices;

(b)(ii) The renewal survey must include an inspection of the structure, machinery and equipment referred to in paragraph (b)(i) to ensure that they fulfil the requirements of these regulations, are in satisfactory condition and fit for the service for which the ship is intended;

(b)(iii) The intermediate survey must include an inspection of the structure, boilers and other pressure vessels, machinery and equipment, steering gear and associated control systems and electrical installations to ensure that they remain satisfactory for the intended voyage. In the case of tankers, the survey shall also include the inspection of pump rooms, cargo, bunker and vent piping systems and associated safety devices and the testing of the insulation resistance of the electrical system in hazardous areas;

(b)(iv) The annual survey shall include a general inspection of the structure, machinery and equipment referred to in paragraph (b)(i) to ensure that they have been maintained in accordance with regulation 11(a) and that they remain satisfactory for the service for which the ship is intended;

(b)(v) The inspection of the ship's external bottom and the survey of related matters carried out at the same time shall be carried out so as to ensure that they remain satisfactory for the speed for which the ship is intended.

(c) The intermediate and annual surveys and the external bottom inspection referred to in paragraphs (a)(iii), (a)(iv) and (a)(v) shall be endorsed on the cargo ship's structural safety certificate.

Regulation 10-1 Survey of the ship's structure, machinery and equipment in cargo ships of less than 500 gross tonnage

(a) *Cargo ships of 15 metres in length (L) and upwards or with a scantling number of 100 or more but less than 500 gross tonnage shall be subject to surveys and inspections of their construction, machinery and equipment as listed below:*

(a)(i) *A first survey before the ship is put into service, including an inspection of the external bottom of the ship.*

(a)(ii) *A renewal survey at least every 5 years.*

(a)(iii) *A minimum of two inspections of the ship's external bottom in any 5-year period, except where regulation 14-1(d) applies. Where regulation 14-1(d) applies, the 5-year period may be extended to coincide with the extended validity period of the licence. In no case shall the interval between two such inspections exceed 36 months.*

(b) *The surveys and inspections referred to in paragraph (a) shall be carried out as follows:*

(b)(i) *The first survey shall include a complete inspection of the structure, machinery and equipment, including the external bottom of the vessel. The survey must be carried out so as to ensure that the arrangements, materials, material dimensions and workmanship of the structure, boilers and other pressure vessels with accessories, main and auxiliary machinery, including steering gear and associated control systems, electrical installations and other equipment fulfil the requirements of the applicable regulations, are in satisfactory condition and are suitable for the speed for which the vessel is intended, and that the necessary stability information has been provided. In the case of tankers, a survey must also include inspection of pump rooms, cargo, bunker pipe and vent piping systems and associated safety devices.*

(b)(ii) *The renewal survey must include an inspection of the structure, including the ship's external bottom, machinery and equipment referred to in paragraph (b)(i) to ensure that they fulfil the requirements of these regulations,*[15)] *are in satisfactory condition and fit for the service for which the ship is intended.*

(b)(iii) *The inspection of the ship's external bottom and the survey of associated conditions carried out at the same time must be such as to ensure that they remain satisfactory for the service for which the ship is intended. The survey also includes an examination of the rudder, propeller shaft and all sea connections located below the deepest load line.*

(c) *The aforementioned inspection of the ship's external bottom is endorsed on the ship's safety certificate.*

Regulation 11 Maintaining the state after the survey[16)]

(a) To ensure that the vessel will remain fit in all respects to proceed to sea without danger to the vessel or persons on board, the vessel and its equipment shall be maintained at all times so as to comply with the provisions of these regulations.

(b) After completion of a survey under regulations 7, 8, 9 or 10, no change shall be made in the structural, machinery, equipment or other matters covered by the survey without the permission of the Administration.

(c) When the ship suffers a casualty or a defect is discovered and the casualty or defect affects the safety of the ship or the effectiveness or integrity of its life-saving appliances or the overall state, the master or owner of the ship shall, as soon as practicable, report the matter to the Administration, the nominated surveyor or the recognised organisation responsible for the issue of the relevant certificate, which shall arrange for investigations to be carried out to determine whether a survey required by regulations 7, 8, 9 or 10 is necessary. If the ship is in the port of another Contracting Government, the master or owner shall also immediately report the incident to

the competent authorities of the port State and the nominated surveyor or recognised organisation must satisfy itself that such notification has been made.

Regulation 12 Issuance or endorsement of certificates[17)]

Except for paragraph (a)(iv), which applies to cargo ships of 300 gross tonnage and above, this regulation does not apply to cargo ships of less than 500 gross tonnage.

(a)(i) A certificate to be known as a Passenger Ship Safety Certificate shall be issued, after a first survey or a renewal survey, to a passenger ship which fulfils the relevant requirements of chapters II-1, II-2, III, IV and V and any other relevant requirements of these regulations.

After the aforementioned survey of a passenger ship, a licence to carry passengers is also issued. The licence must contain information about the conditions of use of the ship, including at least the speed range and the maximum number of passengers allowed. The licence shall be issued in duplicate, one of which shall be placed in a conspicuous place on board for passengers.

(a)(ii) A certificate to be known as a Cargo Ship Design Safety Certificate shall be issued after a first or renewal survey to a cargo ship which complies with the relevant requirements of chapters II-1 and II-2 (other than those relating to fire safety systems, means of extinguishing and fire control plans) and any other relevant requirements of these regulations;

(a)(iii) A certificate to be known as the Cargo Ship Equipment Safety Certificate shall be issued after a first survey or a renewal survey to a cargo ship which fulfils the relevant requirements of chapters II-1, II-2, III and V and any other relevant requirements of these regulations.

(a)(iv) A certificate to be known as the Cargo Ship Safety Radio Certificate shall be issued after a first survey or a renewal survey to a cargo ship which fulfils the relevant requirements of chapter IV and all other relevant requirements of these regulations.

(a)(v)(1) A certificate to be known as a Cargo Ship Safety Certificate may be issued, after a first survey or a renewal survey, to a cargo ship which fulfils the relevant requirements of chapters II-1, II-2, III, IV and V and any other relevant requirements of these regulations as an alternative to those referred to in paragraphs (a)(ii), (a)(iii) and (a)(iv).

(a)(v)(2) When reference is made in this chapter to a Cargo Ship Design Safety Certificate, a Cargo Ship Equipment Safety Certificate or a Cargo Ship Radio Safety Certificate, it also applies to a Cargo Ship Safety Certificate if used as an alternative to these certificates.

(a)(vi) The Passenger Ship Safety Certificate, Cargo Ship Safety Equipment Certificate, Cargo Ship Safety Radio Safety Certificate and Cargo Ship Safety Certificate referred to in points (i), (iii), (iv) and (v) shall be supplemented by an equipment list.

(a)(vii) When an exemption has been granted to a ship under and in accordance with the provisions of these regulations, in addition to the certificates prescribed in this paragraph, a certificate called an Exemption Certificate shall be issued;

(a)(viii) Certificates referred to in this regulation must be issued or endorsed by the Administration or a person or organisation authorised by it. In each case, the Administration has full responsibility for the certificates.

b) A Contracting Government may not issue certificates under and in accordance with the provisions of the International Convention for the Safety of Life at Sea, 1960, 1948 or 1929 after the date on which its accession to that Convention becomes effective.

Regulation 12-1 Certification of cargo ships of less than 500 gross tonnage

(i) *A national certificate to be known as the National Cargo Ship Safety Certificate shall be issued after a first or renewal survey to a cargo ship which fulfils the relevant requirements of chapters II-1, II-2, III, IV and V and any other relevant requirements of these regulations. An existing cargo ship built before 1 January 2002 that complies with the applicable regulations*[18)] *and requirements for the ship will be issued a Cargo Ship Safety Certificate after a renewal survey. On cargo ships of 300 gross tonnage and above, the relevant requirements for radio installations are covered by the Radio Safety Certificate referred to in regulation 12(iv). For cargo ships classed by a classification society, the relevant requirements for hull construction, strength, anchor equipment, machinery, boiler plant, equipment and installations for obtaining the periodically unmanned machinery spaces and electrical installations designation are covered by the class certificates for hull and machinery. The Cargo Ship Safety Certificate must be supplemented with a Record of Equipment for the Cargo Ship Safety Certificate.*

(ii) *If a ship has been granted an exemption under these regulations, this must be indicated on the Cargo Ship Safety Certificate.*

(iii) *Certificates referred to in this regulation shall be issued or endorsed by the Administration or a person or organisation authorised by it.*

Regulation 13 Issuance or endorsement of certificates by another government

This regulation does not apply to certificates issued under regulation 12-1.

A Contracting Government may, at the request of the Administration, have a ship surveyed and shall, if satisfied that the requirements of these regulations have been complied with, issue or authorise the issue of certificates to the ship and, where appropriate, endorse or authorise the endorsement of certificates on the ship in accordance with these regulations. Any certificate so issued shall include a statement that it was issued at the request of the government of the country whose flag the ship is entitled to fly and shall have the same validity and be recognised in the same manner as a certificate issued under regulation 12.

Regulation 14 Validity and validity period of certificates[19)]

This regulation does not apply to certificates issued under regulation 12-1.

(a) A Passenger Ship Safety Certificate shall be issued for a maximum period of 12 months. A Cargo Ship Design Safety Certificate, a Cargo Ship Equipment Safety Certificate, and a Cargo Ship Radio Safety Certificate shall be issued for a period to be determined by the Administration, which shall not exceed 5 years. An exemption certificate is not valid beyond the validity period of the certificate to which it relates.

A licence to carry passengers is valid as long as the conditions of use of the ship remain unchanged and are observed. Validity is also subject to compliance with the survey dates in the safety certificates for passenger ships.

(b)(i) Regardless of the requirements of paragraph (a), when the renewal survey is performed within 3 months before the expiry date of the existing licence, the new licence shall be valid from the date of the main survey until:

(b)(i)(1) For passenger ships: maximum 12 months from the expiry date of the existing certificate;

(b)(i)(2) For cargo ships: maximum 5 years from the expiry date of the existing certificate;

(b)(ii) When renewal surveys are performed after the expiry date of the existing certificate, the new certificate shall be valid from the date the renewal survey was performed until:

(b)(ii)(1) For passenger ships: maximum 12 months from the expiry date of the existing certificate;

(b)(ii)(2) For cargo ships: maximum 5 years from the expiry date of the existing certificate;

(b)(iii) When renewal surveys are performed more than 3 months before the expiry date of the existing certificate, the new certificate shall be valid from the date of the renewal survey until:

(b)(iii)(1) For passenger ships: maximum 12 months from the date of the renewal survey;

(b)(iii)(2) For cargo ships: maximum 5 years from the date of the renewal survey.

(c) With the exception of passenger ship safety certificates, for certificates issued for a period of less than 5 years, the Administration may extend the period of validity of the certificate beyond the expiry date to the maximum period laid down in paragraph (a), provided that the surveys referred to in regulations 8, 9 and 10 applicable to certificates issued for a 5-year period are carried out as prescribed.

(d) If a renewal survey has been carried out and a new certificate cannot be issued or placed on board the ship before the expiry date of the existing certificate, the person or organisation authorised by the Administration may endorse the existing certificate and such certificate shall be accepted as valid for an extended period not exceeding 5 months from the expiry date.

(e) If, at the time of expiry of the certificate, the ship is not in a port where it is due for a survey, the Administration may extend the period of validity of the certificate, but such extension shall be granted only for the purpose of allowing the ship to complete its voyage to the port where it is due for the survey and then only in cases where it appears just and reasonable to do so. No certificate shall be extended for a period longer than 3 months, and a ship to which such an extension has been granted shall not be entitled, on arrival in the port of call, to leave that port by virtue of that extension without having obtained a new certificate. Once a renewal survey has been performed, the new certificate must be valid until:

(e)(i) For passenger ships: maximum 12 months from the expiry date of the existing certificate before the extension was granted;

(e)(ii) For cargo ships: maximum 5 years from the expiry date of the existing certificate before the extension was granted.

(f) A certificate issued to a ship engaged on short voyages which has not been revalidated under the preceding provisions of this regulation may be revalidated by the Administration for an additional period of up to 1 month from its stated expiry date. Once the renewal survey is done, the new certificate must be valid until:

(f)(i) For passenger ships: maximum 12 months from the expiry date of the existing certificate before the extension was granted;

(f)(ii) For cargo ships: maximum 5 years from the expiry date of the existing certificate before the extension was granted.

(g) In exceptional cases, a new certificate need not be dated from the expiry date of the existing certificate as required by paragraph (b)(ii), (e) or (f), as determined by the Administration. In these special cases, the new certificate must be valid until:

(g)(i) For passenger ships: maximum 12 months from the date of the renewal survey;

(g)(ii) For cargo ships: maximum 5 years from the date of the renewal survey.

(h) If an annual, intermediate or periodic survey takes place before the period specified in the relevant regulations, then:

(h)(i) The anniversary date shown on that certificate shall be changed by endorsement to a date not more than 3 months later than the date of the survey;

(h)(ii) The subsequent annual, intermediate or periodic survey required by those regulations shall be carried out at intervals as prescribed in those regulations using the new anniversary date;

(h)(iii) The expiry date may remain unchanged provided that one or more annual, intermediate or periodic surveys are carried out as conditions warrant so that the maximum intervals between surveys prescribed in the relevant regulations are not exceeded.

(i) A certificate issued under regulations 12 or 13 shall cease to be valid in any of the following cases:

(i)(i) If the surveys and inspections concerned have not been carried out within the periods specified under regulations 7(a), 8(a), 9(a) and 10(a);

(i)(ii) If the certificate is not endorsed in accordance with these regulations;

(i)(iii) On transfer of the ship to the flag of another State. A new certificate shall only be issued when the Government which is to issue the new certificate is satisfied that the ship complies with the requirements of regulations 11(a) and (b). In the case of transfer between Contracting Governments, the Government of the State whose flag the ship was formerly entitled to fly shall, if requested within 3 months after the transfer has taken place, send to the Administration as soon as possible copies of the certificates held by the ship before the transfer and copies of the relevant survey reports, if available.

Regulation 14-1 Validity and period of validity of certificates for cargo ships of less than 500 gross tonnage

This regulation applies only to certificates issued under regulation 12-1.

(a) *A trade permit is valid as long as the conditions of use of the ship remain unchanged and are respected. Validity is also subject to compliance with the inspection dates in the national safety certificate for cargo ships.*

(b) *A National Cargo Ship Safety Certificate must be issued for a maximum period of 5 years.*

(c)(i) *The new certificate, when the renewal survey is performed within 3 months before the expiry date of the existing certificate, shall be valid from the date of completion of the renewal survey until a maximum of 5 years from the expiry date of the existing certifcate.*

(c)(ii) *When a renewal survey is performed after the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey until a maximum of 5 years from the expiry date of the existing certificate.*

(c)(iii) *When a renewal survey is performed more than 3 months before the expiry date of the existing certificate, the new certificate shall be valid until a maximum of 5 years from the date when the renewal survey was completed.*

(d) *The Authority may extend the period of validity of the licence beyond the expiry date in accordance with the provisions of regulations 14(c) to (h).*

(e) *A certificate issued under regulation 12-1 shall cease to be valid in any of the following cases:*

(e)(i) *If the surveys and inspections concerned have not been carried out within the time periods specified under regulations 8-1(a) and (b), 9-1(a) and 10-1(a);*

(e)(ii) *On transfer of the ship to the flag of another State.*

Regulation 15 Form of certificates and equipment lists[20)]

This regulation does not apply to certificates issued under regulation 12-1.

The certificates and equipment lists shall be drawn up in a form corresponding to the models set out in the Annex to this Convention *(SOLAS* 74). If the language used is neither English nor French, the wording must include a translation into one of these languages.[21)]

Regulation 16 Availability of certificates[22)]

Certificates issued in accordance with regulations 12 and 13 *and* 12-1 shall be readily available for inspection on board at all times.

Regulation 17 Recognition of certificates

This regulation does not apply to certificates issued under regulation 12-1.

Certificates issued under the authority of a Contracting Government shall be recognised by the other Contracting Governments in all matters relating to this Convention *(SOLAS 74).* They shall be recognised by the other Contracting Governments as having the same validity as certificates issued by themselves.

Regulation 18 Limitation of certificates

(a) If a ship carries fewer persons on board on a single voyage than the total number specified in the Passenger Ship Safety Certificate and is consequently entitled, in accordance with the provisions of these regulations, to carry a smaller number of lifeboats and other life-saving appliances on board than those specified in the certificate, the Government or the person or organisation referred to in regulations 12 or 13 of this chapter may issue an annex to the certificate.

(b) It must be stated in this annex that, under the circumstances, there has been no violation of the provisions of these regulations. It shall be attached to the certificate and shall replace it as far as the rescue equipment is concerned. It is only valid for the specific voyage it is issued for.

Regulation 19 Control[23)]

(a) Every ship in the port of another Contracting Government shall be subject to control by officers authorised by that Government in so far as such control is for the purpose of ascertaining the validity of certificates issued in accordance with regulations 12 or 13.

(b) Such certificates, if valid, shall be recognised unless there are clear grounds for believing that the condition of the ship or its equipment is not substantially in accordance with the information contained in any of the certificates or that the ship or its equipment does not comply with the provisions of regulations 11(a) and (b).

(c) In the circumstances referred to in paragraph (b) or if a certificate has expired or is no longer valid, the inspecting officer must take steps to ensure that the ship does not sail until it can proceed to sea or leave the port to proceed to the appropriate repair yard without danger to the ship or persons on board.

(d) In the event that this control gives rise to action of any kind, the official carrying out the control shall immediately inform the Consul or, if there is no Consul, the nearest diplomatic representation of the State whose flag the ship is entitled to fly[24]) in writing of the circumstances which led to the action being deemed necessary. In addition, the nominated surveyors or recognised organisations responsible for issuing the certificates shall also be informed. The facts surrounding the intervention must be reported to the Organisation.

(e) The competent authority of the port State must provide the authorities of the next port of call, in addition to the parties mentioned in paragraph (d), with all relevant information concerning the ship if it is unable to take measures referred to in paragraphs (c) and (d) or if the ship has been authorised to proceed to the next port of call.

(f) When exercising control under this regulation, every effort shall be made to avoid unnecessary detention or delay of a ship. If the ship has been unnecessarily detained or delayed, it is entitled to compensation for any loss or damage.

Regulation 20 Privileges

No privileges under this Convention *(SOLAS* 74) may be claimed for a ship which does not hold the prescribed valid certificates.

Section C Marine

casualties Regulation

21 Marine casualties[25])

(a) Each Administration undertakes to conduct an investigation into any marine casualty occurring in a of its ships to which the provisions of this Convention *(SOLAS* 74) apply, when it considers that such a survey may assist in determining what amendments to these regulations may be desirable.[26])

(b) Each Contracting Government undertakes to provide the Organisation with relevant information on the results of these investigations. No report or recommendation of the Organisation based on this information shall disclose the identity or nationality of the ships concerned or in any way, expressly or impliedly, attribute responsibility to any ship or person.

Section D Miscellaneous

Regulation 22 General safety

Adequate precautions must be taken to protect against casualties during the normal operation of the ship so that people working or staying on board or getting on or off the vessel are, as far as possible, not exposed to injury except through lack of due caution.

[1] Chap. I. Refer to MSC-MEPC. 5/Circ. 8 on Unified interpretation of the application of regulations governed by the building contract date, the keel laying date and the delivery date for the requirements of the SOLAS and MARPOL Conventions.

[2] Chap. I. The Danish Maritime Authority accepts calculations and tests carried out by recognised testing institutes, including testing institutes in other EU Member States and in countries covered by the EEA Agreement, which provide adequate and satisfactory guarantees of a technical, professional and independent nature. Equipment that has been conformity assessed and ratchet marked in accordance with Council Directive 2014/90/EU of 23 July 2014 on marine equipment, as amended, which entered into force on 18 September 2016, and repealing Council Directive 96/98/EC, as amended, which entered into force on 1 January 1999, is approved. Reference is made to the Order on marine equipment implementing Council Directive 2014/90/EU, most recently Order no. 1493 of
11 December 2018.

[3] Chap. I. Reference is made to the current regulation on the recognition and authorisation of organisations that carry out inspections and surveys of ships, most recently Order no. 1294 of 24 November 2015.

[4] Chap. I. Cf. Order no. 845 of 1 December 1998 on the measurement of small ships.

[5] Chap. I. See the definition of length in the Order on Load Lines.

[6] Chap. I. Reference is made to: SLS. 14/Circ. 115, as amended, on the issue of exemption certificates under the 1974 SOLAS Convention and amendments thereto and Port State concurrence with SOLAS exemptions (MSC/Circ. 606).

[7] Chap. I. Reference is made to Global and uniform implementation of the harmonised system of survey and certification (HSSC) (resolution A. 883(21)), Survey guidelines under the harmonised system of survey and certification (HSSC), 2011 (resolution A. 1053(27), as may be amended), Guidelines for pre-planning of surveys in dry docks of ships which are not subject to the enhanced programme of inspections (MSC. 1/Circ. 1223), Unified interpretation of the term "first survey" referred to in SOLAS regulations (MSC. 1/Circ. 1290) and Guidelines for Administrations to ensure the adequacy of transfer of class-related matters between recognised organisations (ROs) (MSC-MEPC. 5/Circ. 2).

[8] Chap. I. *In addition to the surveys and certificates in this chapter, which refer to the SOLAS 74 Convention as amended, these regulations also contain requirements for surveys and certificates in other chapters, including chapters XIII and XIV, and in codes to which the regulation refers*

[9] Reference is made to MSC/Circ. 1010 - MEPC/Circ. 382 on Communication of information on the authorisation of recognised organisations (ROs), and the information collected via the Global Integrated Shipping Information System (GISIS).

[10] Refer to Surveys and inspections of ro-ro passenger ships (resolution A. 794(19), Guidelines for unscheduled inspections of ro-ro passenger ships by flag States (MSC/Circ. 956) and Guidelines for the assessment of technical provisions for the performance of an in-water survey in lieu of bottom inspection in dry-dock to permit one dry-dock examination in any five-year period for passenger ships other than ro-ro passenger ships (MSC. 1/Circ. 1348).

[11] Chap. I. Refer to: SLS. 14/Circ. 1, Record of approved cargo ship safety equipment.

[12] Chap. I. For cargo ships built before 1 January 2002, this means the regulations in force at the time of construction, as amended. For ships built after 1 June 1985 but before 1 January 2002, Danish Maritime Authority Notices C as amended.

[13] Chap. I. Refer to Guidelines for bulk carrier hatch cover surveys and owner's inspections and maintenance (MSC/Circ. 1071)

[14] Chap. I. Refer to: PSLS. 2/Circ. 5, Circular concerning inspection of the outside of the ship's bottom.

[15] Chap. I. For cargo ships built before 1 January 2002, this means the regulations in force at the time of construction, as amended. For ships built after 1 June 1985, but before 1 January 2002, Danish Maritime Authority Notices C as amended.

[16] Chap. I. Refer to Ship design, construction, repair and maintenance (MSC/Circ. 1070) and Shipboard technical operating and maintenance manuals (MSC. 1/Circ. 1253).

[17] Chap. I. Refer to resolution A. 1073(28) on recommendation on the use of national tonnage in applying international conventions.

[18] Chap. I. For cargo ships built before 1 January 2002, this means the regulations in force at the time of construction, as amended. For ships built after 1 June 1985, but before 1 January 2002, Danish Maritime Authority Notices C as amended.

[19] Chap. I. Refer to MSC-MEPC. 5/Circ. 1 on Recommended conditions for extending the period of validity of a certificate and to MSC-MEPC. 5/ Circ. 3 on Unified interpretation of the date of completion of the survey and verification on which the certificates are based.

[20] Chap. I. Reference is made to Guidance on the timing of replacement of existing certificates by the certificates issued after the entry into force of amendments to certificates in IMO instruments (MSC-MEPC. 5/Circ. 6).

[21] Chap. I. Refer to resolution A. 561(14), Translation of the text of certificates.

[22] Chap. I. Reference is made to Retention of original records/documents on board ships (MSC-MEPC. 4/Circ. 1) and Guidance on the timing of replacement of existing certificates by the certificates issued after the entry into force of amendments to certificates in IMO instruments (MSC-MEPC. 5/Circ. 6).

[23] Chap. I. Refer to resolution A. 1052(27), procedures for port State Control and Code of good practice for port State control officers (MSC MEPC. 4/Circ. 2).

[24] Chap. I. Reference is made to MSC/Circ. 1011 - MEPC/Circ. 383 on Measures to improve port State control procedure and to MSC-MEPC. 6 circular series and to the information collected via the Global Integrated Shipping Information System (GISIS).

[25] Chap. I. Reference is made to further provisions for the investigation of marine casualties and incidents as laid down in regulation XI-1/6.

[26] Chap. I. Refer to resolution A. 849(20), Code for the investigation of marine casualties and incidents, as amended by resolution A. 884(21). Also refer to: MSC/Circ. 953 - MEPC/Circ. 372: Reports on marine casualties and incidents. Revised harmonised reporting procedures - Reports required under SOLAS regulation I/21 and MARPOL 73/78 articles 8 and 12, and to Act no. 457 of 18 May 2011 on safety investigation of casualties at sea, Order no. 585 of 8 June 2011 for Greenland on investigation of casualties at sea. Furthermore, refer to resolution MSC 255(84) "Adoption of the code of the international standards and recommended practices for a safety investigation into a marine casualty or marine incident (Casualty Investigation Code)".

Annex 3

Chapter II-1 - Construction - building, partitioning and stability, machinery and electrical systems

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Section A General provisions

Regulation 1 Scope of application[1)]

1.1 Unless expressly provided otherwise, this chapter applies to *passenger ships irrespective of size and cargo* ships *of 500 gross tonnage and upwards, the keel* of which is laid or is at a similar stage of construction on or after 1 January *2009 and cargo ships of less than 500 gross tonnage, the keel of which is laid on or after 1 January 2002.*

1.1.1 Unless expressly provided otherwise, sections B, B-1, B-2 and B-4 of this chapter apply only to ships:

1) where the building contract was signed on or after 1 January 2020; or

2) if a building contract does not exist where the keel is laid or where the structure is at an equivalent stage of construction on or after 1 July 2020; or

3) where delivery takes place on 1 January 2024 or later.

1.1.2 Unless expressly provided otherwise, the Administration shall, in respect of ships not subject to the provisions of subsection 1.1.1 but constructed on or after 1 January 2009

1) ensure that the requirements of sections B, B-1, B-2 and B-4 of chapter II-1 of the International Convention on Safety of Life at Sea (SOLAS) 1974, as amended by resolution MSC. 216(82), MSC. 269(85) and MSC. 325(90), are met; and

2) ensure that the requirements of regulations 8-1.3 and 19-1 are met.

1.2 In this chapter, the term "at a similar stage of construction" means the stage where:

1.2.1 construction work identifiable with a specific ship is commenced; and

1.2.2 assembly of this ship has commenced and involves at least 50 tonnes or 1% of the estimated total hull mass, whichever is less.

1.3 In this part:

1.3.1 the term *'constructed ships'* means ships the keel of which is laid or which are at a similar stage of construction;

1.3.2 *the* term *ships built on or after 1 January 2024* means ships:

1) for which the building contract is signed on or after 1 January 2024, or

2) if there is no building contract, the keel of which is laid or which is at a similar stage of construction on or after 1 July 2024; or

3) if delivery takes place on or after 1 January 2028.

1.3.3 the term "*all ships*" means ships built before, on or after 1 January 2009;

1.3.4 a cargo ship, irrespective of when it was built, which is converted into a passenger ship shall be treated as a passenger ship built on the date on which the conversion commences."

2 Unless expressly provided otherwise, the Administration shall, in respect of ships built before 1 January 2009

2.1 ensure that the requirements of chapter II-1 of the International Convention on Safety of Life at Sea (SOLAS) 1974, as amended by resolution MSC. 1(XLV), MSC. 6(48), MSC. 11(55), MSC. 12(56), MSC. 13(57), MSC. 19(58), MSC. 26(60), MSC. 27(61), resolution 1 of the 1995 SOLAS Conference, MSC. 47(66), MSC. 57(67), MSC. 65(68), MSC. 69(69), MSC. 99(73), MSC. 134(76),
MSC. 151(78) and MSC. 170(79) are met, and

2.2 ensure that the requirements of regulations 8-1.3 and 19-1 are met.

3 All ships that are repaired, altered, converted and refitted in connection therewith must continue to fulfil at least the requirements that previously applied to these ships. Such ships, if built before 1 January 2009, shall, as a general rule, comply with the requirements for ships built on or after that date to at least the same extent as they did before they were repaired,

rebuilt, altered or modified in terms of equipment in connection therewith. Repairs, alterations and modifications of a major character and outfitting related thereto shall comply with the requirements for ships constructed on or after 1 January 2009 as far as the Administration considers reasonable and practicable.

4 The Administration may, if it considers that the conditions of the voyage are such that the application of one or more provisions of this chapter would be unreasonable or unnecessary, exempt certain ships or classes of ships flying its flag from complying with these requirements, provided that such ships do not proceed more than 20 miles from the nearest land during the voyage.

5 In the case of passenger ships engaged on specialised services for the carriage of large numbers of passengers, such as pilgrim trade, the Administration may, if it considers it impracticable to require compliance with the requirements of this chapter, exempt such ships from compliance with these requirements provided that they comply fully with the provisions of:

1) the regulations contained in the Annex to the Special Trade Passenger Ships Agreement, 1971; and

2) the regulations contained in the Annex to the Protocol on Space Requirements for Special Trade Passenger Ships, 1973.

Regulation 2 Definitions

For the purposes of this chapter, unless otherwise expressly provided, the following shall apply:

1 "Division length (L_s)" means the greatest calculated length of that part of the ship on or below the deck or decks, which limits the vertical extent of water ingress when the ship is in the deepest division load line.

2 "Midship" is at the centre of the length (L).

3 "Rear perpendicular" is the rearmost part of the division length.

4 "Front perpendicular" is the front part of the division length

5 "Length (L)" is the length as defined in the applicable International Load Line Convention.

6 "Freeboard deck" is the dek defined in the applicable International Load Line Convention.

7 "The front perpendicular" is the front perpendicular as defined in the applicable International Load Line Convention.

8 "Ship's width (W)" is the maximum width from the outer edge of the frame to the outer edge of the frame measured at or below the deepest division load line.

9 "Draught (d)" is the vertical distance from the top of the keel

9.1 amidships for ships subject to the provisions of regulation II-1/1.1.1.1; and

9.2 the mid-point of the division length (L_s) for ships not subject to the provisions of regulation II-1/1.1.1.1 but built on or after 1 January 2009 to the waterline in question.

10 "Deepest division load line (d_s)" is the ship's summer load line draught.

11 "Lightest operational draught (d_l)" means the lightest operational draught corresponding to the lightest anticipated loading and corresponding volume of the tank, including, however also the ballast that maybe necessary for

stability reasons and/or submergence. The entire crew of passengers and crew should be included for passenger ships.

12 "Partial division load line (d_p)" is the lightest operational draught plus 60% of the difference between the lightest operational draught and the deepest division load line.

13 "Trim" is the difference between the forward draught and the aft draught, where the draught is measured at:

13.1 the fore and aft perpendiculars, as defined in the applicable International Convention on Load Lines, for ships to which the provisions of regulation II-1/1.1.1.1 apply; and

13.2 the forward and after end points respectively for ships not subject to the provisions of regulation II-1/1.1.1.1 but constructed on or after 1 January 2009, excluding the curvature of the keel.

14 "Fillability (μ)" is the percentage of a space that can be filled with water.

15 'Machinery space' shall be taken to extend from the top of the keel to the margin line and between the outermost watertight transverse main bulkheads bounding the rooms in which the main and auxiliary propulsion machinery and boilers necessary for propulsion and all fixed coal boxes are located. In the case of more specialised layouts, the Administration can determine the limits of the machinery space.

16 "Weatherproof" means that no matter the conditions on the sea, water will not enter the ship.

17 "Watertight" means that the vessel has structural elements and devices capable of preventing the passage of water in any direction at the pressure level likely to occur intact and in a leak state. In leak condition, the pressure head in the worst-case situation should be considered as at equilibrium, including the intermediate stages of water ingress.

18 "Design pressure" is the hydrostatic pressure that each structure and device assumed to be watertight in the intact and leak stability calculations is designed to withstand.

19 "Bulkhead deck" in a passenger ship means the upper deck

19.1 where the main bulkheads and shell plating are watertight connected for ships subject to the provisions of regulation II-1/1.1.1.1; and

19.2 at any point in the division length (L_s) where the main bulkheads and the shell plating of the ship are watertight, and the lower deck from which the evacuation of passengers and crew will not be impeded at any point by water in relation to the leak stability state as defined in regulation 8 and section B-2 of this chapter for ships not subject to the provisions of regulation II-1/1.1.1.1 but constructed on or after 1 January 2009.

The bulkhead deck can be a stepped deck. In cargo ships not subject to the provisions of regulation II-1/1.1.1.1 but constructed on or after 1 January, the freeboard deck may be considered as a bulkhead deck.

20 "Deadweight" is the difference in metric tonnes between the displacement of a ship in water with a specific gravity of 1.025 at the load waterline corresponding to the assigned summer freeboard and the lightweight of the ship.

21 "Lightweight" means a ship's displacement in metric tonnes without cargo, fuel, lubricating oil, ballast water, fresh and feed water in tanks, ship's provisions and passengers and crew with their effects.

22 "Oil tanker" means an oil tanker as defined in regulation 1 of annex 1 of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973.

23 "Ro-ro passenger ship" means a passenger ship with ro-ro cargo holds or special cargo holds as defined in regulation II-2/3.

24 "Bulk carrier" means a bulk carrier as defined in regulation 1.1, chapter XII.

25 "Keel line" is a line that is parallel to the curvature of the keel and passes through the centre of the ship:

25.1 the upper part of the keel at the centre line or the intersection of the keel with the inside of the shell plating if the rail keel extends below this line on a ship whose shell plating is made of metal; or

25.2 in wooden or composite ships, measure the distance from the lowest edge of the keel rebate. In cases where the shape of the lowest part of the ship's centre is of a hollow nature or where keel planks are fitted, the distance is measured from the point where the line of the flat bottom extending inwards crosses the centre line amidships.

26 "2008 IS Code" means the International Code on Intact Stability, 2008 (the International Code on Intact Stability, 2008), which consists of an introduction, section A (whose provisions shall be deemed mandatory) and section B (whose provisions shall be deemed recommendatory).

27 "Performance-based ship design standards for bulk carriers and oil tankers" means the International Performance-based Ship Design Standards for Bulk Carriers and Oil Tankers, as adopted by the Maritime Safety Committee by resolution MSC. 287(87), which may be amended by the Organisation, provided that such amendments have been adopted, entered into force and given effect in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to Annexes other than chapter I.

28 "I-GF Code" means the International Code for Ships Using Gases or Other Low Flashpoint Fuels, as adopted by the Maritime Safety Committee of the IMO by resolution MSC. 391(95), which may be amended by the Organisation provided that such amendments have been adopted, entered into force and given effect in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to Annexes other than chapter I.

29 "Low flashpoint fuel" means gaseous or liquid fuel with a flashpoint lower than that otherwise permitted by regulation II-2/4.2.1.1.

Regulation 3 Definitions relating to sections C, D and E

For the purposes of of the provisions in sections C, D, and E, unless expressly provided otherwise, the following definitions apply:

1 "Steering control system" is the means by which commands are transmitted from the bridge to the steering gear drives. The control system for steering gear includes transceivers, hydraulic control pumps and associated motors, control devices, pipework and cables.

2 'Main steering gear' means the machinery, rudder actuators, steering gear and any power units for the steering gear and associated equipment and means for transmitting to the rudder stock (e.g. tiller or quadrant) the torque necessary to move the rudder for the purpose of steering the ship under normal operating conditions.

3 "Steering gear" is:

1) in the case of electrical steering gear, an electric motor with associated electrical equipment;

2) electro-hydraulic steering gear, an electric motor with associated electrical equipment and connected pump;

3) in the case of other hydraulic steering gear, a drive motor with connected pump.

4 "Auxiliary steering gear" means the equipment which, without being part of the main steering gear, is necessary to steer the ship in the event of failure of the main steering gear, but does not include tiller, quadrant or components serving the same purpose.

5 "Normal operating and accommodation conditions" means conditions under which the ship as a whole, machinery, plant, appliances and aids to propulsion, steering, safe navigation, fire and flooding protection, internal and external communications and signals, means of escape and navigation and the arrangement of comfortable accommodation are in good order and functioning normally.

6 "Emergency" is a situation where systems necessary for normal operating and living conditions are not functioning due to the failure of the main electrical energy source.

7 "Main source of electrical power" means a source intended to supply electrical energy to the main switchboard for distribution to all systems necessary to maintain normal operating and living conditions in the ship.

8 "Dead ship" is a situation where the main propulsion system, boilers and auxiliary machinery are inoperable due to lack of power.

9 "Main power station" is the room where the main electrical energy source is located.

10 "Main switchboard" is a switchboard that is supplied directly from the main electrical power source and is intended to distribute electrical energy to the ship's systems.

11 "Emergency switchboard" means a switchboard which, in the event of failure of the main electrical power source, is supplied directly from the emergency electrical power source or the temporary emergency power source and which is intended to distribute electrical energy to the emergency systems.

12 "Emergency electrical energy source" is an electrical energy source to supply the emergency switchboard in case the power supply from the main electrical energy source fails.

13 "Power actuating system" means the hydraulic equipment to provide power to turn the rudder stock, comprising one or more drive units with associated pipework and fittings and a rudder actuator. The power actuation systems can share common machine components, i.e. tiller, quadrant and rudder stock, or components that serve the same purpose.

14 "Maximum forward speed" is the maximum speed that the vessel is designed to maintain on the water at maximum draught.

15 "Maximum astern speed" is the speed that the vessel is estimated to be able to achieve with the maximum astern capability at the maximum draught for which the vessel is designed.

16 "Machinery space" means all machinery spaces of category A and all other spaces containing propulsion machinery, boilers, fuel oil installations, steam engines, internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating machinery, stabilisers, ventilation and air conditioning machinery and similar spaces and trunks to such spaces.

17 "Machinery spaces of category A" are those spaces and trunks to such spaces which contain:

1) internal combustion engines used for main propulsion; or
2) internal combustion engines used for purposes other than main propulsion where such machinery has a total power output of at least 375 kW; or
3) an oil-fired boiler or a fuel oil installation.

18 'Control rooms' are the rooms where the radio station, main navigation equipment, emergency power system or centralised fire detection or fire control installations are located.

19 "Chemical tanker" means a cargo ship built or adapted and used for the carriage in bulk of any of the following liquid products listed in either:
1) the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk, chapter 17, adopted by the Safety Committee through resolution MSC. 4(48), hereinafter referred to as the "International Bulk Chemical Code", as it may be amended by the Organisation; or
2) Chapter VI of the Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk, adopted by the Organisation by resolution A. 212(VII), hereinafter referred to as the 'Bulk Chemical Code', as it is or may be amended by the Organisation;

whichever is relevant.

20 "Gas carrier" means a cargo ship built or adapted and used for the carriage in bulk of a liquefied gas or other substance listed in either:
1) the International Code for the Construction and Equipment of Ships carrying liquefied gases in bulk, chapter 19, adopted by the Safety Committee through resolution MSC. 5(48), hereinafter referred to as
"International Gas Carrier Code" means the International Gas Carrier Code as it may be amended by the Organisation; or
2) the Code for the Construction and Equipment of Ships carrying liquefied gases in bulk, chapter XIX, adopted by the Organisation by resolution A. 328 (IX), hereinafter called the 'Gas Carrier Code', as it may be amended, whichever is applicable.

Section A-1 Construction of ships

Regulation 3-1 Structural, mechanical and electrical requirements for ships

In addition to the requirements contained elsewhere in these regulations, ships shall be designed, constructed and maintained in accordance with the strength, mechanical and electrical requirements of a classification society recognised by the Administration in accordance with the provisions of regulation XI-1/1 or comply with national standards of the Administration, which shall provide an equivalent level of safety.

Regulation 3-2 Protective coating in ballast tanks intended for salt water in all types of ships and side tanks in the double skin of bulk carriers

1 Subsections 2 and 4 of this regulation apply to ships of 500 gross tonnage or more:
1) where the building contract was signed on or after 1 July 2008; or
2) if a building contract does not exist where the keel is laid or where the construction is at a similar stage of construction on or after 1 January 2009; or
3) where delivery takes place on or after 1 July 2012.[2)]

2 All ships' ballast tanks intended for salt water in ships and double-hull side tanks in bulk carriers of 150 metres in length and above shall be coated at the design stage in accordance with the standard for protective coatings in ballast tanks intended for salt water in all types of ships and double-hull side tanks in bulk carriers adopted by resolution MSC.215(82), as may be amended by

the Organisation, provided that such amendments are adopted and enter into force in accordance with the provisions of article VIII of the present Convention on amendment procedures applicable to the annex other than chapter I.

3 All ballast tanks intended for salt water in oil tankers and bulk carriers constructed on or after 1 July 1998 to which section 2 does not apply shall comply with the requirements of regulation II-1/3-2 adopted by resolution MSC.47(66).

4 Maintenance of the protective coating must be included in the ship's overall maintenance plan. The effectiveness of the protective coating must be approved during the service life of the ship by the Administration or an organisation recognised for this purpose by the Administration on the basis of guidelines established by the Organisation.[3)]

Regulation 3-3 Safe access to the bow of tankers

This regulation applies to tankers with a gross tonnage of 500 and above.

1 The application of this regulation and regulation 3-4 includes oil tankers as defined in regulation 2, chemical tanker as defined in regulation VII/8.2 and gas carriers as defined in regulation VII/11.2.

2 Every tanker must be equipped with the means to allow the crew safe access to the bow, even in rough weather. Such means of access shall be approved by the Administration, based on guidelines adopted by the Organisation.[4)]

Regulation 3-4 Emergency towing arrangements on tankers
1 Emergency towing arrangements on tankers

1.1 Emergency towing arrangements must be fitted at both ends of all tankers of 20,000 tonnes deadweight and above.

1.2 For tankers built on or after 1 July 2002, the following applies:

1) It must be possible to quickly mobilise the arrangements at any time in the event of failure of the main power source on the ship to be towed, and it must be easy to connect them to the towing ship. At least one of the emergency towing arrangements must be pre-rigged for rapid deployment; and

2) The emergency towing arrangements at both ends shall be of sufficient strength, taking into account the size and deadweight of the ship and the expected force effects in adverse weather conditions. The design and construction and prototype testing of emergency towing arrangements shall be approved by the Administration on the basis of guidance material developed by the Organisation.[5)]

3) For tankers constructed before 1 July 2002, the design and construction of such emergency towing arrangements shall be approved by the Administration on the basis of guidelines developed by the Organisation.[6)]

2 Emergency towing procedures on ships

2.1 This subsection shall apply to:

2.1.1 all passenger ships by 1 January 2010;

2.1.2 cargo ships built on or after 1 January 2010; and

2.1.3 cargo ships built before 1 January 2010, no later than 1 January 2012.

2.2 Every ship must be equipped with an emergency towing procedure specific to the individual ship, which must be provided on board for use in emergency situations and be based on existing arrangements and equipment on board the ship.

2.3 The procedure[7)] must contain:

2.3.1 Foredeck and aft deck drawings showing possible emergency towing arrangements;

2.3.2 An overview of the equipment on board that can be used for emergency towing;

2.3.3 Communication means and methods; and

2.3.4 Examples of procedures to facilitate the preparation and execution of emergency towing operations.

Regulation 3-5 New installations and repairs of asbestos-containing materials

1 This regulation applies to materials used for hull construction, machinery, electrical installations and equipment covered by the SOLAS Convention.

2 From 1 January 2011, it is prohibited on all ships to carry out new installations[8)] with materials containing asbestos.[9)]

Regulation 3-6 Access to and within spaces in and forward of the cargo area of oil tankers and

bulk carriers 1 Application

1.1 Except as provided in subsection 1.2, this regulation applies to oil tankers of 500 gross tonnage and above and to bulk carriers as defined in regulation IX/1 with a gross tonnage of
20,000 or more built on or after 1 January 2005.

1.2 Oil tankers of 500 gross tonnage and above constructed on or after 1 October 1994 but before 1 January 2005 shall comply with the provisions of regulation II-1/12-2, as adopted by resolution MSC. 27(61).

2 Means of access for cargo holds and other spaces

2.1 All spaces shall be provided with permanent means of access to ensure that general and detailed surveys and thickness measurements of the ship's structure can be carried out throughout the service life of the ship by the Administration, the company as defined in regulation IX/1, the ship's crew or others, as may be necessary. Such means of access shall fulfil the requirements of subsection 5 and of the "Technical provisions for means of access for inspections" adopted by the Maritime Safety Committee by resolution MSC. 133(76) and which may be amended by the Organisation when such amendments have been adopted and entered into force in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to chapters other than chapter I.

2.2 Where a permanent means of access may be damaged during normal loading and unloading operations or where it is impracticable to establish permanent means of access, the Administration may authorise the use of portable or transportable means of access as specified in the technical provisions, provided that the means by which the transportable means of access are fixed, rigged, suspended or supported form an integral part of the ship's structure. All transportable equipment must be easy for the ship's crew to lift or set up.

2.3 All means of access and devices by which they are attached to the ship shall be designed and constructed of materials satisfactory to the Administration. The means of access shall be subjected to a survey prior to or simultaneously with their use during surveys carried out in accordance with regulation I/10.

3 Safe access to cargo holds, cargo tanks, ballast tanks and other compartments

3.1 Safe access[10)] to cargo holds, cofferdams, ballast tanks, cargo tanks and other spaces in the cargo area directly from the open deck shall be provided and it shall be ensured that these spaces can be subjected to a full inspection. Safe access to double bottom spaces or to ballast tanks forward of the cargo area can be from a pump room, deep cofferdam, pipe tunnel, cargo hold, double hull space or similar spaces not intended to carry oil or dangerous goods.

3.2 Tanks and subdivisions of tanks with a length of 35 metres or more shall be equipped with at least two access hatches and ladders located as far apart as practicable. There must be at least one access hatch and ladder for tanks with a length of less than 35 metres. Where a tank is subdivided by one or more bulkheads or similar obstacles that do not provide immediate access to the other parts of the tank, at least two hatches and ladders shall be provided.

3.3 Each cargo hold shall be equipped with at least two means of access located as far apart as practicable. These access points should generally be arranged diagonally, for example, with one access point close to the forward bulkhead on the port side and another close to the aft bulkhead on the starboard side.

4 Handbook on access to the ship's construction

4.1 A ship's means of access to carry out general and detailed surveys and thickness measurements shall be described in a Ship structure access manual approved by the Administration, which shall be kept on board in an up-to-date version. The ship structure access manual must contain the following information about each space:

4.1.1 Drawings showing means of access to the space, with relevant technical specifications and dimensions;

4.1.2 drawings showing the means of access available in each compartment for the purpose of carrying out general surveys, with relevant technical specifications and dimensions. The drawings must indicate from where each area of the compartment can be inspected;

4.1.3 drawings showing the means of access available in each compartment for the purpose of carrying out detailed inspections, with relevant technical specifications and dimensions. The drawings should indicate where critical structural areas are located, whether the means of access is permanent or portable, and from where each area can be inspected;

4.1.4 instructions for inspection and maintenance of the strength of all means of access and fasteners, taking into account the corrosive atmosphere that may exist in the compartment;

4.1.5 instructions and safety tips to follow when using rafts to perform closer inspections and thickness measurements;

4.1.6 instructions on how to safely rig and use any portable means of access;

4.1.7 an overview of all portable means of access; and

4.1.8 a list of the periodic inspections and maintenance of the ship's means of access.

4.2 For the purpose of this regulation, "critical areas" means areas that have been shown by calculations to require monitoring or that have been shown by operating experience with similar structures or sister ships to be susceptible to cracks, dents, deformations or corrosion that could impair the strength of the ship.

5 General technical specifications

5.1 Access through horizontal openings, hatches or manholes must be sized to allow a person wearing a respirator and protective equipment to walk up or down a ladder without encountering obstacles and have an opening large enough to allow an injured person to be hoisted up from the bottom of the compartment. The minimum clear opening must not be less than 600 mm x 600 mm. When access to a cargo hold is established through the cargo hatch, the top of the ladder must be placed as close as possible to the hatch frame. Access hatch frames higher than 900 mm must also have steps on the outside in connection with the ladder.

5.2 For access through vertical openings or manholes in bulkheads, decks, girders and web frames that allow passage through the space, the smallest opening shall not be less than 600 mm x 800 mm at a height of not more than 600 mm from the floor, unless gratings or other steps are provided.

5.3 On oil tankers of less than 5,000 tonnes deadweight, the Administration may in special circumstances approve smaller dimensions for the openings referred to in subsections 5.1 and 5.2 if it can be shown to the satisfaction of the Administration that it is possible to pass through such openings or to remove an injured person.

Regulation 3-7 Storage of construction drawings on board and ashore

1 A set of structural drawings of the ship's construction[11)] and drawings showing all subsequent structural modifications shall be kept on board ships built on or after 1 January 2007.

2 A spare set of these drawings shall be kept at the shipping company's premises as defined in chapter IX, regulation 1(2).

Regulation 3-8 Towing and mooring equipment

1 Subsections 4 to 6 of this regulation apply to ships built on or after 1 January 2007.

2 Subsections 7 and 8 of this regulation apply only to ships:

1) for which the building contract is signed on or after 1 January 2024, or

2) if there is no building contract, if the keel is laid or is at an equivalent construction date on or after 1 July 2024, or

3) if delivery takes place on or after 1 January 2027.

3 This regulation does not apply to towing under regulation 3-4.

4 Ships must be fitted with devices, equipment and fittings with sufficient safe working loads to enable the safe performance of all towing and mooring operations in the normal operation of the ship.

5 Devices, equipment and appliances supplied in accordance with subsection 4 above shall comply with the relevant requirements of the Administration or an organisation recognised by the Administration in accordance with regulation I/6.[12)]

6 Each fitting or equipment supplied under this regulation shall be clearly labelled with all limitations on its safe operation taking into account the strength of the supporting ship structure and its attachment to it.

7 For ships of 3,000 gross tonnage and above, the mooring arrangement shall be designed and the mooring equipment, including lines, shall be selected to ensure healthy and safe mooring of the ship, based on the guidelines developed by the Organisation[13)]. Ship-specific information must be provided and stored on board[14)].

8 Ships of less than 3000 gross tonnage should fulfil the requirement of subsection 7 above as far as practicable or meet the Administration's applicable national standards.

9 For all ships, mooring equipment, including lines, shall be inspected and maintained in a condition fit for their intended purpose[15)].

Regulation 3-9 Means of access on ships

1 Ships constructed on or after 1 January 2010 shall be fitted with means of access for use in port and in port-related operations, such as gangways, in accordance with subsection 2, unless the Administration considers that it would be unreasonable or impracticable[16)] for the ship to comply with a particular regulation.

2 The means of access required in subsection 1 shall be designed and installed on the basis of guidelines developed by the Organisation[17)].

3 On all ships, means of access should be inspected and maintained[18)]) to be in an appropriate condition for their purpose, taking into account the limitations that may be associated with safe loading operations. All wires used to support means of access shall be maintained as specified in chapter III, regulation 20.4.

Regulation 3-10 - Function-based ship design standards for bulk carriers and oil tankers

1 This regulation applies to oil tankers of 150 metres in length and above and to bulk carriers of 150 metres in length and above constructed with a single deck, topsides tanks and hopper tanks in the cargo holds, other than ore carriers and combination carriers:

1.1 for which the building contract was created on or after 1 July 2016;

1.2 in the absence of a building contract, ships whose keel is laid or which are at a similar stage of construction on or after 1 July 2017; or

1.3 ships delivered on or after 1 July 2020.

2 Ships must be designed and constructed for a specified service life, ensuring they are safe and environmentally friendly when properly operated and maintained under specified operational and environmental conditions, both in intact and specific damaged conditions throughout their service life.

2.1 "Safe and environmentally friendly" means that the ship must have sufficient strength, integrity and stability to limit the risk of loss of the ship or pollution of the marine environment due to structural failure, including collapse resulting in flooding or loss of watertight integrity.

2.2 "Environmentally friendly" also implies that the ship is built from materials that can be recycled in an environmentally acceptable way.

2.3 "Safety" also includes the ship's structure, equipment and arrangements for safe access, evacuation, inspection and appropriate maintenance and facilitation of safe operation.

2.4 "Specified operational and environmental conditions" is defined by the intended operating range of the ship throughout its service life and covers conditions, including temporary conditions, arising from cargo and ballast operations in ports, on waterways and at sea.

2.5 "Specified service life" is the nominal period during which the ship is assumed to be exposed to operational and/or environmental conditions and/or degradation and is used to select appropriate ship design parameters. However, the actual service life of the vessel may be longer or shorter depending on the actual operating conditions and the maintenance of the vessel throughout its service life.

3 The requirements of subsections 2 to 2.5 shall be met by satisfactory relevant design requirements of an organisation recognised by the Administration in accordance with the provisions of regulation XI-1/1 or national standards of the Administration which meet the performance requirements of the performance-based ship design standards for bulk carriers and oil tankers.

4 A ship design file containing specific information on how the functional requirements of the performance-based ship design standards for bulk carriers and oil tankers have been applied in the design and construction of the ship shall be made available on delivery of a new ship and kept on board the ship and/or ashore and updated, as appropriate, during the operational life of the ship. The content of the ship design file must at least comply with the guidelines developed by the Organisation.[19)]

Regulation 3-11 - Corrosion protection of crude oil tankers' oil cargo tanks

1 Subsection 3 shall apply to crude oil tankers[20)] as defined in regulation 1 of annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as amended by the Protocol of 1978 relating thereto, of 5,000 tonnes deadweight and above:

1.1 for which the building contract is created on or after 1 January 2013; or

1.2 in the absence of a building contract, ships the keel of which is laid or which are at a similar stage of construction on or after 1 July 2013; or

1.3 vessels delivered on or after 1 January 2016.

2 Subsection 3 shall not apply to combination carriers or chemical tankers as defined in regulation 1 of annexes I and II, respectively, of the International Convention for the Prevention of Pollution from Ships, 1973, as amended by the Protocol of 1978 relating thereto. For the purpose of this regulation, chemical tankers also include chemical tankers certified to carry oil.

3 All crude oil tankers' oil cargo tanks must be:

3.1 coated under the ship's structure in accordance with the Performance standard for protective coatings for cargo oil tanks of crude oil tankers, as adopted by the Maritime Safety Committee by resolution MSC. 288(87), as may be amended by the Organisation provided that such amendments have been adopted, entered into force and given effect in accordance with the provisions of article VIII of this Convention concerning the amendment procedures applicable to annexes other than chapter I; or

3.2 protected by the use of alternative corrosion protection means or the use of corrosion resistant material to maintain the required design integrity for 25 years in accordance with the Performance standard for protective coatings for cargo oil tanks of crude oil tankers as adopted by the Maritime Safety Committee by resolution MSC. 288(87), which may be amended by the Organisation provided that such amendments have been adopted, entered into force and given effect in accordance with the provisions of article VIII of this Convention concerning the amendment procedures applicable to annexes other than chapter I.

4 The Administration may exempt a crude oil tanker from the requirements of subsection 3 to permit the use of new prototypes as alternatives to the coating system specified in subsection 3.1 on a trial basis, provided that such alternatives are subject to appropriate control, regular assessment and recognition of the need for immediate corrective action if the system fails or is shown to fail. Such exceptions must be specified in an exemption.

5 The Administration may exempt a crude oil tanker from the requirements of subsection 3 if the ship is built to carry cargoes exclusively and to be engaged exclusively in cargo-handling activities that do not cause corrosion.[21]) Such an exemption and its conditions shall be specified in an exemption.

Regulation 3-12 - Protection against noise

This regulation is only included for the sake of completeness, as this regulation also serves the purpose of being a Danish translation of the International Convention for the Safety of Life at Sea.

The regulation of noise in ships appears in the Danish regulation on the working environment on ships, which implements a number of EU directives on the protection of workers, including Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the health and safety of workers at work and Directive 2003/10/EC of the European Parliament and the Council on the minimum health and safety requirements regarding the exposure of workers to the risks arising from noise.

The regulations on noise are based on the "Code on noise levels on board ships" (the noise code), adopted by the Maritime Safety Committee (MSC) by resolution MSC. 337(91), and the specified noise limits are identical. However, it should be noted that they cover all ships, including cargo ships of all types, cargo ships of less than 500 gross tonnage, passenger ships engaged in domestic trade and fishing vessels.

1 This regulation applies to any ship with a gross tonnage of 1,600 or more:

1.1 for which the building contract was created on or after 1 July 2014; or

1.2 in the absence of a building contract, a ship the keel of which is laid or which is at a similar stage of construction on or after 1 January 2015; or

1.3 a vessel delivered on or after 1 July 2018,

unless the Administration determines that it would be unreasonable or impracticable to fulfil a specific provision.

2 On a ship delivered before 1 July 2018, and:

2.1 for which a building contract was created before 1 July 2014 and for which the keel has been laid or which is at a similar stage of construction on or after 1 January 2009; or

2.2 in the absence of a building contract, on a ship the keel of which is laid or which is at a similar stage of construction on or after 1 January 2009 but before 1 January 2015,

measures shall be taken[22)] to limit machine noise in machinery spaces to an acceptable level as determined by the Administration. If the noise cannot be adequately minimised, the source of the excessive noise must be adequately isolated, sealed off, or a place of refuge must be provided from the noise if the compartment is required to be manned. If necessary, hearing protection must be provided for personnel in such spaces.

3 Ships shall be designed to minimise noise on board and to protect personnel from noise in accordance with the Code on noise levels on board ships adopted by the Maritime Safety Committee (MSC) by resolution MSC. 337(91) and which may be amended by the Organisation provided that such amendments have been adopted, entered into force and given effect in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to annexes other than chapter I. For the purposes of this provision, although the Noise Code is treated as a mandatory instrument, guidance material as further specified in chapter I of the Code shall be treated as non-mandatory, provided that amendments to such guidance material are adopted by the Maritime Safety Committee (MSC) in accordance with its rules of procedure.

4 Regardless of the provisions of subsection 1, this regulation does not apply to the ship types listed in subsection 1.3.4 of the Noise Code.

5 *Regardless of the provisions of sections 1, 2, 3 and 4 of this regulation, all ships, irrespective of the time of construction, shall be designed to minimise noise on board and to protect personnel from noise in accordance with Notices from the Danish Maritime Authority A, chapter III.*

ANNEX

Revised technical provisions on means of access for inspections and overhauls[23)] 1 Introduction

1.1 It has long been recognised that the only way to ensure a ship's structure is maintained to meet current requirements is to inspect it regularly throughout its service life. This can provide assurance that the ship is free from damage such as cracks, dents or deformations caused by corrosion, overloading or contact damage and that the plate thickness is kept within the set limits. It is important that appropriate means of access to the structure are available for general and more thorough inspection, and these means of access should be considered and included already at the design stage of the ship.

1.2 A ship should be designed and built taking into account how it will be inspected and monitored by flag state and classification society surveyors and overhauled by the ship's crew throughout its service life. Without good access conditions, the condition of the ship can deteriorate unnoticed and serious damage can occur. It is important to incorporate design and maintenance to cover the entire planned service life of the ship.

1.3 To address this issue, the Organisation has developed these technical provisions on means of access for surveys to facilitate the control of the ship's structure and thickness measurements as required by SOLAS regulation II-1/3-6 on access to and forward of cargo holds on board oil tankers and bulk carriers. These regulations do not apply to chemical/oil tankers complying with the provisions of the IBC Code, which are periodically engaged in the carriage of oil cargoes.

1.4 Permanent means of access that are designed as integral parts of the structure are preferred, and the Administration may allow reasonable deviations to facilitate such designs.

2 Definitions

For the purpose of these technical provisions, the following definitions apply in addition to those defined in the 1974 SOLAS Convention, as amended, and in Resolution A. 744(18), as amended:

2.1 "Step" means a step on a vertical ladder or a step on the vertical surface.

2.2 "Steps" means steps on inclined ladders, or steps to the vertical access openings.

2.3 "Flight of an inclined ladder" means the actual side rail length of an inclined ladder. For vertical ladders, it is the distance between platforms.

2.4 "Stringer" means:

2.4.1 the side rail on a ladder, or

2.4.2 a stiffened horizontal plate on the side plating, transverse bulkhead or longitudinal bulkhead in the compartment. In ballast tanks with a width of less than 5 m, placed in a double skin, the horizontal plate may be considered as a stringer and a permanent means of access if it provides a passage of 600 mm or more in width along its entire length, past frames or stiffeners on the side shell or longitudinal bulkheads. Openings in the stringer plate used as permanent access points shall be fitted with railings or gratings to provide safe passage on the stringer or safe access to all cross-ship web frames.

2.5 "Vertical ladder" means a ladder where the angle of inclination with the horizontal is 70º and above up to 90º. Vertical ladders must not be twisted more than 2º.

2.6 "Obstacles above" means the deck or stringer structure, including bracing above the access.

2.7 "Distance under the top of the deck" means the distance under the plate.

2.8 "Centre deck" means the area of the main deck that lies inside and between the hatch frames.

3 Technical provisions

3.1 The structural members to be thoroughly inspected and measured for thickness as specified in SOLAS regulation II-1/3-6 shall, except those in double bottoms, be fitted with permanent means of access as detailed in tables 1 and 2, as appropriate. In oil tankers and in wing tanks of ships carrying ore as cargo, other methods may be used in combination with permanent means of access, provided that the design makes their use safe and efficient.

3.2 As far as possible, permanent means of access should be integrated into the ship's construction to ensure that they are robust and at the same time part of the ship's strength.

3.3 Raised walkways used as permanent access routes shall have a minimum width of 600 mm, except where they pass around vertical webs, where the minimum width may be reduced to 450 mm, and shall be fitted with railings on the open side for their full length. Inclined structures that form part of the access route must be slip resistant. Railings must have a height of 1000 mm and consist of a handrail and an intermediate crossbar at a height of 500 mm and must be a solid construction. There must be no more than 3 metres between supports.

3.4 Permanent means of access and vertical openings must be accessible from the bottom of the ship via easily accessible walkways, ladders or steps. Steps must be fitted with lateral support for the foot. Where steps are placed against a vertical surface, the distance from the centre of the step to the surface must be at least 150 mm. Where vertical manholes are placed at a height of more than 600 mm above the level where you

walk, access should be made easier with steps and handholds, and platforms should be provided on both sides.

3.5 Permanent inclined ladders must have an incline of less than 70°. There must be no obstacles within 750 mm of the front of the inclined ladder, except through openings where this distance can be reduced to 600 mm. The ladder route for inclined ladders must not be greater than 6 metres vertical height. Appropriately sized resting platforms must be provided, usually with a maximum vertical distance of 6 metres. Ladders and handrails shall be constructed of steel or similar material of sufficient strength and rigidity and shall be securely fastened to the tank structure by means of stays. The stays must be supported and their length adjusted to minimise vibration. In cargo holds, ladders should be positioned to minimise difficulties when handling cargo and the risk of damage caused by unloading equipment.

3.6 Inclined ladders must not have a width of less than 400 mm between the side rails. There should be equal distance between all steps and - measured vertically - this distance should be between 200 mm and 300 mm. When steel is used, the steps must be made of two square bars with a cross-section of not less than 22 mm x 22 mm, arranged to form a horizontal step with the edges pointing upwards. The steps must be routed through the side rails and secured to them with a double full weld. All inclined ladders must be fitted with robust handrails on both sides and positioned at an appropriate height above the steps.

3.7 For vertical ladders or spiral ladders, the width and construction shall be in accordance with international or national standards accepted by the Administration.

3.8 No free-standing portable ladder may exceed 5 metres in length.

3.9 Alternative means of access include, but are not limited to items such as:

3.9.1 A hydraulic arm fitted with a stable basket;

3.9.2 a wire-suspended platform;

3.9.3 scaffolding;

3.9.4 a fleet;

3.9.5 a robotic arm or remote controlled vehicle;

3.9.6 portable ladders longer than 5 metres, which may only be used if they are fitted with a mechanical device to secure the upper part of the ladder.

3.9.7 other means of access approved by the Administration.

Means for the safe use and rigging of such equipment in these areas must be detailed in the Ship Structure Access Manual.

3.10 For access through horizontal openings, hatches or manholes, the opening must not be smaller than 600 x 600 mm. When accessing the cargo hold through the cargo hatch, the top of the ladder must be placed as close to the hatch frame as possible. Hatch frames used for access that are higher than 900 mm must also have steps on the outside connecting with the ladder.

3.11 For access through vertical openings or manholes in bulkheads, floors, girders and web frames that provide access through the length and width of the compartment, the opening must not be smaller than 600 x 800 mm and have a maximum height of 600 mm from the passage, unless there is a grate or equivalent to provide a foothold.

3.12 For oil tankers of more than 5,000 tonnes deadweight, the Administration may, in special circumstances, permit smaller openings than those referred to in subsections 3.10 and 3.11 if the Administration is satisfied that such openings can be passed or an injured person can be moved in an acceptable manner.

3.13 On board bulk carriers, access ladders to cargo holds must be as follows:

3.13.1 Where the vertical distance between two decks, measured on the upper side, or between a deck and the bottom of the cargo hold is not more than 6 metres, either a vertical ladder or an inclined ladder shall be provided;

3.13.2 Where the vertical distance between two decks, measured on the upper side, or between a deck and the bottom of the cargo hold is greater than 6 metres, inclined ladders shall be provided at one end of the cargo hold, provided that the upper 2.5 metres and the lower 6 metres of the cargo hold are fitted with vertical ladders, provided that the vertical height of the inclined ladders is not less than 2.5 metres.

Means of access at the other end of the cargo hold may consist of staggered vertical ladders with one or more platforms with a maximum vertical distance of 6 metres and offset to one side of the ladder. Adjacent sections of the ladder should be offset to the side at a distance equal to at least the width of the ladder. The upper part of the ladder that provides direct access to the cargo hold should be vertical for a length of 2.5 metres, free of overhead obstacles and connected to a platform.

3.13.3 A vertical ladder may be used as a means of access to wing tanks if the vertical distance between the deck and the long ship means of access, stringers, or tank bottom is 6 metres or less. The top of the tank ladder should be vertical for a length of 2.5 metres, free of overhead obstructions and connected to a platform, unless it ends at a longitudinal means of access, a stringer or the tank bottom.

3.13.4 Unless otherwise permitted in . 3, inclined ladders should be used for access to tanks or spaces where the vertical distance between deck and stringer, between stringers, or between stringers and the bottom of the space is greater than 6 metres.

3.13.5 Using . 4 above, the upper part of the ladder at the entrance should be vertical for a length of 2.5 metres, free of overhead obstacles and connected to a platform that continues with an inclined ladder. The actual length of the ladders should not be more than 9 metres and the vertical height should normally not be more than 6 metres. The lower part of the ladder can be vertical for a maximum length of 2.5 metres.

3.13.6 Access to double-skinned compartments with a width of less than 2.5 m can be provided by vertical ladders connected by one or more platforms spaced no more than 6 m apart vertically and offset to one side of the ladder. Adjacent sections of the ladder should be offset to the side at a distance equal to at least the width of the ladder.

3.13.7 A spiral ladder is considered an acceptable alternative to inclined ladders. The top 2.5 metres does not have to be a vertical ladder, but can still be a spiral ladder.

3.14 The top of a ladder providing access from the deck to a tank should be vertical at a distance of 2.5 metres, free of overhead obstructions and connected to a platform offset to one side of the ladder. The vertical ladder can be between 1.6 m and 3 m below the deck if it ends on a longitudinal or transverse means of access.

Table 1 - Means of access on oil tankers

1 Ballast tanks not covered by point 2 and cargo tanks Access

to structure below deck and on vertical surfaces

1.1 Tanks with a height of 6 metres or more and with an internal structure shall be equipped with permanent means of access in accordance with points . l to . 6:

1.1.1 A continuous transverse permanent means of access on the stiffened side of each transverse bulkhead, not less than 1.6 metres and not more than 3 metres below the upper deck;

1.1.2 At least one longitudinal permanent means of access on each side of the tank. One of these means of access must be at least 1.6 metres and no more than 6 metres below the deck above, and the other must be at least 1.6 metres and no more than 3 metres below the deck above.

1.1.3 There shall be access between the events mentioned in points . 1 and . 2 and access from the main deck to the event mentioned in either point . 1 or . 2.

1.1.4 Continuous, longitudinal permanent means of access shall be provided, built into the stiffened side of the longitudinal bulkhead and, where possible, in line with the horizontal girders of the transverse bulkheads, to provide access to the transverse web frames, unless permanent fittings are installed on the upper platform for the alternative means mentioned in subsection 3.9 of the technical provisions.

1.1.5 Ships which have cross ties more than 6 metres above the bottom of the tank shall have a longitudinal permanent means of access which allows inspection of the tie flaring brackets on both sides of the tank with access from the means of access referred to in . 4; and

1.1.6 In smaller ships, alternative means of access, as mentioned in subsection 3.9 of the technical provisions, may be used as an alternative to subsection 4 when the height in the cargo tank is less than 17 metres.

1.2 In tanks with a height of less than 6 metres, alternative means of access mentioned in subsection 3.9 of the technical provisions or portable means of access may be used instead of the permanent means of access.

Forepeak tanks

1.3 In forepeak tanks with a depth of 6 m or more, measured at the centre line of the collision bulkhead, adequate access must be provided to critical areas such as deck structure, stringers, collision bulkheads and side plating.

1.3.1 Stringers placed less than 6 metres vertically below deck are considered to provide adequate access when combined with a portable means of access.

1.3.2 If the vertical distance between the deck and stringer, between stringers or between the lower stringer and the bottom of the tank is 6 metres or more, alternative means of access shall be provided as mentioned in subsection 3.9 of the technical provisions.

2 Ballast tanks in double skin wing and hopper tanks, less than 5 metres wide. Access

to structures below deck and on vertical surfaces

2.1 Permanent means of access shall be provided in the double plating above the upper bend point of the hopper tank in accordance with . 1 to . 3:

2.1.1 Where the vertical distance between the top horizontal stringer and the underside of the deck is 6 m or more, there shall be a continuous, longitudinal permanent means of access along the full length of the tank which allows access to pass through transverse web frames and which is installed not less than 1.6 m and not more than 3 m to the underside of the deck and has vertical access ladders at each end of the tank;

2.1.2 Continuous, longitudinal permanent means of access shall be provided that are built into the structure at a vertical distance not exceeding 6 metres; and

2.1.3 Plate stringers should be aligned with the horizontal girders on the transverse bulkheads as far as possible.

2.2 Hopper tanks where the vertical distance from the tank bottom to the upper bend point is 6 metres or more shall be fitted with a longitudinal, permanent means of access along the full length of the tank. This means of access must be accessible from vertical, permanent means of access at both ends of the tank.

2.2.1 The continuous, longitudinal permanent means of access must be positioned at least 1.6 metres and no more than 3 metres from the top of the hopper tank. In this case, a platform adjacent to the means of access can be used to inspect the critical areas.

2.2.2 Alternatively, the continuous, longitudinal permanent means of access can be positioned at least 1.2 metres from the lower edge of the free opening in the web frame to allow the critical areas to be reached with portable means of access.

2.3 Where the vertical distance mentioned in subsection 2.2 is less than 6 metres, alternative means of access as defined in subsection 3.9 of the technical provisions or portable means of access may be used instead of the permanent means of access. To improve the use of the alternative means of access, openings should be placed in the horizontal stringers. These openings should have an appropriate diameter and be protected with a satisfactory railing.

Table 2 - Means of access on bulk carriers[24)]

1 Cargo tanks
Access to the structure below deck

1.1 Permanent means of access shall be provided to allow access to below-deck structures on both sides of the mid-deck and near the centre line. Each means of access must be accessible from the cargo hold access or directly from the main deck and be located at least 1.6 metres and no more than 3 metres below deck.

1.2 Transverse permanent means of access located not less than 1.6 m and not more than 3 m below mid-deck on transverse bulkheads may be accepted as equivalent to subsection 1.1.

1.3 Access to permanent means of access to the overhead structures of the centre deck can also be made from the top bulkhead seat.

1.4 Permanent means of access on the mid-deck is not required in ships where there is access from the main deck to a bulkhead seat at the top of the transverse bulkhead if the bulkhead seat covers the full width of the between deck, and it is possible to inspect all internal frames and plates.

1.5 If the vertical distance from the tank top is 17 m or less, removable means of access can be used to provide access to the structure under a mid-deck.

Access to vertical surfaces

1.6 Permanent vertical means of access shall be provided in all cargo holds to permit inspection of at least 25% of the total number of bulkheads in the cargo hold on both the port and starboard sides; these shall be equally distributed throughout the cargo hold, including at each end at transverse bulkheads. However, in no case may this arrangement include fewer than three means of access on each side (front, centre and rear of the cargo hold). Permanent, vertical means of access that are placed between two frames are counted as

Access to both frames. A portable means of access can be used to provide access across the inclined part of the hopper tank.

1.7 In addition, portable or removable means of access must be used to provide access to transverse bulkheads and to the remaining frames in the cargo hold up to the upper knees.

1.8 Portable or removable means of access may be used for access to the top knees of the frames instead of permanent means of access as required in 1.6. These means of access must be available on board the ship and ready for use.

1.9 The width of vertical ladders for access to the frames must be at least 300 mm measured between the ladder's side rails.

1.10 A single vertical ladder over 6 metres in length is acceptable when inspecting frames in single skin cargo holds.

1.11 In double-skinned cargo holds, no vertical ladder is required to inspect the sides of the cargo hold. This inspection should be done inside the double hull.

2. Ballast tanks

Wing tanks

2.1 In each wing tank with a height of 6 metres or more, there shall be a continuous, longitudinal, permanent means of access at the webs frames, located not less than 1.6 metres and not more than 3 metres below deck and with a vertical ladder at each tank access.

2.2 If there are no access holes through the transverse webs within 600 mm from the tank bottom and if the webs are higher than 1 metre at the side plating and at the inclined plate, steps or handles must be provided to allow safe access over each transverse web frame.

2.3 Three permanent means of access must be placed in the tank, one in the centre and one at each end of the tank, extending from the bottom of the tank up to the intersection of the inclined plate with the hatch girder. The existing longitudinal structure can be used as part of this means of access.

2.4 In wing tanks with a height of less than 6 metres, an alternative means of access as defined in subsection 3.9 of the technical provisions or a portable means of access may be used instead of permanent means of access.

Hopper tanks

2.5 In each hopper tank with a height of 6 m or more, there shall be a continuous, longitudinal, permanent means of access at the web frames in the plating located at least 1.2 m below the free opening of the web frame and with a vertical ladder at each tank access.

2.5.1 An access ladder between the longitudinal permanent means of access and the bottom must be placed at each end of the tank.

2.5.2 Alternatively, the longitudinal permanent means of access can be placed above the free opening of the web frame at least 1.6 metres below deck if this makes it easier to inspect the critical areas. An enlarged longitudinal frame can be used as a walkway.

2.5.3 On double-hull bulk carriers, the continuous, permanent means of access can be installed up to 6 metres from the bend point of the hopper tank if combined with other methods to reach the bend point.

2.6 If there is no access through the transverse web frames within 600 mm from the bottom of the tank and if the web frames are more than 1 m high at the side shell and at the inclined plate, steps or handles shall be provided to allow safe access over each transverse web frame.

2.7 In hopper tanks with a height of less than 6 metres, an alternative means of access as defined in subsection 3.9 of the technical provisions or a portable means of access may be used instead of permanent means of access. For such means of access, it must be demonstrated that they can be placed and used in areas where they are needed.

Side tanks in double plating

2.8 Permanent means of access must be provided that comply with the relevant sections in table 1.

Forepeak tanks

2.9 In forepeak tanks with a depth of 6 m or more, measured at the centre line of the collision bulkhead, adequate access must be provided to critical areas such as deck structure, stringers, collision bulkheads and side plating.

2.9.1 Stringers placed less than 6 metres vertically below deck or stringers immediately above are considered to provide adequate access when combined with a portable means of access.

2.9.2 If the vertical distance between the deck and stringer, between stringers or between the lower stringer and the bottom of the tank is 6 metres or more, alternative means of access shall be provided as mentioned in subsection 3.9 of the technical provisions.

Section B Division and stability

Regulation 4 General

1 Unless explicitly stated otherwise, the requirements of sections B-1 to B-5 shall apply to passenger ships.

2 For cargo ships, the requirements of sections B-1 to B-4 apply as follows:

2.1 In section B-1:

2.1.1 Unless expressly stated otherwise, regulation 5 applies to cargo ships and regulation 5-1 to cargo ships other than tankers as defined in regulation I/2(h);

2.1.2 Regulations 6 to 7-3 apply to cargo ships of 80 metres in length (L) and above, but ships to which the following instruments apply and which demonstrably comply with the subdivision and stability requirements of that instrument may be exempted:

.1 Annex I of the MARPOL Convention, except that combined bulk carriers (as defined in SOLAS regulation II-2/3.14) with type B freeboard shall comply with regulations 6 to 7-3;[25)] or

.2 the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code);[26)] or

.3 the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code);[27)] or

.4 The leak stability requirements of regulation 27 of the 1966 Load Line Convention as applied in accordance with resolutions A. 320(IX) and A. 514(13), provided that for cargo ships subject to regulation 27(9), transverse

watertight main bulkheads, in order to be considered effective, shall be spaced as specified in subsection (12)(f) of resolution A. 320(IX), except that ships intended for the carriage of deck cargoes shall comply with regulations 6 to 7-3; or

.5 The leak stability requirements of regulation 27 of the Protocol to the Load Line Convention, 1988, except that ships intended for the carriage of deck cargo shall comply with regulations 6 to 7-3; or

.6 the standards for classification and leak stability in other instruments,[28]) as developed by the Organisation.

2.2 Unless explicitly stated otherwise, the requirements of sections B-2 and B-4 apply to cargo ships.

3 The Administration may accept alternative methods for a particular ship or group of ships if the Administration is satisfied that at least the same degree of safety as that represented by these regulations is achieved. Any administration allowing such alternative methods shall communicate details thereof to the Organisation.

4 Ships shall be divided as efficiently as possible, taking into account the speed at which the ship is travelling. The degree of division shall vary with the ship's subdivision length (L_s) and with the type of voyage in such a way that the highest degree of division is found on the ships with the largest division length and which mainly carry passengers.

5 Where it is proposed to fit decks, internal linings or longitudinal bulkheads which are sufficiently watertight to significantly limit water ingress, it must be demonstrated to the Administration that the favourable or unfavourable consequences of such structures have been properly considered in the calculations.

Section B-1 Stability

Regulation 5 Intact stability[29)]

1 Any passenger ship of any size and any cargo ship with a length (L) of 24 metres or more must be subjected to a heeling test once it has been completed. Its light ship displacement and the longitudinal, transverse and vertical position of its centre of gravity shall be determined. In addition to any other applicable requirements of these provisions, ships of 24 metres in length and above shall at least comply with the requirements of Section A of "The IS Code of 2008".

2 The Administration may authorise the omission of a heeling test for a particular ship when stability information is available from a heeling test carried out with a sister ship and it is demonstrated to the satisfaction of the Administration that reliable stability information for the exempted ship can be derived from this basic information, as required in accordance with regulation 5-1. A lightweight statement shall be prepared when the ship is completed and the ship shall be subjected to a heeling test if, when compared with the stability data of the sister ship, there is a deviation in the lightweight of the ship of more than 1% for ships with a length of 160 metres or more, or if there is a deviation of more than 2% for ships with a length of 50 metres or less, or as determined by linear interpolation for lengths in between, or if there is a deviation in the light ship's longitudinal centre of gravity of more than 0.5 % of L.

3 The Administration may also allow the heeling test to be waived for a particular ship or type of ship specially designed to carry liquids or ores in bulk when existing data from similar ships clearly show that,

due to the ship's proportions and arrangements, there will be more than adequate metacentre height in all possible loading conditions.

4 In cases where a ship has been altered to such an extent that it has a significant impact on the stability information provided to the master, amended stability information must be provided. A new heeling test must be performed if the expected deviations exceed one of the values specified in subsection 5.

5 For all passenger ships, a lightweight statement must be prepared at least every five years to check for changes in the ship's lightweight displacement and longitudinal centre of gravity. The ship shall be subjected to a new heeling test when, by comparison with the approved stability information, a deviation of the lightweight displacement of the ship of more than 2% or a deviation of the longitudinal centre of gravity of more than 1% of L is observed or expected.

6 Draught marks must be clearly marked on the bow and stern of all ships. In cases where the draught marks are not located where they are easily visible, or there are operational limitations at a particular speed type that make it difficult to read the draught marks, the ship must also be fitted with a reliable draught indication system so that the draught fore and aft can be determined.

Regulation 5-1 Stability information to be provided to the master[30)]

1 The master of the ship must be provided with the reliable information necessary to enable them to obtain accurate guidance on the stability of the ship under various operating conditions in a quick and simple manner. A copy of the stability information must be provided to the Administration.

2 The information must include:

2.1 curves or tables showing the minimum operational metacentre height (GM) and the maximum permissible trim above the draught, ensuring compliance with any intact stability and leakage stability requirements, or equivalent curves or tables for the maximum permissible vertical centre of gravity (KG) and maximum permissible trim above the draught or with other information equivalent to one of these curves or tables;

2.2 instructions for operating cross-filling arrangements; and

2.3 all other data and aids that may be necessary to maintain the required intact stability and stability in damaged condition.

3 The intact stability and leakage stability information required in regulation 5-1.2 shall be presented as consolidated information and shall cover the full operational trim and draught variation. The trim values used must coincide with all stability information intended for on-board use. Stability information that is not required to determine the stability and trim values should not be included in this information.

4 If the leakage stability is calculated in accordance with regulations 6 to 7-3 and, where applicable, with regulations 8 and 9.8, a stability limitation curve shall be determined using linear interpolation between the minimum required GM as assumed for each of the three draughts d_s, d_p and d_j. When calculating additional division indices for different trims, a single envelope curve should be presented based on the minimum values of these calculations. When the intention is to develop curves of the maximum allowed KG, ensure that the resulting maximum KG curves correspond to a linear variation over GM.

5 As an alternative to a single envelope curve, the calculations of additional trim can be done with a common GM for all trim states assumed at each division depth. The minimum values for each partial index A_s, A_p and A_i across these trim states should then be used in the summation

of the obtained classification index A according to regulation 7.1. This will result in a GM limiting curve based on the GM used for each draught. A diagram of the trim constraints must be drawn up showing the assumed trim spectrum.

6 When curves or tables for the minimum operational metacentre height (GM) or the highest permissible KG deployed above the draught are not provided, the master must ensure that the operating conditions do not deviate from the approved loading conditions or ensure by calculation that the stability requirements are met for this loading condition.

Regulation 6 Required division index [R31)]

1 The division of a ship shall be considered adequate if the achieved division index A, calculated in accordance with regulation 7, is not less than the required division index R calculated in accordance with this regulation and if the partial indices As, Ap and Al are not less than 0.9R for passenger ships and 0.5R for cargo ships.

2 The degree of division required shall be determined from the required division index R for ships subject to the leak stability requirements of this section as follows:

2.1 for cargo ships over 100 metres in L_s

$$R = 1 - \frac{128}{L_s + 152}$$

2.2 for cargo ships with a length (L) of 80 metres or more but not exceeding 100 metres (L_s):

$$R = 1 - [1/(1 + \frac{L_s}{100} \times \frac{R_o}{1 - R_o})]$$

Where R_o is the value of R as calculated according to the formula in subsection 2.1 above.

2.3 for passenger ships:

People on board	R
N < 400	R = 0.722
400 ≤ N ≤ 1,350	R = N / 7,580 + 0.66923
1,350 < N ≤ 6,000	R = 0.0369 X Ln (N + 89.048) + 0.579
N > 6,000	R = 1 - (852.5 + 0.03875 X N) / (N + 5,000)

Where:

N = total number of people on board

$$R = 1 - \frac{5{,}000}{L_s + 2.5N + 15{,}225}$$

where:

$N = N_1 + 2N_2$

N_1 = number of people for whom there are rescue boats.

N_2 = number of persons (including officers and crew) that the ship is authorised to carry in addition to N_1.

Regulation 7 Achieved division index A

1 The obtained division index A is obtained by adding the partial indices A_s, A_p and A_l (weighted as indicated) and calculated for depths d_s, d_p and d_l as defined in regulation 2 in accordance with the following formula:

$A = 0.4A_s + 0.4A_p + 0.2A_l$

Each of the partial indices is an aggregation of contributions from all claims taken into account using the following formula:

$A = \Sigma\, p_i\, s_i$

where:

i denotes each compartment or group of compartments considered,

p_i describes the probability that only the compartment or group of compartments considered will be filled with water without regard to any horizontal division as defined in regulation 7-1.

s_i describes the probability of survival after filling the compartment or group of compartments under consideration, including the effect of a horizontal division as defined in regulation 7-2.

2 The calculation of A must be carried out at least at the deepest division load line d_s and the partial division load line d_p. The estimated trim during operation can be used for the lightest operational draught d_l. If, under any operating conditions within the depth range d_s to d_l, there is a deviation of the trim from the calculated trim greater than 0.5% of L, one or more additional calculations of A shall be made for the same depths but for different sufficient trims to ensure that, under all intended operating conditions, the difference between the trim in comparison with the trim used as the basis for a calculation is not greater than 0.5% of L. Any further calculation of A shall be in accordance with regulation 6.1.

3 When determining the positive stability arm (GZ) for the residual stability curve in the intermediate and final equilibrium filling stages, the displacement used should be the same as for the constant download condition. All calculations should be performed while the ship is trimming freely.

4 The summation as given by the above formula shall be applied over the entire division length of the ship (L_s) in all cases of filling where a single or two or more adjacent compartments are involved. In cases where the layout is asymmetrical, the calculated A-value should be the average value resulting from a calculation that includes both sides. Alternatively, it should be taken to be equivalent to the side that appears to give the least favourable result.

5 Where wing tanks are present, the summation in the formula shall include all cases of filling involving wing tanks. In addition, all cases of simultaneous filling of one or more wing tanks and the adjacent inner compartment(s) may be included, except damage in a transverse extent greater than half the breadth of the ship (B). In this regulation, the inboard extent of the cross-ship is measured from the ship's side perpendicular to the centre line at the height of the deepest division load line.

6 In the infill calculations performed according to the regulations, it is only necessary to assume one hull breach and one free surface. The presumed vertical extent of the damage extends in an upward direction from the baseline towards any watertight horizontal division above the waterline or higher. If minor damage will result in a more serious condition, such damage must be taken into account in the calculations.

7 If pipes, shafts or tunnels are located in the spaces assumed to be affected by the damage, measures must be taken to ensure that filling does not continue to spaces other than those assumed to be filled with water. However, the Administration may authorise a minor continued filling if it is demonstrated that the effect can be easily controlled and that the safety of the ship is not impaired.

Regulation 7-1 Calculation of the factor pi

1 The factor pi for a compartment or group of compartments shall be calculated in accordance with subsections 1.1 and 1.2 based on the following definitions:

j = rearmost damaged area involved in the damage, starting at the stern with no. 1 n = number

of neighbouring damaged areas involved in the damage.

k = number of a specific longitudinal bulkhead as a barrier to cross-ship penetration in a damage area counted from the outer plating towards the centre line. The shell plating has k = 0

x1 = distance from the aft end point of L_s to the rear of the area in question;

x2 = the distance from the aft end point of L_s to the front of the area in question;

b = the mean transverse distance in metres, measured perpendicular to the centreline at the deepest division draught, between the shell plating and an assumed plane through the outermost part of, and parallel to, that part of the longitudinal bulkhead which lies between the longitudinal boundaries used in calculating factor p_i and which are tangent to or common to all or part of the outermost part of the longitudinal bulkhead in question. This vertical plane shall be positioned so that the distance between the centre of the transverse plane and the shell plating is maximum, but not more than twice the minimum distance between the plane and the shell plating. If the upper part of the longitudinal bulkhead is below the deepest subdivision draught, the vertical plane used as the basis for calculating b shall be assumed to extend upwards to the deepest division waterline. In any case, b must not be greater than B/2. If the damage only

involves one area:

$p_i = p(x1_j, x2_j) - [r(x1_j, x2_j, b_k) - r(x1_j, x2_j, b_{k-1})]$ If

the damage involves two neighbouring areas:

$p_i = p(x1_{j,} x2_{j+1}) \cdot [r(x1_{j,} x2_{j+1}, b_k) - r(x1_{j,} x2_{j+1}, b_{k-1})]$

$- p(x1_{j,} x2_j) \cdot [r(x1_{j,} x2_{j,} b_k) - r(x1_{j,} x2_j, b_{k-1})]$

$- p(x1_{j+1}, x2_{j+1}) \cdot [r(x1_{j+1,} x2_{j+1,} b_k) - r(x1_{j+1,} x2_{j+1,} b_{k-1})]$ If

the damage involves three or more neighbouring areas: p_i

$= p(x1_{j,} x2_{j+n-1}) \cdot [r(x1_{j,} x2_{j+n-1,} b_k) - r(x1_{j,} x2_{j+n-1}, b_{k-1})]$

$- p(x1_{j,} x2_{j+n-2}) \cdot [r(x1_{j,} x2_{j+n-2,} b_k) - r(x1_{j,} x2_{j+n-2}, b_{k-1})]$

$- p(x1_{j+1}, x2_{j+n-1}) \cdot [r(x1_{j+1}, x2_{j+n-1,} b_k) - r(x1_{j+1}, x2_{j+n-1,} b_{k-1})]$

$+ p(x1_{j+1}, x2_{j+n-2}) \cdot [r(x1_{j+1}, x2_{j+n-2}, b_k) - r(x1_{j+1}, x2_{j+n-2}, b_{k-1})]$

and where $r(x1, x2, b_0) = 0$

1.1 The factor *p(x1, x2)* must be calculated according to the following formulas: Total normalised maximum damage length: $J_{max} = 10/33$

Knuckle point in the distribution: $J_{kn} = 5/33$

Cumulative probability at J_{kn}: $p_k = 11/12$

Maximum absolute damage length: $l_{max} = 60$ m

Length where the normalised distribution ends: $L^* = 260$ m Probability density at $J = 0$:

$$b_0 = 2\left(\frac{p_k}{J_{kn}} - \frac{1-p_k}{J_{max} - J_{kn}}\right)$$

Where $L_s \leq L^*$:

$$J_m = \min\left\{J_{max}, \frac{l_{max}}{L_s}\right\}$$

$$J_k = \frac{J_m}{2} + \frac{1-\sqrt{1+(1-2p_k)b_0 J_m + \frac{1}{4}b_0^2 J_m^2}}{b_0}$$

$$b_{12} = b_0$$

Where $L_s > L^*$:

$$J_m^* = \min\left\{J_{max}, \frac{l_{max}}{L^*}\right\}$$

$$J_k^* = \frac{J_m^*}{2} + \frac{1-\sqrt{1+(1-2p_k)b_0 J_m^* + \frac{1}{4}b_0^2 J_m^{*2}}}{b_0}$$

$$J_m = \frac{J_m^* \cdot L^*}{L_s}$$

$$J_k = \frac{J_k^* \cdot L^*}{L_s}$$

$$b_{12} = 2\left(\frac{p_k}{J_k} - \frac{1-p_k}{J_m - J_k}\right)$$

$$b_{11} = 4\frac{1-p_k}{(J_m - J_k)J_k} - 2\frac{p_k}{J_k^2}$$

$$b_{21} = -2\frac{1-p_k}{(J_m - J_k)^2}$$

$$b_{22} = -b_{21} J_m$$

The unnamed damage length:

$$J = \frac{(x2 - x1)}{L_s}$$

The normalised length of a compartment or group of compartments: J_n should be taken as the smaller of J and J_m

1.1.1 Where no boundary of the compartment(s) in question coincides with the aft or forward endpoints.

$J \le J_k$:

$$p(x1,x2) = p_1 = \frac{1}{6}J^2(b_{11}J + 3b_{12})$$

$J > J_k$:

$$p(x1,x2) = p_2 = -\frac{1}{3}b_{11}J_k^3 + \frac{1}{2}(b_{11}J - b_{12})J_k^2 + b_{12}JJ_k - \frac{1}{3}b_{21}\left(J_n^3 - J_k^3\right) + \frac{1}{2}(b_{21}J - b_{22})\left(J_n^2 - J_k^2\right) + b_{22}J(J_n - J_k)$$

1.1.2 Where the aft boundary of the compartment(s) in question coincides with the aft end point or the forward boundary of the compartment(s) in question coincides with the forward end point:

$J \le J_k$:

$$p(x1,x2) = \frac{1}{2}(p_1 + J)$$

$J > J_k$:

$$p(x1,x2) = \frac{1}{2}(p_2 + J)$$

1.1.3 Where the space(s) in question extends over the entire length of the division (L_s):

$p(x1, x2) = 1$

1.2 The factor *r(x1, x2, b)* should be determined according to the following formula:

$$r(x1,x2,b) = 1 - (1 - C)\cdot\left[1 - \frac{G}{p(x1,x2)}\right]$$

hvor:

$$C = 12\cdot J_b\cdot(-45\cdot J_b + 4)$$

hvor:

$$J_b = \frac{b}{15\cdot B}$$

1.2.1 Where the space(s) in question extends over the entire length of the division (L_s):

$$G = G_1 = \frac{1}{2}b_{11}J_b^2 + b_{12}J_b$$

1.2.2 Where no boundaries of the compartment(s) in question coincide with the aft or forward endpoints.

$$G = G_2 = -\frac{1}{3}b_{11}J_0^3 + \frac{1}{2}(b_{11}J - b_{12})J_0^2 + b_{12}JJ_0 ,$$

where:

$J_0 = \min(J.\ J_b)$

1.2.3 Where the aft boundary of the compartment(s) in question coincides with the aft end point or the forward boundary of the compartment(s) in question coincides with the forward end point:

$$G = \frac{1}{2}\cdot(G_2 + G_1\cdot J)$$

Regulation 7-2 Calculation of the factor s i

1 The factor S_i shall be determined for each assumed filling situation for each compartment or group of compartments according to the following notations and the provisions of this regulation.

θ_e is the final equilibrium angle of heel (in degrees);

θ_v is the angle at any stage of filling where the stability arm becomes negative or the angle at which an opening that cannot be made weathertight is submerged;

GZ_{max} is the maximum positive stability arm (in metres) up to the angle θ_v;

Extension is the extension of the positive stability arm beyond the angle of the equilibrium state (in degrees), measured from the angle θ_e. The positive extension must be taken up to the angle θ_v;

Filling stage is any phase during the filling process, including the pre-equalisation phase (if it occurs) until the final equilibrium state is reached.

1.1 The factor S_i for any damage condition based on any intact loading conditions is to be determined from the following formula:

s_i = minimum $\{ s_{intermediate,i}$ or $s_{final,i} \cdot s_{mom,i} \}$

where:

$s_{intermediate,i}$ is the probability of surviving all intermediate filling phases until the final equalisation phase and is calculated according to subsection 2;

$s_{final,i}$ is the probability of surviving the final equalisation phase of the filling. It is calculated according to subsection 3;

$s_{mom,i}$ is the probability of surviving heeling moments and is calculated according to subsections 4.

2 For passenger ships and cargo ships equipped with cross-filling devices, the $S_{intermedia-\ te,i}$ factor shall be calculated as the smallest of the s-factors obtained at all filling stages, including the pre-equilibrium stage (if any), and shall be calculated as follows:

$$s_{intermediate,i} = \left[\frac{GZ_{max}}{0.05} \cdot \frac{Range}{7}\right]^{\frac{1}{4}}$$

where GZ_{max} should not be set to more than 0.05 m and *Range should* not be set to more than 7°. $S_{intermediate,i} = 0$ if the intermediate heel angle exceeds 15º for passenger ships and 30º for cargo ships.

For cargo ships not equipped with cross-filling devices, the $S_{intermediate,i}$ factor should be calculated as 1, except that if the Administration considers that the stability at intermediate filling stages may be insufficient, further investigation should be required.

For passenger ships and cargo ships equipped with cross-filling devices, equalisation time shall not exceed 10 minutes.

3 The factor $S_{final,i}$ should be calculated from the formula:

$$S_{final,i} = K \times \left[\frac{GZ_{max}}{TGZ_{max}} \times \frac{Range}{TRange}\right]^{\frac{1}{4}}$$

where:

GZ_{max} should not be calculated as greater than TGZ_{max};

The Range should not be calculated as greater than *TRange*;

TGZ_{max} = 0.20 m, for ro-ro passenger ships each damage case involving a ro-ro space, TGZ_{max}

= 0.12 m, in other cases;

TRange = 20º, for ro-ro passenger ships each case of damage involving a ro-ro space, TRange

= 16º, in other cases; K = 1 if $\Theta_e \leq \Theta_{min}$

K = 0 if $\Theta_e \geq \Theta_{max}$

$K = \sqrt{\frac{\Theta \max - \Theta e}{\Theta \max - \Theta min}}$ *i øvrige tilfælde*

where:

Θ_{min} is 7° for passenger ships and 25° for cargo ships;

and Θ_{max} is 15° for passenger ships and 30° for cargo

ships**.**

4 The $S_{mom,i}$ factor only applies to passenger ships (for cargo ships $S_{mom,i}$ must be set to 1) and must be calculated at the last equalisation according to the formula:

$$S_{\text{mom},i} = \frac{(GZ_{\max} - 0.04) \times Displacement}{M_{\text{heel}}}$$

where:

Displacement is the intact displacement at the relevant draft (d_s, d_p or d_l).

M_{heel} is the maximum assumed heeling moment calculated according to subsection 4.1; and $S_{mom,i} \leq 1$

4.1 The heeling moment M_{heel} should be calculated as follows:

M_{heel} = maximum ($M_{passenger}$ or M_{wind} or $M_{survival\ craft}$)

4.1.1 $M_{passenger}$ is the largest assumed heeling moment resulting from passenger movement and should be calculated as follows:

$M_{passenger}$ = (0.075 x N_p) x (0.45 x B) (tm) where:

N_p is the maximum number of passengers authorised to be on board in the sailing condition corresponding to the deepest division draught concerned; and

W is the width of the ship as defined in regulation 2.8.

Alternatively, the heeling moment can be calculated assuming that the passengers are distributed with 4 persons per square metre on the available deck areas on one side of the ship, on the decks where the muster stations are located, in such a way that they form the most unfavourable heeling moment. Assume that each passenger weighs 75kg.

4.1.2 M_{wind} is the maximum assumed wind torque in a leak state:

M_{wind} = (P x A x Z) / 9,806 (tm)

where:

P = 120 N/m^2;

A = projected lateral plane area above the waterline;

Z = distance from the centre of gravity of the projected lateral plane area above the waterline

to T/2; and T = draught, (d_s, d_p or d_l).

4.1.3 $M_{\text{Survival craft}}$ is the largest assumed heeling moment resulting from launching all fully loaded davit-launched survival craft on one side. It should be calculated based on the following assumptions:

4.1.3.1 all lifeboats and man overboard boats installed on the side to which the ship heeled after damage are assumed to have been swung out fully loaded and ready for lowering;

4.3.1.2 for lifeboats intended for launching in fully loaded condition directly from the place where they are stowed, the maximum heeling moment during launching shall be used;

4.3.1.3 a fully loaded davit-launched liferaft attached to each davit on the side to which the ship heeled after damage is assumed to be swung out and ready for lowering;

4.3.1.4 Persons not in swung-out life-saving appliances shall not provide additional heeling or righting moment.

4.3.1.5 Life-saving appliances on the side of the ship opposite to the side to which the ship is heeled are assumed to be in the stowed position.

5 Unsymmetrical filling must be kept within the narrowest possible limits, taking into account the efficient layout of the ship. Where it is necessary to correct for large heeling angles, the means used shall be self-acting as far as possible, but where cross-filling controls are provided, they shall be operable from a position above the bulkhead deck on passenger ships and the freeboard deck on cargo ships. These means and their control arrangements must be accepted by the Administration.[32]) The Master must be provided with the necessary information on the use of the equalisation means.

5.1 Tanks and compartments involved in such equalisation shall be equipped with air pipes or similar of sufficient cross-sectional area to ensure that water inflow into the compartments used for equalisation is not delayed.

5.2 The factor s_i shall be set to zero in cases where the final waterline, taking into account sinking, heeling and trim, is lowered:

. 1 for cargo ships, the lower edge of openings through which gradual flooding may occur, and such flooding is not taken into account when calculating the factor s_i Such openings include air pipes, fans and openings that are closed by weatherproof doors or shutter doors;

. 2 any part of the bulkhead deck of passenger ships considered as a horizontal escape route for the purpose of compliance with chapter II-2; and

. 3 For passenger ships to which the provisions of regulation 1.1.1.1.1 apply and constructed before 1 January 2024, the lower edge of openings through which gradual flooding may occur and where such flooding is not taken into account in calculating the factor s_i. Such openings include air pipes, fans and openings that are closed by weatherproof doors or shutter doors;

5.3 The factor s_i shall be set to zero if, taking into account subsidence, heeling and trimming, one of the following situations occurs in an intermediate phase or in the final phase of the flood:

. 1 submersion of any vertical escape hatch in the bulkhead deck of passenger ships and on the freeboard deck of
cargo ships designed to comply with chapter II-2;

. 2 the inaccessibility or inoperability of controls for the operation of watertight doors, equalisation devices, valves on piping or ventilation ducts intended to maintain the integrity of watertight bulkheads above the bulkhead deck on passenger ships and the freeboard deck on cargo ships;

. 3 submersion of parts of pipelines or ventilation ducts located within the suspected damage area and routed through a watertight boundary, if this may lead to gradual flooding of spaces that are not suspected to be flooded; and

. 4 for passenger ships constructed on or after 1 January 2024, the lowering of the lower edge of openings through which gradual flooding may occur, and this flooding shall not be taken into account for the calculation of the factor s_i. Such openings include air pipes, fans and openings that are closed by weatherproof doors or shutter doors;

5.4 Where spaces that are assumed filled due to continued filling are taken into account in stability calculations, multiple values of $s_{\text{intermediate,i}}$ can be calculated where equalisation is assumed in further filling phases.

5.5 Unless otherwise provided in subsection 5.3.1, openings closed by means of watertight hatch covers and scuttles, remotely operated watertight sliding doors, doors, side shutters of the non-opening type and watertight access doors and watertight closing doors required to be kept closed during navigation in accordance with regulation 22-24 need not be taken into account.

6 Where there are horizontal watertight divisions above the waterline in question, the s-value calculated for the lower compartment(s) shall be obtained by multiplying the value determined in subsection 1.1 by the reduction factor v_m according to subsection 6.1, representing the probability that the compartment above the horizontal division will not be filled.

6.1 The factor v_m should be obtained from the following formula:

$$v_m = v(H_{j,\,n,\,m}, d) - v(H_{j,\,n,\,m-1}, d)$$

where:

$H_{j\,,\,n\,,\,m}$ is the minimum height above the baseline in m within the longitudinal extent $x_{1(j)} \ldots x_{2(j+n-1)}$) of the horizontal boundary $(m-1)^{th}$ which is assumed to limit the vertical extent of the filling of the damaged spaces in question;

j denotes the aft end point of the damaged compartments in question;

m represents each horizontal boundary counted upwards from that waterline;

d is the relevant draught as defined in regulation 2; and

x_1 and x_2 represent the endpoints of the compartment or compartments covered by regulation 7-1.

6.1.1 The factors $v(H_{j, n, m}, d)$ and $v(H_{j, n, m-1}, d)$ must be obtained from the formula:

$$v(H,d) = 0.8\frac{(H-d)}{7.8}$$

if $(H_m\text{-}d)$ is less than or equal to 7.8 m; in all

other cases,

$$v(H,d) = 0.8 + 0.2\left[\frac{(H-d)-7.8}{4.7}\right]$$

where:

$v\,(\,H_{j\,,\,n\,,\,m}\,,\,d\,)$ shall be taken as 1 if H_m coincides with the upper watertight boundary of the ship within the extent $(x1_{(j)} \ldots x2_{(j+n-1)})$, and

$v(H_{j, n, 0}, d)$ should be set to 0.

v_m must not be set to less than zero or greater than 1.

6.2 In general, each contribution *dA* to the index *A* with respect to horizontal division should be obtained from the following formula:

$$dA = p_i \cdot [v_1 \cdot s_{min1} + (v_2 - v_1) \cdot s_{min2} + \cdots + (1 - v_{n-1}) \cdot s_{minn}]$$

where:

v_m = *v* value calculated according to subsection 6.1;

s_{min} = the smallest s-factor obtained for all combinations of damage when the suspected damage extends downwards from the suspected damage height H_m.

Regulation 7-3 Fillability

1 When calculating the stability in the lea state, the fillability of each general space or parts of such spaces shall be assumed as follows:

Compartment	**Fillability**
Used for stores	0.60
Adapted for accommodation	0.95
Adapted for machinery spaces	0.85
Empty compartments	0.95
Used for liquids	0 or 0.95*)

*) Whichever entails the most stringent requirements.

2 When calculating the stability in a leak state, the fillability of cargo holds or parts of cargo holds must be assumed as follows:

Compartment	Fillability at draught d s	Fillability at draught d p	Fillability at draught d l
Dry cargo hold	0.70	0.80	0.95
Container cargo hold	0.70	0.80	0.95
Ro-ro cargo hold	0.90	0.90	0.95
Liquid cargo	0.70	0.80	0.95

3 Other figures for fillability can be used if they are supported by calculations.

Regulation 8 Special stability requirements for passenger ships

1 A passenger ship intended to carry 400 or more persons shall have a watertight division aft of the collision bulkhead such that $s_i = 1$ for damage involving all spaces within 0.08 L measured from the forward perpendicular for the three loading conditions used to calculate the division index A obtained. If the obtained division index A is calculated for different trims, this requirement must also be fulfilled for these loading conditions.

2 A passenger ship intended to carry 36 or more persons shall be capable of withstanding damage along the ship's side to the extent described in subsection 3. Compliance with this regulation shall be achieved by demonstrating that s_i, as defined in regulation 7-2, is not less than 0.9 for the three loading conditions on which the calculation of the obtained division index A is based if the obtained division index A is calculated for different trim, this requirement shall also be met for these loading conditions.

3 In demonstrating compliance with subsection 2, the extent of the damage shall be dependent on the total number of persons carried and L such that:

3.1 the vertical extent of damage is assumed to extend from the ship's moulded baseline to a point up to 12,5 m above the deepest division draught as defined in regulation 2, unless a smaller vertical extent would result in a lower s-value, in which case the smaller extent shall be assumed;

3.2 where 400 or more persons are to be carried, a damage extent of 0.03L but not less than 3 m in length shall be assumed for any point along the ship's side for an inboard penetration of 0.1B but not less than 0.75 m measured from the ship's side, perpendicular to the centreline at the level of the deepest division draught;

3.3 in cases where less than 400 persons are to be carried, the extent of damage shall be assumed anywhere along the ship's side between transverse watertight bulkheads, provided that the distance between two adjacent transverse watertight bulkheads is not less than the assumed extent of damage. If the distance between two adjacent transverse watertight bulkheads is less than the presumed extent of the damage, only one bulkhead shall be considered effective when demonstrating compliance with subsection 2.

3.4 when 36 or more persons are carried, the damage extent of 0.015L but not less than 3 metres in length shall be assumed for an inboard penetration of 0.05B but not less than 0.75 metres; and

3.5 in cases where more than 36 persons but less than 400 persons are carried, the damage extent and inboard penetration values used to determine the assumed damage extent shall be obtained by linear interpolation between the damage extent and penetration values applicable to ships carrying 36 persons and 400 persons as specified in subsections 3.4 and 3.2.

Regulation 8-1 - Usability of systems and operational information after flooding damage on passenger ships

1 - Application

Passenger ships having a length as defined in regulation II-1/2.5 of 120 metres or more or having three or more main vertical zones shall comply with the provisions of this regulation.

2 - Availability of essential systems in case of filling damage[33)]

A passenger ship shall be designed so that the systems specified in regulation II-2/21.4 remain operational even if a single watertight compartment in the ship becomes flooded.

3 - Operational information after filling damage

In order to provide the master with operational information on the safe return of the ship to a port following a cargo damage incident, passenger ships referred to in subsection 1 shall have:

. 1 an on-board stability computer; or

. 2 land-based support,

based on guidelines developed by the Organisation[34)]

3.2 Passenger ships built before 1 January 2014 shall comply with the provisions of subsection 3.1 at the latest from the date of the first renewal survey after 1 January 2025.

Section B-2 Division, waterproof and weatherproof integrity

Regulation 9 Double bottom in passenger ships and cargo ships other than tankers

1 The ship shall be fitted with a double bottom extending from the forward collision bulkhead to the aft peak bulkhead, as far as practicable and compatible with the design and normal operation of the ship.

2 Where a double bottom is prescribed, the inner bottom must be led out to the ship's side so that it protects the bottom out to the rounding of the bilge. This protection is considered satisfactory if the inner floor is not lower anywhere than a plane parallel to the keel line and located not less than a vertical distance (h) measured from the keel line calculated according to the following formula:

h = B/20

However, the distance (h) must not be less than 760 mm and need not be more than 2,000 mm.

3.1 Small wells that are built into the double bottom in connection with bilge devices must not be deeper than necessary. The vertical distance from the bottom of such a well to a level coincident with the keel line shall not be less than h/2 or 500 mm, whichever is greater, or compliance with subsection 8 of this regulation shall be demonstrated for that part of the ship.

3.2 Other wells (e.g. for lubricating oil under main machinery) may be permitted by the Administration if

it is satisfied that the arrangement provides the same protection as a double bottom complying with the provisions of this regulation.

3.2.1 For cargo ships of 80 metres in length and over or for passenger ships, evidence of equivalent protection shall be provided by demonstrating that the ship is capable of withstanding bottom damage as detailed in subsection 8. Alternatively, wells for lubricating oil under the main machinery may extend into the double bottom below the dividing line defined by the distance *h*, provided that the vertical distance between the bottom of the well and a level coincident with the cooling line is not less than *h*/2 or 500 mm, whichever is less.

3.2.2 For cargo ships with a length of less than 80 metres, the arrangements must provide a level of safety satisfactory to the Administration.

4 Double bottoms are not required under watertight tanks, including dry cargo tanks, of moderate size, provided that the safety of the ship in case of bottom or side damage is not impaired.

5 In the case of ships to which the provisions of regulation 1(5) apply and which are engaged on a regular service within the limits of a short international voyage as defined in regulation III/3.22, the Administration may permit the double bottom requirement to be waived if it is satisfied that the fitting of a double bottom in that part of the ship would be incompatible with the design and normal operation of the ship.

6 Any part of a cargo ship of 80 metres in length or over or of a passenger ship which does not have a double bottom in accordance with subsections 1, 4 or 5, as specified in subsection 2, shall be capable of withstanding bottom damage, as specified in subsection 8, in that part of the ship. For cargo ships of less than 80 metres in length, the alternative arrangements shall provide a level of safety satisfactory to the Administration.

7 Where unusual double bottom arrangements are fitted in a cargo ship of 80 metres in length or more or in a passenger ship, it shall be demonstrated that the ship can withstand bottom damage as detailed in subsection 8. For cargo ships of less than 80 metres in length, the alternative arrangements shall provide a level of safety satisfactory to the Administration.

8 Compliance with subsections 3.1, 3.2.1, 6 or 7 is achieved by demonstrating that s_i, when calculated in accordance with regulation 7-2, is not less than 1 in all service conditions when the ship is subjected to bottom damage to an extent specified in subsection 8.2 below anywhere in the affected part of the ship:

. 1 The filling of such spaces shall not render emergency power and lights, internal communications, signals or other emergency equipment in other parts of the ship unusable.

. 2 The calculated extent of damage shall be as follows:

	For 0.3 L from the ships' front perpendicular	All other parts of the ship
Longitudinal stretching	1/3 $L^{2/3}$ or 14.5 m, whichever is smaller	1/3 $L^{2/3}$ or 14.5 m, whichever is smaller

Cross-ship stretching	B/6 or 10 m, whichever is smaller	B/6 or 5 m, depending on which is smallest

Vertical stretching, measured from the middle line	B/20, not less than 0.76 m and not more than 2 m	B/20, not less than 0.76 m and not over 2 metres

. 3 If damage of a lesser extent than described in subsection 8.2 would result in a more severe condition, such damage should be used in the calculations.

9 Where in passenger ships there are larger cargo holds below the bulkhead deck, the Administration may require the height of the double bottom to be increased by up to B/10 or 3 metres, whichever is less, measured from the middle line. Alternatively, bottom damage can be calculated for these areas in accordance with subsection 8, assuming a larger vertical extent.

Regulation 10 Structure of watertight bulkheads

1 Every watertight division bulkhead, whether transverse or longitudinal, shall be constructed and dimensioned as detailed in regulation 2.17. In any case, watertight division bulkheads must at least be able to withstand the pressure of a water column reaching up to the bulkhead deck on passenger ships and the freeboard deck on cargo ships.

2 Offsets and recesses in bulkheads shall have the same strength as the bulkhead in which they are located.

Regulation 11 Initial testing of watertight bulkheads, etc.

1 Testing of watertight compartments not intended to be used for liquids or cargo holds intended to be filled with ballast by filling them with water is not mandatory. If such a test does not take place, a spray test shall be carried out where possible. This test shall be carried out as late as possible in the fitting-out of the vessel. Where a spray test cannot be carried out because of the risk of damage to machinery, electrical equipment, insulation or fittings, it may be replaced by a careful visual inspection of the weld seam, supplemented, where deemed necessary, by a liquid penetrant, ultrasonic or equivalent test. In all cases, the watertight bulkheads must be carefully examined.

2 The forepeak, double bottoms (including ducted keels) and inner linings shall be pressure tested with a water column height corresponding to the requirements of regulation 10.1.

3 Tanks intended for the storage of liquids and forming part of the division of the vessel shall be tested for watertightness and strength at a head of water corresponding to the pressure for which the tank is designed. However, in no case shall the water column be less than the top of the air pipe or less than 2.4 m above the tank top, whichever is greater.

4 The tests referred to in subsections 2 and 3 are intended to ensure that the construction of the division is watertight and shall not be considered as a test of the suitability of a compartment for the storage of liquids or for other special purposes for which a more stringent test may be required, depending on the height to which the liquid may rise in the tank or its connections.

Regulation 12 Peak and machinery space bulkheads, shaft allies, etc.

1 A collision bulkhead must be provided that is watertight up to the bulkhead deck on passenger ships and the freeboard deck on cargo ships. This bulkhead must be placed at a distance from the front perpendicular of at least

5% of the ship's length (L) or 10 metres, whichever is less, and - except as the Administration may permit - not more than 8% or 5% + 3 metres of the ship's length, whichever is greater.

2 The ship shall be so designed that s_i calculated in accordance with regulation 7-2 is not less than 1 at the deepest division loading conditions, horizontal trim or any forward trim loading condition, if any part of the ship forward of the collision bulkhead is water-filled without vertical limitations.

3 Where any part of the vessel below the waterline extends forward of the forward perpendicular, such as a bulbous bow, the distances specified in subsection 1 shall be measured from a point either:

. 1 from the middle of this extension; or

. 2 at a distance of 1.5% of the length (L) of the vessel in front of the forward perpendicular; or

. 3 at a distance of 3 metres in front of the front perpendicular; whichever point gives the smallest measurement.

4 The bulkhead may have offsets or recesses, provided that the restrictions prescribed in subsections 1 or 3 are complied with.

5 No doors, manholes, access openings, ventilation ducts or other openings in the collision bulkhead may be placed below the bulkhead deck on passenger ships and the freeboard deck on cargo ships.

6.1 For ships to which the provisions of subsection 1.1.1.1.1 apply and which are constructed before 1 January 2024, no more than one pipe for discharge from the forepeak tank shall be led through the collision bulkhead below the bulkhead deck on passenger ships and the freeboard deck on cargo ships and only on provided that the pipe is fitted with a screw valve operable from a position above the bulkhead deck on passenger ships and the freeboard deck on cargo ships and that the valve is located inside the forepeak at the collision bulkhead, cf. however, see subsection 6.2. However, the Administration may accept that the valve is located on the aft side of the collision bulkhead, provided that the valve is readily accessible under all operating conditions and is not located in a cargo hold. Alternatively, on cargo ships, the pipe can be fitted with a butterfly valve supported by a bearing or sleeves that can be operated from a location above the freeboard deck. All valves shall be of steel, bronze or another approved tough material. Valves made of ordinary cast iron or similar material cannot be approved.

6.2 For ships constructed on or after 1 January 2024, the collision bulkhead may, except as provided by the provisions in subsection 6.3, be pierced below the bulkhead deck on passenger ships and the freeboard deck on cargo ships by not more than one pipe for handling liquid the forepeak tank, provided that the pipe is fitted with a remotely controlled valve operable from a position above the bulkhead deck on passenger ships and the freeboard deck on cargo ships. The valve should be normally closed. If the remote control system fails during valve operation, the valve must close automatically or be able to be closed manually from a position above the bulkhead deck on passenger ships and the freeboard deck on cargo ships. The valve must be located at the collision bulkhead on either the forward or aft side, provided that the space on the aft side is not a cargo hold. The valve shall be made of steel, bronze, or other approved tough material. Valves made of ordinary cast iron or similar material cannot be approved.

6.3 Where the forepeak is divided for the storage of two different types of liquids, the Administration may permit two pipes to be passed through the collision bulkhead below the bulkhead deck in passenger ships and the freeboard deck in cargo ships, both arranged as required in subsection 6.1, provided that the Administration is satisfied that there is no practical alternative to the fitting of the second pipe and that the safety of the ship is maintained taking into account the further division of the forepeak.

7 Where there is a long superstructure forward, the collision bulkhead must be extended weathertight to the deck immediately above the bulkhead deck on passenger ships and the freeboard deck on cargo ships. This extension does not need to be placed directly above the underlying bulkhead, provided that all parts of the extension,

including any part of the ramp attached to it, is located within the limitations prescribed in subsection 1 or 3, with the exception permitted in subsection 8, and that the part of the deck forming the offset is made effectively watertight. The extension must be arranged in such a way as to exclude the possibility of any top door or ramp being damaged in the event of damage to or detachment of the top door or part of the ramp.

8 Where bow doors are fitted and a sloping cargo ramp forms part of the collision bulkhead extension above the bulkhead deck on passenger ships and the freeboard deck on cargo ships, the ramp shall be weathertight along its entire length. On cargo ships, that part of the ramp which is more than 2.3 metres above the freeboard deck may extend forward of the limitation specified in subsections 1 or 3. Ramps that do not fulfil the above requirements should not be included as an extension of the collision bulkhead.

9 The number of openings in the extension of the collision bulkhead above the freeboard deck shall be limited as much as is compatible with the design and normal operation of the vessel. All such openings shall be capable of being closed weathertight.

10 Bulkheads shall be fitted to separate the machinery space from the cargo and accommodation spaces fore and aft and be watertight up to the bulkhead deck on passenger ships and the freeboard deck on cargo ships. A stern peak bulkhead that is watertight up to the bulkhead deck or freeboard deck must also be fitted. However, the aft peak bulkhead may have an offset below the bulkhead deck or freeboard deck, provided that the safety of the ship in terms of division is not compromised.

11 In any case, stern tubes must be placed in watertight compartments of moderate size. On passenger ships, the stuffing box shall be located in a watertight shaft tunnel or other watertight space separate from the stern tube space and of such size that the bulkhead deck will not flood even if this space is filled due to leakage in the stuffing box. On cargo ships, other measures may, at the discretion of the Administration, be taken to minimise the risk of water ingress into the ship in the event of damage to the stern tube arrangement.

Regulation 13 Openings in watertight bulkheads below the bulkhead deck on passenger ships

1 The number of openings in watertight bulkheads shall be reduced to the minimum compatible with the design and proper functioning of the ship; satisfactory means shall be provided to close these openings.

2.1 Where pipes, scuppers, electrical cables, etc., are routed through watertight bulkheads, measures must be taken to ensure that the watertightness of the bulkheads is maintained.

2.2 Valves that are not part of a piping system must not be present in watertight bulkheads.

2.3 Lead or other heat-sensitive materials shall not be used in systems penetrating watertight bulkheads if deterioration of such systems in the event of fire would impair the watertightness of the bulkheads.

3 Doors, manholes or access openings are not permitted in watertight transverse bulkheads separating a cargo space from an adjacent cargo space, except as prescribed in subsection 8.1 and in regulation 14.

4 As specified in subsection 10, there shall be no more than one door other than doors to shaft tunnels in each transverse bulkhead within spaces containing main propulsion machinery and auxiliary machinery, including boilers necessary for propulsion. Where there are two or more propeller shafts, the tunnels must have an interconnection. There shall be only one access door between the machinery space and the tunnels, where there are two propeller shafts, and only two doors where there are more than two propeller shafts. All these doors shall be sliding doors and shall be positioned so that the threshold height is as high as practical

as possible. The hand mechanism for operating these doors from a location above the bulkhead deck must be located outside the machinery spaces.

5.1 Watertight doors, except those prescribed in subsection 8.1 or regulation 14, shall be power-operated sliding doors which fulfil the requirements of subsection 6.

5.2 The control device, either power-operated or manual, for any power-operated sliding watertight door shall be capable of closing the door with the ship heeled to 15° to either side. The forces that can act on both sides of the door, which can occur when water flows through the opening with a static water height corresponding to a water height of at least 1 m above the threshold at the centre of the door, must also be taken into account.

5.3 Controls for watertight doors, including hydraulic pipes

and electrical cables should be routed as close as possible to the bulkhead in which the doors are mounted to minimise the likelihood of them being involved in any damage that the ship may sustain. The location of watertight doors and their operating systems shall be such that the operation of the watertight door which is outside the damaged part of the ship is not impaired if the ship is damaged within 1/5 of the breadth of the ship, as defined in regulation 2, the distance being measured perpendicular to the centreline at the level of the deepest division load line.

6.1 Each mechanically operated watertight sliding door:

. 1 must have a vertical or horizontal movement;

. 2 shall, subject to subsection 9, normally be limited to a maximum clear opening width of 1.2 m. The Administration may authorise larger doors only to the extent considered necessary for the efficient operation of the ship, provided that other security measures, including the following, are taken into account:

. 1 special attention must be paid to the strength of the door and its closing devices to prevent leakage; and

. 2 the door must be located within damage zone B/5;

. 3 shall be provided with the necessary equipment to open and close the door by means of electric power, hydraulic power or any other form of power that may be authorised by the Administration;

. 4 must be equipped with an individual hand-operated mechanism. It must be possible to open and close the door by hand at the door itself from both sides and also to close the door from an accessible position above the bulkhead deck by hand or another movement that provides the same degree of safety acceptable to the Administration. The direction of rotation or other movement shall be clearly indicated at all points of operation When operated by hand, the time required for complete closure of the door shall not exceed 90 seconds when the ship is free of trim and heel, Visual indicators showing whether the door is open or closed shall be provided at the accessible location above the bulkhead deck;

. 5 must be equipped with controls for opening and closinghe the door mechanically on both sides of the door and also for closing the door by mechanical force from the central operating console(s) required in accordance with subsection 7.1;

. 6 shall be fitted with an audible alarm, distinct from any other alarm in the area, which shall sound when the door is closed remotely by mechanical power and which shall sound for a minimum of 5 seconds and a maximum of 10 seconds before the door begins to move and shall continue to sound until the door is completely closed. In the case of remote control by hand, it is sufficient that the acoustic alarm only sounds when the door moves. In passenger areas and areas with high ambient noise, the Administration may also require that the audible alarm be supplemented with a visual flashing signal at the door; and

. 7 must have an approximately uniform closing speed when closed by machine. The closing time, from the time the door starts to move until it is fully closed, shall in no case be less than 20 s or more than 40 s when the ship is without trim and heel.

6.2 The electrical energy required for mechanically operated sliding watertight doors must be supplied from the emergency switchboard either directly or from a special distribution board located above the bulkhead deck. The associated control, indication and alarm circuits shall be supplied from the emergency switchboard either directly or via a special distribution board located above the bulkhead deck and shall be capable of being supplied automatically by the temporary source of emergency power required in regulation 42.3.1.3, in the event of failure of the electrical energy supply from either the main or emergency source.

6.3 Mechanically operated watertight sliding doors must have either:

. 1 a centralised hydraulic system with two independent energy sources, each consisting of a motor and a pump that can close all doors simultaneously. In addition, hydraulic accumulators with sufficient capacity to operate all doors at least three times, i.e. close-open-close, must be provided for the entire system against an unfavourable tilt of 15º. This operation cycle must be able to be performed when the accumulator is at pump starting pressure. The fluid used must be selected taking into account the temperatures to which the system may be exposed during its operation. The mechanically operated system must be designed to minimise the possibility of a single fault in the hydraulic piping system undesirably affecting the function of more than one door. The hydraulic system shall be equipped with a low-level alarm in the hydraulic fluid reservoirs serving the engine-driven system and a low gas pressure alarm or other effective means to monitor the loss of accumulated energy in hydraulic accumulators. These alarms shall be audible and visual and shall be located on the central operating console(s) required in accordance with subsection 7.1; or

. 2 an independent hydraulic system for each door, where each energy source consists of a motor and a pump that can open and close the door. Furthermore, there must be a hydraulic accumulator with sufficient capacity to operate the door at least three times, i.e. closed-open-closed, against a counter-rotation of 15o. This operation cycle must be able to be performed when the accumulator is at pump starting pressure. The fluid used must be selected taking into account the temperatures to which the system may be exposed during its operation. A low gas pressure group alarm or other effective means to monitor the loss of accumulated energy in hydraulic accumulators shall be provided at the central operating console(s) required in accordance with subsection 7.1. There must also be an indication of accumulated energy loss at each local control point, or

. 3an independent electrical system and motor for each door, with its own energy source consisting of a motor capable of opening and closing the door. The power source shall be capable of being automatically supplied by the temporary emergency source of power as prescribed in regulation 42.4.2 - in the event of failure of either the main or emergency source of power, and have sufficient capacity to operate the door at least three times, i.e. close-open-close, against an adverse list of 15°. For the systems specified in subsections 6.3.1, 6.3.2, and 6.3.3, the following precautions shall be taken: The power system for power-operated sliding watertight doors shall be separate from all other power systems. A single fault in the electrically or hydraulically driven system, with the exception of the hydraulic actuator, must not prevent manual operation of any door.

6.4 Control handles shall be located on both sides of the bulkhead at a minimum height of 1.6 metres above the floor and such that it is possible for persons passing through the door to hold both control handles in the open position without accidentally triggering the machine-operated closing system. The direction of movement of the control handles when opening and closing the door must be in the same direction as the door movement and must be clearly indicated.

6.5 As far as possible, electrical equipment and components for watertight doors should be located above the bulkhead deck and outside hazardous areas and compartments.

6.6 Enclosures of electrical components that must necessarily be placed below the bulkhead deck must provide adequate protection against water ingress[35)].

6.7 Electrical power, control, indication and alarm circuits shall be protected against faults in such a way that a fault in one door circuit does not cause faults in other door circuits. Short circuits or other faults in a door's alarm or indicator circuits must not cause the door to become inoperable. Measures shall be taken to ensure that water ingress into electrical equipment located below the bulkhead deck cannot cause the door to open.

6.8 A single electrical fault in the power or control system of a power-operated sliding watertight door must not result in a closed door opening. The presence of available energy shall be continuously monitored at a point in the electrical circuit as close as practicable to each of the motors required in subsection 6.3. Loss of such power supply shall trigger an audible and visual alarm at the central control console(s) required in accordance with subsection 7.1.

7.1 A central control console for all power-operated sliding watertight doors shall be located in the safety centre in accordance with regulation II-2/23. If the safety centre is located in a separate room next to the bridge, there must also be a central control console on the bridge. The central control console(s) shall have a "master mode" switch with two control functions: a "local control function" which allows all doors to be opened and closed locally after use without automatic closing, and a "door close" function which automatically closes all doors that are open after a maximum of 60 seconds when the ship is without trim and heel. In "doors closed" mode, it should be possible to open the doors locally and automatically close them again when the local operating mechanism is triggered. The master mode switch mode should normally be in local control mode. The "doors closed" mode should only be used in case of emergency or for testing purposes.

For ships to which the provisions of regulation 1.1.1.1.1. apply and built before 1 January 2024, the central operating console on the navigating bridge shall be provided with a diagram showing the location of each door with visual indicators showing whether each door is open or closed. A red light indicates that a door is fully open and a green light indicates that a door is fully closed.

7.2 When the door is closed, a red light should indicate the intermediate position by flashing. The indicator circuit must be independent of each door's control circuit.

7.3 For ships constructed on or after 1 January 2024, the central operating console shall be provided with a diagram showing the location of each power-operated sliding watertight door with visual indicators showing whether each door is open or closed. A red light indicates that a door is fully open and a green light indicates that a door is fully closed. When closing the door remotely, the red light should indicate the intermediate position by flashing. The indicator circuit must be independent of each door's control circuit. Indication shall also be given for the on-board stability computer if installed in accordance with regulation II-1/8-1.3.1.

7.4 It must not be possible to open a door remotely from the central control console.

8.1 If the Administration is satisfied that such doors are essential, watertight doors of satisfactory construction may be fitted in watertight bulkheads separating cargo spaces on between decks. Such doors can be hinged, rolling or sliding doors, but must not be remotely operated. They should be positioned as high and as far from the shell plating as possible, but in no case should the vertical edge of the table be

located at a distance from the shell plating that is less than 1/5 of the width of the ship, as defined in regulation 2. This distance shall be measured perpendicular to the centre line of the ship at the height of the deepest division draught.

8.2 If any of the doors are accessible while travelling, they must be fitted with a device that prevents them from being opened by unauthorised persons. Where it is intended to install such doors, the number of such doors and their location shall be carefully scrutinised by the Administration.

9 The use of removable plates in bulkheads is only permitted in machinery spaces. The Administration may authorise one power-operated sliding watertight door in each watertight bulkhead that is larger than the doors specified in subsection
6.1.2 as substituted for removable plates, provided that such doors are closed at sea, except where opening is imperative at the master's discretion. These doors do not need to fulfil the requirements of subsection 6.1.4 with regard to complete manual closing within 90 seconds.

10.1 Where trunks or tunnels serving as access from crew accommodation spaces to machinery spaces are passed through watertight bulkheads for pipework or other reasons, these shall be watertight and fulfil the requirements of regulation 16-1. Access to at least one end of each of these trunks or tunnels, if used at sea for passage, shall be through a trunk that is watertight and extends high enough that the entrance is above the bulkhead deck. Access to the other end of the trunk or tunnel can be through a watertight door. Such trunks or tunnels must not be routed through the first division bulkhead opposite the collision bulkhead.

10.2 Where tunnelling through watertight bulkheads is planned, these must be carefully examined by the Administration.

10.3 Where trunks for cooling loads and ventilation or artificial draught pass through more than one watertight bulkhead, the closing devices at such openings shall be mechanically operated and capable of being closed from a central point located above the bulkhead deck.

Regulation 13-1 Openings in watertight bulkheads and inner decks of cargo ships

1 The number of openings in the division shall be limited as much as is compatible with the design and normal operation of the vessel. Where it is necessary to penetrate watertight bulkheads and internal decks for reasons of access, pipe penetration, ventilation, electrical cables, etc., measures shall be taken to ensure that the watertight integrity is maintained. The Administration may permit relaxations in the watertight integrity of openings above the freeboard deck, provided it is shown that any progressive filling can be readily controlled and that the safety of the vessel is not thereby impaired.

2 Doors intended to ensure the watertight integrity of internal openings used in the sea shall be watertight sliding doors capable of being closed by remote control from the bridge and shall also be capable of being operated locally from each side of the bulkhead. Indicators shall be fitted at the control desk to indicate whether the doors are open or closed and there should be an audible alarm that sounds when the doors are closing. The power source, controls and indicators shall be operational in the event of a main power failure. Particular attention must be paid to limiting the impact of failures in the control system. Every power-operated sliding watertight door shall have an individual hand-operated mechanism. It shall be possible to open and close the door by hand from both sides at the door itself.

3 Access doors and hatch covers normally closed at sea to ensure the watertight integrity of internal openings shall have indicators locally and on the bridge to indicate whether such doors or hatch covers are open or closed. A sign shall be placed on each of these doors or hatch covers to ensure that they are not left open.

4 Watertight doors or ramps of satisfactory construction may be installed for the internal division of large cargo holds provided that the Administration considers such doors or ramps to be absolutely necessary. These doors or ramps can be hinged, roller or sliding doors or ramps, but do not need to be remote controlled. If any of the doors are accessible during navigation, they shall be installed with a device to prevent unauthorised opening.

5 Other closing devices which are kept permanently closed at sea in order to ensure the watertight integrity of the internal openings shall bear a sign on each closing device stating that they are to be kept closed. Manholes fitted with bolted covers need not be marked in this way.

Regulation 14 Passenger ships carrying lorries with accompanying personnel

1 This regulation applies to all passenger ships constructed or adapted for the carriage of goods vehicles with accompanying personnel.

2 If the total number of passengers in such a ship, including accompanying personnel, does not exceed N = 12 + A/25, where A = the total deck area (m^2) of spaces intended for the stowage of lorries and where the clear height at the place where they are stowed and at the entrance to such spaces is not less than 4 metres, the provisions of regulations 13.9.1 and 13.9.2 concerning watertight doors shall apply, except that doors may be fitted at any height in watertight bulkheads separating cargo holds. In addition, indicators are required on the bridge that automatically show when each door is closed and all door holders are secured.

3 If a watertight door is installed in accordance with this regulation, the ship shall not be authorised to carry a higher number of passengers than mentioned in subsection 2.

Regulation 15 Openings in the shell plating below the bulkhead deck on passenger ships and the freeboard deck on cargo ships

1 The number of openings in the shell plating shall be limited to the minimum possible, taking into account the design and normal operation of the vessel.

2 The means of closing openings in the shell plating shall be arranged and function in a manner appropriate to their intended use and the location in which they are fitted, and the arrangement shall be such as to satisfy in all respects the requirements of the Administration.

3.1 No porthole shall be fitted in such a position that its lower edge is below a line drawn parallel to the bulkhead deck at sides and with its lowest point 2.5% of the moulded breadth of the ship above the deepest division load line or 500 mm, whichever is higher, subject to the requirements of the applicable International Convention on Load Lines.

3.2 Subject to subsection 3.1, all portholes whose lower edge is below the bulkhead deck for passenger ships and below the freeboard deck for cargo ships shall be so constructed that they cannot be opened without the master's authorisation.

4 Solid hinged storm flaps shall be fitted to the inside of all portholes in such a way that they can be easily and effectively closed watertight. However, aft of 1/8 of the ship's length from the forward perpendicular and above a line drawn parallel to the bulkhead deck in sides having its lowest point at a height of 3.7 m plus 2.5% of the ship's breadth above the deepest division load line, storm flaps in passenger accommodation may be removable unless, in accordance with the applicable International Convention on Load Lines

are required to be fixed in their proper place. Such removable storm flaps must be stored in the immediate vicinity of the portholes they belong to.

5.1 Portholes shall not be placed in compartments intended exclusively for the carriage of cargo.

5.2 Portholes may, however, be placed in compartments used alternately for the carriage of goods and for the carriage of passengers, but the portholes in such compartments shall be of such construction as effectively to prevent any person from opening them or their storm flaps without the permission of the master.

6 Automatic ventilation ducts shall not be fitted in the shell plating below the bulkhead deck in passenger ships and the freeboard deck in cargo ships without special authorisation from the Administration.

7 The number of scuppers, sanitary drains and other similar openings in the shell plating shall be reduced to the minimum practicable, either by allowing each egress opening to serve as many of these installations as possible or by some other satisfactory means.

8.1 All ingress and egress openings in the shell plating shall be provided with effective and accessible means of preventing the ingress of water into the vessel in the event of a casualty.

8.2.1 Subject to the requirements of the International Convention on Load Lines in force and except as provided by the provisions in subsection 8.3, each discharge pipe passing through the ship's side from spaces below the bulkhead deck on passenger ships or below the freeboard deck on cargo ships shall be fitted with an automatically-operated non-return valve equipped with a closing mechanism operable from a position above the bulkhead deck on passenger ships and the freeboard deck on cargo ships, or two automatic non-return valves without an additional closing mechanism, provided that the inboard valve is located above the deepest division draught and is always accessible for examination during normal operation of the ship. Where a valve with an additional closing mechanism is fitted, the control position above the bulkhead deck on passenger ships and the freeboard deck on cargo ships shall always be easily accessible and means shall be provided to indicate whether the valve is open or closed.

8.2.2 The requirements of the current International Convention on Load Lines apply to drains led through the side of the ship from spaces above the bulkhead deck on passenger ships or the freeboard deck on cargo ships.

8.3 Machinery spaces, main and auxiliary sea connections in egress openings for the operation of the machinery shall be provided with readily accessible valves between the pipes and the shell plating or between the pipes and built-up boxes placed on the shell plating. Valves may be locally operated and shall have indicators to show whether they are open or closed.

8.4 Moving parts passing through the shell plating below the deepest division depth shall be fitted with a watertight sealing arrangement that satisfies the Administration's requirements. The inboard stuffing box shall be placed in a watertight compartment of such size that the bulkhead deck of passenger ships and the freeboard deck of cargo ships will not flood even when this compartment is filled. The Administration may require main or emergency power systems and lights, internal communications, signals or other emergency equipment to function elsewhere in the ship, even if the space fills with water."

8.5 All fittings in the shell plating and valves required by this regulation shall be of steel, bronze or other approved tough material. Valves made of ordinary cast iron or similar material cannot be approved. All pipes referred to in this regulation shall be of steel or other equivalent material satisfactory to the Administration.

9 For ships to which the provisions of regulation 1.1.1.1.1. Apply and which are constructed before 1 January 2024, gangway, cargo and fuel ports fitted below the bulkhead deck of passenger ships and cargo ships

Freeboard decks shall be watertight and shall in no case be fitted so that their lowest point is below the deepest division draught.

10 For ships constructed on or after 1 January 2024, cargo ports and other similar openings (e.g. gangways and tank ports) in the side of the ship below the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall be fitted with doors designed to ensure the same watertight integrity and structural integrity as the surrounding hull plating. Unless otherwise authorised by the Administration, these openings must open outwards. The number of such openings shall be the minimum compatible with the design and proper functioning of the ship. Under no circumstances should these openings be mounted in such a way that their lowest point is below the deepest division depth.

Reguation 15-1 External openings in cargo ships

1 All exterior openings leading to spaces that are assumed intact in the damage analysis and that are below the final waterline in damaged condition must be watertight.

2 External openings required to be watertight in accordance with subsection 1 shall be of sufficient strength and, except for cargo hatch covers, shall have indicators on the bridge.

3 Openings in the shell plating below the deck, which limit the vertical extent of damage, shall be kept permanently closed at sea. If any of these openings are to be accessible when at sea, they must be fitted with a device to prevent unauthorised opening.

4 Other closing appliances, which are kept permanently closed at sea to ensure the watertight integrity of the external openings, shall bear a sign affixed to each closing appliance stating that it is to remain closed. Manholes fitted with bolted covers need not be marked in this way.

Regulation 16 Construction and initial testing of watertight closures.

1.1 The design, materials and construction of all watertight closures such as doors, hatches, portholes, gangways and loading ports, valves and pipes referred to in these regulations shall be to the satisfaction of the Administration.

1.2 Such valves, doors, hatches and mechanisms must be appropriately labelled to ensure that they are used in the best possible way to provide the highest level of safety.

1.3 The frames of vertical watertight doors must not have grooves at the bottom edge where dirt can accumulate and prevent the door from closing effectively.

2 Watertight doors and hatches shall be tested at a water pressure corresponding to the maximum water column they can be exposed to in a final or intermediate stage of filling. On cargo ships not subject to leakage stability requirements, watertight doors and hatches shall be tested at a water pressure corresponding to a water column measured from the lowest edge of the opening to 1 metre above the freeboard deck. If the testing of individual doors and hatches is omitted because of the risk of damage to insulation or equipment, the testing of these doors and hatches may be replaced by a prototype pressure test of each type and size of door or hatch at a test pressure equal to at least that required for the intended location. Prototype testing must be performed before the door or hatch is installed. The method and procedure of installation on board shall correspond to the prototype test. After installation on board, each door or hatch must be checked for correct positioning between the bulkhead, frame and door or between the deck, frame and hatch.

Regulation 16-1 Construction and initial testing of watertight decks, trunks, etc., on passenger and cargo ships

1 Watertight decks, trunks, tunnels, duct coolers and ventilation ducts shall have the same strength as watertight bulkheads of equivalent height. The means used to render them watertight and the devices used to close openings in them shall be to the satisfaction of the Administration. Watertight fans and trunks must be led at least up to the bulkhead deck in passenger ships and to the freeboard deck on cargo ships.

2 On passenger ships where a ventilation duct passing through a structure penetrates a watertight bulkhead deck area, the duct shall be capable of withstanding the water pressure which may occur inside the duct after taking into account the maximum angle of heel during flooding in accordance with regulation 7-2.

3 On ro-ro passenger ships where the penetration of the bulkhead deck is wholly or partially located on the main ro-ro deck, the duct shall be able to withstand a dynamic shock/pressure caused by the movement (sloshing) of water enclosed on the ro-ro deck

4 After their completion, watertight decks shall be subjected to a spray test or similar and watertight trunks, tunnels and ventilation ducts shall be subjected to a spray test.

Regulation 17 Watertightness of passenger ships above the bulkhead deck

1 For passenger ships to which the provisions of regulation 1.1.1.1.1 apply and which are constructed before 1 January 2024, the Administration may require that all reasonable and practicable measures are taken to limit the ingress and spread of water above the bulkhead deck. Such measures can include partial bulkheads or sheet metal frames. When partially watertight bulkheads and plate frames are fitted on the bulkhead deck above or immediately adjacent to watertight bulkheads, they shall be watertight connected to the shell plating and bulkhead deck to limit the flow of water along the deck when the damaged ship is heeled. If the partially waterproofed bulkhead is not flush with the underlying bulkhead, the intermediate bulkhead deck must be effectively waterproofed. When openings, pipes, scuppers, electrical cables, etc., are routed through partially watertight bulkheads or decks within the submerged part of the bulkhead deck, measures must be taken to ensure that the construction above the bulkhead deck is watertight[36)].

2 For ships constructed on or after 1 January 2024, the internal watertight division arrangements for limiting the ingress and spread of water above the bulkhead deck shall comply with the design arrangements necessary to meet the stability requirements of sections B-1 and B-2, if applicable. If pipes, scuppers, electrical cables, etc., are routed through internal watertight boundaries submerged in an intermediate or final stage of flooding in damage cases contributing to the achieved division index *A*, measurements shall be taken to ensure their watertightness.

3 For ships constructed on 1 January 2024, doors in internal watertight division arrangements above the bulkhead deck and also above the worst intermediate or final stage of the waterlines at flooding shall be capable of preventing the passage of water when immersed in the required range of positive stability for all the damage cases contributing to the achieved division index A. These doors can remain open, provided they can be closed from a distance from the bridge. They should always be ready to be closed immediately.

4 All openings in the exposed weather deck must have frames of appropriate height and strength and must be provided with effective means to quickly close them weathertight. Drainage ports, open handrails and scuppers shall be positioned as necessary to allow the open deck to be quickly lowered in all weather conditions.

5 Air pipes which terminate within a superstructure and which are not fitted with watertight closing mechanisms shall be considered to be unprotected openings for the purposes of regulation 7-2.6.1.1.

6 Portholes, gangway, cargo and coal ports and other means of closing openings in the shell plating above the bulkhead deck shall be of satisfactory design and construction and of sufficient strength, having regard to the compartments in which they are fitted and to their position in relation to the deepest division draught.[37)]

7 Solid internal storm flaps positioned so that they can be easily and effectively closed and secured watertight shall be provided at all portholes in spaces below the first deck above the bulkhead deck.

Regulation 17-1 Hull and superstructure integrity, control and prevention of leakage in ro-ro passenger ships

1.1 All access routes from the ro-ro deck leading to spaces below the bulkhead deck shall have a lowest point which is at least 2.5 metres above the bulkhead deck unless the access is subject to the provisions of subsections 1.2 or 1.3.

1.2 Where vehicle ramps are fitted to provide access to spaces below the bulkhead deck, their openings shall be weathertight to prevent ingress of water below the deck vessel and be fitted with alarms and open/close indicators on the bridge. The closing device shall be watertight if the deck is intended as a watertight horizontal boundary according to regulation 7-2.6.

1.3 Subject to regulations 23.3 and 23.6, the Administration may authorise the provision of special access routes to spaces below the bulkhead deck, provided that they are necessary for the essential operation of the ship, e.g. moving machinery and stores, and provided that such access routes are watertight, fitted with alarms and open/close indicators on the bridge

2 The bridge shall be provided with indicators for all doors in the shell plating, cargo doors and other closing devices which, if left open or insufficiently secured, may, in the opinion of the Administration, lead to flooding of special cargo holds or ro-ro cargo holds. The indicator system shall be designed according to the fail-safe principle and shall indicate by visible (visual) alarms if the door is not fully closed or if any safety device is not in place and fully locked, and give an audible (acoustic) alarm if such a door or closing device is opened or the safety devices are inoperative. The monitoring panel on the bridge shall be equipped with an "in port/at sea" switch function so that an audible (acoustic) alarm is given on the bridge if the ship leaves port with bow doors, inner doors, stern ramps or other side shell doors open, or any closing device in an incorrect position. The indicator system power supply must be independent of the power supply to operate and secure the ports.

3 TV monitoring and a water ingress detection indicator system shall provide indication on the bridge and in the machinery space control room of any leakage through inner and outer bow ports, stern ports or other ports in the shell plating that could lead to flooding of special cargo holds or ro-ro cargo holds.

Section B-3 Determination of division load lines on passenger ships

Regulation 18 Determination, marking and labelling of division load lines on passenger ships

1 To ensure compliance with the required degree of division, a load line corresponding to the approved division draught must be assigned, and this line must be marked on the sides of the ship. A ship with spaces arranged so that they can be used alternately for the carriage of passengers and goods may, if the company so desires, have one or more additional cargo lines marked corresponding to the division draughts,

that the Administration can approve the change in transport conditions. Each approved transport condition must fulfil the provisions of section B-1 of this chapter independently of the results obtained for the various other cases.

2 The assigned and marked division load lines shall be indicated in the Passenger Ship Safety Certificate so that the designation P1 shall be used when the ship is mainly used for passenger transport, and P2, P3, etc., for the various other cases. When the ship is mainly used for passenger transport, the required division index R shall have the highest value.

3 The freeboard corresponding to each of these load lines shall be measured at the same place and from the same deck line as the freeboards calculated in accordance with the applicable International Convention on Load Lines.

4 The Passenger Ship Safety Certificate shall clearly indicate the freeboard corresponding to each approved division load line and the transport conditions for which they are authorised.

5 In no case shall a division load line mark be placed above the deepest load line for salt water as determined by the strength of the ship and/or the applicable International Convention on Load Lines.

6 Regardless of the position of the division load line marks, in no case shall a ship be loaded so deep that the load line mark applicable for the time of year and location, calculated in accordance with the applicable International Convention on Load Lines, is submerged.

7 In no case shall a ship be loaded so deep that its division load line mark applicable to the voyage and conditions of carriage concerned is submerged when the ship is in salt water.

Section B-4 Stability information

Regulation 19-0 Stability information for passenger and cargo ships

1 *Ships laid down or at a similar stage of construction on or after 1 April 1976,*[38)] *irrespective of their length, shall comply with the relevant provisions of the International Code for Intact Stability 2008 as amended.*

1.1 *The same applies to ships undergoing conversion if the conversion has a significant impact on stability conditions, and to ships purchased from abroad if they are entered in the Register of Shipping or entered in the Danish International Register of Shipping.*

1.2 *However, ships that were keel-laid or at a similar stage of construction before 1 July 1998, and all cargo ships of less than 500 gross tonnage, need not comply with the weather criteria of regulation 3.2 of the Code.*

1.3 *The special stability criteria for container ships over 100 metres in length in the Code's regulation 4.9 are not mandatory.*

1.4 *If a ship's existing stability information needs to be corrected to comply with this regulation, the corrected stability information must be approved at the next renewal survey at the latest.*

2 *Sand pumpers must fulfil the Code requirements in the general loading conditions and the following special loading conditions:*

2.1 *Light ship with stores and 10% bunker.*

2.2 *100% bunker, no cargo.*

2.3 *10% bunker, water in the cargo box to the widest point.*

2.4 *10% bunker, water to the top of the cargo box.*

2.5 *10% bunker, 1/3 sand cargo, water to the top of the cargo box.*

2.6 *10% bunker, 2/3 sand cargo, water to the top of the cargo box.*

2.7 *10% bunker, cargo box filled with sand.*

2.8 *70% bunker, cargo box filled with sand.*

2.9 *In . 3, . 4, . 5, and . 6, the free surface effect of the water in the cargo box is taken into account.*

2 For excavation work where, for example, mud is present, the full free surface effect of the cargo must be taken into account. The specific gravity of mud or the like is set at 1.5.

The stability information of sand pumps should make the master aware that when sailing in rough weather, the sand cargo must be drained by bottom suction.

Regulation 19 Damage limitation information[39)]

1 For the guidance of the duty officer, plans shall be permanently exhibited showing clearly for each deck and cargo hold the boundaries of the watertight compartments, the openings therein with means of closure and the position of any controls and the measures to be taken to equalise any list due to flooding. In addition, booklets containing this information shall be available for use by ship's officers.

2 General precautions shall consist of a list of equipment, conditions and operational procedures considered by the Administration to be necessary to maintain the watertight integrity of the ship during normal operation.

3 Special precautions shall consist of a list of actions (e.g., closing, securing cargo, investigating alarms, etc.) which are considered by the Administration to be essential for the survival of the vessel, passengers and crew.

4 For ships required to comply with the stability requirements of section B-1, leakage stability information shall provide the master with a simple and easily understood means to assess the survivability of the ship in all damage events involving one or more compartments.

5 For passenger ships constructed on or after 1 January 2024 to which regulation 8-1.3 applies, the damage control information shall include a reference to the activation of damage stability support from the on-board stability computer, if installed, and to shore-based support if available.

Regulation 19-1 - Passenger ship casualty control drills

1 This regulation applies to passenger ships built before, on or after 1 January 2020.

2 A casualty control drill must be conducted at least every three months. It is not necessary for the entire crew to participate in every drill, but only those crew members who have responsibilities related to casualty control.

3 Each scenario in the casualty control drills shall be varied to simulate emergency conditions in different damage conditions and shall, as far as practicable, be conducted as if there were an actual emergency.

4 Each casualty control drill must include:

. 1 reporting to stations and preparing for the duties described in the muster list required by regulation III/8 for crew members with casualty control responsibilities;

. 2 use of casualty control information and of the leakage stability computer, if installed on board, to make stability assessments of the simulated damage conditions;

. 3 establishing a communication link between the ship and the shore-based support function, if available;

. 4 operation of watertight doors and other watertight closures;

. 5 demonstration of competence in the use of the water detection system, if available, in accordance with the task allocation in the muster list;

. 6 demonstration of competence in the use of cross-fill and equalisation systems, if available, in accordance with the task allocation in the muster list;

. 7 operation of bilge pumps and control of bilge alarms and automatic bilge pump starting systems; and

. 8 instruction in casualty investigation and use of the ship's casualty control systems.

5 At least one casualty control drill per year shall include the activation of the shore-based support system, if installed in accordance with regulation II-1/8-1.3, to perform stability assessments for the simulated damage conditions.

6 All crew members with assigned casualty control responsibilities must be familiar with their duties and with the casualty control information before starting the voyage.

7 A record shall be kept of all casualty control drills in the same manner as prescribed for other drills in regulation III/19.5.

Regulation 20 Loading of ships

1 Upon completion of the loading of the ship, but before its departure, the master of the ship shall determine the trim and stability of the ship and ensure and record that the ship is upright and fulfils the stability criteria of relevant regulations. The determination of the ship's stability shall always be made by calculation or by ensuring that the ship is loaded in accordance with one of the pre-calculated loading conditions within the approved stability information. The Administration may accept the use of an electronic loading and stability computer or similar devices for this purpose.

2 Water ballast should not normally be carried in tanks intended for fuel oil. In ships where it is impracticable to avoid filling water into fuel oil tanks, an oil/water separation system satisfactory to the Administration shall be provided or other means, such as facilities for pumping oily water ballast ashore, acceptable to the Administration, shall be provided to remove the oily water ballast.

3 The provisions of this regulation are without prejudice to the provisions of the International Convention for the Prevention of Pollution from Ships in force.

Regulation 21 Periodical operation and inspection of watertight doors, etc., on passenger ships

1 Watertight doors, portholes, valves and scupper closing mechanisms must be function tested weekly. On ships travelling for more than one week, a complete set of operational tests must be carried out before the voyage begins and then other tests at least once a week during the voyage.

2 All watertight doors, both power-operated and hinged, in the main transverse bulkheads shall be tested daily when used at sea.

3 The watertight doors and all associated mechanisms and indicators, all valves that must be closed to make a compartment watertight, and all valves that require operation for the control of cross connections in the event of a leak shall be subject to periodic inspection during the voyage at least once a week.

4 Records of all operational tests and inspections required in accordance with this regulation shall be entered in the ship's logbook with an explicit indication of any deficiencies found.

Regulation 22 Prevention and control of water ingress, etc.

1 All watertight doors shall be kept closed at sea, except that they may be opened at sea as specified in subsection 2.2.2.2.
3. Watertight doors exceeding 1.2 metres in width in machinery spaces permitted by the provisions of regulation 13.9 shall only be opened in the circumstances listed in that subsection. According to these provisions, doors that open must be ready to be closed immediately.

2 Watertight doors located below the bulkhead deck of passenger ships and the freeboard deck of cargo ships, which have a maximum opening of more than 1.2 metres, shall be kept closed during navigation, except for absolutely necessary shorter periods as determined by the Administration.

3 A watertight door may be opened at sea for the passage of passengers or crew members or when work in the immediate vicinity of the door requires it to be opened. The door must be closed immediately after passing through the door or when the work that required it to be open is completed. The Administration should only authorise the opening of such a watertight door at sea during the voyage after careful consideration of the effect on the operation and survivability of the ship, taking into account guidance issued by the Organisation.[40)] A watertight door which may be left open during the voyage should be clearly indicated in the ship's stability information and should be capable of being closed immediately at any time.

4 Removable plates on bulkheads must always be in place before the voyage commences and must not be removed during the voyage unless, in the master's judgement, it is absolutely necessary. Necessary measures must be taken to ensure that the joints are watertight when reinstalled. Power-operated sliding watertight doors permitted in machinery spaces in accordance with regulation 13.9 shall be closed before the voyage commences and shall remain closed during navigation unless, in the judgment of the master, it is essential that they remain closed.

5 Watertight doors fitted in watertight bulkheads separating cargo holds between two decks in accordance with regulation 13.8.1 shall be closed before the voyage commences and shall be kept closed during the voyage. The time when such doors are opened or closed shall be recorded in a logbook as may be required by the Administration.

6 For ships to which the provisions of regulation 1.1.1.1.1 apply and which are constructed before 1 January 2024, gangway, cargo and fuel ports fitted below the bulkhead deck on passenger ships and the freeboard deck on cargo ships shall be effectively closed and secured watertight before the voyage commences and shall be kept closed during navigation.

7 For ships constructed on or after 1 January 2024, gangways, cargo and fuel doors located below the bulkhead deck and freeboard deck of passenger ships and freight ships and all watertight hatches shall be effectively closed and secured watertight before the voyage commences and shall be kept closed during the voyage. However, the master may authorise the opening of a watertight hatch during navigation for a limited time sufficient to allow passage or access. It must then be closed.

8 The following doors located above the bulkhead deck on passenger ships and the freeboard deck on cargo ships shall be closed and secured before the voyage commences and shall be kept closed and secured until the ship arrives at the next berth:

.1 load doors in the shell plating or closed superstructure limitations;

. 2 bow doors placed in the locations specified in subsection 8.1;

. 3 cargo doors in the collision bulkhead; and

. 4 ramps that provide an alternative closure to the doors defined in subsections 8.1 to 8.3 inclusive.

9 A door which cannot be opened or closed while the ship is at the berth may be opened or kept open while the ship is approaching or leaving the berth, but only to the extent necessary for the immediate operation of the door. In all cases, the inner bow door must be kept closed.

10 Regardless of the provisions of subsections 8.1 and 8.4, the Administration may authorise the opening of certain doors if the master deems it necessary for the operation of the ship or for embarking and disembarking passengers when the ship is safely anchored and provided that the safety of the ship is not thereby impaired.

11 The master shall ensure that an effective monitoring and reporting system relating to the closing and opening of the ports referred to in subsection 8 is implemented.

12 Before the voyage commences, the master shall ensure that an entry is made in the ship's logbook prescribed by the Administration as to when the doors referred to in subsection 13 were closed and when certain doors were opened in accordance with subsection 14.

13 Hinged doors, removable plates, portholes, gangway doors, cargo doors, bunkering doors, and other openings required by these regulations to be kept closed during navigation must be closed before the voyage commences. The time of opening and closing of such doors (if authorised by these regulations) shall be recorded in the ship's logbook prescribed by the Administration.

14 If there are portholes as referred to in regulation 15.3.2 on a between-deck, the lower edge of which is below a line drawn parallel to the bulkhead deck in the case of passenger ships and the freeboard deck in the case of cargo ships and the lowest point of which is 1.4 metres plus 2.5% of the breadth of the ship above the waterline at the start of the ship's voyage, all portholes on this between deck shall be closed watertight and locked before the voyage commences and shall not be opened until the ship arrives at the next port. In the application of this subsection, fresh water may be allowed to be taken into account where appropriate.

. 1 The time of opening such portholes in port and of closing and locking them before the voyage commences shall be entered in the ship's logbook prescribed by the Administration.

. 2 For any ship which has one or more portholes so arranged that the requirements of subsection 13 would apply when the ship is at its deepest division load line, the Administration may specify the limited mean draught at which these portholes will have their lower edge above a line drawn parallel to the bulkhead deck in the case of passenger ships and the freeboard deck in the case of cargo ships and the lowest point 1.4 metres plus 2.5% of the width the ship above the waterline corresponding to the restricted mean draught, and at which it will therefore be permissible to start the voyage without closing and opening them and to open them during navigation under the master's responsibility. In tropical zones as defined in the applicable International Convention on Load Lines, the limited draught may be increased by 0.3 metres.

15 Portholes and associated storm flaps that are not accessible during sailing must be closed and secured before the journey begins.

16 If cargo is carried in such spaces referred to in regulation 15.5.2, the portholes and their storm flaps shall be closed watertight and locked before the cargo is taken, and the time of closing and locking of such portholes and storm flaps shall be entered in the logbook prescribed by the Administration.

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Regulation 22-1 Water level alarms for passenger ships carrying 36 persons or more

1 Based on the guidance adopted by the Organisation[41)] a water level alarm shall be provided for spaces below the bulkhead deck.

Regulation 23 Special requirements for ro-ro passenger ships

1 Special cargo holds and ro-ro cargo holds must be continuously patrolled or effectively monitored, e.g. by CCTV, so that it is possible to see whether vehicles have moved in bad weather and whether there are unauthorised passengers during the voyage.

2 Documented operating procedures for closing and securing all hatch covers, cargo doors and other means of closing which, if left open or insufficiently secured, could, in the judgement of the Administration, lead to flooding of special holds or ro-ro cargo holds, shall be kept on board and shall be posted in an appropriate place.

3 All accesses from the ro-ro deck and vehicle ramps leading to spaces below the bulkhead deck shall be closed before the voyage commences and shall remain closed until the ship is at its next berth.

4 The master of the ship shall ensure that an effective monitoring and reporting system concerning the closing and opening of the doors referred to in subsection 3 is implemented.

5 As required by regulation 22.13, before the ship commences its voyage, the master shall ensure that the time of the last closing of the gates referred to in subsection 3 is entered in the ship's logbook.

6 Regardless of the provisions of subsection 3, the Administration may authorise the opening of certain accesses during the voyage, but only for a period necessary to permit passage and, if necessary, for essential work connected with the operation of the ship.

7 All transverse and longitudinal bulkheads counted as effective in limiting the accumulation of sea water on the ro-ro deck shall be in place and secured before the voyage commences and remain in place and secured until the ship reaches the next berth.

8 Regardless of the provisions of subsection 7, the Administration may authorise the opening of certain accesses in such bulkheads during the voyage, but only for a period necessary to permit passage and for work strictly necessary for the operation of the ship.

9 On all ro-ro passenger ships, the master or designated officer shall ensure that no passenger is allowed access to an enclosed ro-ro deck during the voyage without the express consent of the master or designated officer.

Regulation 24 Additional requirements for prevention and control of water ingress, etc., on cargo ships

1 Openings in the shell plating below the deck that limit the vertical extent of damage must be kept permanently closed during sailing.

2 Regardless of the requirements of subsection 3, the Administration may permit special doors to be opened if, in the opinion of the master of the vessel, this is necessary for the operation of the vessel and provided that the safety of the vessel is not thereby impaired.

3 Watertight doors or ramps fitted internally to divide large cargo holds must be closed before the voyage begins and must be kept closed during the voyage. The time of opening and closing of these doors shall be recorded in the ship's logbook prescribed by the Administration.

4 The use of access doors and hatch covers to ensure the watertight integrity of internal openings shall be authorised by the duty officer.

Regulation 25 Water level alarms on cargo ships with a single cargo hold other than bulk carriers

1 Cargo ships with a single cargo hold, other than bulk carriers, constructed before 1 January 2007, shall comply with this regulation by 31 December 2009.

2 Ships of less than 80 m in length (*L*), or 100 m if constructed before 1 July 1998, having only one cargo hold below the freeboard deck which is not subdivided by watertight bulkheads leading to this deck, shall be fitted with water level alarms.[42)]

3 Water level alarms, as required in subsection 2, shall:

3.1 give an audible and visual alarm on the bridge when the water level reaches a height of 0.3 m measured from the bottom of the cargo hold, and a second alarm when the water level exceeds 15% of the average depth of the cargo hold; and

3.2 be fitted in the rearmost part of the cargo hold, or in the lowest part of the cargo hold if the bottom is not parallel with the structure waterline. Where frames or partially watertight bulkheads are fitted above the bottom of the cargo hold, the Administration may require additional water level detectors.

4 Water level alarms as required in subsection 2 shall not be fitted on ships complying with regulation XII/12 or on ships having watertight compartments on each side of the cargo hold extending from the bottom of the cargo hold to the freeboard deck.

Regulation 25-1 - Water level detectors on cargo ships with multiple cargo holds other than bulk carriers and tankers

1 Cargo ships with multiple cargo holds, except bulk carriers and tankers built on or after 1 January 2024, shall be fitted with water level detectors[43)] in each cargo hold intended for dry cargo. Water level detectors are not required for cargo holds located completely above the freeboard deck.

2 The water level detectors required under subsection 1 shall

. 1 give an audible and visual alarm on the bridge, one when the water level above the cargo hold bottom reaches a height of at least 0.3 metres and another at a height of at least 15 % of the cargo hold depth but not exceeding 2 metres; and

. 2 is mounted at the rear end of the cargo holds. For cargo holds that are occasionally used for water ballast, an alarm override device can be installed. The visual alarms must clearly distinguish between the two different water levels detected in each compartment.

3 As an alternative to the water level detector at a height of not less than 0.3 metres in accordance with subsection 2.1, a bilge level sensor[44]) serving the bilge pumping arrangements required by regulation 35-1 and installed on the cargo hold bilge wells or other suitable location is acceptable provided that:

. 1 installation of a bilge water level sensor at a height of at least 0.3 metres at the aft end of the cargo hold; and

. 2 The bilge water level sensor provides an audible and visual alarm on the bridge, which is clearly different from the alarm given by the other water level detector mounted in the cargo hold.

Section C Machine installations

(Unless expressly provided otherwise, section C applies to passenger and cargo ships)

Regulation 26 General provisions

1 Machinery, boilers and other pressure receptacles and their associated piping systems and accessories shall be so designed and constructed as to be fit for the function for which they are intended and shall be so located and protected as to minimise danger to persons on board with due regard to moving parts, hot surfaces and other hazards. The design must take into account the construction materials used, the purpose of the equipment, the operating conditions it will be exposed to and the environmental conditions on board.[45)]

2 The Administration shall pay particular attention to the reliability of essential individual components of the propulsion system and may require a separate source of propulsion energy sufficient to provide manoeuvrability, especially in the case of unconventional systems.

3 Means must be provided to ensure that the normal function of the propulsion system can be maintained or restored, even if one of the important auxiliary installations should cease to function. Particular attention should be paid to malfunctions in the case of:

3.1 a generator set that serves as the main electrical energy source;

3.2 the steam supply sources;

3.3 feed water systems for boilers;

3.4 fuel oil systems for boilers or engines,[46)]

3.5 the means to generate lubricating oil pressure;

3.6 the means to generate water pressure;

3.7 a condensate pump and the arrangement for maintaining vacuum in condensers;

3.8 the mechanical air supply to boilers;

3.9 an air compressor and receiver for starting or control purposes;

3.10 the hydraulic, pneumatic or electrical means of control of the main propulsion machinery, including controllable pitch propellers.

However, the Administration may authorise a partial reduction of the propulsion capability, taking into account overall safety considerations.

4 Means must be in place to ensure that the machinery can be restored to working order after a "dead ship" state without outside help.

5 All boilers, machinery parts, steam installations, hydraulic installations, compressed air installations and all other installations and associated accessories operating under internal pressure must be subjected to appropriate tests, including a pressure test, before being put into service for the first time.

6 The main propulsion plant and all auxiliary machinery necessary for the propulsion and safety of the ship, as installed in the ship, shall be arranged to function when the ship is on an even keel and when heeled with an angle of heel up to and including 15º to either side under static conditions and 22.5º under dynamic conditions (rolling) to either side and simultaneously dynamic heeling (pitching) 7.5º fore and aft. The Administration may authorise deviations from these angles taking into account the type, size and operating conditions of the vessel.

7 Measures shall be taken to facilitate cleaning, inspection and maintenance of main propulsion and auxiliary machinery, including boilers and pressure vessels.

8 Particular attention must be paid to the design, construction and installation of propulsion systems so that their vibrations do not cause excessive stresses in these machines within the normal operating ranges.

9 Non-metallic expansion joints in piping systems, if located in a system which passes through the ship's side and both the penetration and the non-metallic expansion joint are located below the deepest load waterline, shall be inspected as part of the surveys described in regulation I/10(a) and, if necessary, replaced or inspected at intervals recommended by the manufacturer.

10 Operating and maintenance instructions and drawings relating to machinery installations and equipment essential for the safe operation of the ship must be in a language understandable to those officers and crew members who are required to understand such instructions in the performance of their duties.

11 This subsection shall apply only *to passenger ships of any size and cargo ships of 500 gross tonnage and upwards* built on or after 1 July 1998.

The location and arrangement of ventilation pipes in connection with fuel oil service, fuel oil settling and lubricating oil tanks shall be organised in such a way that the rupture of an air pipe does not directly lead to a risk of seawater or rainwater ingress. On board all new ships, two fuel oil service tanks shall be installed for each type of fuel required for propulsion and the operation of other vital systems or similar arrangements, each with a capacity equivalent to 8 hours of operation at maximum continuous power of the propulsion machinery and normal operating load of the generators at sea.[47)]

12 *In addition to the requirements in this chapter section E, regulations 46 to 53 on additional requirements for periodically unmanned machinery spaces, ships must, in order to obtain the designation periodically unmanned machinery spaces, comply with a recognised classification society's regulations for this or be equipped in accordance with the Danish Maritime Authority's guidelines for sailing with periodically unmanned machinery spaces.*

Regulation 27 Machinery

1 Where there is a risk to the machinery due to excessive rotational speed, measures must be taken to ensure that the safe operating speed is not exceeded.

2 Where main or auxiliary machinery, including pressure vessels, or any part of such machinery is subject to internal pressure and may be subject to dangerous overpressure, means shall be provided where practicable to protect against such overpressure.

3 Gears and any shaft and coupling used to transmit power to machinery necessary for the propulsion and safety of the ship or for the safety of persons on board must be designed and constructed to withstand the maximum stresses to which they may be subjected under all operating conditions, due regard being paid to the type of engines by which they are driven or of which they form a part.

4 Internal combustion engines with a cylinder diameter of 200 mm or a crankcase volume of 0.6 m^3 and above must be fitted with explosion relief valves of an appropriate type with sufficient flow area. Relief valves shall be located or provided with means to direct the flow from them so as to minimise the risk of injury to personnel.

5 Main propulsion turbines and any main propulsion internal combustion engines and auxiliary machinery must be fitted with automatic cut-off devices in case of failure, e.g. of the lubricating oil supply, which could rapidly lead to complete breakdown, serious damage or explosion.

The Administration may authorise measures that bypass the automatic switching devices.

Regulation 28 Reversing capability

1 The ship shall have sufficient reversing capability to ensure adequate manoeuvrability under all normal conditions.

2 The ability of the machinery to change the direction of propeller action in a sufficiently short time to bring the ship to rest within a reasonable distance travelled from the maximum service speed in the future shall be demonstrated and recorded.

3 Information on stopping times, directions and distances travelled recorded during sea trials and the results of sea trials to determine the ability of ships with multiple propellers to navigate and manoeuvre with one or more of them inoperative shall be kept on board for use by the master or designated personnel.

4 Where the ship is fitted with additional means of manoeuvring or stopping, the effectiveness of such means shall be demonstrated and recorded as mentioned in subsections 2 and 3.

Regulation 29 Steering gear[48)]

1 Unless otherwise expressly provided, every ship shall be provided with a main steering gear and auxiliary steering gear, both to the satisfaction of the Administration. The main steering gear and the auxiliary steering gear must be organised in such a way that the failure of one will not render the other inoperative.

2.1 All steering gear components and the rudder stock must be of solid and reliable construction to the satisfaction of the Administration. Particular attention must be paid to the suitability of any important component that is not duplicated. Any such major component shall, where appropriate, be fitted with anti-friction bearings, such as ball bearings, roller bearings or plain bearings, which shall be permanently lubricated or fitted with a lubricator.

2.2 The design pressure for calculation to determine the material dimensions of pipelines and other parts of the steering gear exposed to internal hydraulic pressure shall be at least 1.25 times the maximum working pressure to be expected under the operating conditions specified in subsection 3.2, taking into account any pressure that may exist on the low pressure side of the gear. At the discretion of the Administration, fatigue criteria should be used in the design of pipelines and components, taking into account pulsating pressures caused by dynamic loads.

2.3 Safety valves must be installed on any part of the hydraulic system that can be shut off and where pressure from the energy source or external forces can occur. The setting of the safety valves must not exceed the design pressure. Valves must be appropriately sized and positioned to prevent the pressure from rising unacceptably above the design pressure.

3 The main steering gear and rudder stock must;

3.1 have sufficient strength and be able to steer the ship at maximum service speed in the future, which must be demonstrated,

3.2 be able to put the rudder over from 35º on one side to 35º on the other side when the ship is at maximum draught and proceeding at maximum service speed and service speed and, under the same conditions, from 35º on one side to 30º on the other side in not more than 28 seconds, where it is not practicable to demonstrate compliance with this requirement during sea trials when the ship is at its maximum draught and proceeding at a speed corresponding to the maximum main engine speed and maximum designed pitch rate, ships, regardless of the date of construction, may demonstrate compliance with this requirement by one of the following methods:

1) on a trial run, the ship is on an upright keel and has the rudder fully submerged while proceeding at a speed corresponding to the maximum main engine speed and maximum calculated pitch rate; or

2) where it is not possible to completely submerge the rudder during a trial run, an appropriate forward speed shall be calculated using the area of the rudder blade submerged under the loading conditions proposed for the trial run. The calculated forward speed shall result in an application to the main steering gear of a force and torque at least as great as would have been the case had it been tested with the ship at its maximum draught and at a forward speed corresponding to the maximum speed of rotation and maximum calculated pitch of the main gear; or

3) The rudder force and torque under the loading condition of the test ride have been reliably predicted and extrapolated to the full load condition. The ship's speed must correspond to the maximum rotation speed of the main engine and the maximum calculated pitch of the propeller.

3.3 powered where necessary to fulfil the requirements of subsection 3.2 and in cases where the Administration requires a rudder stock with a diameter of more than 120 mm measured at the tiller, except for reinforcement for navigation in ice; and

3.4 designed so as not to be damaged at maximum reverse speed; however, this design requirement need not be demonstrated by test runs at maximum reverse speed and maximum rudder angle.

4 The auxiliary steering gear must;

4.1 Have adequate strength and be able to steer the ship when manoeuvring and be ready for use in an emergency;

4.2 be able to put the rudder over from 15º on one side to 15º on the other side in not more than 60 seconds with the ship at maximum draught and at half the maximum service speed ahead or 7 knots if this

is greater; where it is not practicable to demonstrate compliance with this requirement during sea trials with the ship at its deepest draught and proceeding ahead at half the speed corresponding to the maximum speed of rotation of the main machinery and maximum calculated pitch or 7 knots, whichever is the greater, ships, regardless of their date of construction, including ships constructed before 1 January 2009 – may demonstrate compliance with this requirement by one of the following methods:

1) on a trial run, the ship is on an even keel and has the rudder fully submerged while travelling ahead at half the speed corresponding to the maximum revolutions per minute and maximum designed pitch rate of the main engine or 7 knots, whichever is greater; or

2) where it is not possible to completely submerge the rudder during a trial run, an appropriate forward speed shall be calculated using the area of the rudder blade submerged under the loading conditions proposed for the trial run. The calculated forward speed shall result in an application to the main steering gear of a force and torque at least equal to that which would have been applied if it had been tested with the ship at its maximum draught and at one half of the forward speed corresponding to the maximum main engine speed and maximum calculated pitch rate or 7 knots, whichever is greater; or

3) The rudder force and torque under the loading condition of the test ride have been reliably predicted and extrapolated to the full load condition.

4.3 powered if necessary to fulfil the requirements of subsection 4.2 and in all cases where the Administration requires a rudder stock with a diameter of more than 230 mm measured at the tiller, except for reinforcement for navigation in ice.

5 The power units on main and auxiliary steering gear must:

5.1 be designed to automatically restart when power is restored after a power failure; and

5.2 could be initiated from a location on the bridge. In the event of failure of the energy supply to any of the control machine's power units, an audible and visual alarm must be sounded on the bridge.

6.1 Where the main steering gear includes two or more power units, it is not necessary to install a auxiliary steering gear, provided that;

6.1.1 the main steering gear of a passenger ship may drive the rudder as prescribed in subsection 3.2 as long as one of the power units is inoperative;

6.1.2 the main steering gear of a cargo ship can drive the rudder as prescribed in subsection 3.2 when all power units are in operation;

6.1.3 The main steering gear is designed so that after a single failure in its piping system or in one of the power units, it is possible to isolate the fault so that steering performance can be maintained or quickly recovered.

6.2 Until 1 September 1986, the Administration may permit the installation of steering gear which has been proven to be reliable but which does not meet the requirements of subsection 6.1.3 for a hydraulic system.

6.3 Steering gear of a type other than the hydraulic type shall fulfil standards equivalent to the requirements of this subsection to the satisfaction of the Administration.

7 Steering gear must be available;

7.1 for the main steering gear, both on the bridge and in the steering gear space;

7.2 where the main steering gear is arranged in accordance with subsection 6, by two independent control systems, both operable from the bridge. This does not require duplicating the steering wheel or steering lever. Where the recording equipment consists of a hydraulic telemotor, it is not necessary to install a second independent system except on a tanker, chemical tanker or gas carrier of 10,000 gross tonnage or more;

7.3 for the auxiliary steering gear in the steering gear space and, if powered, shall also be operable from the bridge and shall be independent of the main steering control system.

8 Any control system for main and auxiliary steering gear that can be operated from the bridge shall fulfil the following requirements;

8.1 if it is electric, it shall have its own separate circuit supplied from a steering gear circuit from a point within the steering gear space or directly from the switchboard busbars supplying that steering circuit at a point on the switchboard busbars supplying that steering gear circuit at a point on the switchboard adjacent to the supply to the steering gear circuit;

8.2 Means shall be provided in the steering gear space to isolate any steering control system operated from the bridge from the steering gear it serves;

8.3 the system must be able to be initiated from a location on the bridge;

8.4 in the event of a failure in the supply of electrical energy to the steering control system, an audible and visual alarm shall be given on the bridge; and

8.5 power circuits supplying the steering control system for steering gear must only be protected against short circuit.

9 The electrical circuits and steering control systems for steering gear and associated components, cables and pipes required by this regulation and by regulation 30 shall be separated as far apart as practicable throughout their length.

10 A means of communication must be found between the bridge and the steering gear space.

11 The angle of the rudder should;

11.1 be indicated on the bridge if the main steering gear is operated mechanically. The rudder angle indication must be independent of the steering gear control system.

11.2 could be clearly perceived in the steering gear space.

12 Hydraulic steering gear operated by machine must be fitted with the following;

12.1 device for cleaning the hydraulic fluid, taking into account the type of hydraulic system and its construction;

12.2 a low fluid level alarm for each hydraulic fluid container to provide the earliest possible notification of a leak in the hydraulic system. An audible and visual alarm shall be given on the bridge and in the machinery space where it can be easily perceived; and

12.3 a fixed storage tank with sufficient capacity to refill at least one hydraulically operated system including the container where the main steering gear is required to be power-operated. The storage tank must be permanently connected by piping in such a way that the hydraulic systems can be easily refilled from a location within the steering gear space and must be fitted with a content gauge.

13 The steering gear space should be:

13.1 easily accessible and, where possible, separated from the machinery spaces; and

13.2 fitted with appropriate devices to ensure that the crew members concerned have access to the steering gear machinery and controls. These measures must include handrails and gratings or other non-slip surfaces to ensure reasonable working conditions in case of a leak in the hydraulic system.

14 Where the rudder stock is required to have a diameter of more than 230 mm measured at the quadrant arm, excluding reinforcement for navigation in ice, an alternative energy supply at least sufficient to supply the steering gear power units and complying with the requirements of subsection 4.2 shall be automatically provided within 45 seconds, and also the associated steering control system and rudder controls, either from the emergency source of electrical power or from an independent power source located in the steering gear space. This standalone energy source may only be used for this purpose. In any ship of 10,000 gross tonnage and above, the alternative energy supply shall have a capacity for at least 30 minutes of continuous operation and in any other ship for at least 10 minutes.

15 In every tanker, chemical tanker, or gas carrier of 10,000 gross tonnage and upwards, and in every other ship of 70,000 gross tonnage and upwards, the main steering gear shall include two or more identical power units complying with the provisions of subsection 6.

16 Any tanker, chemical tanker, or gas carrier of 10,000 gross tonnage and above shall, subject to subsection 17, fulfil the following requirements:

16.1 the main steering gear shall be so arranged that in the event of loss of steering capability due to a single failure of any part of one of the main steering gear drive units, other than the tiller, quadrant or components serving the same purpose, or in the event of failure of the rudder actuators, it is possible to restore steering capability within a maximum of 45 seconds after the failure of one of the drive units;

16.2 The main control gear must include either

16.2.1 two independent and separate power units, both capable of meeting the requirements of subsection 3.2; or

16.2.2 at least two identical power units which, when operating simultaneously during normal operation, must be able to fulfil the requirements of subsection 3.2. Where necessary to fulfil this requirement, the hydraulic power units must be interconnected. Loss of hydraulic fluid from one system must be indicated and the faulty system must be automatically shut off so that the other power unit(s) remain fully functional;

16.3 Steering gear of a type other than the hydraulic type must fulfil equivalent standards.

17 On tankers, chemical tankers or gas carriers of 10,000 gross tonnage and upwards but less than 100,000 tonnes deadweight, solutions other than the single failure criterion may be applied to the rudder actuator or actuators referred to in subsection 16, provided that equivalent safety is achieved and that;

17.1 control capability after loss due to a single failure of a part of the piping system or of one of the power units is recovered within 45 seconds; and

17.2 where the steering gear includes only a single rudder actuator, special consideration shall be given to stress analysis of the structure including fatigue analysis and fracture mechanism analysis where appropriate, to the materials used, to the location of the sealing arrangement and to testing and inspection, and to measures for effective maintenance. In

consideration of the foregoing, the Administration shall establish regulations incorporating the provisions of "Guidelines for the approval of non-duplicating rudder actuators in tankers, chemical tankers and gas carriers of 10,000 gross tonnage and above but less than 100,000 tonnes deadweight" adopted by the Administration.[49)]

18 In a tanker, chemical tanker, or gas carrier of 10,000 gross tonnage and upwards but less than 70,000 tons deadweight, the Administration may, until 1 September 1986, allow a steering gear system of proven reliability but not meeting the single failure criterion required in subsection 16 for a hydraulic system.

19 Any tanker, chemical tanker or gas carrier of 10,000 gross tonnage and upwards constructed before 1 September 1984 shall, not later than 1 September 1986, comply with the following requirements:

19.1 The requirements in subsections 7.1, 8.2, 8.4, 10, 11, 12.2, 12.3, and 13.2;

19.2 Two independent set of steering gear must be installed for the steering control system, both of which can be operated from the bridge. This does not require duplication of steering wheels or steering levers;

19.3 if the current steering control system for the steering gear should fail, the other system must be able to be initiated immediately from the bridge; and

19.4 each electrical control system shall have its own separate power circuit, supplied either from the steering gear's power circuit or directly from the switchboard busbars from the point supplying this steering gear in the switchboard that is (directly) connected to the steering gear's power circuit.

20 In addition to the requirements of subsection 19, the steering gear of every tanker, chemical tanker or gas carrier of 40,000 gross tonnage and upwards constructed before 1 September 1984 shall, not later than 1 September 1988, be so arranged that in the event of a single failure of the piping system or of one of the power units the steering capability can be maintained or the rudder movement can be limited so that the steering can be rapidly restored.

This should be achieved by:

20.1 an independent means of controlling the movement of the rudder; or

20.2 Fast-acting valves that can be manually operated to isolate the activator or activators from the external hydraulic piping system, and a means of directly refilling the activators by means of a fixed, self-contained, mechanically driven pump and piping system; or

20.3 a device that allows, where hydraulic power units are interconnected, to detect the loss of hydraulic fluid from one of the units and isolate the faulty unit, either automatically or from the bridge, so that the other unit remains in full operation.

Regulation 30 Additional requirements for electrical and electro-hydraulic steering gear

1 Means to indicate whether electric and electro-hydraulic steering gear motors are in operation shall be installed on the bridge and at an appropriate main machinery control position.

2 Any electrical or electro-hydraulic steering gear comprising one or more power units shall be fed through at least two special circuits directly from the main switchboard; however, one circuit may be fed through the emergency switchboard. An electric or electro-hydraulic auxiliary steering gear connected to an electric or electro-hydraulic main steering gear can be connected to one of the circuits supplying this main steering gear. The circuits supplying an electric or electro-hydraulic steering gear must

Have enough capacity to power all motors that can be connected to them at the same time and that may need to operate simultaneously.

3 Short-circuit protection and an overload alarm must be provided for such circuits and motors. Any overcurrent protection devices, including any starting current, shall be at least twice the full current rating of the protected motor or circuit and shall be so arranged that the protection device allows the necessary starting current to flow.

Where a three-phase supply is used, an alarm device must be installed to indicate if a fault occurs in one of the supply phases.

The alarms required herein shall be both audible and visual and shall be placed in a conspicuous position in the main machinery space or control room from which the main machinery is normally controlled, and as may be required by regulation 51.

4 In a ship of less than 1,600 gross tonnage where auxiliary steering gear required by regulation 29.4.3 to be power-operated is not powered by electricity or by an electric motor used primarily for the operation of other systems, the main steering gear may be supplied through a circuit extending from the main switchboard. Where such an electric motor used primarily for the operation of other installations is arranged to power such auxiliary steering gear, the Administration may waive the requirement of subsection 3 if it finds the protective measures satisfactory in relation to the requirements of regulations 29.5.1-2 and 29.7.3 applicable to auxiliary steering gear.

Regulation 31 Control measures for machinery

1 Main and auxiliary machinery essential for the propulsion and safety of the ship shall be provided with effective means of operation and control.

2 Where remote control of the propulsion machinery is arranged from the navigating bridge and provided the machinery spaces are to be manned, the following provisions shall apply:

2.1 The propeller speed, direction of action and possible pitch shall be fully controllable from the bridge in all speed conditions, including manoeuvring;

2.2 remote control shall be performed for each independent propeller by means of a control device designed and constructed so that its operation does not require special attention to the detailed operation of the machinery. Where multiple propellers need to operate simultaneously, they can be controlled using a single control device;

2.3 The main propulsion machinery shall be fitted with an emergency stop device on the bridge and this device shall be independent of the bridge control system;

2.4 Orders from the bridge to the propulsion machinery shall be indicated in the main machinery control room or on the manoeuvring platform, whichever is more appropriate;

2.5 remote control of the propulsion machinery shall only be possible from one location at a time; at such locations, interconnected control centres are permitted. At each location, there must be an indicator showing from which location the propulsion machinery is controlled. The transfer of control between the bridge and machinery spaces may only take place in the main machinery space or its control room. This system shall include means to prevent the propeller thrust from changing significantly when control is transferred from one location to another;

2.6 It must be possible to control the propulsion machinery locally, even in the event of a failure in one part of the remote control system;

2.7 The remote control system must be designed in such a way that an alarm will sound if a fault occurs in the system. The propeller preset speed and direction of rotation shall be maintained until local control is in operation unless the Administration considers this impracticable;

2.8 there should be indicators on the bridge that indicate:

2.8.1 propeller speed and direction of rotation in case of fixed pitch propellers;

2.8.2 Propeller rotation speed and pitch angle in case of controllable pitch propellers;

2.9 A low starting air pressure alarm shall be provided on the navigating bridge and in the machinery space, and shall have an alarm point that allows further starting operations to start the main engine. If the remote control system of the propulsion machinery is designed for automatic starting, the number of consecutive automatic unsuccessful attempts to start the machinery shall be limited to ensure sufficient starting air pressure for local starting.

3 Where the main propulsion machinery and associated machinery including main sources of electrical power are equipped with varying degrees of automatic or remote control and are under continuous manual supervision from a control room, the arrangement and means of control shall be so designed, equipped and installed that the operation of the machinery will be as safe and efficient as if it were under direct supervision; for this purpose the provisions of regulations 46 to 50 shall apply, as appropriate. Special care must be taken to protect such spaces from fire and water ingress.

4 Automatically operating starting, operation and control systems shall generally include the possibility to manually override the automatic control systems. Failures in any part of such systems must not prevent the use of the manual bypass.

5 Ships constructed on or after 1 July 1998 *and cargo ships of less than 500 gross tonnage constructed on or after 1 January* 2002, shall comply with the requirements of subsections 1 to 4 with the following modifications:

5.1 Subsection 1 is replaced with the following:

5.1.1 Main and auxiliary machinery essential for the propulsion, control and safety of the ship shall be provided with effective means of operation and control. All controls essential for the propulsion, control and safety of the ship must be independent or designed in such a way that failure of one system does not impair the performance of another system;

5.2 in the second and third lines of subsection 2, the words 'and provided that the machinery spaces shall be manned' are deleted;

5.3 the first sentence of subsection 2.2 is replaced by the following:

'5.3.2 the control of each independently acting propeller shall be possible with one control device with automatic control of associated auxiliary equipment including, where necessary, overload protection of the propulsion machinery;

5.4 subsection 2.4 is replaced by the following:

'5.4.4 Orders from the bridge to the propulsion machinery shall be indicated in the main machinery control room and on the manoeuvring platform';

5.5 the following new sentence is added at the end of subsection 2.6:

"It must also be possible to control auxiliary machinery essential for the propulsion and safety of the ship at or near that machinery"; and

5.6 Subsections 2.8, 2.8.1 and 2.8.2 are replaced with the following:

'5.6.8 indicators shall be installed on the bridge, in the main engine control room and at the manoeuvring platform indicating:

5.6.8.1 the propeller speed and direction of action for fixed pitch propellers; and

5.6.8.2 the propeller speed and pitch position for controllable pitch propellers; ".

6 Ships constructed on or after 1 July 2004 *and cargo ships of less than 500 gross tonnage constructed on or after 1 July* 2004, shall comply with the requirements of subsections 1 to 5 with the following modifications:

6.1 In clause 2, a new subsection 10 is added with the following wording:

"**6.1.10** automatic systems shall be so designed as to ensure that the officer in charge of the bridge watch is given advance warning of an impending or imminent slowing or stopping of the propulsion system in sufficient time to enable them to assess the navigational circumstances in an emergency. In particular, the systems shall perform control and monitoring, provide notifications and alarms and take safety action to reduce the speed of the propulsion machinery or stop the machinery, while allowing the officer in charge of the bridge watch to have the opportunity to intervene manually - except in cases where such manual intervention would result in total damage to the machinery and/or propulsion equipment within a short period of time, e.g. in the case of excessive overspeed."

Regulation 32 Steam boilers and boiler feed systems

1 Every steam boiler and unfired steam generator must be equipped with at least two safety valves of sufficient capacity. However, taking into account the performance or other special circumstances of a boiler or unfired steam generator, the Administration may allow a safety valve to be fitted only if it is satisfied that adequate protection against overpressure is thereby provided.

2 Any oil-fired boiler intended to operate without manual supervision shall be fitted with safety devices that shut off the fuel supply and sound an alarm in case of low water level, air supply failure or flame failure.

3 Water pipe boilers supplying steam to turbine propulsion machinery must be equipped with a high water level alarm.

4 Every steam-generating system, which is essential for the safety of the ship or which would be dangerous if its feed water supply were to fail, shall be provided with at least two independent feed water systems from and including the feed pumps, except that a single opening in the steam header may be permitted.

Unless overpressurisation is impossible due to pump characteristics, measures must be taken to prevent overpressurisation in any part of the installations.

5 Boilers must be equipped with means to monitor and control feed water quality. Suitable devices must be provided to prevent, as far as possible, the ingress of oil or other contaminants that could adversely affect the boiler.

6 Every boiler essential to the safety of the ship and designed to contain water at a specified height shall be provided with at least two means of indicating the water level, at least one of which shall be a water level glass for direct reading.

Regulation 33 Steam piping systems

1 Any steam pipe and associated fittings through which steam may pass must be designed, constructed and installed to withstand the maximum working loads to which it may be subjected.

2 Means must be provided to drain any steam pipe in which dangerous water hammer could otherwise occur.

3 If a steam pipe or its accessories can receive steam from a source with a higher pressure than the pressure it is designed for, an appropriate pressure reducing valve, safety valve and pressure gauge must be fitted.

Regulation 34 Compressed air systems

1 Means shall be provided in every ship to prevent overpressure in any part of compressed air systems and in all places where cooling jackets or casings of compressors and air coolers may be subjected to dangerous overpressure due to leakage from air pressure parts. The systems must be equipped with appropriate safety valve arrangements.

2 The main starting air arrangements for main propulsion internal combustion engines must be adequately protected against the effects of backfire and internal explosion in the starting air pipes.

3 All outlet pipes from starting air compressors shall lead directly to the starting air reservoirs, and all starting pipes from the starting air reservoirs to the main or auxiliary machinery shall be completely separated from the compressor outlet piping system.

4 Care must be taken to minimise the ingress of oil into air pressure systems and to ensure that these systems are drained.

Regulation 35 Ventilation systems in machinery spaces

For the safety and well-being of personnel and the operation of machinery, category A machinery spaces must be adequately ventilated to ensure that a sufficient supply of air is maintained when machinery or boilers in these spaces are operating at full power in all weather conditions, including severe weather. Any other machinery space must be adequately ventilated, taking into account its use.

Regulation 35-1 Bilge drainage system

1 This regulation applies to ships built on or after 1 January 2009.

2 Passenger and cargo ships.

2.1 An efficient bilge drainage system shall be installed capable in all practical conditions of pumping from and draining any watertight compartment except those spaces intended exclusively for the storage of fresh water, water ballast, fuel oil or liquid cargo and for which other efficient means of drainage are available. Effective means of draining water from isolated cargo holds must be found.

2.2 Sanitary, ballast and general service pumps can be recognised as stand-alone engine-driven bilge pumps if they are equipped with the necessary connections to the bilge drainage system.

2.3 All drainage pipes used in or under coal bunkers or fuel oil tanks or in boiler or machinery spaces, including compartments in which service tanks or fuel oil pumping systems are located, shall be of steel or other approved material.

2.4 Bilge and ballast arrangements shall be such that water from the sea and from water ballast tanks is prevented from entering cargo and machinery spaces or from passing from one space to another. Measures shall be taken to prevent high tanks with bilge and ballast connections from being negligently filled from the sea when they contain cargo or pumped out through a bilge pipe when they contain water ballast.

2.5 All distribution boxes and manually operated valves associated with the bilge drainage system must be placed in locations that are accessible under normal conditions.

2.6 Provision shall be made for the drainage of enclosed cargo holds located on the bulkhead deck of passenger ships and on the freeboard deck of cargo ships; if the Administration considers that, owing to the size or division of such spaces, the safety of the ship is not thereby impaired, it may authorise dispensation from bilge systems in any particular space on any ship or class of ships. For ships to which the provisions of regulation II-1/1.1.1.1 apply in respect of the special hazards arising from loss of stability when fitted with fixed high-pressure sprinkler fire-extinguishing arrangements (refer to regulation II-2/20.6.1.4).

2.6.1 Where the freeboard to the bulkhead deck or to the freeboard deck is such that the deck edge is immersed when the ship heels more than 5º, the drainage shall be by means of a sufficient number of scuppers of suitable size and arranged in accordance with the requirements of regulation 17 in the case of a passenger ship and the regulations for access and escape openings of the International Convention on Load Lines, 1966, in the case of a cargo ship.

2.6.2 Where the freeboard is such that the edge of the bulkhead deck or the edge of the freeboard deck is submerged when the ship heels 5º or less, the discharge from enclosed cargo holds on the bulkhead deck bulkhead deck or freeboard deck respectively, shall be channelled to a suitable space or spaces of adequate capacity, fitted with a high water level alarm and with a suitable arrangement for overboard discharge. Furthermore, it must be ensured that:

2.6.2.1 The number, size and location of drains are such that accumulation of free water is avoided,

2.6.2.2 the pumping arrangement required for passenger or cargo ships under this regulation shall also take into account the requirements for a fixed sprinkler fire-extinguishing system,

2.6.2.3 water contaminated with petrol or other hazardous substances is not discharged into machinery spaces or other spaces where ignition may occur; and

2.6.2.4 Enclosed cargo holds protected with a CO_2 fire extinguishing system have deck drains that are fitted with means to prevent the escape of the suffocating gas.

2.6.3. Means for the drainage of enclosed vehicle deck spaces, ro-ro spaces and special cargo holds shall also comply with regulations II-2/20.6.1.4 and II-2/20.6.1.5.

3 Passenger ships

3.1 As far as practicable after a marine casualty, the bilge drainage system required by subsection 2.1 shall be operable whether the ship is upright or listing. For this purpose, straws should generally be placed in tables except in confined spaces in the fore and aft end of the ship, where a single suction pipe may be sufficient. In compartments of unusual shape, additional suction pipes may be required. Measures must be taken to ensure that the water in the compartment flows to the suction pipes. *As far as possible, the suction pipe outlet should be placed in bilge wells. Each outlet must be fitted with a filter as close to the end of the suction pipe as possible, but so that it is easily accessible for cleaning.* If the Administration is satisfied

that a bilge drainage system may be inappropriate in certain spaces, it may authorise the omission of such an arrangement if calculations made in accordance with the requirements of regulations 7 and 8 show that the seaworthiness of the ship will not be impaired.

3.2 There must be at least three machine-driven pumps connected to the main bilge line, one of which can be driven by the propulsion machinery. If the bilge pump count is 30 or more, an additional standalone motorised pump must be provided.

The number of bilge pumps should be calculated as follows:

When P_1 is greater than P:

$$\text{Lænsepumpetallet} = 72 \cdot \left[\frac{M + 2P_1}{V + P_1 - P} \right]$$

I andre tilfælde:

$$\text{Lænsepumpetallet} = 72 \cdot \left[\frac{M + 2P}{V} \right]$$

Where:

L = length of the vessel (in metres) as defined in regulation 2;

M = the volume of the machine room (in cubic metres) as defined in regulation 2, which is below the bulkhead deck, with the addition of any fixed fuel oil bunker tanks situated above the inner bottom and forward or aft of the machine room.

P = the total volume of passenger and crew spaces below the bulkhead deck (in cubic metres) arranged for the use of passengers and crew, excluding baggage, stores and provisions spaces.

V = volume of the entire ship below the bulkhead deck (in

cubic metres) $P_1 = CN$,

where:

N = the number of passengers the ship is authorised to carry according

to its certificate; and K = 0.056L

Where the value of the product KN is greater than the sum of P and the volume of the actual passenger spaces above the bulkhead deck, the value used as P_1 shall be either this sum or 2/3 KN, whichever is greater.

3.3 Where practicable, engine driven bilge pumps shall be distributed in separate watertight compartments so arranged or located that these compartments do not fill with water in the event of the same damage. If the main propulsion machinery, auxiliary machinery and boilers are installed in two or more watertight compartments, the pumps available for draining shall, as far as possible, be distributed in all these compartments.

3.4 In a ship of 91.5 metres or more in length L or with a bilge pump number calculated in accordance with subsection 3.2 of 30 or more, the system shall be such that at least one power-driven pump is available for use during any flooding which the ship is required to withstand and, in the case of ships to which the provisions of regulation II-1/1.1.1.1 apply, during any flooding resulting from minor damage as further specified in regulation 8, as follows:

3.4.1 one of the required bilge pumps is an emergency bilge pump of a reliable underwater type, the power source of which is located above the bulkhead deck; or

3.4.2 the bilge pumps and their energy sources are distributed throughout the length of the ship so that at least one pump in an undamaged compartment will be ready for use.

3.5 With the exception of additional pumps that may be installed for peaking tanks only, any required bilge pump shall be arranged to drain from any space required to be drained by subsection 2.1.

3.6 Each engine-driven bilge pump shall be capable of pumping water through the prescribed main bilge line at a speed of at least 2 metres per second. Self-contained engine-driven bilge pumps located in machinery spaces shall have a direct suction line from such spaces, provided that not more than two such suction lines are required in any one space. Where there are two or more such suction lines, there shall be at least one on each side of the ship. The Administration may require stand-alone engine-driven bilge pumps located in other compartments to have dedicated direct suction lines. Direct suction lines must be appropriately positioned, and in a machinery space, they must have at least the same diameter as required for the main bilge line.

3.7.1 In addition to the suction line(s) required by subsection 3.6, a direct suction line from the main circulation pump to the bilge level in the machinery space, fitted with a non-return valve, shall be provided. The diameter of this direct suction line must be at least 2/3 of the diameter of the pump suction nozzle in steamships and the same diameter as the pump suction nozzle in motor vessels.

3.7.2 Where the Administration considers that the main circulating pump is not suitable for this purpose, a direct emergency suction line from the largest independent power-driven pump available shall be led directly to the bilge level in the machinery space; the suction line shall have the same diameter as the main suction port of the pump used. The capacity of the pump so connected shall exceed the capacity of any required bilge pump by such amount as the Administration may deem satisfactory.

3.7.3 The spindles of the seacock valves and direct suction valves must be routed well above the machinery space deck.

3.8 All bilge suction pipes up to the connection to the pumps must be independent of other pipework.

3.9 The diameter ’d’ of the main bilge pipe must be calculated according to the following formula. However, the actual inner diameter of the head tube may be rounded to the nearest standard size acceptable to the Administration:

$$d = 25 + 1{,}68\sqrt{L(B + D)}$$

where:

d is the inner diameter of the main bilge pipe (millimetres);

L and W are the length and width (metres) of the ship as defined in regulation 2; and

D is the moulded depth of the ship to the bulkhead deck (metres). If the ship has an enclosed cargo hold on the bulkhead deck which is internally drained in accordance with the requirements of subsection 2.6.2 and extends the full length of the ship, D shall be measured to the next deck above the bulkhead deck. Where the enclosed cargo hold extends over a smaller length, D should be taken as the moulded depth to the bulkhead deck plus lxh/L, where l and h are the total length and height of the enclosed cargo hold (metres). The diameter of the side guide pipes must fulfil the Administration's requirements.

3.10 Measures shall be taken to prevent bilge suction pipe compartments from filling with water in the event of the pipe breaking or otherwise being damaged in one of the other compartments due to collision or grounding. As a result, where a pipe is at any point closer to the ship's side than 1/5 of the ship's width (as defined in regulation 2 and measured perpendicular to the diametral plane at the level of a deepest division load line) or in a ducted keel, a non-return valve shall be fitted on the pipe in the space where the open end terminates. For ships subject to the provisions of regulation II-1/1.1.1.1, the deepest division load line shall be measured as the deepest division draught.

3.11 All distribution boxes and valves connected with the bilge drainage system shall be so arranged that one of the bilge pumps can operate in any watertight compartment in the event of flooding. Furthermore, damage to a pump or its piping, which is connected to the main bilge pipe at a point outside a line drawn at a distance from the ship's side of 1/5 of the breadth of the ship, shall not render the bilge drainage system inoperative. If there is only one piping system common to all pumps, the valves needed to control suction from the drainage points must be operable from a location above the bulkhead deck. If an emergency bilge drainage system is provided in addition to the main drainage bilge system, it shall be independent of the main system and so arranged that a pump can draw water from any compartment when it is filled with water as specified in subsection 3.1, in which case only the valves necessary for the operation of the emergency bilge drainage system need be operable from a position above the bulkhead deck.

3.12 Valves referred to in subsection 3.11 that can be operated from a position above the bulkhead deck shall be clearly labelled at the points of operation and provided with indicators showing whether they are open or closed.

4 Cargo ships.

There must be two machine-driven pumps connected to the main bilge drainage system, one of which can be driven by the propulsion machinery. If the Administration is satisfied that the safety of the ship is not impaired, the bilge drainage system may be omitted in certain spaces.

Regulation 36 Deleted

Regulation 37 Communication between the bridge and machinery space

1 There shall be at least two independent means of communicating orders from the navigating bridge to the point in the machinery space or control room from which the machinery is normally controlled. One will be a machine telegraph that provides a visual representation of orders and responses both in the machinery space and on the bridge. Appropriate means of communication must be provided to any other locations from which the machines can be controlled.

2 For ships constructed on or after 1 October 1994, the following requirements shall apply instead of the regulations of subsection 1:

There shall be at least two independent means of communicating orders from the navigating bridge to the point in the machinery space or control room where the speed and thrust direction of the propellers are normally controlled. One will be a machine telegraph that provides a visual representation of orders and responses both in the machinery space and on the bridge. Suitable means of communication shall be provided from the wheelhouse and machinery space to any other place from which the speed or direction of thrust of the propellers can be controlled.

Regulation 38 Engineers' alarm

An engineers' alarm shall be provided which can be operated from the engine control room or manoeuvring platform, as appropriate, and shall be clearly audible in the engineers' accommodation.

Regulation 39 Location of emergency installations on passenger ships

Emergency sources of electrical power, fire pumps, bilge pumps other than those specifically serving the spaces forward of the collision bulkhead, any fixed fire-extinguishing system required by chapter II-2 and other emergency installations essential for the safety of the ship other than anchor windlasses shall not be installed forward of the collision bulkhead.

Section D Electrical installations

(Unless expressly provided otherwise, section D applies to passenger ships and cargo ships)

Regulation 40 General provisions

1 Electrical installations must be organised accordingly:

1.1 all auxiliary electrical installations necessary to maintain normal shipboard operating and accommodation conditions can be provided without the use of the emergency source of electrical power;

1.2 that the operation of electrical installations essential for safety is maintained during various emergency situations; and

1.3 that passengers, crew and ship will be safe from electrical hazards.

2 The Administration shall take the necessary measures to ensure uniformity in the implementation and application of the provisions of this section with regard to electrical installations.[50)]

Regulation 41 Main electrical power source and lighting systems

1.1 A main source of electrical power of sufficient capacity shall be provided to supply all installations referred to in regulation 40.1.1. This main electrical energy source must consist of at least two generator sets.

1.2 The output of these generator sets shall be sufficient to ensure that, in the event of failure of one set, it will still be possible to ensure the operation of the installations necessary to maintain normal propulsion and safety conditions. Comfortable conditions must also be ensured in living areas, etc., that include at least adequate cooking, heating, cooling, mechanical ventilation, sanitation and fresh water.

1.3 The ship's main source of electrical power shall be so arranged that the installations referred to in regulation 40.1.1 can be maintained regardless of the speed and direction of rotation of the propulsion machinery or the shaft line.

1.4 In addition, the generator sets shall be such as to ensure that, with any generator or its prime mover out of service, the other generator sets are capable of energising the electrical plant necessary to start up the main propulsion plant from a dead ship. The emergency source of electrical energy may be used to start up from a dead ship if its output, either alone or in conjunction with the output of another source of electrical energy, is sufficient to simultaneously supply power to the installations to be supplied in accordance with regulations 42.2.1 to 42.2.3 or 43.2.1 to 43.2.4.

1.5 Where transformers form an essential part of the electrical supply system prescribed in this subsection, the system shall be so arranged as to ensure the same continuity of supply as specified in this subsection.

2.1 An electric main lighting system, which shall provide lighting in all parts of the ship normally accessible to and used by passengers or crew, shall be supplied from the main source of electrical power.

2.2 The main electric lighting system shall be so arranged that a fire or other casualty in spaces containing the main source of electrical power, any associated transformer equipment, the main switchboard and the main lighting switchboard will not render the emergency electric lighting system required by regulations 42.2.1 and 42.2.2 or 43.2.1, 43.2.2 and 43.2.3, out of operation.

2.3 The emergency electric lighting system shall be so arranged that a fire or other casualty in spaces containing the emergency source of electrical power, any associated transformer equipment, the emergency switchboard and the emergency lighting switchboard will not render the main electric lighting system required by this regulation inoperative.

3 The main switchboard shall be positioned in relation to one main generating station in such a way that the normal electricity supply will, as far as possible, only be affected by a fire or other breakdown in a compartment.

An environmental enclosure of the main switchboard, such as could be achieved by an engine control room located within the main boundaries of the room, is not considered to separate the switchboards from the generators.

4 Where the total installed electrical power of the main generating sets exceeds 3 MW, the main busbars shall be divided into at least two parts, which shall normally be connected by demountable joints or other approved means; the connection of the generating sets and any duplicated equipment shall, as far as possible, be equally distributed between the individual parts. Similar measures may be authorised if they satisfy the Administration.

5 Ships built on or after 1 July 1998 *and cargo ships of less than 500 gross tonnage built on or after 1 January 2002,*

5.1 must fulfil the following in addition to subsections 1 to 3:

5.1.1 Where the main source of electrical power is necessary for the propulsion and steering of the ship, the system shall be so arranged that the electrical supply to equipment necessary for propulsion and steering and to ensure the safety of the ship is maintained or immediately restored in the event of failure of one of the generators in operation;

5.1.2 The generators required by this regulation shall be protected against sustained overload by means of load-sharing equipment or equivalent equipment;

5.1.3 where the main source of electrical power is necessary for the propulsion of the ship, the main busbar shall be divided into at least two parts which shall normally be connected by circuit breakers or other approved devices; as far as practicable, the connection of generator sets and any other equipment which is duplicated shall be equally distributed between the individual parts; and

5.2 need not fulfil subsection 4.

6 In passenger ships built on or after 1 July 2010, additional lighting shall be provided in all cabins to clearly indicate the exit so that persons in the cabin can find their way to the door. Such lighting, which may be connected to an emergency power source or have an independent electrical power source in each cabin, shall switch on automatically when the power to the normal cabin lighting is lost and remain on for at least 30 minutes.

Regulation 42 Emergency electrical power source on passenger ships

(subsections 2.6.1 and 4.2 of this regulation apply to ships built on or after 1 February 1992)

1.1 An independent emergency electrical power source must be available.

1.2 The emergency electrical power source, any associated transformer equipment, the emergency source of transitional power, the emergency switchboard and the emergency lighting switchboard shall be located above the upper through deck and shall be easily accessible from the open deck. They must not be positioned in front of the collision bulkhead.

1.3 The emergency source of electrical power and any associated transformer equipment, the emergency source of transitional power, the emergency switchboard and the emergency lighting switchboard shall be so arranged in relation to the main source of electrical power, any associated transformer equipment and the main switchboard as to ensure to the satisfaction of the Administration that a fire or other casualty in a space containing the main source of electrical power, any associated transformer equipment and the main switchboard, or in a machinery space of category A, will not interfere with the supply, control and distribution of emergency electrical power. The space containing the emergency source of electrical power, any associated transforming equipment, the transitional source of electrical power and the emergency switchboard shall, as far as practicable, not be adjacent to the boundaries of machinery spaces of category A or of the spaces containing the main source of electrical power, any associated transforming equipment or the main switchboard.

1.4 Provided that suitable measures are taken to ensure autonomous emergency operation under all conditions, the emergency generator can - exceptionally and for short periods - be used to supply power to non-emergency circuits.

2 The electrical power available shall be sufficient for the operation of all installations essential for safety in an emergency, taking due account of installations that must operate simultaneously. The emergency electrical energy source, taking into account starting currents and the transient nature of certain current loads, shall be capable of simultaneously (*simultaneity factor 1*) powering at least the following installations for the time periods specified below if their operation requires an electrical energy source.

2.1 For a period of 36 hours: Emergency lighting

2.1.1 at any launching point on deck and over the side of the ship as prescribed in regulations 11.4 and 16.7 of chapter III;

2.1.2 in all corridors, stairways and exits giving access to muster and launching points as prescribed in regulation 11.5 of chapter III;

2.1.3 in all corridors in service and living areas, on stairs and exits, and in and around passenger lifts;

2.1.4 in the machinery spaces and main generator rooms, including their control centres;

2.1.5 at all manoeuvring positions, engine control rooms and at each main and emergency switchboard;

2.1.6 at fire-fighter's outfit storage locations;

2.1.7 at the steering gear; and

2.1.8 at the fire pump, sprinkler pump and emergency bilge pump referred to in subsection 2.4 and at the starting places of their engines.

2.2 For a period of 36 hours:

2.2.1 the navigation lights and other lights prescribed in the applicable international regulations for the prevention of collisions at sea; and

2.2.2 in ships built on or after 1 February 1995:

The VHF equipment prescribed in regulations 7.1.1 and 7.1.2 of chapter IV; and, where applicable;

2.2.2.1 The MF equipment prescribed in regulations 9.1.1, 9.1.2, 10.1.2 and 10.1.3 of chapter IV;

2.2.2.2 the ship earth station prescribed in regulation 10.1.1 chapter IV; and

2.2.2.3 The MF/HF equipment required by the regulations in IV/11.1.1.1 and IV/11.1.2.

2.3 For a period of 36 hours:

2.3.1 All internal communication equipment required in an emergency;

2.3.2 navigational equipment in ships prescribed in regulation 12 of chapter V; where this is unreasonable or impracticable, the Administration may waive this requirement for ships of less than 5000 gross tonnage;

2.3.3 the fire detection and fire alarm system and the holding and release arrangement for fire doors; and

2.3.4 for intermittent operation of the day signal lamp, the ship's whistle, the manually operated alarm push buttons, and all internal signals required in an emergency;

unless these systems are independently powered for 36 hours from an accumulator battery located in a suitable place for use in an emergency.

2.4 For a period of 36 hours:

2.4.1 one of the fire pumps prescribed in regulations 4.3.1 and 4.3.3 of chapter II-2;

2.4.2 the automatic sprinkler pump, if applicable; and

2.4.3 the emergency bilge pump and all the equipment necessary for the operation of electrically operated remote-controlled bilge valves.

2.5 During the period prescribed in regulation 29.14: the steering gear if it is to be so supplied in accordance with that provision.

2.6 For a period of 30 minutes:

2.6.1 all watertight doors, if any, which are required by regulation 13[51)] to be power-operated and their indicators and warning signals;

2.6.2 the emergency measures to bring the lift seats up to deck level for rescuing people. Passenger lift seats can be sequentially raised to deck level in an emergency.

2.7 In a ship regularly engaged on voyages of short duration, the Administration may accept a shorter period than that specified in subsections 2.1 to 2.5, but not less than 12 hours, if it is satisfied that the safety achieved will be adequate.

3 The emergency electrical energy source can be either a generator or an accumulator battery, which must fulfil the following requirements:

3.1 Where the emergency electrical energy source is a generator, it must;

3.1.1 be powered by a suitable power engine with an independent supply of fuel that has a flashpoint (test in closed appliance) of at least 43ºC;

3.1.2 shall start automatically in the event of failure of the main electrical energy source and shall be automatically connected to the emergency switchboard; the installations referred to subsection 4, shall then be automatically transferred to the emergency generator set. The automatic starting system and the characteristics of the prime mover shall be such that the emergency generator set is capable of carrying its full maximum load as quickly as is practicable with regard to safety, but in no more than 45 seconds; unless another independent means of starting the emergency generator set is provided, the sole source of stored energy shall be protected to prevent it being completely discharged by the automatic starting system; and

3.1.3 be supplied with an emergency electrical energy source for transitional power supply in accordance with subsection 4.

3.2 Where the emergency electrical energy source is an accumulator battery, it must;

3.2.1 be able to carry the emergency electrical load without recharging while maintaining the battery's voltage throughout the power delivery period within 12% above or below its nominal voltage;

3.2.2 automatically connect to the emergency switchboard in case the main electrical power source fails; and

3.2.3 be able to immediately supply power to at least the installations referred to in subsection 4.

3.3 The following regulation in subsection 3.1.2 shall not apply to ships constructed on or after 1 October 1994:

Unless there is another independent means of starting the emergency generator set, the only source of stored energy must be protected to prevent it from being completely depleted by the automatic starting system.

3.4 For ships constructed on or after 1 July 1998, where electrical energy is required to restore propulsion, the capacity shall be sufficient to restore the ship's propulsion, including other necessary machinery, within 30 minutes from a dead ship after all electrical energy supply has been interrupted (blackout).

4 The emergency transitional source of electrical energy prescribed in subsection 3.1.3, shall consist of an accumulator battery, located in a suitable place for use in an emergency, which shall function without recharging while maintaining the voltage of the battery throughout the period of current delivery within 12% above or below its nominal voltage, and shall have sufficient capacity and be so arranged that, in the event of an electrical main or emergency power supply failure, in that shall have sufficient capacity and be so arranged that in the event of failure of the main or emergency electrical energy source, it automatically supplies at least the following installations, if their operation requires an electrical source:

4.1 For 30 minutes:

4.1.1 the lighting prescribed in subsections 2.1 and 2.2;

4.1.2 all systems prescribed in subsections 2.3.1, 2.3.3, and 2.3.4, unless these systems are supplied independently during the period in question from an accumulator battery located in a suitable place for use in an emergency.

4.2 Energy to operate the watertight doors as prescribed in regulation 13.6.3.3.3[52]), but not necessarily all of them simultaneously, unless an independent energy source for transitional supply of stored energy is available. Energy for control, indication and alarm circuits as prescribed in regulation 13.6.2[53]) to half an hour.

5.1 The emergency switchboard must be located as close as practical to the emergency power source.

5.2 Where the emergency electrical power source is a generator, the emergency switchboard shall be located in the same room unless the operation of the emergency switchboard would be impaired.

5.3 No accumulator battery installed in accordance with this regulation shall be placed in the same room as the emergency switchboard. An indicator shall be installed in a suitable location on the main switchboard or in the engine control room to indicate when the batteries constituting either the emergency electrical energy source or the transitional electrical energy source referred to in subsections 3.1.3 or 4 are discharged.

5.4 Under normal operating conditions, the emergency switchboard shall be supplied from the main switchboard by a feeder which shall be protected against overload and short circuit and shall be automatically disconnected at the emergency switchboard should the main electrical power source fail. If the system is designed for return feed, the supply line must also be protected at the emergency switchboard, at least against short circuits.

5.5 To ensure rapid availability of the emergency electrical energy source, provision shall be made, if necessary, to automatically disconnect non-emergency circuits from the emergency switchboard to ensure that power is available for the emergency circuits.

6 The emergency generator and its prime mover and any emergency accumulator battery shall be so designed and arranged as to be capable of operating at maximum output when the ship is on an even keel and when heeled with an angle of heel of up to 22.5º or when lying with a trim of up to 10º either fore or aft or any combination of angles within these limits.

7 Arrangements shall be made for periodic testing of the entire emergency system, including testing of automatic starting devices.

Regulation 42-1 Supplementary emergency lighting for ro-ro passenger ships

This regulation applies to all passenger ships with ro-ro cargo holds or special cargo holds as defined in regulation II-2/3, except that for ships constructed before 22 October 1989, this regulation applies as of 22 October 1990.

1 In addition to the emergency lighting required by regulation 42.2, on every passenger ship with ro-ro cargo holds or special cargo holds as defined in regulation 3 of chapter II-2, there shall be installed:

1.1 A system for electric emergency lighting in all public spaces and passenger corridors. The system must work for at least 3 hours during any heeling situation when all other power supplies have failed. Lighting should be good enough to make access to exits easily visible. The energy source for emergency lighting shall consist of accumulator batteries installed in the light fittings and continuously charged from the emergency switchboard where practical. Alternatively, any other form of emergency lighting that is at least as effective may be authorised by the Danish Maritime Authority. The emergency lighting must be designed in such a way that any failure of the lamp is visible. All accumulator batteries must be replaced periodically, taking into account their specific operating time in the environment where they will be used.

1.2 A portable rechargeable battery-powered lamp shall be provided in all corridors of the crew accommodation, recreational spaces, and in all working spaces that are normally used, unless additional emergency lighting is installed in accordance with 1.1.

Regulation 43 Emergency electrical power source on cargo ships

1.1 An independent emergency electrical power source must be available.

1.2 The emergency electrical power source, any associated transformer equipment, the emergency source of transitional power, the emergency switchboard and the emergency lighting switchboard shall be located above the upper through deck and shall be easily accessible from the open deck. They may not be placed in front of the collision bulkhead unless authorised by the Administration in exceptional circumstances.

1.3 The emergency source of electrical power, any associated transformer equipment, the emergency source of transitional power, the emergency switchboard and the emergency lighting switchboard shall be so arranged in relation to the main source of electrical power, any associated transformer equipment and the main switchboard that it is ensured to the satisfaction of the Administration that a fire or other casualty in the space containing the main source of electrical power, any associated transformer equipment and the main switchboard, or in a machinery space of category A, will not interfere with the supply, control and distribution of emergency electrical power. The space containing the emergency source of electrical power, any associated transformer equipment, the transitional source of electrical power and the emergency switchboard shall, as far as practicable, not be adjacent to the boundaries of machinery spaces of category A or to the spaces containing the main source of electrical power, any associated transformer equipment and the main switchboard.

1.4 Provided that suitable measures are taken to ensure autonomous emergency operation under all conditions, the emergency generator can - exceptionally and for short periods - be used to supply power to non-emergency circuits.

2 The electrical energy available shall be sufficient for the operation of all installations essential for safety in an emergency, taking due account of installations that may need to operate simultaneously. Taking into account starting currents and the transient nature of certain loads, the emergency electrical energy source shall be capable of simultaneously powering at least the following installations during the time periods specified below if their operation requires electricity:

2.1 For a period of 3 hours: Emergency lighting for any launching on deck and beyond the ship's side as prescribed in regulations 11.4 and 16.7 of chapter III.

2.2 For a period of 18 hours: Emergency lighting.

2.2.1 in all corridors in service and living areas, on stairs and at exits, in and around passenger lifts and lift shafts;

2.2.2 in the machinery spaces and main generator rooms, including their control points;

2.2.3 at all manoeuvring positions, engine control rooms and at each main and emergency switchboard;

2.2.4 at all fire-fighter's outfit locations;

2.2.5 at the steering gear;

2.2.6 at the fire pump referred to in subsection 2.5, at the sprinkler pump, if any, and at the emergency bilge pump, if any, and at the starting places of their engines; and

2.2.7 in all cargo pump rooms of tankers built on or after 1 July 2002.

2.3 For a period of 18 hours:

2.3.1 the navigation lights and other lights prescribed in the applicable international regulations for the prevention of collisions at sea; and

2.3.2 in ships constructed on or after 1 February 1995: the VHF equipment prescribed in regulations 7.1.1 and 7.1.2 of chapter IV; and, where applicable

2.3.2.1 The MF equipment prescribed in regulations 9.1.1, 9.1.2, 10.1.2 and 10.1.3 of chapter IV;

2.3.2.2 the ship earth station prescribed in regulation 10.1.1 of chapter IV; and

2.3.2.3 The MF/HF equipment required according to regulations IV/11.1.1.1 and IV/11.1.2.

2.4 For a period of 18 hours:

2.4.1 All internal communication equipment required in an emergency;

2.4.2 navigational equipment on ships as prescribed in regulation 19 of chapter V; where this is unreasonable or impracticable, the Administration may waive this requirement for ships of less than 5000 gross tonnage;

2.4.3 the fire detection and fire alarm system; and

2.4.4 intermittent operation of the day signal lamp, the ship's whistle, the manually operated alarm push buttons and all internal signals required in an emergency;

unless these systems are independently powered for a period of 18 hours from an accumulator battery located in a suitable place for use in an emergency.

2.5 For a period of 18 hours, one of the fire pumps prescribed in regulations 4.3.1 and 4.3.3 of chapter II-2 if it relies on the emergency generator as a source of power.

2.5.1 During the period prescribed in regulation 29.14, the steering gear is to be so supplied in accordance with that regulation.

2.5.2 In a ship regularly engaged on voyages of short duration, the Administration may accept a shorter period than the 18 hours specified in 2.2 to 2.5, but not less than 12 hours if it is satisfied that adequate safety can be achieved thereby.

In cargo ships with a gross tonnage of less than 500, the Administration accepts a period of 8 hours instead of 18 hours as stated in 2.2-2.5.

3 The emergency electrical energy source can be either a generator or an accumulator battery that fulfils the following requirements:

3.1 Where the emergency electrical energy source is a generator, it must;

3.1.1 be powered by a suitable power engine with an independent supply of fuel that has a flashpoint (test in closed appliance) of at least 43ºC;

3.1.2 start automatically in the event of failure of the supply from the main electrical energy source, unless a transitional source of emergency electrical energy is installed in accordance with subsection 3.1.3; where the emergency generator starts automatically, it shall be automatically connected to the emergency switchboard; the devices referred to in subsection 4, shall then be automatically connected to the emergency generator; unless another independent means of starting the emergency generator is provided, the sole source of stored energy shall be protected to prevent it from being completely depleted by the automatic starting system; and

3.1.3 be provided with an emergency source of electrical energy for transitional power supply operation, as specified in subsection 4, unless an emergency generator is installed that is capable of supplying both

systems, as specified in subsection 4, and to be able to switch on automatically and apply the required current load as quickly as is safely possible, but in no more than 45 seconds.

3.2 Where the emergency electrical energy source is an accumulator battery, it must;

3.2.1 be able to carry the emergency electrical load without recharging, while maintaining the battery's voltage throughout the power delivery period within 12% above or below its nominal voltage;

3.2.2 automatically connect to the emergency switchboard in case the main electrical power source fails; and

3.2.3 immediately be able to operate at least the systems referred to in subsection 4.

3.3 The following provision of subsection 3.1.2 shall not apply to ships built on or after 1 October 1994:

Unless there is another independent means of starting the emergency generator set, the only source of stored energy must be protected to prevent it from being completely depleted by the automatic starting system.

3.4 For ships constructed on or after 1 July 1998 *and for cargo ships of less than 500 gross tonnage constructed on or after 1 January 2002* where electrical power is necessary to restore propulsion, the capacity shall be sufficient to restore the ship's propulsion including other necessary machinery within 30 minutes from a dead ship after all electrical power has been cut off (blackout).

4 The emergency source of electrical energy for transitional supply, where required in subsection 3.1.3, shall consist of an accumulator battery, located in a suitable place for use in an emergency, capable of operating without recharging while maintaining the voltage of the battery throughout the period of current delivery within 12% above or below its nominal voltage; it shall have sufficient capacity and be so arranged that, in the event of the main or emergency electrical supply being interrupted, in that it shall have sufficient capacity and be so arranged that, in the event of failure of the main or emergency source of electrical energy, it can automatically supply the following installations, if their operation requires an electrical source, for at least 30 minutes:

4.1 the lighting prescribed in subsections 2.1, 2.2, and 2.3.1. During this transitional phase, the required emergency electric lighting for the machinery space, accommodation and service spaces may be provided by fixed automatically charged relay-controlled accumulator lamps; and

4.2 all the installations prescribed in subsections 2.4.1, 2.4.3, and 2.4.4, unless they are supplied independently for the specified period from an accumulator battery placed in a suitable place for use in an emergency.

5.1 The emergency switchboard should be located as close as possible to the emergency power source.

5.2 Where the emergency electrical power source is a generator, the emergency switchboard shall be located in the same room unless the operation of the emergency switchboard would be impaired.

5.3 No accumulator battery installed in accordance with this regulation shall be placed in the same room as the emergency switchboard. An indicator shall be installed in a suitable location on the main switchboard or in the engine control room to indicate when the batteries constituting either the emergency electrical energy source or the emergency transitional source of energy referred to in subsections 3.2 or 4, are discharged.

5.4 The emergency switchboard shall be supplied under normal operating conditions from the main switchboard by a feeder which shall be effectively protected at the main switchboard against overload and short circuit, and shall be automatically disconnected at the emergency switchboard should the main electrical power source fail. Where the system is designed for return supply, the supply line must also be protected at the emergency switchboard, at least against short circuits.

5.5 To ensure rapid utilisation of the emergency electrical energy source, provision shall be made, if necessary, to automatically disconnect non-emergency circuits from the emergency switchboard to ensure that the emergency circuits are automatically powered.

6 The emergency generator and its prime mover and any emergency accumulator battery shall be so designed and arranged as to be capable of operating at maximum output when the ship is on an even keel and when heeled with an angle of heel up to 22.5º or when in a trim of up to 10° either fore or aft or a combination of angles within these limits.

7 Provision shall be made for periodic testing of the entire emergency system, including testing of automatic starting devices.

Regulation 44 Starting devices for emergency generator sets

1 Emergency generator sets must be easily started in cold mode at a temperature of 0ºC. If this is not practicable or if it is anticipated that the ship will encounter lower temperatures, such measures acceptable to the Administration shall be taken to maintain heating to ensure easy starting of the generating sets.

2 Any emergency generator set equipped for automatic starting shall be equipped with starting devices approved by the Administration with stored energy for at least three consecutive starts. A second energy source must be available for three additional starts within 30 minutes, unless it can be demonstrated that manual starting is possible.

2.1 Ships built on or after 1 October 1994, *and cargo ships of less than 500 gross tonnage built on or after 1 January 2002.* Instead of the requirements in the second sentence of subsection 2, they shall fulfil the following regulations:

The stored energy source must be secured against depletion to a critical point by the automatic starting system, unless another independent energy source is available. In addition, another independent starting device must be provided for three additional starts within 30 minutes, unless it can be demonstrated that manual starting is possible.

3 The stored energy must be maintained at all times as follows:

3.1 Electrical and hydraulic starting systems must be supplied from the emergency switchboard;

3.2 Compressed air starting systems can be supplied from main or reserve compressed air tanks through a suitable non-return valve or from an emergency air compressor, which, if electrically powered, is supplied with power from the emergency switchboard;

3.3 all these starting, charging and energy storage devices shall be located in the emergency generator room; these devices shall not be used for any purpose other than the operation of the emergency generator set. However, this does not preclude the emergency generator set's air receiver from being supplied from the main or reserve compressed air system through the check valve located in the emergency generator room.

4.1 Where automatic starting is not required, manual starting may be allowed, such as hand cranking, rotary starters, manually charged hydraulic accumulators, or pressure-charged accumulators, or powder-charged cartridges if their effectiveness can be demonstrated.

4.2 When manual starting is not possible, the requirements in subsections 2 and 3 must be met; however, the start may be initiated manually.

Regulation 45 Precautions against shock, fire and other hazards of an electrical nature

(Subsections 10 and 11 of this regulation apply to ships constructed on or after 1 January 2007.)

1.1 Unprotected metal parts of electrical machines or apparatus which are not intended to be live, but which can easily become live due to faults, must be connected to the hull of the ship, unless these machines or apparatus;

1.1.1 are supplied with a voltage not exceeding 50 V d.c. or 50 V r.m.s. between conductors; autotransformers shall not be used to achieve this voltage; or

1.1.2 supplied at a voltage not exceeding 250 V through safety isolating transformers serving only one utility item; or

1.1.3 designed according to the principle of double insulation.

1.2 The Administration may require additional precautions for portable electrical equipment in confined or particularly humid spaces where there may be special hazards due to specific conductivity.

1.3 All electrical appliances must be constructed and positioned so that they do not cause damage when handled or touched in the normal way.

2 Main and emergency switchboards shall be arranged in such a way that devices and equipment can be easily accessed as needed without danger to personnel. The sides and back and, if necessary, the front of switchboards must be adequately shielded. Unprotected live parts that have voltages to the hull exceeding a voltage to be determined by the Administration shall not be placed on the front of these switchboards. If necessary, non-conductive mats or grating must be provided at the front and back of the switchboard.

3.1 Distribution systems utilising the hull as a return line shall not be used for any purpose in a tanker or for power, heating or lighting in any other ship of 1600 gross tonnage and above.

3.2 However, the requirement in subsection 3.1 does not preclude, in circumstances approved by the Administration, the use of;

3.2.1 cathodic impressed current protection systems;

3.2.2 limited systems and systems that are locally connected to the hull of the ship;

3.2.3 devices to check the insulation level, provided that the bypass current does not exceed 30 mA under the most unfavourable conditions.

3.2.1 For ships constructed on or after 1 October 1994 *and cargo ships of less than 500 gross tonnage constructed on or after 1 January* 2002, the requirements of subsection 3.1 shall not preclude the use of limited and local grounding systems, provided that any possible resultant current does not pass through any dangerous space.

3.3 Where a hull return line is used, all terminating circuits, i.e. all circuits installed after the last protective device, shall be of the two-wire type and special precautions shall be taken to the satisfaction of the Administration.

4.1 Distribution systems connected to the hull of a tanker must not be used. The Administration may exceptionally permit the neutral line of a tanker to be connected to the hull for AC mains of 3000 V (conductor to conductor) and above, provided that any resulting current does not pass directly through any of the dangerous spaces.

4.2 Where a distribution system, primary or secondary, for power, heating or lighting is used without

connection to the hull, a device shall be provided which continuously monitors the insulation level to the hull and gives an audible or visual indication of abnormally low insulation values.

4.3 For ships constructed on or after 1 October 1994, *and cargo ships of less than 500 gross tonnage constructed on or after 1 January 2002,* the following requirements shall apply instead of the regulations of subsection 4.1:

4.3.1 Except as permitted in 4.3.2, grounded distribution systems shall not be used in tankers.

4.3.2 The requirements of subsection4.3.1 do not preclude the use of grounded intrinsically safe circuits and, in addition, under conditions approved by the Administration, the use of the following grounded systems:

4.3.2.1 Energised control and instrument circuits where technical or safety considerations preclude the use of an ungrounded system, provided that the current in the hull is limited to not more than 5 amps under both normal and fault conditions; or

4.3.2.2 Limited and localised grounded systems, on condition that any possible resulting current does not pass directly through any hazardous space.

4.3.2.3 AC supply networks of 1,000 V rms (between conductors) and above, on condition that any possible resulting current does not pass directly through any hazardous space.

5.1 The metal sheathing and armouring of cables shall be continuous in the electrical sense and connected to the ship's hull unless the Administration waives this requirement in exceptional circumstances.

5.2 All electrical cables and wires outside the appliance must be at least of a fire-retardant type and must be installed in such a way that their original flame-retardant properties are not impaired. However, for special purposes, the Administration may authorise the use of special cable types, such as radio frequency cables, which do not meet the above requirements.

5.3 Cables and wiring for essential supplies or emergency power, lighting, internal communications or signalling shall be kept as far as possible clear of galleys, laundries, category A machinery spaces and their casings and other high fire risk areas. On ro-ro passenger ships, the wiring of emergency alarms and public address systems installed on or after 1 July 1998 shall be approved by the Administration in accordance with the provisions developed by the Organisation.[54)]

Cables connecting fire pumps to the emergency switchboard must be of a fire-resistant type where they pass through more flammable areas. Where possible, all such cables shall be routed in such a way that they cannot be rendered unserviceable by heating bulkheads that may be caused by a fire in an adjacent room.

5.4 Where cables are installed in flammable areas, present a risk of fire or explosion in the event of an electrical fault in these areas, special precautions shall be taken to the satisfaction of the Administration against such hazards.

5.5 Cables and wires must be laid in such a way as to avoid fraying or other damage.

5.6 Terminations and joints of all conductors shall be made in such a way that the original electrical, mechanical, flame retardant and, if necessary, fire-resistant properties of the cable are maintained.

6.1 Each circuit must be protected against short-circuit and overload, except where exempted in accordance with regulations 29 and 30 or where the Administration may exceptionally authorise otherwise.

6.2 The rating or the correct setting of the overload protection device for each circuit must be permanently marked at the location where the device is installed.

7 Light fittings must be designed to avoid temperature rises that could damage cables and wiring, as well as excessive heating of the surroundings.

8 All lighting circuits and main power circuits terminating in bunkers or cargo holds shall be fitted with a multi-pole circuit breaker outside the space to disconnect these circuits.

9.1 Accumulator batteries shall be securely installed and spaces primarily used for their location shall be properly designed and effectively ventilated.

9.2 Electrical appliances or other equipment that may pose a risk of ignition of flammable vapours are not permitted in these rooms, cf. however, subsection 10.

9.3 Accumulator batteries shall not be placed in sleeping compartments unless they are hermetically sealed to the satisfaction of the Administration.

10 Electrical equipment shall not be installed in rooms where flammable mixtures may accumulate, such as rooms used primarily for storage batteries, lockers used for paint storage, acetylene depots or similar rooms, unless the Administration is satisfied that such equipment is:

10.1 necessary for operational purposes;

10.2 of a type that will not ignite the mixture in question;

10.3 suitable for installation in the room in question; and

10.4 duly approved for safe use in dust accumulations, vapours or gases that may occur.

11 In tankers, electrical equipment, cables and wiring must not be installed in hazardous areas unless this is done in accordance with standards at least equivalent to those accepted by the Organisation[55)]. In hazardous areas not covered by these standards, electrical equipment, cables and wiring not complying with the standards may be installed provided that a risk assessment demonstrates to the satisfaction of the Administration that an equivalent level of safety is achieved.

12 Distribution systems on a passenger ship shall be so arranged that fire in a main vertical zone as defined in regulation 3.9 of chapter II-2 will not interfere with systems essential for safety in another main vertical zone of the same type. This requirement is considered fulfilled if the main and emergency feed lines passing through such a zone are placed, both vertically and horizontally, as far apart as possible.

Section E Additional requirements for periodically unattended machinery spaces

(Section E applies to cargo ships with the exception of regulation 54, which applies to passenger ships)

Regulation 46 General provisions

1 Care shall be taken to ensure that the safety of the ship in all sailing conditions, including manoeuvring, is equivalent to that of a ship whose machinery spaces are manned.

2 Measures satisfactory to the Administration shall be taken to ensure that the equipment operates reliably and that there is satisfactory provision for regular inspections and routine tests to ensure safe operation at all times.

3 Every ship shall carry a document certifying to the satisfaction of the Administration that it is capable of operating with periodically unmanned machinery spaces.

Regulation 47 Precautions against fire

1 Means must be available to detect fire and raise alarms at an early stage in the event of a fire:

1.1 in air supply casings and exhaust pipes (flues) of boilers; and

1.2 in the scavenging air belts of the propulsion machinery,

unless the Administration considers this unnecessary in special cases.

2 Internal combustion engines of 2250 kW and above or with cylinders over 300 mm bore must be equipped with oil mist detectors in the crankcase or engine bearing temperature monitoring devices or equivalent devices.

Regulation 48 Protection against filling

1 Bilge wells in machinery spaces that are periodically unattended shall be located and monitored in such a way that accumulation of liquids is detected at normal trim and heel angles and shall be of sufficient size to easily accommodate the normal drainage during the unattended period.

2 Where bilge pumps can be started automatically, means shall be provided to indicate when the flow of liquid exceeds the pump's capacity or when the pump is operating more frequently than would normally be expected. In such cases, smaller wells that can absorb the drainage for a reasonable period of time may be authorised. Where automatically controlled bilge pumps are available, special attention must be paid to the requirements for avoiding oil contamination.

3 The controls of any valve serving a sea connection, an underwater overboard line or a gutter ejector system shall be so arranged that there is sufficient time to operate them in sufficient time to operate them in the event of water entering the space, taking into account the time likely to be required to reach and operate these controls. If the height to which the compartment could be filled with the ship fully loaded so requires, arrangements shall be made to operate the control devices from a position above this level.

Regulation 49 Control of propulsion machinery from the bridge

1 The speed of the propeller, its direction of action and, if applicable, its pitch must be fully controllable from the bridge under all navigation conditions, including manoeuvring.

1.1 This remote control shall be realised by a single control device for each independent propeller with automatic execution of all related functions, including, if necessary, means to prevent overloading of the propulsion machinery.

1.2 The main propulsion machinery shall be equipped with an emergency stop device on the bridge, which shall be independent of the bridge control system.

2 Orders from the bridge to the propulsion machinery shall be indicated in the main machinery control room or at the propulsion machinery control position, as appropriate.

3 Remote control of the propulsion machinery shall only be possible from one area at a time; in such areas, interconnected control centres are permitted. At each control point there must be an indicator showing which control point controls the propulsion machinery. It must be possible to switch controls between the bridge and the machinery spaces in the main machinery space or in the main machinery space control room. The system shall include means to prevent the propeller drive pressure from changing significantly when the control is switched from one position to another.

4 It must be possible to control all machinery essential for the safe operation of the ship from a local location, even in the event of failure of any part of the automatic or remote control systems.

5 The automatic remote control system must be designed in such a way that an alarm will sound if it fails. The preset speed and the direction of propeller action must be maintained until the local control is in operation, unless the Administration deems that this is not feasible.

6 Indicators must be installed on the bridge for:

6.1 Propeller speed and direction of action in case of fixed propellers; or

6.2 the speed and pitch of the propeller in the case of adjustable propellers.

7 The number of unsuccessful consecutive automatic start attempts should be limited to ensure sufficient air pressure. There shall be a low air pressure alarm set at a level that still allows the propulsion machinery to be started.

Regulation 50 Communication

A reliable means of oral communication shall be provided between the main engine control room or, as appropriate, the propulsion machinery control room, the bridge and the engineers' accommodation.

Regulation 51 Alarm systems

1 An alarm system shall be provided to indicate any fault requiring attention and this system shall:

1.1 be able to sound an audible alarm in the main engine control room or at the propulsion machinery control position and visibly indicate each alarm function in a suitable location.

1.2 be connected to the engineers' accommodation and to each engineers' compartment through a selector switch to ensure connection to at least one of these compartments; the Administration may authorise the use of another equivalent arrangement.

1.3 trigger an audible and visible alarm on the bridge in any situation that requires intervention or attention from the duty navigator.

1.4 be designed according to the fail-safe principle wherever possible.

1.5 trigger the engineers' alarm prescribed in regulation 38 if an alarm has not been locally responded to within a limited period of time.

2.1 The alarm system must be powered at all times and must automatically switch to a backup power supply in case the normal power supply fails.

2.2 If the alarm system's normal energy supply should fail, this must be indicated by an alarm.

3.1 The alarm system must be able to indicate more than one fault simultaneously and the receipt of an alarm must not prevent a new alarm from being received.

3.2 The receipt of an alarm mode at the location referred to in subsection 1 shall be indicated at the locations where it has been displayed. Alarms shall continue to sound until acknowledged and the visual indications of each alarm shall remain until the fault is corrected, after which the alarm system shall automatically return to normal operating mode.

Regulation 52 Safety systems

A safety system must be in place to ensure that a serious malfunction in the operation of machinery or boilers, presenting an immediate danger, triggers an automatic stop of the affected part of the installation, and an alarm is raised.

A shutdown of the propulsion system must not be triggered automatically, except in cases that could lead to serious breakdown, complete collapse or explosion. Where there are devices to override the automatic stop of the main propulsion machinery, they shall be so arranged as to preclude inadvertent operation. Means must be provided to visually indicate that the manual emergency operation device is activated.

Regulation 53 Special requirements for machinery and boiler installations and electrical installations

1 The special requirements for machine and boiler installations and electrical installations shall be to the satisfaction of the Administration and shall at least include the requirements of this regulation.

2 The main electrical energy source must fulfil the following requirements:

2.1 Where electrical power can normally be supplied by a generator, appropriate measures must be taken to disconnect loads to ensure adequate supplies to propulsion and steering gear and to maintain the safety of the ship. In the event of failure of the generator in operation, adequate provision shall be made for automatic starting of a standby generator and its connection to the main switchboards. This generator shall have sufficient capacity to enable propulsion and steering and to maintain the safety of the ship with automatic restarting of the necessary machinery, including, if necessary, sequential starting. The Administration may waive this requirement for ships of less than 1600 gross tonnage if it is not considered practicable to implement it.

2.2 Where electrical power is normally supplied by more than one generator set simultaneously in parallel operation, measures such as load shedding shall be taken to ensure that, in the event of loss of one of these generator sets, the remaining set is kept in operation without overload to enable propulsion and steering and to maintain the safety of the ship.

3 Where spare auxiliary machinery is necessary for other auxiliary machinery essential for propulsion, automatic changeover devices must be provided.

4 Automatic control and alarm system.

4.1 The control system must be so organised that the facilities necessary for the operation of the main propulsion machinery and its auxiliaries are ensured by the necessary automatic devices.

4.2 An alarm must be triggered by the automatic switch.

4.3 An alarm system complying with the provisions of regulation 51 shall be provided for all important pressures, temperatures and fluid levels and other important parameters.

4.4 A control centre must be set up in a central location with the necessary alarm panels and devices to indicate any alarm.

5 Means shall be provided to maintain the starting air pressure at the required level where internal combustion engines are used for main propulsion.

Regulation 54 Special considerations for passenger ships

Passenger ships shall be given special consideration by the Administration as to whether their machinery spaces may be periodically unattended and, if so, whether it is necessary to prescribe requirements additional to those contained in these regulations in order to achieve the same safety as in normally manned machinery spaces.

Section F Alternative design and alternative arrangements

Regulation 55 Alternative design and alternative arrangements

1 Purpose

The purpose of this regulation is to provide a methodology for alternative design and arrangements for machinery, electrical installations and systems for storage and distribution of low flashpoint fuels.

2 General

2.1 The design and arrangements of machinery, electrical installations and systems for the storage and distribution of low flashpoint fuels may deviate from the requirements set out in sections C, D, E or G, provided that the alternative design and arrangements fulfil the intent of the relevant requirements and provide a level of safety equivalent to that intended by this chapter.

2.2 When an alternative design or alternative arrangements deviate from the prescriptive requirements set out in sections C, D, E or G, a technical analysis, evaluation and approval of the design and arrangements shall be performed in accordance with this regulation.

3. Technical analysis

The technical analysis shall be prepared and submitted to the Administration in accordance with the guidelines established by the Organisation[56)] and shall contain at least the following elements:

3.1 Determining the type of ship, machinery, electrical installations, low-flashpoint fuel storage and distribution systems and spaces;

3.2 determining which prescriptive requirement(s) the machinery, electrical installations and low-flashpoint fuel storage and distribution systems will not fulfil;

3.3 determining the reason why the proposed design will not fulfil the prescriptive requirements, supported by compliance with other recognised technical or industry standards;

3.4 Identification of the functional criteria of the ship, machinery, electrical installation, low-flashpoint fuel storage and distribution system or spaces affected by the relevant prescriptive requirement(s):

3.4.1 the functional criteria shall provide a level of safety not inferior to the relevant prescriptive requirements in sections C, D, E and G; and

3.4.2 The performance criteria must be quantifiable and measurable;

3.5 detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational constraints or conditions;

3.6 technical justification demonstrating that the alternative design and arrangements fulfil the functional criteria related to safety; and

3.7 a risk assessment based on a determination of possible errors and hazards associated with the proposal.

4 Evaluation of the alternative design and alternative arrangements

4.1 The technical analysis required in subsection 3 shall be evaluated and approved by the Administration in accordance with the guidelines established by the Organisation.[57)]

4.2 A copy of the documentation approved by the Administration indicating that the alternative design and arrangements comply with this regulation shall be kept on board the ship.

5 Exchange of information

The Administration shall send relevant information on alternative designs and arrangements approved by it to the Organisation for circulation to all Contracting Governments.

6 Re-evaluation due to changed conditions

If the assumptions and operational constraints stated in the alternative design and arrangements are changed, the technical analysis shall be performed under the changed conditions and approved by the Administration.

Section G Ships using low-flashpoint fuels Regulation 56

Application

1 With the exception of the provisions of subsections 4 and 5, this section applies to ships using fuels with a low flashpoint:

1.1 where the building contract was signed on or after 1 January 2017;

1.2 if a building contract does not exist where the keel is laid or where the structure is at a similar stage of construction on or after 1 July 2017; or

1.3 where delivery takes place on 1 January 2021 or later.

Such ships using low-flashpoint fuels shall, in addition to any other applicable requirements of these regulations, comply with the requirements of this section.

2 Except as provided for in subsections 4 and 5, ships, including ships built before 1 January 2009, which are converted to use low-flashpoint fuels on or after 1 January 2017, shall be considered

to be ships using low-flashpoint fuels from the date of commencement of such conversion.

3 Except as provided for in subsections 4 and 5, ships using low-flashpoint fuels irrespective of their date of construction, including ships built before 1 January 2009, which on or after 1 January 2017 switch to the use of low-flashpoint fuels other than those which they were originally certified to use before 1 January 2017, shall be deemed to be ships using low-flashpoint fuels from the date on which such use commenced.

4 This section does not apply to gas carriers as defined in regulation VII/11.2:

4.1 that use their cargo as fuel and fulfil the requirements of the IGC Code as defined in regulation VII/11.1; or

4.2 using other gaseous fuels with a low flashpoint, provided that the design and arrangements of the systems for the storage and distribution of such gaseous fuels fulfil the requirements of the IGC Code regarding gas as cargo.

5 This section does not apply to ships owned or operated by a Contracting Government and currently used only in its service for non-commercial purposes. However, ships owned or operated by a Contracting Government and currently used in its service for non-commercial purposes only are encouraged to act in a manner consistent, as far as is reasonable and practicable, with this section.

Regulation 57 Requirements for ships using fuels with a low flashpoint

Except as provided in regulations 56.4 and 56.5, ships using low-flashpoint fuels shall comply with the provisions of the IGF Code.

[1] Chap. II-1. Reference is made to the Unified interpretation on the application of regulations governed by the building contract date, the keel laying date and the delivery date for the requirements of the SOLAS and MARPOL Conventions (MSC-MEPC. 5/Circ. 8).
[2] Chap. II-1. Refer to Unified interpretations of "unforeseen delay in delivery of ships" MSC1/Circ. 1247).
[3] Chap. II-1. Refer to the "Guidelines for maintenance and repair of protective coatings (SC 1.1/Circ. 1330)"
[4] Chap. II-1. Refer to resolution MSC. 62(67), Guidelines for safe access to tanker bows.
[5] Chap. II-1. Refer to resolution MSC. 35(63), Guidelines on emergency towing arrangements for tankers, as amended.
[6] Chap. II-1. Refer to resolution MSC. 35(63), Guidelines on emergency towing arrangements for tankers, as amended
[7] Chap. II-1. Refer to MSC. 1/Circ. 1255, Guidelines for owners/operators on preparing emergency towing procedures.
[8] The use of asbestos is further defined in regulation (EC) No. 1272/2008 of the European Parliament and the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures
[9] Chap. II-1. *Attention is drawn to Commission Directive 1999/77/EC of 26 July 1999 relating to restrictions on the marketing and use of certain dangerous substances and preparations (asbestos), according to which the derogations listed in SOLAS have lapsed in EU Member States and in countries covered by the EEA Agreement.*
[10] Chap. II-1. Refer to resolution A. 1050(27), Revised, "Recommendations for Entering Enclosed Spaces Aboard ships".
[11] Chap. II-1. Refer to MSC/Circ. 1135 "As-built construction drawings to be maintained on board the ship and ashore".
[12] Refer to the *Guidance on shipboard towing and mooring equipment* (MSC. 1/Circ. 1175) for ships constructed on or after 1 January 2007 but before 1 January 2024 and the *Guidance on shipboard towing and mooring equipment* (MSC. 1/Circ. 1175/Rev. 1) for ships constructed on or after 1 January 2024.
[13] Refer to the *Guidelines on the design of mooring arrangements and the selection of appropriate mooring equipment and fittings for safe mooring* (MSC. 1/Circ. 1619).
[14] Refer to towing and mooring arrangement plan in the *Guidelines on the design of mooring arrangements and the selection of appropriate mooring equipment and fittings for safe mooring (*MSC. 1/Circ. 1619).
[15] Refer to the *Guidelines for inspection and maintenance of mooring equipment including lines* (MSC. 1/Circ. 1620.
[16] Chap. II-1. It may be considered unreasonable or impractical for a ship to have to comply with the provisions when it: 1) has a low freeboard and is equipped with access ramps; or 2) is travelling between certain ports where appropriate means of landing (platforms) are available.
[17] Chap. II-1. Refer to Guidelines for construction, installation, maintenance and inspection/survey of accommodation ladders and gangways, as issued in MSC. 1/Circ 1331.
[18] Chap. II-1. Refer to Guidelines for construction, installation, maintenance and inspection/survey of accommodation ladders and gangways, as issued in MSC. 1/Circ 1331.
[19] Chap. II-1. Refer to "Guidelines for the information to be included in a Ship Construction File" (MSC. 1/Circ. 1343).
[20] Chap. II-1. Refer to subsections 1.11.1 or 1.11.4 of the International Oil Pollution Prevention Certificate Supplement (Form B):
[21] Chap. II-1. Reference is made to MSC. 1/Circ. 1421, "Guidelines on exemptions for crude oil tankers solely engaged in the carriage of cargoes and cargo handling operations not causing corrosion".
[22] Chap. II-1. Refer to the Code on Noise levels on board ships, adopted by the Organisation by resolution A. 468(XII).
[23] Chap. II-1. *The text reproduces the content of resolution MSC. 158(78), Adoption of technical provisions for means of access for inspections.*
[24] Chap. II-1. In ships carrying ore as cargo, the permanent means of access to wing tanks shall comply with the relevant sections of tables 1 and 2.
[25] Chap. II-1. Refer to "Guidelines for verification of damage stability requirements for tankers" (MSC. 1/Circ. 1461).
[26] Chap. II-1. Refer to "Guidelines for verification of damage stability requirements for tankers" (MSC. 1/Circ. 1461).
[27] Chap. II-1. Refer to "Guidelines for verification of damage stability requirements for tankers" (MSC. 1/Circ. 1461).
[28] Chap. II-1. 1 For offshore supply vessels not exceeding 100 metres (L) in length, the Guidelines for the design and construction of offshore supply vessels, 2006 (resolution MSC. 235(82), as amended by resolution MSC. 335(90); or . 2 For special purpose ships, the 'Code of safety for special purpose ships, 2008' (resolution MSC. 266(84).
[29] Chap. II-1. Refer to the Code on intact stability for all types of ships covered by IMO instruments (resolution A. 749(18), as amended) and the International Code on Intact Stability 2008 (resolution MSC 267(85)).
[30] Chap. II-1. Reference is also made to "Guidelines for the preparation of intact stability information" (MSC/Circ. 456) and "Revised guidance to the master for avoiding dangerous situations in adverse weather and sea conditions" (MSC. 1/Circ. 1228).
[31] Chap. II-1. When the IMO Maritime Safety Committee (MSC) adopted the provisions contained in sections B to B-4, the Committee asked Administrations to note that the provisions should be used in conjunction with the explanatory notes developed by the Organisation to ensure uniform enforcement.
[32] Chap. II-1. Cf. Recommendation on a standard method for demonstrating compliance with the requirements for cross-filling arrangements on passenger ships. The recommendation is adopted by the Organisation by resolution MSC. 362(92), as amended from time to time.
[33] Chap. II-1. Reference is made to "Interim Explanatory Notes for the assessment of passenger ship systems' capabilities after a fire or flooding casualty" (MSC. 1/Circl. 1369).
[34] Chap. II-1. Reference is made to "Guidelines on operational information for masters of passenger ships for safe return to port by own power or under tow" (MSC. 1/Circ. 1400) for ships constructed on or after 1 January 2014 but before 13 May 2016 or "Revised guidelines on operational information for masters of passenger ships for safe return to port" (MSC. 1/Circ. 1532/Rev. 1) for ships constructed on or after 13 May 2016 or "Guidelines on operational information for masters in case of flooding for passenger ships constructed before 1 January 2014" (MSC. 1/Circ. 1589).
[35] Refer to the following publication IEC 60529:2003:
. 1 electrical motors, associated circuits and control components; protected to IPX 7 standard;
. 2 door position indicators and associated circuit components; protected to IPX 8 standard; and
. 3 door movement warning signals; protected to IPX 6 standard.
Other arrangements for the enclosures of electrical components may be fitted provided the Administration is satisfied that an equivalent protection is achieved. The water pressure IPX 8 shall be based on the pressure that may occur at the location of the component during flooding for a period of 36 h.
[36] Refer to the *Guidance notes on the integrity of flooding boundaries above the bulkhead deck of passenger ships for proper application of regulations II-1/8 and 20, paragraph 1, of SOLAS 1974, as amended* (MSC/Circ. 541, as may be amended).
[37] Chap. II-1. Refer to the Recommendation on Strength and Security and Locking Arrangements for doors in the plating of ro-ro passenger ships adopted by the Organisation by resolution A. 793(19).
[38] Chap. II-1. *For passenger ship keels laid or at a similar stage of construction before 1 April 1976, reference is made to the Danish Maritime Authority's technical regulation no. 6 of 3 August 1995 on additional requirements for intact stability for existing passenger ships in international trade.*
[39] Refer to the *"Guidelines for damage control plans and information to the maste"r* (MSC. 1/Circ. 1245), as amended by MSC. 1/Circ. 1570 and to the *"Guidelines for verification of damage stability requirements for tanker"s* (MSC. 1/Circ. 1461).
[40] Chap. II-1. Refer to "*Revised guidance for watertight doors on passenger ships which may be opened during navigation" (MSC. 1/Circ. 1564).*
[41] Chap. II-1. Refer to "Guidelines for flooding detection systems on passenger ships" (MSC. 1/Circ. 1291).

[42] Chap. II-1. Refer to "Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers" as adopted by MSC resolution MSC. 188(79).

[43] Refer to the *"Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers"* (resolution MSC. 188(79)), as may be amended.

[44] Refer to the *"Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers"* (resolution MSC. 188(79)), as may be amended.

[45] Chap. II-1. Refer to: MSC/Circ. 834, Guidelines for Engine-room Layout, Design and Arrangement. *This circular should be used as a general guide for the design and layout of machinery spaces.*

[46] Chap. II-1. Refer to: MSC/Circ. 647, Guidelines to minimise leakage from flammable liquid systems, as supplemented by MSC/Circ. 851, Guidelines on engine-room oil fuel systems.

[47] Chap. II-1. Refer to: regulation II-2/4.2 regarding arrangements for fuel oil, lubricating oil and other combustible oils.

[48] Chap. II-1. Reference is made to: Resolution A. 601(15), "Recommendation on the provision and the display of manoeuvring information on board ships", and resolution MSC. 137(76), "Standards for ships manoeuvrability", and MSC/Circ. 1053 "Explanatory notes to the interim standards for ship manoeuvrability".

[49] Chap. II-1. Reference is made to: Resolution A. 415(XI) on improved steering gear standards for passenger and cargo ships and resolution A. 416(XI) on examination of steering gears on existing tankers.

[50] Chap. II-1. Refer to: Recommendations published by the International Electrotechnical Commission and, in particular, publication IEC 60092 - Electrical installations in ships.

[51] Chap. II-1. Until 1 January 2009, regulation 13 corresponded to regulation 15.

[52] Before 1 January 2009, regulation 13.7.3.3 was numbered as regulation 15.7.3.3.

[53] Before 1 January 2009, regulation 13.7.2 was numbered as regulation 15.7.2.

[54] Chap. II-1. Refer to: MSC/Circ. 808, Recommendation on performance standards for public address systems on passenger ships, including cabling.

[55] Chap. II-1. Refer to: Standards published by the International Electrotechnical Commission, and in particular IEC 60092-502:1999: Electrical installations in ships - Tankers.

[56] Chap. II-1. Reference is made to "Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III" MSC. 1/Circ. 1212) and "Guidelines for the approval of alternatives and equivalents as provided for in various IMO instruments" (MSC. 1/Circ. 1455).

[57] Refer to MSC. 1/Circ. 1212, "Guidelines on the alternative design and arrangement for SOLAS chapter II-1 and III".

Annex 4

Chapter II-2 - Construction - fire protection, fire detection and extinguishing

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Regulation 1 Application

1 Application[1)]

1.1 Unless expressly provided otherwise, this chapter shall apply to ships built on or after 1 July 2012.

1.2 In this chapter:

1.2.1 the term 'ships under construction' means ships with the keel laid or which are at a similar stage of construction;

1.2.2 the term 'all ships' means ships of any type built before 1 July 2012, on or after that date; and

1.2.3 a cargo ship which is converted into a passenger ship, regardless of when it was built, shall be treated as a passenger ship built on the date on which such conversion commences.

1.3 In this chapter, the term "at a similar stage of construction" means the stage where:

1.3.1 construction work identifiable with a specific ship is commenced; and

1.3.2 assembly of this ship has commenced and involves at least 50 tonnes or 1% of the estimated total hull mass, whichever is less.

2 Requirements applicable to existing ships

Except for the reference in subsections 2.2.1 to 3, subsection 2, shall not apply to cargo ships of less than 500 gross tonnage[2)] built before 1 July 2002.

2.1 Unless expressly provided otherwise, for ships constructed before 1 July 2012, the Administration shall ensure that the requirements of Chapter II-2 of the International Convention for the Safety of Life at Sea (SOLAS) 1974, as amended by Resolution MSC. 1 (XLV), MSC. 6(48), MSC. 13(57), MSC. 22(59), MSC. 24(60), MSC. 27(61), MSC. 31(63), MSC. 57(67), MSC. 99(73), MSC. 134(76), MSC. 194(80), MSC. 201(81), MSC. 216(82), MSC. 256(84), MSC. 269(85) and MSC. 291(87) are fulfilled.

2.2 Ships built before 1 July 2002 must also comply:

2.2.1 subsections 3, 6.5 and 6.7, whichever is applicable;

2.2.2 regulations 13.3.4.2 to 13.3.4.5, 13.4.3 and section E, except regulations 16.3.2.2 and 16.3.2.3 herein, where applicable, no later than the date of the next survey[3)] after 1 July 2002;

2.2.3 regulations 10.4.1.3 and 10.6.4, only for new installations;

2.2.4 regulation 10.5.6 not later than 1 October 2005 for passenger ships of 2,000 gross tonnage and above; and

2.2.5 regulations 5.3.1.3.2 and 5.3.4 for passenger ships not later than the date of the first survey after 1 July 2008; and

2.2.6 regulation 4.5.7.1.

2.3 Ships built on or after 1 July 2002 and before 1 July 2010 shall comply with subsections 7.1.1, 7.4.4.3 and 7.5.2.1.2 of regulation 9, as adopted by resolution MSC. 99(73).

2.4 The following ships with cargo holds designed for the carriage of dangerous goods in packaged form shall comply with the requirements of regulation 19.3, except when carrying dangerous goods of classes 6.2 and 7 and dangerous goods in limited quantitise[4)], and excepted quantities[5)] in accordance with tables 19.1 and 19.3 not later than the date of the first renewal survey on or after 1 January 2011:

2.4.1 cargo ships of 500 gross tonnage or more and passenger ships built on or after 1 September 1984 but before 1 January 2011; and

2.4.2 cargo ships of less than 500 gross tonnage built on or after 1 February 1992 but before 1 January 2011,

and regardless of the following provisions:

2.4.3 cargo ships of 500 gross tonnage and above and passenger ships constructed on or after 1 September 1984 but before 1 July 1986 need not comply with regulation 19.3.3 if they comply with regulation 54.2.3 as adopted by resolution MSC. 1(XLV);

2.4.4 cargo ships of 500 gross tonnage and above and passenger ships constructed on or after 1 July 1986 but before 1 February 1992 need not comply with v 19.3.3 if they comply with regulation 54.2.3 as adopted by resolution MSC. 6(48);

2.4.5 cargo ships of 500 gross tonnage and above and passenger ships constructed on or after 1 September 1984 but before 1 July 1998 need not comply with regulations 19.3.10.1 and 19.3.10.2;

2.4.6 cargo ships of less than 500 gross tonnage built on or after 1 February 1992 but before 1 July 1998 need not comply with regulations 19.3.10.1 and 19.3.10.2

2.4.7 cargo ships of 500 gross tonnage and above and passenger ships constructed on or after 1 February 1992 but before 1 July 2002 need not comply with regulation 19.3.3, provided they comply with regulation 54.2.3 as adopted by resolution MSC. 13(57); and

2.4.8 cargo ships of 500 gross tonnage and above and passenger ships constructed on or after 1 September 1984 but before 1 July 2002 need not comply with regulations 19.3.1, 19.3.5, 19.3.6, 19.3.9 provided that they comply with regulations 54.2.1, 54.2.5, 54.2.6, 54.2.9 as adopted by resolution MSC.1(XLV).

2.5 Ships built before 1 July 2012 must also comply with regulation 10.10.1.2 as adopted by resolution MSC. 338(91).

2.6 Car carriers built before 1 January 2016, including those built before 1 July 2012, shall comply with subsection
2.2 of regulation 20-1, as adopted by resolution MSC. 365(93).

2.7 Tankers built before 1 January 2016, including those built before 1 July 2012, shall comply with the provisions of regulation 16.3.3, except 16.3.3.3.

2.8 Regulations 4.5.5.1.1 and 4.5.5.1.3 apply to ships built on or after 1 July 2002 but before 1 January 2016, and regulation 4.5.5.2.1 applies to all ships built before 1 January 2016.

2.9 Regulation 10.5.1.2.2, as amended by resolution MSC.409(97), applies to ships built before 1 January 2020, including ships built before 1 July 2012.

3 Repairs, alterations, remodelling and outfitting

3.1 All ships that are repaired, altered, converted and refitted in connection therewith must continue to fulfil at least the requirements that previously applied to these ships. Such ships, if built before 1 July 2012, shall, as a general rule, comply with the requirements for ships built on or after that date to at least the same extent as they did before they were repaired, altered, converted or refitted.

3.2 Repairs, alterations and conversions which substantially alter the dimensions of a ship or passenger accommodation or substantially increase the service life of a ship and its equipment shall comply with the requirements for ships constructed on or after 1 July 2012, in so far as the Administration considers reasonable and practicable.

4 Exceptions

4.1 The Administration may, if it considers that the conditions of the voyage are such that the application of one or more provisions of this chapter would be unreasonable or unnecessary, exempt ([6]) certain ships or classes of ships flying its flag from complying with these requirements, provided that such ships do not proceed more than 20 miles from the nearest land during the voyage.

4.2 In the case of passenger ships engaged on specialised services for the carriage of large numbers of passengers, such as pilgrim trade, the Administration may, if it considers it impracticable to require compliance with the requirements of this chapter, exempt such ships from compliance with these requirements provided that they comply fully with the provisions of:

4.2.1 the regulations contained in the Annex to the Special Trade Passenger Ships Agreement, 1971; and

4.2.2 the regulations contained in the Annex to the Protocol on Space Requirements for Special Trade Passenger Ships, 1973.

5 Requirements that apply depending on the type of ship

Unless explicitly stated otherwise, you must:

5.1 requirements that do not refer to a specific ship type are met by ships of all types; and

5.2 requirements referring to "tankers" are met by tankers in accordance with the requirements specified in subsection 6 below.

6 Scope of application on tankers

6.1 The requirements of this chapter apply to tankers carrying crude oil and petroleum products with a flashpoint not exceeding 60ºC (closed apparatus test) as measured by an approved flashpoint apparatus and a Reid vapour pressure lower than atmospheric pressure and other liquid products presenting a similar fire risk.

6.2 Where it is intended to carry a liquid cargo other than that referred to in subsection 6.1 or liquefied gas and such cargo involves additional fire risk, additional security measures shall be required with due regard to the provisions of the International Bulk Chemical Code as defined in regulation VII/8.1 (the International Bulk Chemical Code), the Bulk Chemical Code, the International Gas Carrier Code as defined in regulation VII/11.1 (the International Gas Carrier Code) and the Gas Carrier Code, as appropriate.

6.2.1 A liquid cargo with a flashpoint of less than 60ºC for which a standard foam extinguishing system meeting the requirements of the Fire Safety Systems Code is not effective is considered to be a cargo that poses additional fire risk in this context. The following additional precautions are required:

6.2.1.1 The foam must be of a type that is resistant to alcohol;

6.2.1.2 the type of foam concentrates for use in chemical tankers shall be to the satisfaction of the Administration, taking into account the guidance developed by the Organisation;[7]) and

6.2.1.3 The capacity and delivery rate of the foam extinguishing system shall comply with chapter 11 of the International Bulk Chemical Code, except that lower delivery rates may be accepted on the basis of a performance test. On tankers with inert gas installations, a foam concentrate quantity sufficient for 20 minutes of foam production is acceptable.[8])

6.2.2 When applying this regulation, a liquid cargo with an absolute vapour pressure greater than 1,013 bar at 37.8ºC is considered to be a cargo that causes additional fire risk. Ships carrying such substances must comply with subsection 15.14 of the IBC Code. When ships operate in restricted areas and for limited periods of time, the Administration may agree to waive the requirements for refrigeration systems in accordance with subsection 15.14.3 of the International Bulk Chemical Code.

6.3 Liquid cargoes with a flashpoint above 60ºC, other than petroleum products or liquid cargo subject to the requirements of the International Bulk Chemical Code, are considered to have a low fire risk that does not require the protection of a fixed foam extinguishing system.

6.4 Tankers carrying petroleum products with a flashpoint above 60ºC (closed apparatus test) as measured by an approved flashpoint apparatus shall comply with the provisions of regulations 10.2.1.4.4 and 10.10.2.3 and the requirements for cargo ships other than tankers, except that instead of the fixed fire-extinguishing system required by regulation 10.7, they shall be provided with a fixed foam system on deck that shall fulfil the requirements of the Fire Safety Systems Code.

6.5 Combination ships constructed on or after 1 July 2002 shall not carry cargoes other than oil unless all cargo holds are empty of oil and free from gas or unless the arrangement in each case has been approved by the Administration in accordance with the guidelines developed by the Organisation.[9])

6.6 Chemical tankers and gas carriers shall comply with the requirements for tankers except where alternative or additional measures have been taken to the satisfaction of the Administration taking due account of the provisions of the International Bulk Chemical Code and the International Gas Carrier Code, as appropriate.

6.7 The requirements of regulations 4.5.10.1.1 and 4.5.10.1.4 shall be complied with, and a continuous monitoring system for the concentration of hydrocarbon gases shall be fitted in all tankers constructed before 1 July 2002 on the date of the first scheduled dry-docking after 1 July 2002, but not later than 1 July 2005. Sampling points or detector heads should be placed in suitable locations to quickly detect possible dangerous leaks. When the hydrocarbon gas concentration reaches a preset level, which must not be higher than 10% of the lower flame limit, a continuous audible and visual alarm shall automatically sound in the pump room and load control room to alert people of the possible danger. However, an existing monitoring system that is already installed and has a preset level not exceeding 30% is acceptable.

Regulation 2 Purpose and functional requirements of fire protection

1 The purpose of fire protection

1.1 The purpose of fire protection in this chapter is to:

1.1.1 prevent the occurrence of fire and explosion;

1.1.2 reduce the danger to life caused by fire;

1.1.3 minimise the risk of damage to the ship, its cargo and the environment caused by fire;

1.1.4 contain, control and stop fire and explosion in the space where they occur; and

1.1.5 provide adequate and easily accessible escape/exit routes for passengers and crew.

2 Functional requirements

2.1 In order to achieve the purpose of fire protection as stated in subsection 1 above, the following functional requirements are incorporated in the regulations of this chapter where applicable:

2.1.1 division of the ship into vertical and horizontal main zones using structures that are resistant in terms of heat and strength;

2.1.2 separation of accommodation spaces from the rest of the ship with structures in terms of resistant to heat and strength,

2.1.3 limited use of flammable materials;

2.1.4 detection of any fire in the zone where it occurs;

2.1.5 contain and extinguish any fire in the room where it occurs;

2.1.6 protection of escape routes and access routes for firefighting;

2.1.7 easy accessibility to firefighting equipment; and

2.1.8 minimising the possibility of ignition of flammable vapours from the load.

3 Achieving the purpose of fire protection

The fire protection objectives specified in subsection 1 above shall be achieved by ensuring compliance with the regulatory requirements specified in sections B, C, D, E, or G of this chapter or by alternative designs or arrangements that fulfil section F of this chapter. A ship shall be considered to fulfil the functional requirements set out in subsection 2 and to satisfy the fire safety purposes set out in subsection 1 when either:

3.1 the ship's structure and arrangements as a whole fulfil the relevant regulatory requirements of sections B, C, D, E or G of this chapter;

3.2 the ship's design and arrangements as a whole have been reviewed and approved in accordance with section F of this chapter; or

3.3 one or more parts of the ship's structures and arrangements have been reviewed and approved in accordance with section F of this chapter, and the remaining parts of the ship comply with the relevant regulatory requirements of sections B, C, D, E or G of this chapter.

Regultion 3 Definitions

For the purposes of this chapter, unless expressly provided otherwise, the following definitions apply:

1 "Accommodation" are those spaces that are commonly accessible rooms, hallways, toilets, chambers, offices, hospitals, cinemas, game and hobby rooms, barbershops, pantries that do not contain cooking facilities, and similar spaces.

2 Class 'A' divisions consist of bulkheads and decks that meet the following requirements:

2.1 They must be made of steel or other similar material;

2.2 They must be properly braced;

2.3 they shall be insulated with approved non-combustible materials so that the average temperature on the unexposed side does not rise more than 140ºC above the initial temperature, and so that the temperature at any point, including a joint, does not rise more than 180ºC above the initial temperature within the time specified below:

Class "A-60" 60 minutes

Class "A-30" 30 minutes

Class "A-15" 15 minutes

Class "A-0" 0 minutes

2.4 they must be designed to prevent the penetration of smoke and flames until the end of a standard 1-hour fire test; and

2.5 The Administration has required that a prototype bulkhead or deck be tested in accordance with the Fire Test Procedures Code to ensure that it meets the above requirements for mechanical resistance (integrity) and temperature rise.

3 "Atrium" are commonly accessible spaces within a single main vertical zone that extends over three or more decks.

4 Class 'B' divisions consist of bulkheads, decks, ceilings or inner skins that fulfil the following requirements:

4.1 They shall be constructed of approved non-combustible materials, and all materials used in the construction and fitting of Class 'B' divisions shall be non-combustible except that combustible veneers may be used, provided they meet other applicable requirements of this chapter;

4.2 they shall have an insulation performance such that the average temperature on the unexposed side does not rise more than 140ºC above the initial temperature, and that the temperature at any point, including a joint, does not rise more than 225ºC above the initial temperature within the time specified below:

Class "B-15" 15 minutes Class

"B-0" 0 minutes

4.3 they are designed to prevent the penetration of flames until the end of the first half hour of the standard fire test; and

4.4 The Administration has demanded that a test of the prototype is carried out on a division according to "Fire Test Procedures Code" to ensure that it fulfils the above requirements for mechanical resistance and temperature rise.

5 "Bulkhead deck" is the upper deck to which the watertight transverse bulkheads are led.

6 "Cargo area" means that part of the ship containing cargo holds, cargo tanks, slop tanks, cargo pump rooms, including pump rooms, cofferdams, ballast tanks and void spaces adjacent to cargo tanks, and deck areas throughout the length and breadth of the ship above these areas.

7 "Cargo ship" means a ship as defined in regulation I/2(g).

8 "Cargo hold" means all spaces used for cargo, cargo oil tanks, tanks for other liquid cargo and trunks for such spaces.

9 "Central control rooms" are control rooms in which the following control and indicator functions are centralised:

9.1 fixed fire detection and fire alarm systems;

9.2 automatic sprinkler, fire detection and fire alarm systems;

9.3 panels for indicating fire doors;

9.4 closing fire doors;

9.5 panels for indicating watertight doors;

9.6 closing watertight doors;

9.7 ventilation fans;

9.8 main alarm/fire alarm;

9.9 communication systems including phones; and

9.10 microphones for public address systems.

10 Class "C" divisions are divisions constructed from approved, non-combustible materials. They do not need to fulfil requirements regarding smoke and flame penetration or temperature rise limitations. The use of combustible veneer is permitted provided that it fulfils other requirements in this chapter.

11 "Chemical tanker" means a tanker built or adapted and used for the carriage in bulk of a liquid product of a flammable nature listed in chapter 17 of the International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk (the International Bulk Chemical Code), as defined in regulation VII/8.1.

12 "Enclosed ro-ro spaces" are ro-ro spaces that are neither open ro-ro spaces nor weather decks.

13 "Enclosed vehicle spaces" are vehicle spaces that are neither open vehicle spaces nor weather decks.

14 "Combination ship" is a cargo ship designed to transport both oil and solid cargo in bulk.

15 "Combustible material" is any material that is not a "non-combustible material".

16 Continuous class 'B' ceilings or trims are those class 'B' ceilings or inner skins that are terminated by a class 'A' or a class 'B' division.

17 "Permanently manned central control room" means a central control room that is always manned by a responsible member of the crew.

18 "Control room" means the room in which the radio station, the main navigating equipment, the emergency power plant or the central fire detection or fire control installations are grouped. Rooms where the centralised installations for fire detection or fire control equipment are gathered are also considered to be fire control rooms.

19 "Crude oil" means any oil occurring naturally in the subsoil, whether or not it has been treated to render it suitable for transport, and includes crude oil from which certain distillation fractions may have been removed or added.

20 "Dangerous goods" are the goods referred to in regulation VII/2.

21 "Deadweight" is the difference in tonnes between the displacement of a ship in water of a density of 1.025 at the load waterline corresponding to the assigned summer freeboard and the lightweight of the ship.

22 "Fire Safety Systems Code" means the International Code for Fire Safety Systems adopted by the Maritime Safety Committee of the Organisation by resolution MSC. 98(73), which the Organisation may amend provided that such amendments are adopted, brought into force and given effect in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to annexes other than chapter I.

23 "Fire Test Procedures Code" means the International Code for Application of Fire Test Procedures, 2010 (2010 FTP Code), adopted by the Maritime Safety Committee of the Organisation by Resolution MSC. 307(88), which may be amended by the Organisation provided that such amendments are adopted, brought into force and given effect in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to annexes other than chapter I.

24 "Flashpoint" is the temperature in degrees Celsius and measured using an approved flashpoint apparatus (test in a closed apparatus) at which a product will give off flammable vapours sufficient to ignite.

25 "Gas carrier" means a cargo ship built or adapted and used for the carriage in bulk of any liquefied gases or other combustible substances listed in chapter 19 of the International Gas Carrier Code, as defined in regulation VII/11.1.

26 "Helideck" means a purpose-built helicopter landing area located on a ship, including all structures, firefighting equipment and other equipment necessary for the safe operation of helicopters.

27 "Helicopter facility" means a helideck including any refuelling and hangar facilities.

28 "Lightweight" means a ship's displacement in tonnes without cargo, fuel, lubricating oil, ballast water, fresh water and feed water in tanks, ship's provisions and passengers and crew with their effects.

29 "Low flame spread" means that the surface so designated will adequately limit flame spread according to the Fire Test Procedures Code.

30 "Machinery spaces" are machinery spaces of category A and all other spaces containing propulsion machinery, boilers, fuel oil installations, steam engines, internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating machinery, stabilisers, ventilation and air conditioning machinery and similar spaces and trunks to such spaces.

31 "Machinery spaces of category A" are those spaces and trunks to such spaces that either contain:

31.1 Internal combustion engines used for main propulsion,

31.2 internal combustion engines used for purposes other than main propulsion, where this machinery has a total power output of at least 375 kW; or

31.3 an oil-fired boiler or fuel oil installation or any oil-fired equipment other than boilers, such as inert gas generators, waste burners (incinerators), etc.

32 'Main vertical zones' are the compartments into which hull, superstructure and deckhouses are divided by class
"A" divisions and whose average length and width do not normally exceed 40 metres on any single deck.

33 "Non-combustible material" is a material that is neither capable of burning nor of giving off flammable vapours in such quantity as to be capable of spontaneous combustion when heated to approximately 750ºC, as determined by the IMO Fire Test Procedures Code.

34 "Fuel oil installations" are those installations used to treat fuel oil for use in an oil-fired boiler or installations used to treat the oil for the supply of preheated oil to an internal combustion engine and include oil pressure pumps, filters and preheaters that treat the oil at a pressure above 0.18 N/mm^2.

35 "Open ro-ro spaces" are ro-ro spaces which are open at both ends or open at one end and provided with adequate natural ventilation, effective throughout the length of the space, through permanent openings in the side plating, below deck or from above and which have a total area of at least 10% of the total area of the sides of the space.

36 "Open vehicle decks" are vehicle decks that are open at both ends or open at one end and provided with adequate natural ventilation that is effective throughout the length of the compartment, through permanent openings in the side panelling, below the deck or from above, and which have a total area of at least 10% of the total area of the sides of the space.

37 "Passenger ship" is defined in regulation I/2(f).

38 "Regulatory requirements" are the specific constructions, limitations or fire protection systems specified in sections B, C, D, E or G of this chapter.

39 "Publicly accessible spaces" are the part of the accommodation used as halls, dining rooms, lounges and similar permanently enclosed rooms.

40 "Rooms containing furniture and furnishings of restricted fire risk" for the purposes of regulation 9 means rooms containing furniture and furnishings of restricted fire risk (be they chambers, public spaces, offices or other types of accommodation) in which:

40.1 all drawer furniture, such as desks, wardrobes, dressing tables, dressing tables, chests of drawers and similar, are made exclusively of approved, non-combustible materials, except that flammable veneer with a maximum thickness of 2 mm may be used on the working surfaces of such furniture;

40.2 all freestanding furniture, such as chairs, sofas and tables, are made with a frame of non-combustible material;

40.3 all curtains, drapes and other suspended textile fabrics have properties that make them as resistant to the spread of fire as wool with a mass of 0.8 kg/m^2, as determined according to the
Fire Test Procedures Code;

40.4 all door coatings have a low flame spread behaviour;

40.5 all exposed surfaces of bulkheads, inner skins and ceilings have low flame spread;

40.6 all upholstered furniture is resistant to ignition and flame spread, this must be determined according to the Fire Test Procedure Code, and

40.7 all bedding is resistant to ignition and flame spread, as determined according to the Fire Test Procedures Code.

41 "Ro-ro spaces" are spaces not normally subdivided in any way and extending either for a considerable length or the entire length of the ship in which motor vehicles with fuel in their tanks for their own propulsion and/or cargo (packaged or in bulk, in rail or road wagons), driving vehicles (including road or rail tankers)vehicles (including road or rail tankers), trailers, containers, pallets, demountable tanks or similar means of transport or other receptacles) can normally be loaded and unloaded horizontally.

42 "Ro-ro passenger ship" is a passenger ship with ro-ro spaces or specialised cargo holds.

43 "Steel or other equivalent material" means a non-combustible material which, by itself or by the application of insulation, possesses properties equivalent to those of steel in terms of durability and mechanical resistance at the end of the prescribed standard fire test (e.g. a suitably insulated aluminium alloy).

44 "Sauna" is a hot room with temperatures that usually range between 80º-120º and where heat is generated by a hot surface (e.g. an electric heater). The warm room can also include the room where the heater is located and associated shower rooms.

45 "Service spaces" are spaces used as galleys, pantries containing cooking appliances, lockers, mail and safe rooms, storerooms, workshops other than workshops in machinery spaces and similar spaces, and trunks to such spaces.

46 'Special cargo holds' are bulkheaded compartments above or below the bulkhead deck where vehicles can enter and exit and to which passengers have access. Special cargo holds can span more than two decks, provided that the total free height of vehicles does not exceed 10 metres.

47 "Standard fire test" means a test in which specimens of the bulkheads or decks in question are subjected in a test furnace to temperatures approximating the standard curve of time and temperatures in accordance with test methods specified in the Fire Test Procedures Code.

48 "Tanker" means a ship as defined in regulation I/2(h).

49 "Vehicle deck spaces" are cargo holds intended for the transport of motor vehicles with fuel in the tanks for self-propulsion.

50 "Weather decks" are decks that are completely exposed to the weather from above and from at least two sides.

51 "Safe area in the event of a casualty" is - from an occupancy perspective - any area that is not flooded or is outside the primary vertical zone(s) where a fire has occurred, so such that this zone can accommodate all persons on board the ship and thereby protect them from danger to life or health and provide them with basic services.

52 "Safety control centre" is a control station to be used for emergency management. Operation, control and/or monitoring of safety systems is an integral part of the safety centre.

53 "Cabin balcony" is an open deck area specifically intended for the occupants of a single cabin and which has direct access from such cabin.

54 In the implementation of regulation 9.7, as adopted by resolution MSC. 365(93), as amended, a 'fire damper' is a device installed in a ventilation shaft which is open under normal conditions to permit the flow of air into the shaft and which closes in the event of fire to prevent the flow of air into the shaft and restrict the passage of fire. Using the above definition, the following concepts may be related:

1) an 'automatic fire damper' is a fire damper that closes by itself when exposed to fire conditions;

2) a 'manual fire damper' is a fire damper designed to be opened or closed manually by the crew at the damper itself; and

3) a 'remotely operated fire damper' is a fire damper that is closed by the crew using a control device located some distance away from the operated damper.

55 In implementing regulation 9.7, as adopted by resolution MSC. 365(93), as amended, a 'smoke damper' is a device installed in a ventilation shaft which is open under normal conditions to allow flow through the shaft and which is closed in the event of a fire to prevent flow through the shaft and to limit the passage of smoke and hot gases. A smoke damper is not expected to contribute to fire integrity in divisions penetrated by ventilation shafts. Using the above definition, the following concepts may be related:

1) an 'automatic smoke damper' is a smoke damper that closes automatically when exposed to smoke or hot gases;

2) a 'manual smoke damper' is a smoke damper designed to be opened or closed manually by the crew at the damper itself; and

3) a 'remote smoke damper' is a smoke damper that is closed by the crew using a control device located some distance away from the operated damper.

56 "Car carrier" means a cargo ship that carries cargo exclusively in ro-ro spaces or in car deck spaces and that is designed to carry empty motor vehicles as cargo.

57 "Helicopter landing area" means an area on board a ship intended for the occasional landing or emergency landing of helicopters but not intended for routine helicopter operations.

58 "Winching area" means a pick-up area intended for the transfer of personnel or stores to or from the ship via helicopter while the helicopter hovers above the deck.

Section B Prevention of fire and explosion[10)]

Regulation 4 Possibility of ignition

1 Purpose

The purpose of this regulation is to prevent the ignition of flammable materials or flammable liquids. For this purpose, the following functional requirements must be fulfilled:

1.1 means must be found to control leaks of flammable liquids;

1.2 means must be found to limit the accumulation of flammable vapours;

1.3 the flammability of combustible materials must be limited;

1.4 the ignition sources must be limited;

1.5 ignition sources must be separated from combustible materials and flammable liquids; and

1.6 the atmosphere in cargo tanks must be kept outside the hazardous area.

2 Installations for fuel oil, lubricating oil and other flammable oils

2.1 Restrictions on the use of oil as fuel

The following restrictions apply to the use of oil as fuel:

2.1.1 Unless otherwise authorised by the provisions of this subsection, fuel oil with a flashpoint below 60ºC shall not be used,[11)]

2.1.2 In emergency generators, fuel oil with a flashpoint of at least 43ºC can be used;

2.1.3 The use of fuel oil with a flashpoint below 60ºC but not below 43ºC may be permitted (e.g. to power emergency fire pump machinery and auxiliary machinery not located in machinery spaces of category A) under the following conditions:

2.1.3.1 Fuel oil tanks, except those located in the double bottom, shall be located outside category A machinery spaces;

2.1.3.2 it must be possible to measure the oil temperature on the suction line of the fuel oil pump;

2.1.3.3 there must be stop valves and/or taps on the suction side and pressure side of fuel oil filters; and

2.1.3.4 pipe joints of welded construction or of the cutting or compression fitting type should be used as much as possible;

2.1.4 in cargo ships to which Section G of chapter II-1 does not apply, the use of fuel with a lower flashpoint than specified in subsection 2.1.1, for example, crude oil, may be permitted provided that this fuel is not stored in a machinery spaces, and that the Administration has approved the entire installation; and

2.1.5 on ships to which section G of chapter II-1 applies, the use of fuel with a lower flashpoint than specified in subsection 2.1.1 may be authorised.

2.2 Fuel oil installations

On a ship where fuel oil is used, the installations for the storage, distribution and use of fuel oil must provide safety for the ship and persons on board and must at least fulfil the following provisions.

2.2.1 Location of fuel oil systems

The parts of the fuel oil system that contain heated oil *(oil above 60ºC)* with a pressure exceeding 0.18 N/mm ^{2} must, as far as practicable, not be located under cover so that faults and leaks cannot be easily detected. The machinery spaces must be adequately lit for these parts of the fuel oil installation.

2.2.2 Ventilation of the machinery space

Ventilation in machinery spaces must be sufficient to prevent the accumulation of oil vapours under normal conditions.

2.2.3 Fuel oil tanks

2.2.3.1 Fuel oil, lubricating oil and other flammable oils must not be transported in forepeak tanks.

2.2.3.2 Fuel oil tanks shall be built into the hull as far as possible and shall be located outside category A machinery spaces When it is necessary to locate oil fuel tanks, other than double bottom tanks, adjacent to or in machinery spaces of category A, at least one of their vertical sides shall be adjacent to the boundaries of the machinery space and shall preferably have common boundaries with the double bottom tanks, and that part of their boundary which is common with the machinery spaces shall be as small as possible.[12)] Where these tanks are situated within the boundaries of machinery spaces of category A, they shall not contain oil fuel having a flashpoint below 60º C. In general, avoid using free-standing fuel oil tanks. When such tanks are used, they shall not be used in category A machinery spaces of passenger ships. Where permitted, they must be housed in a sufficiently large, oil-tight drip tray with a suitable drain pipe leading to an appropriately sized waste oil tank.

2.2.3.3 An oil tank must never be located in a place where a leak from the tank or leaks in the tank can cause a fire or explosion hazard by causing the fuel to run onto a hot surface.

2.2.3.4 Fuel oil pipes which in damaged condition could cause oil to escape from a storage, settling or daily use tank with a capacity of 500 litres or more located above the double bottom shall be fitted directly on the tank with a tap or valve which can be closed from a safe position outside the space concerned in the event of a fire occurring in the space containing such tanks. In the special case where elevated tanks are located in a shaft or pipe tunnel or similar space, the tanks shall be fitted with shut-off valves, but shut-off of the tanks in case of fire may be authorised by means of an additional valve on the pipeline or pipelines outside the tunnel or similar space. If such an additional valve is located in the machinery space, it must be operated from outside this space. The remote valve control for the emergency generator fuel tank valve must be located separately from the remote control of other valves for tanks located in machinery spaces.

2.2.3.5 There must be a safe and effective means of detecting the amount of oil in any fuel oil tank.

2.2.3.5.1 Where sounding pipes are used, they must not terminate in a room where there is a risk of ignition of spillage from the sounding pipe. In particular, they must not open into passenger or crew compartments. As a general rule, sounding pipes must not terminate in machinery spaces. However, the Administration may, where it deems it impossible to avoid in practice, allow sounding pipes to terminate in machinery spaces provided that all the following requirements are met:

2.2.3.5.1.1 An oil level gauge that fulfils the requirements of subsection 2.2.3.5.2 must be available;

2.2.3.5.1.2 the sounding pipes shall terminate in a location away from ignition sources unless precautions are taken, such as effective shielding, to prevent fuel oil from coming into contact with ignition sources in the event of spillage from the sounding pipes; and

2.2.3.5.1.3 sounding pipes must be fitted with self-closing shut-off devices and with a small-diameter self-closing control tap placed under the shut-off device so that it can be verified that there is no fuel oil in the pipe before the shut-off device is opened. Measures must be taken to ensure that spillage of fuel oil through the control tap does not cause any ignition risk.

2.2.3.5.2 Other devices for checking the oil level may be authorised instead of sounding pipes under the following conditions:

2.2.3.5.2.1 On passenger ships, such metering devices shall not require penetration of the tank below its top, and in case of failure of these devices or overfilling of tanks, shall not cause fuel spillage; and

2.2.3.5.2.2 On cargo ships, failure of such metering devices or overfilling of tanks shall not cause fuel to escape into the space. The use of cylindrical oil level glass is not permitted. The Administration may authorise the use of oil level gauges with flat glasses and self-closing valves between the sight glasses and the fuel tanks.

2.2.3.5.3 The means described in subsection 2.2.3.5.2 and accepted by the Administration shall be maintained to ensure their continued proper functioning during the voyage.

2.2.4 Preventing overpressurisation

Measures must be taken to prevent overpressurisation of oil tanks or parts of the fuel oil installation, including the filling pipes served by pumps on board. Air and overflow pipes and safety valves must terminate in a place where there is no risk of fire or explosion from the release of oil and vapours and must not lead into crew spaces, passenger spaces or into special cargo holds, enclosed ro-ro spaces, machinery spaces or similar spaces.

2.2.5 Fuel oil pipes

2.2.5.1 Fuel oil pipes, their valves and other accessories shall be of steel or other approved material, except that the limited use of flexible pipes may be permitted where the Administration is satisfied that it is necessary.[13]) Such flexible pipes and accessories shall be of approved fire-resistant materials of adequate strength and shall be constructed in a manner satisfactory to the Administration. On valves mounted on fuel oil tanks that are under static pressure, steel or spherical graphite cast iron is acceptable. However, plain cast iron valves can be used in piping systems where the design pressure is below 7 bar and the design temperature is below 60ºC.

2.2.5.2 External high-pressure pipes between the high-pressure fuel pumps and fuel valves must be protected by a pipe jacket system that can collect fuel from a leaking high-pressure pipe. A pipe jacket consists of an outer pipe in which the high-pressure pipe is mounted so that it forms a single unit. The pipe jacket system shall include an oil leakage collection arrangement equipped with an alarm that is activated if a high-pressure pipe leaks.

2.2.5.3 Fuel oil pipes must not be placed immediately above or near high-temperature devices, including boilers, steam lines, exhaust manifolds, silencers, or other equipment that requires insulation according to subsection 2.2.6. As far as possible, fuel oil pipes should be located away from hot surfaces, electrical installations or other ignition sources and should be shielded or adequately protected by other means to avoid oil splashes or oil leaks at the ignition source. The number of joints in such piping systems must be kept to a minimum.

2.2.5.4 Components of a diesel engine fuel system shall be designed taking into account the maximum (peak) pressure that will occur during operation, including any high-pressure pulsation that occurs and is returned to the fuel supply and drain lines by the fuel injection pump. Connections within fuel supply and drainage lines shall be made taking into account their ability to prevent leakage of oil under pressure while in service and after maintenance.

2.2.5.5 In machinery installations with several engines fed from the same fuel source, provision shall be made to isolate the fuel supply and drain lines to each engine. The means to

cut off the supply shall not interfere with the operation of the other engines and shall be operable from a position which would not be inaccessible in the event of a fire in one of the engines.

2.2.5.6 Where the Administration authorises the carriage of oil and flammable liquids through accommodation and service spaces, the pipes carrying oil or flammable liquids shall be of a material approved by the Administration with regard to the risk of fire.

2.2.6 Protection of surfaces with high temperatures

2.2.6.1 Surfaces with a temperature above 220ºC that could be sprayed with oil in the event of leaks in the fuel oil system must be properly insulated.

2.2.6.2 Precautions must be taken to prevent pressurised oil leakage from the pump, filter or heater from coming into contact with heated surfaces.

2.3 Installations for lubricating oil installations

2.3.1 Arrangements for the storage, distribution and use of oil for pressurised lubrication systems must be such that they do not endanger the ship and persons on board. Such installations in machinery spaces of category A and wherever practicable in other machinery spaces shall at least comply with the provisions of subsection 2.2.1, 2.2.3.3, 2.2.3.4, 2.2.3.5, 2.2.4, 2.2.5.1, 2.2.5.3 and 2.2.6, except that

2.3.1.1 this does not preclude the use of sight glasses in lubricating oil systems, provided they have been tested to be sufficiently resistant to fire; and

2.3.1.2 ducting may be permitted in machinery spaces; however, the requirements of subsections 2.2.3.5.1.1 and 2.2.3.5.1.3 need not be met provided the sounding pipes are fitted with suitable means of closure.

2.3.2 The provisions of subsection 2.2.3.4 shall also apply to lubricating oil tanks other than those with a capacity of less than 500 litres, storage tanks whose valves are closed during normal operation of the ship or where it is determined that the accidental operation of a quick closing valve on the lubricating oil tank would endanger the safe operation of the main propulsion machinery and essential auxiliary machinery.

2.4 Installations for other flammable oils

Installations for the storage, distribution, and use of other combustible oils used under pressure in power transmission systems, control and activation systems, and heating systems shall be such that they do not endanger the ship and persons on board. Appropriate arrangements for collecting leaking oil must be installed under hydraulic valves and cylinders. In places where there is a possibility of ignition, these installations shall at least fulfil the provisions of subsections 2.2.3.3, 2.2.3.5, 2.2.5.3, and 2.2.6 and the provisions of subsections 2.2.4 and 2.2.5.1 in terms of strength and construction.

2.5 Fuel oil installations in periodically unattended machinery spaces

In addition to the requirements of subsections 2.1 to 2.4, fuel oil and lubricating oil systems in periodically unattended machinery spaces shall fulfil the following requirements:

2.5.1 Where fuel oil service tanks are filled automatically or by remote control, means must be found to avoid overflow spillage. Other equipment for the automatic treatment of flammable liquids (e.g. fuel oil centrifuges), if possible installed in a special compartment reserved for centrifuges and their preheaters, shall be equipped with devices to prevent overflow spillage; and

2.5.2 Where fuel oil service tanks or settling tanks are equipped with heating agents, a high-temperature alarm must be provided if the flashpoint of the fuel oil may be exceeded.

3 Installations for domestic gas fuel on board

Gas fuel systems used for domestic use on board must be approved by the Administration. Gas cylinders should be stored on an open deck or in a well-ventilated room with openings to open decks only.

4 Different ignition sources

4.1 Electric radiators

If electric radiators are used, they must be fixed and designed to minimise the risk of fire. No such radiators may be installed with an uncovered heating element so that clothing, curtains or similar materials can be burnt or ignited by the heat from the element.

4.2 Waste containers

Waste containers must be made of non-combustible materials without openings in the sides and bottom.

4.3 Protecting the surface of insulation materials against oil penetration

In rooms where there is a risk of penetration of oil products, the surface of the insulation material must be impermeable to oil or oil vapours.

4.4 Bottom layer of deck coverings

The bottom layer of any deck covering in accommodation, service spaces, and control stations, or if fitted on cabin balconies of passenger ships constructed on or after 1 July 2008, shall be of approved non-flammable material; this shall be determined in accordance with the Fire Test Procedures Code.

5 Cargo areas on tankers

5.1 Separation of cargo oil tanks

5.1.1 Cargo pump rooms, cargo tanks, slop tanks and cofferdams must be located in front of the machinery spaces. However, a fuel oil bunker tank does not have to be in front of the machinery space. Cargo tanks and slop tanks must be separated from machinery spaces by cofferdams, cargo pump rooms, bunker tanks or ballast tanks. Pump rooms containing pumps with accessories intended for ballasting the spaces located adjacent to cargo tanks and slop tanks and pumps intended for the transfer of fuel oil, shall be considered equivalent to a cargo pump room for the purpose of this regulation, provided that such pump rooms have the same safety standard as that required for cargo pump rooms. However, pump rooms intended solely for ballast or fuel oil transfer need not fulfil the requirements of regulation 10.9. However, the lower part of the pump room may be arranged as a recess into machinery spaces of category A for the accommodation of pumps, provided that the height of the recess is generally not more than 1/3 of the moulded depth above the keel. However, for ships up to 25,000 tonnes deadweight, where it can be shown that this would be impracticable for reasons of accessibility and satisfactory piping arrangements, the Administration may permit a recess of greater height, but not more than half the moulded depth of the ship above the keel.

5.1.2 Main cargo control rooms, control rooms, accommodation and service spaces (other than separate cargo gear spaces) shall be located forward of all cargo tanks, slop tanks and spaces separating cargo or slop tanks from machinery spaces, but not necessarily forward of fuel oil bunker tanks and ballast tanks, and shall be so arranged that a single leak in a deck or bulkhead will not permit gas or vapours to escape from cargo tanks into accommodation and main cargo control rooms, control stations or service spaces. When determining the location of these compartments, it is not necessary to take into account a recess made in accordance with subsection 5.1.1.

5.1.3 Where deemed necessary, the Administration may permit main cargo control rooms, control rooms, accommodation and service spaces located forward of cargo tanks, slop tanks and spaces separating cargo and slop tanks from machinery spaces, but not necessarily forward of fuel oil bunker tanks or ballast tanks. Machinery spaces other than category A may be permitted to be located forward of cargo tanks and slop tanks, provided they are separated from cargo tanks and slop tanks by cofferdams, cargo pump rooms, fuel oil bunker tanks or ballast tanks and have at least one portable fire extinguisher. In cases where they contain combustion engines, an approved foam extinguisher with a capacity of at least 45 litres or equivalent must be provided in addition to portable fire extinguishers. If the use of a semi-portable fire extinguisher is impractical, this extinguisher can be replaced by two additional portable fire extinguishers. Main cargo control rooms, control rooms, accommodation and service spaces shall be so arranged that a single leak in a deck or bulkhead will not permit gas or vapours from cargo tanks to enter such spaces. In addition, where deemed necessary for the safe navigation of the ship, the Administration may permit machinery spaces containing internal combustion engines with a power exceeding 375 kW, which are not main propulsion machinery, to be located forward of the cargo area, provided that the location is in accordance with the provisions of this subsection.

5.1.4 The following applies to combination vessels:

5.1.4.1 Slop tanks must be surrounded by cofferdams, except where the slop tanks are limited by the hull, main cargo deck, cargo pump room bulkhead or fuel oil bunker tanks. These cofferdams must not have access openings to double bottoms, pipe tunnels, pump rooms or other enclosed spaces, must not be used for cargo or ballast and must not be connected to piping systems for oil cargo or ballast. Means must be provided to fill the cofferdams with water and to drain them. Where a slop tank is confined by the cargo pump room bulkhead, the pump room must not have access openings to the double bottom, pipe tunnel or other enclosed spaces; however, openings with gas-tight, bolted-on covers may be permitted;

5.1.4.2 Means shall be provided to seal off the pipes connecting the pump rooms to the slop tanks mentioned in subsection 5.1.4.1. The shut-off means must consist of a valve followed by a spectacle flange or a short detachable piece of pipe with an accompanying blank flange. This arrangement should be placed in the immediate vicinity of the slop tanks, but where it is unreasonable or impossible, it can be placed inside the pump room just after the pipework. A separate, permanently installed pump and pipe arrangement, including a manifold and equipped with a shut-off valve and blank flange, shall be provided to discharge slop tanks directly to the open deck for disposal to shore reception facilities when the ship is sailing with dry cargo. When the transfer system is used for slop transfer when the ship is sailing with dry cargo, it must not be connected to other systems. Separation from other systems using a removable spool piece is acceptable;

5.1.4.3 Hatches and tank cleaning openings for slop tanks are only allowed on open deck and must be equipped with a closing device. Except where closing arrangements consist of plates with bolts at watertight compartments, these closing arrangements shall be fitted with locking devices which shall be under the supervision of the responsible officer; and

5.1.4.4 Where cargo wing tanks are present, under-deck cargo oil lines must be installed inside these tanks. However, the Administration may allow cargo oil lines to be placed in special ducts provided that they can be adequately cleaned and ventilated to the satisfaction of the Administration. Where there are no cargo wing tanks, under-deck cargo oil lines must be placed in special channels.

5.1.5 Where it is necessary to provide a control room above the cargo area, it shall be used for navigation purposes only and shall be separated from the cargo tank deck by an open space with a height of at least 2 m. The fire protection of such a control room shall also fulfil the requirements for control rooms in regulation 9.2.4.2 and other relevant provisions for tankers where applicable.

5.1.6 Means must be found to prevent spills on decks from spreading to accommodation and service areas. This can be done by installing a fixed, continuous frame with a height of at least 300 mm that extends from side to side. Special measures must be taken for stern loading arrangements.

5.2 Limiting openings in boundaries

5.2.1 Except as permitted in the following subsection 5.2.2, access doors, air intakes and openings to accommodation spaces, service spaces, control rooms and machinery spaces shall not face the cargo area. They shall be fitted in the transverse bulkhead not facing the cargo area or on the outboard side of the superstructure or deckhouse at a distance of at least 4% of the length of the ship, but at least 3 m from the end of the superstructure or deckhouse facing the cargo area. This distance does not need to exceed 5 metres.

5.2.2 The Administration may permit access doors in the bulkheads facing the cargo area or within the 5 m limitation specified in subsection 5.2.1, to main cargo control rooms and to service spaces such as pantries, storerooms and lockers, provided that they do not give direct or indirect access to any other space containing or intended for accommodation, control or service spaces such as galleys, pantries and workshops or similar spaces which may contain sources of ignition of vapours. The boundary of such a room shall be insulated to "A-60" standard, with the exception of the boundary facing the cargo area. Bolted-on plates for openings for the removal of machine parts can be installed within the limitations specified in subsection 5.2.1. Wheelhouse doors and windows may be fitted within the limitations specified in subsection 5.2.1 when they are designed to ensure that the wheelhouse can be quickly and effectively made gas and vapour tight.

5.2.3 Windows and portholes facing the load area and on the sides of superstructures and deckhouses within the limitations specified in subsection 5.2.1 shall be of a fixed type that cannot be opened. Such windows and portholes, with the exception of windows in the wheelhouse, shall be of class "A-60" standard, except that
"A-0" standard acceptable for windows and portholes located outside the limits specified in regulation 9.2.4.2.5.

5.2.4 Where there is permanent access from a pipe tunnel to the main pump room, a watertight door shall be fitted which fulfils the provisions of chapter II-1/13-1.2 and also the following provisions:

5.2.4.1 In addition to being operated from the bridge, the watertight door must also be able to be closed manually from outside the entrance to the main pump room; and

5.2.4.2 the watertight door must be kept closed under normal conditions, except when access to the pipe tunnel is required.

5.2.5 Approved, permanently installed, gas-tight light fittings to illuminate cargo pump rooms may be permitted in bulkheads and decks separating cargo pump rooms and other spaces, provided they are of adequate strength and the integrity and gas-tightness of the bulkhead is maintained.

5.2.6 The arrangement of ventilation inlets and outlets and other openings in deckhouses and superstructure boundaries shall be such that they comply with subsection 5.3 and regulation 11.6. Such fans, especially those for machinery spaces, should be placed as far aft as possible. Due consideration must be given in this regard when the ship is equipped to load or unload over the stern. Ignition sources such as electrical equipment must be positioned to avoid the risk of explosion.

5.3 Venting cargo tanks

5.3.1 General provisions

Ventilation systems for cargo tanks must be kept completely separate from the air pipes to the ship's other compartments. Openings in the cargo tank deck from which flammable vapours may escape shall be so arranged and located as to minimise the risk of flammable vapours entering into enclosed spaces where there is a risk ofing into enclosed spaces where there is a risk of ignition or accumulation of such vapours in the vicinity of machinery and equipment on deck which may present a risk of ignition. In accordance with this general principle, the criteria set out in subsection 1 shall apply to subsection
5.3.2 5.3.5 and regulation 11.6.

5.3.2 Venting arrangements

5.3.2.1 The venting arrangement in each cargo tank can be independent or combined with other cargo tanks and can be included in the inert gas piping system.

5.3.2.2 Where the arrangements are combined with other cargo tanks, stop valves or other acceptable means must be provided to isolate each cargo tank. Where stop valves are used, they shall be fitted with locking devices which shall be under the supervision of the responsible ship's officer. There must be a clearly visible display indicating the position of the stop valves, or another acceptable arrangement. Where tanks have been sealed, ensure that the relevant stop valves are opened before loading, taking on ballast or discharging these tanks. Any barrier shall allow the pressures caused by thermal variations in a cargo tank to be equalised at all times in accordance with subsection 11.6.1.1. For tankers constructed on or after 1 January 2017, any barrier shall continue to allow large quantities of mixed vapours, air or inert gas to escape during loading and ballasting or discharge in accordance with regulation 11.6.1.2.

5.3.2.3 If it is intended to load, take on ballast or discharge a cargo tank or group of cargo tanks, which is isolated from a common venting system, this cargo tank or group of cargo tanks shall be fitted with an arrangement for overpressure and underpressure protection as required in regulation 11.6.3.2.

5.3.2.4 The venting arrangements must be connected to the top of each cargo tank and must be self-draining to the cargo tanks under all normal trim and heeling conditions. Where it is not possible to install self-draining lines, permanent devices must be provided for draining the vent lines to a cargo tank.

5.3.3 Safety devices in ventilation systems

The venting system must be equipped with devices to prevent flames from entering cargo tanks. The design, testing and location of these devices shall meet the Administration's requirements based on the guidance material produced by the Organisation.[14]) Ullage vents shall not be used for pressure equalisation. They must be fitted with self-closing, tight-closing covers. Flame nets and screens are not allowed in these openings.

5.3.4 Opening vents for load handling and ballasting

5.3.4.1 Mouths of vents for loading, unloading and ballasting as prescribed in subsection 11.6.1.2 shall:

5.3.4.1.1.1 Enable free escape of mixed vapours; or

5.3.4.1.1.2 enable regulation of the outflow of mixed vapours to achieve a velocity of at least 30 m per second;

5.3.4.1.2 be arranged so that the vapour mixture flows vertically upwards;

5.3.4.1.3 where the method consists of free discharge of the mixture of vapours, be so arranged that the discharge openings are not less than 6 m above the cargo tank deck or gangway from fore to aft when its position measured horizontally is within 4 m of the gangway and located not less than 10 metres from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from machinery, including windlasses and chain box openings, and deck equipment which may present a risk of ignition; and

5.3.4.1.4 where the method consists of high-speed discharge, be located at a height of at least 2 metres above the cargo deck and at least 10 metres, measured horizontally, from the nearest air intakes to enclosed spaces containing a source of ignition the nearest air intakes and openings to enclosed spaces containing a source of ignition and from machinery and equipment on deck which may present a risk of ignition. These exits must be equipped with high-speed equipment of an approved type.

5.3.4.2 The arrangement for venting vapours displaced from the cargo tanks during loading and ballasting shall comply with subsection 5.3 and regulation 11.6 and shall consist of either one or more risers in masts or a number of high-speed outlets. The inert gas main supply line can be used for this venting.

5.3.5 Separation of slop tanks in combination vessels

In combination carriers, the arrangement for separating slop tanks containing oil or oily residues from other cargo tanks shall consist of blank flanges which will always remain in place when carrying cargoes other than liquid cargoes as referred to in regulation 1.6.1.

5.4 Ventilation

5.4.1 Ventilation systems in cargo pump rooms

Cargo pump rooms must have mechanical ventilation and the outlet from the exhaust fans must be routed to a safe place on the open deck. The ventilation of these spaces must have sufficient capacity to minimise the possibility of flammable vapour build-up. The air must be replaced at least 20 times per hour, based on the gross volume of the room. The air ducts must be positioned so that the entire room is effectively ventilated. Ventilation must be by suction ventilation using fans of a non-sparking type.

5.4.2 Ventilation systems on combination ships

In combination vessels, all cargo holds and all bulkhead spaces adjacent to cargo holds must have mechanical ventilation. Mechanical ventilation can be provided by portable fans. An approved fixed gas alarm system shall be installed to monitor combustible vapours in cargo pump rooms, pipe ducts and cofferdams adjacent to slop tanks and referred to in regulation 5.1.4. Suitable measures shall be taken to facilitate the measurement of flammable vapours in all other spaces within the cargo area, and provision shall be made for such measurements to be taken from the open deck or from easily accessible locations.

5.5 Inert gas systems

5.5.1 Application

5.5.1.1 On tankers of 20,000 tonnes deadweight and above built on or after 1 July 2002 but before 1 January 2016, the protection of the cargo tanks shall be provided by a fixed inert gas system in accordance with the requirements of the Fire Safety Systems Code, as adopted by resolution MSC. 98(73), except that the Administration may accept other equivalent systems or arrangements as described in subsection 5.5.4.

5.5.1.2 On tankers of 8,000 tonnes deadweight and above constructed on or after 1 January 2016 carrying cargoes described in regulations 1.6.1 or 1.6.2, the protection of the cargo tanks shall be by a fixed inert gas system in accordance with the requirements of the Fire Safety Systems Code, except that the Administration may accept other equivalent systems or arrangements as described in subsection 5.5.4.

5.5.1.3 Tankers using a crude oil washing tank cleaning procedure shall be fitted with an inert gas system that fulfils the requirements of the Fire Safety Systems Code and have fixed tank cleaning machinery. However, inert gas systems installed on tankers constructed on or after 1 July 2002 but before 1 January 2016 shall comply with the requirements of the Fire Safety Systems Code, as adopted by resolution MSC. 98(73).

5.5.1.4 Tankers required to have inert gas systems must fulfil the following requirements:

1) Compartments in double hulls must be equipped with suitable connections for the supply of inert gas,

2) where such spaces are connected to a fixed inert gas distribution system, means shall be provided to prevent hydrocarbon gases from the cargo tanks entering the double-hull spaces through the system; and

3) Where such spaces are not permanently connected to an inert gas distribution system, suitable means shall be provided for connection to the main distribution pipework of the system.

5.5.2 Inert gas systems on chemical tankers and gas carriers

5.5.2.1 The inert gas system requirements of the Fire Safety Systems Code need not be met on chemical tankers built before 1 January 2016, including those built before 1 July 2012, and on all gas carriers:

4) when carrying cargoes as specified in regulation 1.6.1, provided that they comply with the requirements for inert gas systems on chemical tankers established by the Administration on the basis of guidelines developed by the Organisation;[15)] or

5) when carrying flammable cargoes, other than crude oil or petroleum products such as cargoes listed in chapters 17 and 18 of the International Bulk Chemical Code, provided that the capacity of the tanks used for this purpose does not exceed 3,000 m3 and that the individual jet spray capacity of the tank cleaning machines does not exceed 17.5 m^3/hour and that the total combined throughput of the number of machines in use in a cargo tank does not exceed 110 m^3/hour at any time.

5.5.3 General requirements for inert gas systems

5.5.3.1 The inert gas system must be able to inert, purge and gas-free empty tanks and maintain the atmosphere in cargo tanks with the required oxygen content.

5.5.3.2 Tankers with a fixed inert gas system must have a closed ullage system.

5.5.4 Requirements for equivalent systems

5.5.4.1 The Administration may accept other fixed installations in accordance with regulation I/5 and subsection 5.5.4.3, after taking into account the arrangement and equipment of the ship.

5.5.4.2 On tankers of 8,000 tonnes deadweight and above but below 20,000 tonnes deadweight, constructed on or after 1 January 2016, the Administration may accept other equivalent arrangements or protective measures in accordance with regulation I/5 and subsection 5.5.4.3 instead of fixed installations required in subsection 5.5.4.1.

5.5.4.3 Equivalent systems or arrangements must:

1) be able to prevent dangerous accumulations of explosive mixtures in intact cargo tanks during normal operation while travelling in ballast and during necessary tank operations; and

2) be designed to minimise the risk of ignition from the system's own generation of static electricity.

5.6 Inerting, purging and gas release

5.6.1 Measures for purging and/or gas release shall be such as to minimise the risk of spreading flammable vapours into the atmosphere and cargo tanks.

5.6.2 The cargo tank purging and/or gas release procedure shall be performed in accordance with regulation 16.3.2.

5.6.3 The arrangements for inerting, purging or releasing empty tanks as required in 5.5.3.1 shall be to the satisfaction of the Administration and shall be such as to minimise the accumulation of hydrocarbon vapours in pockets formed by parts of the internal structure of a tank and such that:

5.6.3.1 If there is a gas discharge pipe on individual cargo tanks, it shall be located as far as practicable from inert gas or air intakes and in accordance with subsection 5.3 and regulation 11.6. The inlets for such discharge pipes can be placed either at deck level or no more than 1 metre above the bottom of the tank;

5.6.3.2 The cross-sectional area of such gas discharge pipes referred to in subsection 5.6.3.1. shall be such that an exit velocity of at least 20 m/s can be maintained when any three tanks are simultaneously supplied with inert gas. Their mouth must be at least 2 metres above deck level; and

5.6.3.3 Each gas discharge outlet referred to in subsection 5.6.3.2 shall be fitted with an appropriate blinding arrangement.

5.7 Gas measurement and display

5.7.1 Portable instruments

Tankers must be equipped with at least one portable instrument for measuring oxygen and one for measuring flammable vapour concentrations and an adequate supply of spare parts. Appropriate means must be available to calibrate such instruments.

5.7.2 Arrangements for measuring gas in double hull and double bottom compartments

5.7.2.1 Suitable portable instruments for measuring oxygen and flammable vapour concentrations must be available in double-hull and double-bottom compartments. When selecting these instruments, special consideration shall be given to their use with the fixed gas sampling system referred to in subsection 5.7.2.2.

5.7.2.2 Where the atmosphere in double-bottom compartments cannot be reliably measured using flexible gas sampling hoses, such compartments shall be fitted with permanent gas sampling tubes. The shape of gas sampling pipes must be adapted to the construction of such rooms.

5.7.2.3 The materials of construction and dimensions of gas sampling pipes must be such that restrictions are avoided. Where plastic materials are used, they must be electrically conductive.

5.7.3 Arrangements for fixed hydrocarbon gas detection systems in double-hull and double-bottom spaces on oil tankers

5.7.3.1 In addition to the requirements of subsections 5.7.1 and 5.7.2, oil tankers of 20,000 tonnes deadweight and above, constructed on or after 1 January 2012, shall be fitted with a fixed hydrocarbon gas detection system complying with the requirements of the Fire Safety Systems Code for measuring hydrocarbon gas concentrations in all ballast tanks and voids in double hull and double bottom spaces adjacent to cargo tanks, including forepeak tanks and any other tanks and spaces below bulkhead decks adjacent to cargo tanks.

5.7.3.2 Oil tankers equipped with systems that operate with constant inerting of such spaces do not need to be equipped with fixed hydrocarbon gas detection equipment.

5.7.3.3 Regardless of the above, cargo pump rooms to which the provisions of subsection 5.10 apply need not fulfil the requirements of this clause.

5.8 Air supply to double-hull and double-bottom compartments

Double-hull and double-bottom compartments must be provided with suitable connections for air supply.

5.9 Protection of cargo areas

Drip trays for collecting cargo residue from cargo pipes and hoses must be provided in the area where pipes and hoses are connected in the manifold area. Cargo hoses and tank wash-down hoses shall be electrically conductive along their entire length, including couplings and flanges (except shore connections), and shall be earthed to eliminate electrostatic charging.

5.10 Cargo pump room protection

5.10.1 On tankers:

5.10.1.1 Cargo pumps, ballast pumps and stripping pumps installed in cargo pump rooms and driven by shafts passing through pump room bulkheads shall be equipped with devices with temperature sensors on shaft penetrations in bulkheads, bearings and pump housing. A continuous audible and visible alarm signal must automatically trigger in the cargo control room or pump control station;

5.10.1.2 Lighting in cargo pump rooms, except emergency lighting, must be linked to ventilation so that ventilation starts when the light is switched on. Faults in the ventilation system must not cause the light to go out;

5.10.1.3 a system to constantly monitor the concentration of hydrocarbon gases must be installed. Sampling points or detector heads should be placed in suitable locations so that any dangerous leaks are quickly detected. When the hydrocarbon gas concentration reaches a preset level which shall not exceed 10% of the lower flashpoint, a continuous audible and visual alarm signal shall automatically activate in the pump room, engine control room, cargo control room and on the bridge to alert the crew of the possible danger; and

5.10.1.4 All pump rooms must be equipped with gutter level monitoring systems and alarms placed in appropriate locations.

Regulation 5 Possibility of fire

development 1 Purpose

The purpose of this regulation is to limit the possibility of fire developing in all spaces on the ship. For this purpose, the following functional requirements must be met:

1.1 Means must be found to control the air supply to the rooms;

1.2 Means must be provided to check for the presence of flammable liquids in the room; and

1.3 The use of combustible materials must be limited.

2 Controlling the supply of air and flammable liquids to the room

2.1 Shut-off devices and means for stopping ventilation

2.1.1 The main inlet and outlet openings of all ventilation systems must be closable from outside the room being ventilated. Closure devices must be easily accessible, as well as conspicuously and permanently labelled, and must indicate whether the closure is open or closed.

2.1.2 Mechanical ventilation of accommodation, service spaces, cargo holds, control rooms and machinery spaces shall be capable of being stopped from an easily accessible location outside the space being operated. Access to this location must not be easily cut off in case of fire in the spaces they serve.

2.1.3 On passenger ships carrying more than 36 passengers, the mechanical ventilation, other than ventilation to machinery spaces and cargo holds, and any alternative system required by regulation 8.2, shall be provided with switches grouped so that all fans can be stopped from two points, which shall be as far apart as practicable. Fans for mechanical ventilation systems for cargo holds must be able to be stopped from a safe location outside these holds.

2.2 Means of regulation/control in the machinery space

2.2.1 Means must be provided to control the opening and closing of skylights, the closing of openings in chimneys that normally allow ventilation to exit, and closing fan dampers.

2.2.2 Means must be provided for stopping fans. The control of mechanical ventilation serving machinery spaces shall be provided with switches grouped so that all fans can be stopped from two locations, one of which shall be located outside these spaces. The means of stopping the mechanical ventilation of machinery spaces must be completely separate from the means of stopping the ventilation of other spaces.

2.2.3 Means must be provided for stopping pressure and suction draft fans, oil fuel transfer pumps, oil fuel pumps, lube oil service pumps, service pumps, hot oil circulation pumps and oil purifiers. However, subsections 2.2.4 and 2.2.5 do not have to be fulfilled for oil-water separators.

2.2.4 The means of control required by subsections 2.2.1 to 2.2.3 and by regulation 4.2.2.3.4 shall be located outside the space in question so that they are not cut off in the event of fire in the space they serve.

2.2.5 On passenger ships, the means of control required by subsections 2.2.1 to 2.2.4 and by regulations 8.3.3 and 9.5.2.3 and the control of any required fire-extinguishing system shall be located at a control station or grouped in as few locations as possible to the satisfaction of the Administration. Such positions must have safe access from the open deck.

2.3 Additional requirements for means of control in periodically unmanned machinery spaces

2.3.1 In periodically unattended machinery spaces, the Administration shall pay particular attention to maintaining the fire integrity of the machinery spaces, the location and centralisation of the fire extinguishing system, the necessary closing arrangements (e.g. ventilation, fuel pumps, etc.), and additional fire extinguishers and other fire extinguishing and breathing apparatus may be required.

2.3.2 On passenger ships, these requirements must be at least equivalent to what is required for normally manned machinery spaces.

3 Materials for fire protection

3.1 Use of non-combustible materials

3.1.1 Insulation materials

Insulation materials must be non-combustible, except in cargo holds, post rooms, baggage compartments or provision coolers. Vapour barriers and adhesives used for insulation, as well as insulation material for pipe joints, valves and bends, etc., for cold water pipes in air conditioning and refrigeration systems do not need to be made of non-combustible material, but their use should be limited as much as possible and their exposed surfaces should have a low flame spread.

3.1.2 Ceilings and inner skins

3.1.2.1 On passenger ships, except in cargo holds, all linings, inner skins (cladding), draught stops, and ceilings shall be of non-combustible materials, except in post rooms, baggage rooms, saunas, or provision coolers.

3.1.2.2 On cargo ships, all inner skins, ceilings, draught stops and their associated base materials shall be of non-combustible materials in the following spaces:

3.1.2.2.1 In accommodation, service and control spaces on ships where method IC is prescribed as mentioned in regulation
9.2.3.1; and

3.1.2.2.2 in corridors and stairway enclosures in accommodation and service spaces on ships where method IIC or IIIC is prescribed as referred to in regulation 9.2.3.1.

3.1.3 Partial bulkheads and decks on passenger ships

3.1.3.1 Partial bulkheads or decks used to divide a space for utility or decorative purposes shall be made of non-combustible materials.

3.1.3.2 Inner skins, ceilings and partial bulkheads or decks used to screen or separate cabin balconies must be made of non-combustible materials. Cabin balconies on passenger ships built before 1 July 2008 must meet these requirements by the first survey after 1 July 2008.

3.2 Use of flammable materials

3.2.1 General provisions

3.2.1.1 On passenger ships, 'A', 'B' or 'C' class divisions in accommodation and service spaces and cabin balconies which are lined with combustible materials, bulkheads, mouldings, decorations and veneers shall comply with the provisions of subsections 3.2.2 to 3.2.4 and regulation 6. However, traditional wooden benches and wood panelling on bulkheads and ceilings are permitted in saunas, and such materials do not need to be subject to the calculations prescribed in subsections 3.2.2 and 3.2.3. However, the provisions of subsection 3.2.3 need not be fulfilled for cabin balconies.

3.2.1.2 On cargo ships, non-combustible bulkheads, ceilings, and inner skins in accommodation spaces and service spaces may be lined with combustible materials, bulkhead linings, mouldings, decorations and veneers provided that the spaces are bounded by non-combustible bulkheads, ceilings and inner skins in accordance with the requirements of subsections 3.2.2 to 3.2.4 and regulation 6.

3.2.2 Maximum calorific value of combustible material

Combustible materials used on surfaces of ceilings and inner skins as specified in subsection 3.2.1 shall have a calorific value,[16]) not exceeding 45 MJ/m^2 of area for the thickness used.

3.2.3 Total volume of combustible materials

Where combustible materials are used in accordance with subsection 3.2.1, they shall fulfil the following requirements:

3.2.3.1 The total volume of combustible surface materials, mouldings, decorations and veneers in accommodation and service spaces must not exceed a volume equivalent to 2.5 mm of the total bulkhead and ceiling area. Furniture attached to inner skins, bulkheads or decks need not be included in the calculation of the total volume of combustible materials; and

3.2.3.2 in ships fitted with an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code, the volume may include a certain quantity of combustible material used for the erection of 'C' class divisions.

3.2.4 Low flame spread on exposed surfaces

The following surfaces must have low flame spread behaviour in accordance with the Fire Test Procedures Code:

3.2.4.1 On passenger ships:

3.2.4.1.1 Exposed surfaces in corridors and stairwells, as well as on bulkheads and inner skins on ceilings in accommodation and service rooms (except saunas) and in control rooms; and

3.2.4.1.2 surfaces and base materials in enclosed or inaccessible spaces in accommodation, service rooms and control rooms.

3.2.4.1.3 Exposed surfaces of cabin balconies, except natural hardwood deck coverings.

3.2.4.2 On cargo ships:

3.2.4.2.1 Exposed surfaces in corridors and stairwells, and on ceilings in accommodation and service rooms (except saunas) and control rooms; and

3.2.4.2.2 surfaces and base materials in enclosed or inaccessible spaces in accommodation, service rooms and control rooms.

3.3 Furniture in stairwells on passenger ships

Furniture in stairwells should be limited to seating. The furniture must be secured, limited to six seats per deck in each stairwell, have limited fire risk as determined in accordance with the Fire Test Procedures Code, and must not restrict passenger escape routes. However, the Administration may allow additional seating to be placed in the main reception area, within a stairwell, if it is fixed, non-combustible and does not restrict the passenger escape route (evacuation route). Furniture cannot be allowed in passenger and crew corridors, which are escape routes in cabin areas. In addition to the aforementioned furniture, the location of cabinets made of non-combustible materials for the storage of non-hazardous safety equipment prescribed in these regulations is authorised. Drinking water dispensers and ice cube machines may be allowed in corridors provided they are fixed and do not restrict the width of escape routes. This also applies to floral decorations or plant arrangements, statues or other artefacts such as paintings and tapestries in hallways and stairwells.

3.4 Furniture and fixtures on cabin balconies on passenger ships

On passenger ships, furniture and fixtures in cabin balconies must comply with regulations 3.40.1, 3.40.2, 3.40.3,
3.40.6 and 3.40.7 unless the balconies are protected by a fixed pressurised water spraying system and a fixed fire detection and fire alarm system in accordance with regulations 7.10 and
10.6.1.3. Passenger ships built before 1 July 2008 shall comply with the requirements of this regulation not later than the first survey after 1 July 2008.

Regulation 6 Possibility of development of smoke and

toxic products 1 Purpose

The purpose of this regulation is to reduce the risk of injury or loss of life due to smoke and toxic products generated during a fire in spaces where people normally work or live. To this end, the amount of smoke and toxic products released during a fire from combustible materials, including surface materials, must be limited.

2 Paints, varnishes and other surface materials

2.1 Paints, varnishes and other surface materials used on exposed interior surfaces must not be capable of generating large amounts of smoke and toxic products. This must be determined in accordance with the Fire Test Procedures Code.

2.2 On passenger ships built on or after 1 July 2008, paints, varnishes and other surface materials used on exposed surfaces of cabin balconies, except natural hardwood deck coverings, shall not be capable of generating large quantities of smoke and toxic products. This must be determined in accordance with the Fire Test Procedures Code.

3 Bottom layer of deck coverings

3.1 The bottom layer of any deck covering in accommodation and service spaces and control rooms shall be of an approved material that does not present a risk of developing smoke or toxic or explosive gases at high temperatures. This must be determined in accordance with the Fire Test Procedures Code.

3.2 On passenger ships constructed on or after 1 July 2008, the bottom layer of deck coverings on cabin balconies shall not present a risk of developing smoke or toxic or explosive gases at high temperatures. This must be determined in accordance with the Fire Test Procedures Code.

Section C Prevention of the origin and spread of fire

Regulation 7 Fire detection and fire alarm systems

1 Purpose

The purpose of this regulation is to detect the origin of a fire and to provide alerting for safe evacuation and activation of fire extinguishing. For this purpose, the following functional requirements apply:

1.1 The permanently installed fire detection and fire alarm system must be suitable for use in the location in question, taking into account the development potential of fire, smoke and gases;

1.2 manual fire alarms must be positioned appropriately to ensure an easily accessible alarm; and

1.3 fire patrols must be an effective means by which fires are detected and localised, and by which the bridge and fire teams are alerted.

2 General requirements

2.1 A fixed fire detection and fire alarm system shall be provided in accordance with the provisions of this regulation.

2.2 A fixed fire detection and fire alarm system and a continuous atmosphere sampling smoke alarm system required by this regulation and other regulations in this section shall be of an approved type and shall comply with the provisions of the Fire Safety Systems Code.

2.3 Where a fixed fire detection and fire alarm system is required for the protection of spaces other than those specified in 5.1, at least one fire detector complying with the provisions of the Fire Safety Systems Code shall be installed in each such space.

2.4 A fixed fire detection and fire alarm system for passenger ships shall be capable of remotely and individually indicating each fire detector and manually operated contact point.

3 Initial testing and periodic tests

3.1 The operation of fixed fire detection and fire alarm systems required by the relevant provisions of this chapter shall be tested under varying ventilation conditions after installation.

3.2 The operation of fixed fire detection and fire alarm systems shall be periodically tested to the satisfaction of the Administration by means of equipment capable of emitting hot air at appropriate temperatures or smoke or aerosol with particles of appropriate density range or size or other means capable of simulating an incipient fire to which the fire detector is designed to respond.

4 Machinery space protection

4.1 Installation

A fixed fire detection and fire alarm system must be installed in:

4.1.1 periodically unmanned machinery spaces;

4.1.2 machinery space, where:

4.1.2.1 The installation of automated and remote systems and equipment has been approved in lieu of manning the room; and

4.1.2.2 the main propulsion machinery and associated machinery, including the main power supply sources, are equipped with various degrees of automatic or remote control and monitored continuously from a manned control room; and

4.1.2.3 Enclosed spaces containing incinerators.

4.2 Construction

The fixed fire detection and fire alarm system required by subsection 4.1.1 shall be so constructed and the fire detectors so located as to indicate rapidly the onset of fire anywhere in those spaces and under all normal conditions of machinery operation and ventilation variations due to any change of the ambient temperature. Fire detection systems that only use heat detectors are

not permitted, except in rooms with low ceilings where they are particularly suitable for use. The fire detection system shall give audible and visual alarms, distinct in both respects from any other non-fire detection system, in sufficient locations to be heard and observed on the navigating bridge and by an engineer in charge. When the bridge is unmanned, the alarm must sound in a location where a responsible crew member is on duty.

5 Protection of accommodation, and service and control room

5.1 Smoke detectors in accommodation rooms

Smoke detectors shall be installed in all stairwells, corridors and escape routes in the accommodation as required in 5.2, 5.3 and 5.4. Consider installing special smoke detectors in the ventilation duct system.

5.2 Requirements for passenger ships carrying more than 36 passengers

A fixed fire detection and fire alarm system shall be installed so that service rooms, control rooms and accommodation spaces including corridors, stairwells and escape routes are monitored by smoke detectors. Private bathrooms and galleys do not require smoke detectors to be fitted. Spaces that have little or no fire risk, such as empty rooms, public toilets, CO_2 rooms and similar areas, do not require a fixed fire detection and fire alarm system. Fire detectors in cabins, when activated, shall also be capable of sounding or being caused to sound an audible alarm in the space where they are installed.

5.3 Requirements for passenger ships carrying no more than 36 passengers

Within each zone, whether vertical or horizontal, in accommodation and in all service spaces and, where the Administration deems it necessary, in control rooms, except for spaces that do not present a major fire risk such as voids, sanitary rooms, etc., there shall be installed either

5.3.1 a fixed fire detection and fire alarm system installed and arranged to detect fire in these spaces and provide monitoring via smoke detectors in corridors, stairwells and escape routes in the accommodation. Fire detectors in cabins, when activated, shall also be capable of sounding or being caused to sound an audible alarm in the space in which they are installed; or

5.3.2 an automatic sprinkler, fire detection and fire alarm system of an approved type that fulfils the relevant requirements of the Fire Safety Systems Code and is installed and arranged to protect these spaces and, in addition, a fixed fire detection and fire alarm system installed and arranged so that corridors, stairways and escape routes in accommodation areas are monitored by smoke detectors.

5.4 Atrium protection on passenger ships

The entire main vertical zone containing an atrium must be fully protected by a smoke detection system.

5.5 Cargo ships

Accommodation spaces, service spaces and control rooms on cargo ships shall be protected by a fixed fire detection and fire alarm system and/or an automatically operated sprinkler, fire detection and fire alarm system, depending on the method of protection applied in accordance with regulation 9.2.3.1, as follows:

5.5.1 Method IC

A fixed fire detection and fire alarm system must be installed and arranged so that all corridors, stairwells and escape routes in the accommodation are covered by smoke detectors.

5.5.2 Method IIC

An automatic sprinkler, fire detection and fire alarm system of an approved type complying with the relevant requirements of the Fire Safety Systems Code shall be installed and arranged for the protection of accommodation spaces, galleys and other service spaces, except areas which do not present a major fire risk, such as empty rooms, sanitary rooms, etc. In addition, a fixed fire detection and fire alarm system must be installed and arranged so that corridors, stairwells and evacuation routes in the accommodation are covered by smoke detectors.

5.5.3 Method IIIC

A fixed fire detection and fire alarm system shall be installed and arranged to indicate the occurrence of a fire in any accommodation and service spaces, and so that corridors, stairwells and escape routes are covered by smoke detectors, except for spaces where there is no major fire risk, such as empty rooms, sanitary rooms, etc.

6 Cargo hold protection on passenger ships

A fixed fire detection and fire alarm system or a continuous atmosphere sampling smoke alarm system shall be installed in every cargo hold that is not accessible except where it is proved to the satisfaction of the Administration that the ship is engaged on such short voyages that it would be unreasonable to require compliance with this provision.

7 Manually operated fire alarm buttons

Manually operated fire alarm buttons that fulfil the provisions of the Fire Safety Systems Code shall be installed in accommodation spaces, service rooms and control rooms. A manual fire alarm button must be installed at each exit. Manual fire alarm buttons shall be readily accessible in corridors on each deck so that no part of the corridor is more than 20 metres from a manual fire alarm button.

8 Fire patrols on passenger ships

8.1 Fire patrols

On passenger ships carrying more than 36 passengers, an effective fire patrol must be maintained so that an outbreak of fire can be detected quickly. Each participant in the fire patrol must be trained and familiar with the ship's layout, as well as the location and operation of any equipment they may be expected to use.

8.2 Inspection hatches

The construction of ceilings and bulkheads shall be such that it will be possible to detect any smoke emanating from concealed and inaccessible spaces during the fire patrol without impairing the effectiveness of the fire protection, except where, in the opinion of the Administration, there is no danger of a fire occurring in such spaces.

8.3 Portable two-way radiotelephone set

Each member of the fire patrol must be equipped with a two-way radiotelephone set.

9 Fire alarm signalling system on passenger ships[17)]

9.1 Passenger ships shall at all times while underway or in port (except when laid up) be so manned or equipped that any fire alarm will be immediately received by a responsible member of the crew.

9.2 The control panel of fixed fire detection and fire alarm systems must be designed according to the fail-safe principle (i.e. an open signalling circuit must cause an alarm mode).

9.3 On passenger ships carrying more than 36 passengers, the cabinet for the fire alarm system control panel required by subsection 5.2 shall be located in a control room, which is continuously manned. Furthermore, the remote control for closing fire doors and stopping ventilation fans must be located in the same room. Ventilation fans must be able to be restarted after being stopped by the crew in the manned control rooms. The control panels in the manned control room must have an indication of open or closed fire doors and activated or deactivated/stopped smoke detectors, alarms and ventilation fans. The control panel must be energised at all times and must automatically switch to another energy supply if the normal energy supply fails. The control panel shall be energised from the main source of electrical power and the emergency source of electrical power as defined in chapter II-1, regulation 42, unless other arrangements are permitted by these regulations.

9.4 There shall be a dedicated alarm, operated from the bridge or fire control room to summon the crew. This alarm can be part of the ship's general alarm system, but it must be able to operate independently of the passenger compartment alarm.

10 Protection of cabin balconies on passenger ships

A fixed fire detection and fire alarm system complying with the provisions of the Fire Safety Systems Code shall be installed on cabin balconies subject to regulation 5.3.4 when the furniture and fittings on such balconies are not as defined in regulations 3.40.1, 3.40.2, 3.40.3, 3.40.6 and 3.40.7.

Regulation 8 Control measures against the spread of smoke

1 Purpose

The purpose of this regulation is to control the spread of smoke to minimise the smoke hazard. For this purpose, means to control smoke must be available in atria, control rooms, machinery spaces and confined spaces.

2 Protection of control rooms outside the machinery space

In control rooms outside machinery spaces, practical measures must be taken to ensure that ventilation and visibility are maintained and that the space is kept free from smoke so that the machinery and equipment in the space can be monitored and continue to function effectively in the event of fire. Alternative and separate air supplies must be installed, and the air inlets for the two air supplies must be positioned so that the risk of smoke being sucked into both inlets simultaneously is limited. At the discretion of the Administration, such requirements need not apply to control rooms on or with access to open deck or where local closing devices would be equally effective. The ventilation system serving safety centres can be supplied from the ventilation system serving the bridge, unless it is located in an adjacent main vertical zone.

3 Venting smoke from the machinery space

3.1 The provisions of this subsection shall apply to machinery spaces of category A and, where the Administration considers it necessary, to other machinery spaces.

3.2 Suitable arrangements shall be made for the venting of smoke in the event of fire from the protected space with reference to the provisions of regulation 9.5.2.1. The normal ventilation system can be used for this purpose.

3.3 Smoke ventilation controls shall be provided and shall be located outside the room concerned so that in the event of fire they will not be cut off from the room for which they are intended.

3.4 On passenger ships, the control arrangements required in subsection 3.3 shall be located in one place or in as few places as possible to the satisfaction of the Administration. There must be safe access to these locations from the open deck.

4 Draught stop

Air spaces above ceilings, behind panels or interior plating must be divided by tight-fitting draft stops spaced no more than 14 metres apart. In the vertical direction, such enclosed air spaces, including those behind stairwell linings, trunks, etc., shall be closed at each deck.

5 Smoke extraction systems on passenger ship atria

Atria must be fitted with a smoke extraction system. The extraction system must be activated by the required smoke detection system and be manually operable. The extractors must be dimensioned so that the entire air volume of the room can be extracted in 10 minutes or less.

Regulation 9 Limitation of fires

1 Purpose

The purpose of this regulation is to limit a fire to the point of origin. For this purpose, the following functional requirements must be met:

1.1 The ship must be divided into thermal and structural divisions;

1.2 when thermally insulating the divisions, the fire risk in the room and neighbouring rooms must be taken into account; and

1.3 the fire resistance of divisions must be maintained at openings and penetrations.

2 Thermal and structural divisions

2.1 Thermal and structural subdivisions

Ships of all types must be subdivided into compartments by thermal and structural divisions, taking into account the fire risk of the compartment.

2.2 Passenger ships

2.2.1 Main vertical zones and horizontal zones

2.2.1.1.1 In ships carrying more than 36 passengers, the hull, superstructure and deckhouses shall be divided into main vertical zones[18)] by 'A-60' class divisions. Compartments and recesses should be minimised, but where they are necessary, they should also be class "A-60" divisions. Where compartments of category (5), (9), or (10) as defined in subsection 2.2.3.2.2 are adjacent to the main vertical zone on one side or where fuel oil tanks are on both sides of the division, the division standard may be reduced to 'A-0'.

2.2.1.1.2 In ships carrying not more than 36 passengers, the hull, superstructure and deckhouses at accommodation and service spaces shall be divided into main vertical zones[19)] at 'A' class divisions. These divisions shall have insulation values in accordance with the tables in subsection 2.2.4.

2.2.1.2 The bulkheads that delimit the main vertical zones above the bulkhead deck should as far as possible be a continuation of the watertight division bulkheads located immediately below the bulkhead deck. The length and width of main vertical zones may be extended to a maximum of 48 metres to align the main zones with the watertight bulkhead divisions or to accommodate a large saloon in a main vertical zone, provided that the main vertical zone area does not exceed 1,600 m^2on any deck. The length and width of a vertical head zone are the maximum distances between the outermost points of the bulkhead boundaries.

2.2.1.3 Such bulkheads must extend from deck to deck and to the shell plating or other outer boundaries.

2.2.1.4 Where a main vertical zone is divided by horizontal 'A' class divisions into horizontal zones to provide an appropriate boundary between sprinklered and unsprinklered zones, the divisions shall extend between adjacent main vertical zone bulkheads and to the shell plating or outer boundaries of the ship and be insulated in accordance with the fire insulation and fire resistance values given in table 9.4.

2.2.1.5.1 In ships designed for special purposes, such as car and railway ferries, where the fitting of main vertical zone bulkheads would be incompatible with the purpose of the ship, equivalent means of controlling a fire and preventing its spread shall be provided instead; such means shall be approved by the Administration. Service rooms and storerooms shall not be placed on the ro-ro deck unless they are protected in accordance with the relevant regulations.

2.2.1.5.2 However, in ships with special cargo holds *(e.g. vehicle deck spaces)* ,such spaces shall comply with the relevant provisions of regulation 20 and where this would be incompatible with the fulfilment of other requirements for passenger ships as specified in this chapter, the provisions of regulation 20 shall apply.

2.2.2 Bulkheads within a main vertical zone

2.2.2.1 On ships carrying more than 36 passengers, all bulkheads that are not required to be class "A" divisions shall be at least Class "B" or Class "C" divisions, as prescribed in the tables in subsection 2.2.3.

2.2.2.2 In ships carrying not more than 36 passengers, all bulkheads in accommodation and service spaces which are not required to be 'A' class divisions shall be at least 'B' class or 'C' class divisions as prescribed in the tables in subsection 2.2.4. In addition, all gangway bulkheads that are not required to be Class 'A' divisions must be Class 'B' divisions and extend from deck to deck with the exception that:

2.2.2.2.1 where continuous 'B' class 'B' lining or panelling is fitted on both sides of the bulkhead, the part of the bulkhead behind the continuous lining or panelling shall be of a material which in thickness and composition meets the requirements for the construction of Class "B" divisions, but they shall meet the safety standards for Class "B" divisions only so far as the Administration considers reasonable and practicable; and

2.2.2.2.2 in the case of a ship protected by an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code, bulkheads in corridors may terminate at a ceiling in the corridor, provided that such bulkheads and ceilings comply with the requirements for structures of this class "B" divisions in accordance with subsection 2.2.4. All doors and door frames in such bulkheads must be made of non-combustible material and be as resistant to fire as the bulkhead they are installed in.

2.2.2.3 All bulkheads required by the requirements to be 'B' class divisions, except corridor bulkheads as prescribed in subsection 2.2.2.2, shall extend from deck to deck and to the shell plating or other boundaries unless continuous 'B' class ceilings or inner skins are fitted on both sides of

bulkheads that have at least the same fire resistance as the interrupted bulkheads, in which case the bulkheads can be terminated at the continuous ceiling or continuous lining.

2.2.3 Fire resistance of bulkheads and decks on ships carrying more than 36 passengers

2.2.3.1 In addition to meeting the special provisions for fire resistance of bulkheads and decks on passenger ships, the fire resistance of bulkheads and decks shall be at least as prescribed in tables 9.1 and 9.2. Where, owing to special structural features of the ship, it proves difficult to determine the minimum fire resistance of certain divisions on the basis of the tables, the fire resistance shall be determined in a manner satisfactory to the Administration.

2.2.3.2 The following requirements must apply to the use of the tables:

2.2.3.2.1 Table 9.1 applies to bulkheads that do not delimit main vertical zones or horizontal zones. Table 9.2 applies to decks that do not form steps in main vertical zones or delimit horizontal zones.

2.2.3.2.2 To determine the fire resistance standards to be applied to the partitions between adjacent spaces, these spaces must be classified according to the fire risk they present, as shown in categories (1)-(14) below. Where the contents and use of a space are such that there is doubt as to its classification for the purposes of this regulation, and where it is possible to classify a space into two or more categories, it shall be considered as a space within the category having the most stringent boundary requirements. Smaller enclosed spaces within an area that have less than 30% connection in the form of openings to that area are considered separate spaces. The fire resistance of such compartments, boundary bulkheads and decks shall be as prescribed in table 9.1 and
(9.2). The designation of each category aims to be typical rather than restrictive. The number in parentheses in front of each category refers to that column or row in the tables.

2.2.3.2.2(1) Control room (fire control room)

Rooms containing emergency energy sources for power and

lighting. Wheelhouse and chart room.

Room containing ship radio equipment. Fire

control room.

Propulsion machinery control room when located outside the propulsion machinery space. Central room for

fire alarm equipment.

Room containing emergency stations with centralised public address system and associated equipment.

2.2.3.2.2(2) Stairs

Interior stairways, lifts, fully enclosed escape routes and escalators (other than stairways wholly within machinery spaces) for passengers and crew and the spaces surrounding them.

For this purpose, a stairway that is only enclosed on one deck is considered part of the space from which it is not separated by a fire door.

2.2.3.2.2(3) Corridors

Corridors and halls for passengers and crew.

2.2.3.2.2(4) Launching points and external escape routes

Locations where lifeboats and rafts are housed.

Open deck areas and enclosed promenades used as embarkation and recovery points for lifeboats and liferafts.

Interior and exterior muster stations.

External stairs and open decks used as escape routes.

Ship's side to the waterline in lightest seagoing condition, sides of superstructures and deckhouses which are below or adjacent to places where liferafts or escape slides are fitted.

2.2.3.2.2(5) Open deck areas

Open deck areas and enclosed promenades, clear of embarkation and recovery points for lifeboats and liferafts. To be considered in this category, enclosed promenades must not present a significant fire hazard, i.e. the furniture must be limited to deck furniture. Furthermore, such rooms must be ventilated with natural ventilation through permanent openings.

Deck areas in the open air (deck areas outside superstructures and deckhouses).

2.2.3.2.2(6) Accommodation spaces presenting a low fire risk

Compartments containing furniture and fittings of low fire risk.

Offices and rooms where the ship's medicine is stored that contain furniture and fixtures with limited fire risk.

Commonly accessible spaces containing furniture and fixtures with limited fire risk and with a deck area of less than 50 m^2.

2.2.3.2.2(7) Accommodation spaces presenting a moderate fire risk

Rooms as in category (6) above, but with furniture and furnishings whose fire risk is not restricted.

Commonly accessible spaces containing furniture and furnishings with limited fire risk and with a deck area of 50 m^2 and above.

Separately located lockers and small storage rooms in the accommodation areas with an area of less than 4 m^2 (in which no flammable liquids are stored).

Room for film screening and storage. Kitchens (not containing naked flames). Lockers for

cleaning products (where no flammable liquids are stored).

Laboratories (where flammable liquids are not stored).

Pharmacy.

Smaller drying rooms (with a deck area of 4 m^2 or less).

Room with safe deposit boxes.

Control room.

2.2.3.2.2(8) Accommodation areas presenting a higher fire risk

Commonly accessible spaces with furniture and furnishings whose fire risk is not restricted and with a deck area of 50 m^2 or more.

Hair and beauty salons.

Saunas.

Shops.

2.2.3.2.2(9) Sanitary rooms and similar spaces

Shared sanitary facilities, showers, baths, toilets, etc. Smaller

laundries.

Indoor areas with swimming pools.

Isolated pantries without cooking facilities in the accommodation area.

Private sanitary installations should be considered part of the space in which they are located.

2.2.3.2.2(10) Tanks, voids and auxiliary machinery spaces presenting little or no fire risk

Water tanks that form part of the ship's construction.

Empty spaces (dry tanks) and cofferdams.

Auxiliary machinery spaces that do not contain pressurised machinery and where the storage of flammable substances is prohibited, such as:

Ventilation and air conditioning rooms, windlass rooms, steering gear rooms, stabiliser equipment rooms, electric propulsion machinery rooms, rooms containing section switchboards and clean electrical equipment (except oil-filled electrical transformers (over 10 kVA)); shaft and pipe tunnels; pump rooms and refrigeration machinery rooms (where flammable liquids are not handled or used).

Enclosed trunks serving the rooms listed above. Other

enclosed trunks such as pipe and cable trunks.

2.2.3.2.2(11) Auxiliary machinery spaces, cargo holds, cargo and other oil tanks and other similar spaces presenting a moderate fire risk

Cargo oil tanks.

Cargo hold, trunk and hatch

openings. Cold room.

Fuel oil tanks (when installed in a separate room without machinery).

Shaft and pipe tunnels where flammable substances can be stored.

Auxiliary machinery spaces, as in category (10), containing machinery with pressurised lubrication systems and where storage of flammable substances is permitted.

Oil filling stations.

Rooms containing oil-filled electrical transformers (over 10 kVA).

Rooms containing auxiliary generators driven by turbines or reciprocating steam engines, as well as small internal combustion engines of up to 110 kW driving generators, sprinkler systems, irrigation or fire pumps, bilge pumps, etc.

Enclosed trunks serving the rooms listed above.

2.2.3.2.2(12) Machinery spaces and main galleys

Main propulsion machinery spaces (excluding electric propulsion machinery spaces) and boiler rooms.

Auxiliary machinery spaces other than those in categories (10) and (11) containing internal combustion engines or other oil-fired heating or pumping units.

Main galleys and associated rooms.

Trunks and casings for the spaces listed above.

2.2.3.2.2(13) Store rooms, workshops, pantries, etc.

Main pantries that are not connected to galleys. Central

laundry.

Larger drying rooms (with a deck area of over 4

m^2). Various storage rooms.

Post and luggage
compartment.

Rubbish room.

Workshops (outside of machinery spaces, galleys, etc.).

Lockers and storerooms with an area of more than 4 m^2, except for rooms designed for the storage of flammable liquids.

2.2.3.2.2(14) Other spaces where flammable liquids are stored

Paint room.

Large rooms containing flammable liquids (incl. dyes, medicines, etc.). Laboratories

(where flammable liquids are stored).

2.2.3.2.3 Where the fire resistance of the partition between two rooms is specified with a single value, this value shall apply in all cases.

2.2.3.2.4 Regardless of the provisions of subsection 2.2.2, there are no special requirements regarding materials or fire resistance for bulkheads and decks where there is only a dash in the tables.

2.2.3.2.5 For category (5) spaces, the Administration shall determine whether the insulation values in table 9.1 shall apply to the end bulkheads of deckhouses and superstructures and whether the insulation values in table 9.2 shall apply to weather decks. The requirements of category (5) in tables 9.1 or 9.2 shall in no case necessitate the partitioning of spaces which, in the judgement of the Administration, need not be partitioned.

Table 9.1 - Bulkheads that do not delimit main vertical zones or horizontal zones															
Compartment		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control room	(1)	B-0[a)]	A-0	A-0	A-0	A-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
Stairs	(2)		A-0[a)]	A-0	A-0	A-0	A-0	A-15	A-15	A-0c	A-0	A-15	A-30	A-15	A-30
Corridors	(3)			B-15	A-60	A-0	B-15	B-15	B-15	B-15	A-0	A-15	A-30	A-0	A-30
Launching points and exterior escape routes	(4)					A-0	A-60 [bd)]	A-60 [bd)]	A-60 [bd)]	A-0[d)]	A-0	A-60 [b)]	A-60 [b)]	A-60 [b)]	A-60 [b)]
Open deck areas	(5)					-	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation compartments that present a minor fire risk	(6)						B-0	B-0	B-0	C	A-0	A-0	A-30	A-0	A-30
Accommodation spaces that present moderate fire risk	(7)							B-0	B-0	C	A-0	A-15	A-60	A-15	A-60
Accommodation spaces that present a greater fire risk	(8)								B-0	C	A-0	A-30	A-60	A-15	A-60
Sanitary and similar rooms	(9)									C	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces that present little or no fire risk	(10)										A-0[a)]	A-0	A-0	A-0	A-0

Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces that present a moderate fire risk	(11)											A-0[a)]	A-0	A-0	A-15
Machinery space and main galleys	(12)												A-0[a)]	A-0	A-60

Store rooms, workshops, pantries, etc.	(13)													A-0[a)]	A-0
Other rooms where flammable liquids are stored	(14)														A-30

Table 9.2 - Decks that do not form steps in main vertical zones or delineate horizontal zones

Room below ↓ Room over→		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control room	(1)	A-30	A-30	A-15	A-0	A-0	A-0	A-15	A-30	A-0	A-0	A-0	A-60	A-0	A-60
Stairs	(2)	A-0	A-0	-	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-30	A-0	A-30
Corridors	(3)	A-15	A-0	A-0	A-60	A-0	A-0	A-15	A-15	A-0	A-0	A-0	A-30	A-0	A-30
Launching points and exterior escape routes	(4)	A-0	A-0	A-0	A-0	-	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Open deck area s	(5)	A-0	A-0	A-0	A-0	-	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Fitting rooms that present less fire risk	(6)	A-60	A-15	A-0	A-60	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces that present moderate fire risk	(7)	A-60	A-15	A-15	A-60	A-0	A-0	A-15	A-15	A-0	A-0	A-0	A-0	A-0	A-0
Accommodatio n spaces that present a greater fire risk	(8)	A-60	A-15	A-15	A-60	A-0	A-15	A-15	A-30	A-0	A-0	A-0	A-0	A-0	A-0

Sanitary and similar rooms	(9)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces that present little or no fire risk	(10)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0a)	A-0	A-0	A-0	A-0
Auxiliary machinery compartments, cargo compartments, cargo and other oil tanks and other similar rooms that present a moderate fire risk	(11)	A-60	A-60	A-60	A-60	A-0	A-0	A-15	A-30	A-0	A-0	A-0a)	A-0	A-0	A-30
Machinery space and main galleys	(12)	A-60	A-60	A-60	A-60	A-0	A-60	A-60	A-60	A-0	A-0	A-30	A-30 a)	A-0	A-60
Store rooms, workshops, pantries, etc.	(13)	A-60	A-30	A-15	A-60	A-0	A-15	A-30	A-30	A-0	A-0	A-0	A-0	A-0	A-0
Other rooms where flammable liquids are stored	(14)	A-60	A-60	A-60	A-60	A-0	A-30	A-60	A-60	A-0	A-0	A-0	A-0	A-0	A-0

Notes to tables 9.1 and 9.2:	
a)	Where adjoining rooms belong to the same number category and reference (a) appears in the tables after a number, it is not necessary to place a bulkhead or deck between these rooms if the Administration considers this unnecessary. In category (12), for example, a bulkhead is not required between a galley and its associated pantries, provided that the pantry bulkheads and decks have the same fire resistance as that required for the galley. However, there must be a bulkhead between a galley and a machinery space, although both spaces belong to category (12).
b)	Ship side to waterline in lightest seagoing condition, superstructure and deckhouse sides which are below, or adjacent to liferafts and evacuation slides can be reduced to A-30.

c)	Where public toilets are located within stairwell restrictions, the public toilet bulkheads within the stairwell must be B class.
d)	Where compartments of categories (6), (7), (8) and (9) are located entirely within the outer boundaries of the muster station, the bulkheads of these compartments may be permitted to be B-0. Control points for audio and video instructions and for lighting installations can be part of the muster station.
—	Where a horizontal line (-) appears in the tables, the division must be steel or another equivalent material, but does not need to be class "A" division.

2.2.3.3 Continuous inner skins of ceilings or Class 'B' trims in conjunction with the relevant decks or bulkheads may be accepted as contributing fully or partially to the required insulation and strength of a division.

2.2.3.4 Construction and interior design of saunas

2.2.3.4.1 The outer boundary of the sauna area must be class "A" and can also include changing rooms, shower cabins and toilets. The sauna shall be insulated to A-60 standard against other rooms except other rooms within the outer boundary and rooms of category (5), (9) and (10).

2.2.3.4.2 Bathrooms with direct access to saunas can be considered part of them. In such cases, the door between the sauna and the bathroom does not need to fulfil the fire requirements.

2.2.3.4.3 The traditional wooden panelling on bulkheads and ceiling is allowed in the sauna. The ceiling above the burner must be covered with a non-combustible sheet with an air gap of at least 30 mm. The distance from hot surfaces to combustible materials must be at least 500 mm, or the combustible material must be protected with, e.g. a non-combustible plate with an air gap of at least 30 mm.

2.2.3.4.4 Traditional wooden benches are allowed in the sauna.

2.2.3.4.5 The sauna door must open outwards when pressed.

2.2.3.4.6 Electrically heated burners must be fitted with a time relay.

2.2.4 Fire resistance of bulkheads and decks in ships carrying 36 passengers or less

2.2.4.1 In addition to meeting the special provisions for fire resistance of bulkheads and decks on passenger ships, the fire resistance of bulkheads and decks shall be at least as prescribed in tables 9.3 and 9.4.

2.2.4.2 The following requirements must apply to the use of the tables:

2.2.4.2.1 Tables 9.3 and 9.4 apply to bulkheads and decks, respectively, separating adjacent spaces.

2.2.4.2.2 To determine the fire resistance standards to be applied to the partitions between adjacent spaces, these spaces must be classified according to the fire risk they present, as shown in categories (1)-(11) below. Where the content or use of a space is such that there may be doubt as to its classification in relation to this regulation, or where it is possible to establish two or more classifications for a space, the more stringent classification shall apply. Small enclosures in a room must have less than 30% openings to the room before they are considered separate rooms. The fire integrity of bulkheads and decks in such small spaces shall be as prescribed in tables 9.3 and 9.4. The designation of each category is intended as a type categorisation that should not be restrictive. The number in brackets before each category refers to the corresponding columns or rows in the tables.

2.2.4.2.2(1) Control room

Rooms containing emergency energy sources for power and

lighting. Wheelhouse and chart room.

Room containing ship radio equipment. Fire

control room.

Control room for propulsion machinery when located outside the machinery space. Central

room for fire alarm equipment.

2.2.4.2.2(2) Corridors

Corridors and halls for passengers and crew.

2.2.4.2.2(3) Accommodation rooms

Rooms as defined in regulation 3.1, except corridors.

2.2.4.2.2(4) Stairs

Internal stairways, completely enclosed emergency exit trunks, lifts and escalators (except stairways wholly within machinery spaces) and the spaces surrounding them.

For this purpose, a stairway that is only enclosed on one deck is considered part of the space from which it is not separated by a fire door.

2.2.4.2.2(5) Service rooms (low fire risk)

Lockers and storerooms with an area of less than 4 m^2 in which flammable liquids are not stored, as well as drying rooms and laundries.

2.2.4.2.2(6) Machinery spaces of category A

spaces as defined in regulation 3.31.

2.2.4.2.2(7) Other machinery spaces

Electrical equipment room (automatic telephone exchange, air conditioning duct room).

Spaces as defined in regulation 3.30, except category A machinery spaces.

2.2.4.2.2(8) Cargo hold

All spaces used for loading (including cargo oil tanks), as well as trunks and openings to such spaces (except for special cargo holds).

2.2.4.2.2(9) Service rooms (high fire risk)

Galleys, pantries with cooking facilities, paint rooms, lockers and storerooms with an area of 4 m^2 or more, rooms for storing flammable liquids, saunas and workshops, except workshops that form part of the machinery spaces.

2.2.4.2.2(10) Open decks

Open deck areas and enclosed promenades that present little or no fire risk. To be included in this category, enclosed promenades must not present a significant fire risk, i.e. the furniture must be limited to deck furniture. In addition, such rooms must be ventilated by natural ventilation through permanent openings.

Deck areas in the open air (deck areas outside superstructures and deckhouses).

2.2.4.2.2(11) Special cargo holds and ro-ro spaces

Spaces as defined in regulations 3.41 and 3.46.

2.2.4.2.3 In determining the fire resistance rating to be applied to the partition between two spaces within a main vertical zone or horizontal zone not protected by an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code, or between such zones where neither is so protected, the higher of the two values given in the tables shall apply.

2.2.4.2.4 In determining the fire resistance rating to be applied to the division between two spaces within a main vertical zone or horizontal zone protected by an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code or between such zones both so protected, the lower of the two values given in the tables shall apply. Where a sprinklered zone is adjacent to a non-sprinklered zone within accommodation and service spaces, the higher of the two values given in the tables applies to the separation between the zones.

2.2.4.3 Continuous inner skins of ceilings or Class 'B' trims in conjunction with the relevant decks or bulkheads may be accepted as contributing fully or partially to the required insulation and securing the division.

2.2.4.4 External bulkheads required by regulation 11.2 to be of steel or other equivalent material may have windows and portholes, provided that there is no other requirement for such bulkheads on passenger ships to have a fire integrity equivalent to 'A' class. Likewise, doors in these bulkheads, which do not have to be class "A", can be made of a material that satisfies the Administration.

2.2.4.5 Saunas must fulfil the provisions of 2.2.3.4.

Table 9.3 - Fire resistance of bulkheads between adjacent compartments												
Compartment		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control room	(1)	A-0[c)]	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*	A-60
Corridors	(2)		C[e)]	B-0[e)]	A-0[a)]	B-0[e)]	A-60	A-0	A-0	A-15 A-0[d)]	*	A-30[g]
Accommodation areas	(3)			C[e)]	A-0[a)]	B-0[e)]	A-60	A-0	A-0	A-15 A-0[d)]	*	A-30 A-0[d)]
Stairs	(4)				A-0[a)] B-0[e)]	A-0[a)] B-0[e)]	A-60	A-0	A-0	A-15 A-0[d)]	*	A-30[g]
Service room (low fire risk)	(5)					C[e)]	A-60	A-0	A-0	A-0	*	A-0
Category A machinery space	(6)						*	A-0	A-0	A-60	*	A-60
Other machinery spaces	(7)							A-0[b)]	A-0	A-0	*	A-0
Cargo hold	(8)								*	A-0	*	A-0
Service room (high fire risk)	(9)									A-0[b)]	*	A-30
Open deck	(10)											A-0
Special cargo holds and ro-ro compartment	(11)											A-30[g]

Table 9.4 - Fire resistance of decks separating adjacent compartments												
Room below ↓ Room over→		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control room	(1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0	*	A-60[g]
Corridors	(2)	A-0	*	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30[g]
Accommodation areas	(3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30 A-0[d)]
Stairs	(4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	A-0	*	A-30[g]

Service space (low fire risk)	(5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0

Category of machinery space A	(6)	A-60	A-60	A-60	A-60	A-60	*	A-60[f)]	A-30	A-60	*	A-60
Other machinery spaces	(7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*	A-0
Cargo hold	(8)	A-60	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
Service room (high fire risk)	(9)	A-60	A-30 A-0[d)]	A-30 A-0[d)]	A-30 A-0[d)]	A-0	A-60	A-0	A-0	A-0	*	A-30
Open deck	(10	*	*	*	*	*	*	*	*	*		A-0
Special cargo holds and ro-ro spaces	(11)	A-60	A-30[g)]	A-30 A-0[d)]	A-30[g)]	A-0	A-60[g)]	A-0	A-0	A-30	A-0	A-30[g]

Notes to tables 9.3 and 9.4:	
a)	For clarification of what applies, see subsections 2.2.2 and 2.2.5.
b)	Where compartments belong to the same number category and the designation b) appears in the tables after a number, a bulkhead or deck of the classes indicated in the tables is only required if the adjacent compartments have different uses, e.g. in category (9). Two galleys next to each other will not require shielding, while a galley next to a paint room requires an "A-0" bulkhead.
c)	Bulkheads separating the wheelhouse and chart room can be class "B-0". No fire class is required for separations between the bridge and safety centre when the latter is located within the bridge.
d)	See subsections 2.2.4.2.3 and 2.2.4.2.4.
e)	For the purposes of subsection 2.2.1.1.2, 'B-0' and 'C' where they appear in table 9.3 shall be read as "A-0".
f)	Fire insulation is not required if category (7) machinery spaces are deemed by the Administration to present little or no fire risk.
g)	A ship built before 1 July 2014 must at least meet the previous requirements that applied when the ship was built, as specified in regulation 1.2.
*)	Where an asterisk appears in the tables, the division must be made of steel or other equivalent material, but need not be of class "A" standard. However, except in spaces of category (10), where a deck is penetrated for the passage of electric cables, pipes and ventilation shafts, such penetrations shall be sealed to prevent the passage of flame and smoke. Boundaries between control rooms (emergency generators) and the open deck may have openings for air intake without closing means unless a fixed gas fire extinguishing system is installed.
	For the purposes of subsection 2.2.1.1.2, where an asterisk appears in table 9.4, except categories (8) and (10), read as "A-0".

2.2.5 Protection of stairs and lifts in accommodation areas

2.2.5.1 All stairs shall be enclosed by Class "A" divisions with secure closures at all openings, but such that:

2.2.5.1.1 A staircase connecting only two decks need not be enclosed by bulkheads, provided that the fire resistance of the open deck is maintained by bulkheads or self-closing doors on an between deck space. When a staircase is enclosed on a between deck, the surrounding bulkheads shall be protected in accordance with the tables for decks in subsections 2.2.3 or 2.2.4; and

2.2.5.1.2 stairs can be placed in a publicly accessible space, provided that they are located in their entirety inside such a space.

2.2.5.2 Lift shafts shall be designed to prevent the passage of smoke and flames from one between deck to another and shall be fitted with closing devices that allow draughts and smoke to be shut off. Machinery for lifts located in enclosed staircase areas must be located in separate compartments surrounded by steel bulkheads, although small passages for lift cables are permitted. With the exception of openings to corridors, public spaces, special cargo holds, stairways and exterior areas, lift shafts must not have openings to stairs that are part of the escape routes.

2.2.6 The design of cabin balconies

On passenger ships built on or after 1 July 2008, non-load-bearing partial bulkheads separating cabin balconies shall be capable of being opened from both sides by the crew for firefighting purposes.

2.2.7 Protection of atria

2.2.7.1 Atria shall be located within enclosed areas with Class 'A' divisions with a fire class determined in accordance with tables 9.2 and 9.4, as applicable.

2.2.7.2 Decks separating spaces within atria shall have a fire class determined in accordance with tables 9.2 and 9.4, as applicable.

2.3 Cargo ships, except tankers

2.3.1 Fire protection measures in the accommodation area

2.3.1.1 One of the following fire protection methods must be used in the accommodation, service rooms and control rooms:

2.3.1.1.1 Method IC. Construction of all internal division bulkheads of non-combustible 'B' or 'C' class material, generally without the installation of an automatically operated sprinkler, fire detection and fire alarm system in accommodation and service spaces, except as provided in regulation 7.5.5.1; or

2.3.1.1.2 Method IIC. the installation of an automatically operated sprinkler, fire detection and fire alarm system as required by regulation 7.5.5.2 for the detection and extinguishing of fire in all spaces where there is a risk that a fire may occur, generally without special requirements as to the nature of the internal division bulkheads; or

2.3.1.1.3 Method IIIC. The installation of a fixed fire detection and fire alarm system as required by regulation 7.5.5.3, in all spaces where there is a risk of fire, generally without special requirements as to the nature of the internal division bulkheads, except that the area of the accommodation space or spaces bounded by a 'A' or 'B' class division shall in no case exceed 50 m^2 . The Administration may authorise an increase in this area for generally accessible spaces.

2.3.1.2 The requirements for the use of non-combustible materials in the construction and insulation of bulkheads bounding machinery spaces, control rooms, service spaces, etc., and the protection of stairways and corridors are common to all three methods outlined in subsection 2.3.1.1.

2.3.1.3 *On cargo ships of less than 150 gross tonnage, the Danish Maritime Authority may authorise deviations from the provisions of this regulation with regard to the use of other suitable materials when, taking into account the special circumstances of the individual ship, this is otherwise warranted.*

However, stairs and barriers around machinery spaces and galleys, and around rooms for storing flammable liquids must be made of steel or equivalent.

2.3.2 Bulkheads in accommodation and service rooms

2.3.2.1 All required class 'B' bulkheads shall extend from deck to deck and to the plating or other primary boundary, unless continuous class 'B' ceilings orclass 'B' continuous ceilings or linings on both sides of the bulkhead, in which case the bulkhead may terminate at the continuous ceiling or lining.

2.3.2.2 Method IC All bulkheads which are not required by the provisions of this or other regulations for cargo ships to be 'A' class or 'B' class divisions shall be of at least 'C' class construction.

2.3.2.3 Method IIC There are no requirements for the construction of bulkheads which are not required by these provisions or other provisions for cargo ships to be constructed as 'A' class or 'B' class divisions, except in individual cases where 'C' class bulkheads are required by table 9.5.

2.3.2.4 Method IIIC No requirements are imposed on the construction of bulkheads which are not required in these provisions to be constructed as “A” or “B” class divisions, provided that the area of accommodation spaces enclosed by continuous “A” or “B” class divisions shall in no case exceed 50 m^2, except in special cases where “C” class bulkheads are required in accordance with table 9.5. The Administration may authorise an increase in this area for generally accessible spaces.

2.3.3 Fire resistance of bulkheads and decks

2.3.3.1 In addition to meeting the special provisions for fire resistance of bulkheads and decks in cargo ships, the fire resistance of bulkheads and decks shall be at least as prescribed in tables 9.5 and 9.6.

2.3.3.2 The following requirements apply to the use of the tables:

2.3.3.2.1 Tables 9.5 and 9.6 apply to bulkheads and decks, respectively, separating adjacent spaces.

2.3.3.2.2 To determine the required fire resistance of divisions between adjacent rooms, the rooms are classified according to their fire risk, as indicated in the following categories (1)-(11). Where the content or use of a space is such that there may be doubt as to its classification in relation to this regulation or where it is possible to establish two or more classifications for a space, the more stringent classification shall apply. Small enclosures in a room must have less than 30% openings to the room before they are considered separate rooms. The fire resistance of bulkheads and decks in such small spaces shall be as described in tables 9.5 and 9.6. The designation of each category is intended as a type categorisation that should not be restrictive. The number in brackets represents each category and refers to the respective columns or rows in the tables.

2.3.3.2.2(1) Control room

Rooms containing emergency energy sources for power and

lighting. Wheelhouse and chart room.

Room containing ship radio equipment. Fire

control room.

Control room for propulsion machinery when located outside the machinery space. Central

room for fire alarm equipment.

2.3.3.2.2(2) Corridors

Corridors and halls connected to corridors.

2.3.3.2.2(3) Accommodation areas

Areas as defined in regulation 3.1, excluding corridors.

2.3.3.2.2(4) Stairs

Internal stairways, lifts, completely enclosed escape routes and escalators (other than stairways wholly within machinery spaces) and the spaces containing them.

For this purpose, a stairway that is only enclosed on one deck is considered part of the space from which it is not separated by a fire door.

2.3.3.2.2(5) Service rooms (low fire risk)

Lockers and storerooms with an area of less than 4 m^2 that are not designed for the storage of flammable liquids, as well as drying rooms and laundries.

2.3.3.2.2(6) Category A machinery space

Spaces as defined in regulation 3.31.

2.3.3.2.2(7) Other machinery spaces

Electrical equipment room (automatic telephone exchange, air conditioning duct room).

Spaces as defined in regulation 3.30, except category A machinery spaces.

2.3.3.2.2(8) Cargo hold

All compartments used for cargo (including cargo oil tanks), as well as trunks and openings to such compartments.

2.3.3.2.2(9) Service rooms (high fire risk)

Galleys, pantries with cooking facilities, saunas, paint rooms and storerooms with an area of 4 m^2 or more, rooms for the storage of flammable liquids and workshops, except workshops that form part of the machinery spaces.

2.3.3.2.2(10) Open decks

Open deck areas and enclosed promenades that present little or no fire risk. To be included in this category, enclosed promenades must not present a significant fire risk, i.e. the furniture must be limited to deck furniture. Additionally, such rooms must be ventilated through natural ventilation using permanent openings.

Deck areas in the open air (deck areas outside superstructures and deckhouses).

2.3.3.2.2(11) Ro-ro spaces and motor vehicle spaces

Ro-ro spaces as defined in regulation 3.41.

Motor vehicle spaces as defined in regulation 3.49.

Table 9.5 - Fire resistance of bulkheads between adjacent compartments												
Compartment		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10))	(11))
Control room	(1)	A-0[e])	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*	A-60
Corridors	(2)		C	B-0	B-0 A-0c)	B-0	A-60	A-0	A-0	A-0	*	A-30
Accommodation areas	(3)			C-a,b)	B-0 A-0c)	B-0	A-60	A-0	A-0	A-0	*	A-30
Stairs	(4)				B-0 A-0c)	B-0 A-0c)	A-60	A-0	A-0	A-0	*	A-30
Service space (low fire risk)	(5)					C	A-60	A-0	A-0	A-0	*	A-0
Category A machinery space	(6)						*	A-0	A-0g)	A-60	*	A-60f)
Other machinery spaces	(7)							A-0d)	A-0	A-0	*	A-0
Cargo hold	(8)								*	A-0	*	A-0
Service room (high fire risk)	(9)									A-0d)	*	A-30
Open deck	(10)										-	A-0
Ro-ro spaces and spaces for motor vehicles	(11)											A-30j)*h)
Notes: See notes after table 9.6.												

Table 9.6 - Fire resistance of decks between adjacent rooms												
Space over→ Space under ↓		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control room	(1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0	*	A-60
Corridors	(2)	A-0	*	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30
Accommodation areas	(3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30
Stairs	(4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	A-0	*	A-30

Service space (low fire risk)	(5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Category A machinery space	(6)	A-60	A-60	A-60	A-60	A-60	*	A-60i)	A-30	A-60	*	A-60
Other machinery spaces	(7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*	A-0

Cargo hold	(8)	A-60	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
Service room (high fire risk)	(9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0d)	*	A-30
Open deck	(10)	*	*	*	*	*	*	*	*	*	-	A-0[j)]
Ro-ro space and motor vehicle space	(11)	A-60	A-30	A-30	A-30	A-0	A-60	A-0	A-0	A-30	A-0[j)]	A-30[j)]

Notes to tables 9.5 and 9.6:	
a)	No special requirements for bulkheads for fire protection methods IIC and IIIC.
b)	For method IIIC, class "B-0" bulkheads must be installed between spaces or groups of spaces with an area of 50 m^2 and above.
c)	See further details in sections 2.3.2 and 2.3.4.
d)	Where spaces belong to the same category and reference d) is indicated, a bulkhead or deck as indicated in the tables is only required if adjacent spaces have different application, e.g. in category (9) two galleys located next to each other will not necessitate a bulkhead requirement, while a galley facing a paint room requires an "A-0" bulkhead.
e)	Bulkheads separating the wheelhouse, chart room and radio room from each other can be class "B-0".
f)	Class "A-0" can be used if the ship is not intended for the transport of dangerous goods or if such goods are placed at least 3 metres horizontally from this bulkhead.
g)	For cargo holds in which dangerous goods are intended to be carried, regulation 19.3.8 application.
h)	Deleted.
i)	Fire insulation is unnecessary if a category (7) machinery space is deemed unnecessary by the Administration presents little or no fire risk.
j)	A ship built before 1 July 2014 must at least meet the previous requirements that applied when the ship was built as specified in regulation 1.2.
*)	Where an asterisk appears in the tables, the division must be of steel or other equivalent material, but need not be of class "A" division. However, where a deck, except open decks, is pierced for the passage of electrical cables, pipes and ventilation shafts, such penetrations shall be made watertight to prevent the passage of flames and smoke. Boundaries between control room (emergency generator room) and open deck can have openings for air intakes without closing devices, unless a fixed gas fire extinguishing system is installed.

2.3.3.3 Continuous ceiling constructions or class 'B' inner skins in conjunction with decks or bulkheads are acceptable as contributing fully or partially to the required insulation and securing of the division.

2.3.3.4 External bulkheads required by regulation 11.2 to be of steel or other equivalent material may have windows and portholes provided that other provisions for cargo ships do not require such bulkheads to have a fire integrity equivalent to 'A' class. Likewise, doors in these bulkheads, which do not need to be Class "A" protected, can be of a material that satisfies the Administration.

2.3.3.5 Saunas must fulfil the provisions of subsection 2.2.3.4.

2.3.4 Fire protection of stairs and lift shafts in accommodation spaces, service rooms and control rooms

2.3.4.1 Stairs that only pass through one deck must be separated by "B-0" bulkheads and self-closing doors at least on one level. Lifts that only penetrate a single deck must be surrounded by class "A-0" bulkheads with steel doors on both levels. Stairs and lift shafts that penetrate more than one deck must be at least class "A-0" and be fitted with self-closing doors at all levels.

2.3.4.2 In ships with accommodation for 12 persons or less, where the stairways penetrate more than one deck and where there are at least two means of escape to open deck on each level, the 'A-0' requirements of the subsection 2.3.4.1 are reduced to "B-0".

2.4 Tankers

2.4.1 Application

On tankers, only method IC as defined in subsection 2.3.1.1 may be used.

2.4.2 Fire resistance of bulkheads and decks

2.4.2.1 Instead of subsection 2.3 and in addition to complying with the special provisions for fire resistance of bulkheads and decks on tankers, the fire resistance of bulkheads and decks shall be at least as prescribed in tables 9.7 and 9.8.

2.4.2.2 The following requirements apply to the use of the tables:

2.4.2.2.1 Tables 9.7 and 9.8 apply to bulkheads and decks, respectively, separating adjacent spaces.

2.4.2.2.2 To determine the required fire resistance of divisions between rooms, the rooms are classified according to their fire risk, as indicated in the following categories (1)-(11). Where the content or use of a space is such that there may be doubt as to its classification in relation to this regulation, or where it is possible to establish two or more classifications for a space, the more stringent classification shall apply. Small enclosures in a room must have less than 30% openings to the room before they are considered separate rooms. The fire integrity of bulkheads and decks in such small spaces should be as described in the tables 9.7 and 9.8. The designation of each category is intended as a type categorisation that should not be restrictive. The number in brackets represents each category and refers to the respective columns or rows in the tables.

2.4.2.2.2(1) Control room

Rooms containing emergency energy sources for power and

lighting. Wheelhouse and chart room.

Room containing ship radio equipment.

Room containing fire extinguishing

systems. Fire control room.

Control room for propulsion machinery when the control room is located outside the machinery space.

Central room for fire alarm equipment.

2.4.2.2.2(2) Corridors

Corridors and halls connected to corridors.

2.4.2.2.2(3) Accommodation spaces

Rooms as defined in regulation 3.1, except corridors.

2.4.2.2.2(4) Stairs

Internal stairways, lifts, completely enclosed escape routes and escalators (other than stairways wholly within machinery spaces) and the spaces surrounding them.

For this purpose, a stairway that is enclosed on only one deck shall be considered part of the space from which it is not separated by a fire door.

2.4.2.2.2(5) Service rooms (low fire risk)

Lockers and storerooms not designed for the storage of flammable liquids and with an area of less than 4 m^2, as well as drying rooms and laundries.

2.4.2.2.2(6) Category A machinery space

Spaces as defined in regulation 3.31.

2.4.2.2.2(7) Other machinery spaces

Spaces containing electrical equipment (telephone exchanges and air conditioning

rooms). Spaces as defined in regulation 3.30, except category A machinery spaces.

2.4.2.2.2(8) Cargo pump room

Rooms containing pumps, as well as entrances and trunks to such rooms.

2.4.2.2.2(9) Service rooms (high fire risk)

Galleys, pantries with cooking facilities, saunas, paint rooms, lockers and storerooms with an area of 4 m^2 or more, rooms for storing flammable liquids and workshops that are not part of the machinery spaces.

2.4.2.2.2(10) Open decks

Open deck areas and enclosed promenades that present little or no fire risk. To be included in this category, enclosed promenades must not present a significant fire risk, i.e. the furniture must be limited to deck furniture. Additionally, such rooms must be ventilated through natural ventilation using permanent openings.

Deck areas in the open air (deck areas outside superstructures and deckhouses).

2.4.2.3 Continuous ceiling constructions or class 'B' trim in conjunction with the relevant decks or bulkheads may be accepted as contributing fully or partially to the insulation and strength requirement.

2.4.2.4 External bulkheads required by regulation 11.2 to be of steel or other equivalent material may have windows and portholes provided that other provisions for tankers do not require such bulkheads to have a fire resistance equivalent to 'A' class. Likewise, doors in these bulkheads, which do not have to be class "A" divisions, may be of a material that satisfies the Administration.

2.4.2.5 External boundaries of superstructures and deckhouses containing apertures, including any overhanging decks supporting these apertures, shall be made of steel and insulated to class "A-60" standard on all parts facing the cargo area and the outer sides at a distance of 3 metres from the end bulkhead facing the cargo area. The distance of 3 metres must be measured horizontally and parallel to the ship's centreline from the boundary facing the cargo area at each deck level. For the sides of such superstructures and deckhouses, the insulation must extend to the underside of the bridge deck.

2.4.2.6 Skylights for cargo pump rooms must be made of steel, must not contain glass and must be closable from outside the pump room.

2.4.2.7 The construction and layout of saunas must fulfil the provisions of subsection 2.2.3.4.

Table 9.7 - Fire resistance of bulkheads between adjacent rooms											
Compartment		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Control room	(1)	A-0[c)]	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*
Corridors	(2)		C	B-0	B-0 A-0[a)]	B-0	A-60	A-0	A-60	A-0	*
Accommodation areas	(3)			C	B-0 A-0[a)]	B-0	A-60	A-0	A-60	A-0	*
Stairs	(4)				B-0 A-0[a)]	B-0 A-0[a)]	A-60	A-0	A-60	A-0	*
Service room (low fire risk)	(5)					C	A-60	A-0	A-60	A-0	*
Category of machinery space A	(6)						*	A-0	A-0[d)]	A-60	*
Other machinery spaces	(7)							A-0[b)]	A-0	A-0	*
Cargo pump room	(8)								*	A-60	*
Service room (high fire risk)	(9)									A-0[b)]	*
Open deck	(10)										
See the notes after table 9.8.											

Table 9.8 - Fire resistance of decks between adjacent rooms										
Space over→ Space under ↓		(1)	(2	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Control room	(1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	-	A-0	*
Corridors	(2)	A-0	*	*	A-0	*	A-60	A-0	-	A-0	*
Accommodation areas	(3)	A-60	A-0	*	A-0	*	A-60	A-0	-	A-0	*
Stairs	(4)	A-0	A-0	A-0	*	A-0	A-60	A-0	-	A-0	*
Service space (low fire risk)	(5)	A-15	A-0	A-0	A-0	*	A-60	A-0	-	A-0	*

Category of machinery space A	(6)	A-60	A-60	A-60	A-60	A-60	*	A-60[e)]	A-0	A-60	*
Other machinery spaces	(7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*
Cargo pump room	(8)	-	-	-	-	-	A-0[d)]	A-0	*	-	*
Service room (high fire risk)	(9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	-	A-0[b)]	*
Open deck	(10)	*	*	*	*	*	*	*	*	*	-

Notes to tables 9.7 and 9.8:	
a)	See subsections 2.3.2 and 2.3.4 of this chapter.
b)	Where spaces belong to the same category and reference (b) is given, a bulkhead or deck as indicated in the tables is only required if the adjacent spaces have different uses, e.g. in category (9) where two adjacent galleys do not require bulkhead, while a galley facing a paint room requires an "A-0" bulkhead.
c)	Bulkheads separating the wheelhouse, chart room and radio room from each other can be class "B-0".
d)	Bulkheads and decks between the cargo pump room and category A machinery space can be penetrated by stuffing boxes for cargo pump shafts and similar penetrations, provided that gas-tight seals with effective lubrication or other means of ensuring gas tightness are fitted at the bulkhead or deck.
e)	Fire insulation is not required if category (7) machinery spaces are deemed by the Administration to presents little or no fire risk.
*)	Where an asterisk appears in the tables, the division must be made of steel or other equivalent material, but does not need to be a class "A" division. However, where a deck, except open decks, is pierced for the passage of electrical cables, pipes and ventilation shafts, such penetrations shall be sealed to prevent the passage of flames and smoke. Boundaries between the control room (emergency generator room) and open deck may have openings for air intake without closing means if a fixed gas fire extinguishing system is not installed.

3 Penetration of fire-resistant divisions and prevention of heat transfer

3.1 Where Class 'A' divisions are penetrated, such penetrations shall be tested in accordance with the Fire Test Procedures Code taking into account the provisions of subsection 4.1.1.6. In the case of ventilation shafts, the provisions of subsections 7.1.2 and 7.3.1 apply. However, where a pipe penetration is made of steel or equivalent material and has a wall thickness of 3 mm or more and a length of not less than 900 mm (preferably with 450 mm on each side of the division) and no openings, testing is not required. Such penetrations shall be suitably insulated by extension of the insulation found at the same level of the division.

3.2 Where class "B" divisions are penetrated for the passage of electrical cables, pipes, trunks, ducts, etc., or for the installation of ventilation grilles, light fittings and similar, the arrangement shall be such that the fire resistance is not impaired, taking into account subsection 7.3.2. Pipes other than steel and copper pipes that penetrate class "B" divisions must be protected by either:

3.2.1 A fire-tested penetration suitable for the fire resistance of the division in question and the type of pipe used; or

3.2.2 a steel sleeve with a material thickness of not less than 1.8 mm and a length of not less than 900 mm for pipes with a diameter of 150 mm or more and not less than 600 mm for pipes with a diameter of less than 150 mm (preferably equally distributed on both sides of the division). The pipe must be connected to the ends of the sleeve with flanges or couplings; or the gap between the pipe and the sleeve must not be more than 2.5 mm; or any gap between the pipe and the sleeve must be sealed with a non-combustible or other suitable material.

3.3 Non-insulated metal pipes penetrating Class "A" and "B" divisions shall be of a material with a melting point above 950°C for Class "A-0" divisions and 850°C for Class "B-0" divisions.

3.4 In connection with the approval of the structural fire protection, the Administration must be aware of the risk of heat transmission at the intersections and end points of the prescribed thermal insulation. When insulating decks and bulkheads, the insulation must extend at least 450 mm past the penetration, intersection or endpoint in the case of steel and aluminium constructions. If a room is divided by a deck or bulkhead of class 'A', which have different insulation values, the insulation with the higher value must continue on the deck or bulkhead with the insulation with the lower value over a distance of at least 450 mm.

4 Protection of openings in fire-resistant divisions

4.1 Openings in bulkheads and decks on passenger ships

4.1.1 Openings in class "A" divisions

4.1.1.1 Except for hatches between cargo, special cargo, stores and luggage compartments and between such compartments and the weather decks, all openings shall be fitted with fixed closures which shall be at least as resistant to fire as the divisions in which they are fitted.

4.1.1.2 Doors and door frames in 'A' class divisions and the means of securing the doors when closed shall be as resistant to fire, smoke and flame penetration as the bulkheads in which the doors are housed. This is determined in accordance with the Fire Test Procedures Code [such doors and door frames shall be constructed of steel or equivalent material]. Doors that are approved without the threshold being part of the frame, installed on or after 1 July 2010, must be installed so that the gap under the door does not exceed 12 mm. A non-combustible threshold must be installed under such doors to prevent the floor covering from extending under a closed door.

4.1.1.3 Watertight doors do not need to be insulated.

4.1.1.4 Any of these doors must be able to be opened and closed from both sides of the bulkhead by only one person.

4.1.1.5 Fire doors in bulkheads in main vertical zones, in galley boundaries and in stairways, except for power-operated watertight doors and doors that are normally locked, shall fulfil the following requirements:

4.1.1.5.1 The doors must be self-closing and able to close against a 3.5º pitch;

4.1.1.5.2 For hinged fire doors, the approximate closing time, with the ship upright, shall be not more than 40 seconds and not less than 10 seconds from the time the door begins to move. The approximate smooth closing speed of sliding doors shall not exceed 0.2 m/s and shall not be less than 0.1 m/s when the ship is on an even keel;

4.1.1.5.3 The doors must be triggered remotely from a centralised control room, which must always be manned, either simultaneously or in groups and individually from each side of the door. The release switches must have an on-off function to prevent automatic restoration of the function.

4.1.1.5.4 Door hooks or holders that cannot be released from the central control room are not allowed;

4.1.1.5.5 Doors that have been closed from the central control room must be able to reopen locally from both sides of the door. Once doors have been opened by local operation, they should automatically close again;

4.1.1.5.6 A panel in the central control room, which is manned at all times, shall indicate which remotely triggered doors are closed;

4.1.1.5.7 The door release arrangement shall be designed so that the doors close automatically in the event of a failure of the manoeuvring system or the main electrical power source;

4.1.1.5.8 Local energy accumulators for power-operated doors shall be located in the immediate vicinity of the doors so that the doors can be operated (fully opened and closed) ten times after the control system or main electrical energy source has been disconnected;

4.1.1.5.9 an interruption of the manoeuvring system or electrical energy at one door must not affect the functionality of the other doors;

4.1.1.5.10 Remote-controlled sliding or mechanically operated doors shall be equipped with an alarm that sounds for a minimum of 5 seconds and a maximum of 10 seconds after the door is released from the central control room and before the door begins to move, and shall continue to sound until the door is fully closed;

4.1.1.5.11 Doors that are designed to open again if they bump into objects during movement must not open more than 1 metre from the contact point;

4.1.1.5.12 Where double-hinged doors are fitted with a latch arrangement, in order to maintain the fire resistance of the doors, the latch must be activated automatically when the door is activated by the release system;

4.1.1.5.13 doors giving direct access to special cargo holds that are power-operated and automatically closing are not required to be fitted with alarms and remote release arrangements as required in 4.1.1.5.3 and 4.1.1.5.10;

4.1.1.5.14 the components of the local control system must be accessible for maintenance and adjustment;

4.1.1.5.15 power-operated doors shall be fitted with operating systems of an approved type that are operable in the event of fire in accordance with the provisions of the Fire Test Procedures Code. The system must fulfil the following provisions;

4.1.1.5.15.1 The control system shall be able to operate the door at a temperature of at least 200°C for at least 60 minutes when energised from the main power source;

4.1.1.5.15.2 The energy supply to other doors that are not exposed to the fire must not be affected;

4.1.1.5.15.3 At temperatures above 200ºC, the manoeuvring system must automatically disconnect from the energy source and be able to keep the door closed up to a temperature of at least 945ºC.

4.1.1.6 Where a space in ships carrying not more than 36 passengers is protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of the Fire Safety Systems Code or is fitted with a continuous 'B' class ceiling, openings in decks shall

which neither form steps in main vertical zones nor delimit horizontal zones shall be closed sufficiently tightly, and these decks shall meet the safety requirements for Class 'A' in so far as the Administration deems reasonable and practicable.

4.1.1.7 The requirements for 'A' class integrity of the outer boundaries of a ship do not apply to glazing, windows and portholes, provided there is no requirement for 'A' class integrity in subsection 4.1.3.3. Class requirements
'A' resistance does not apply to external doors, except for doors in superstructures and deckhouses facing launching points and external muster stations, external stairways and open deck areas used as evacuation routes/escape routes. Doors in stairwells do not need to fulfil the requirement.

4.1.1.8 With the exception of watertight doors, weathertight doors (semi-watertight doors), doors leading to an open deck and doors that are required to be reasonably gastight, all 'A' class doors associated with escape routes located in stairwells, public spaces and main vertical zone bulkheads shall be fitted with a self-closing hose strap of the same material, construction and fire resistance as the door in which it is fitted. The free opening with the door closed must be 150 × 150 mm and located in the lower corner of the door opposite the door hinges or, in the case of sliding doors, closest to the opening.

4.1.1.9 Where it is necessary for a ventilation duct to pass through a main vertical zoning, a fail-safe, automatically operating fire damper must be installed at the penetration. The damper must also be able to be closed manually from both sides of the division. The control point must be easily accessible and marked with a red, light-reflecting colour. The duct between the division and the damper must be made of steel or equivalent material and, if necessary, be insulated to fulfil the requirements of subsection 2 of this article. (3.1). The damper must be placed on at least one side of the division with a visible indicator showing if the damper is in the open position.

4.1.1.10 *Doors to ro-ro rooms must not be able to be held in a permanently open position.*

4.1.2 Openings in class "B" divisions

4.1.2.1 Doors and door frames in Class 'B' divisions and means of securing them when closed shall provide a method of closing which shall be as resistant to fire as the divisions. This must be determined according to the Fire Test Procedures Code, although ventilation openings may be allowed in the lower part of these doors. Where there is such an opening or openings in or under a door, the total net area of such an opening shall not exceed 0.05 m^2. Alternatively, it is permitted to have a non-combustible air balance duct running between the cabin and the corridor, and located under the sanitary unit (shower cabin) when the cross-sectional area of the duct does not exceed 0.05 m^2 . All ventilation openings must be fitted with grilles made of non-combustible material. Doors must be non-combustible. Doors that are approved without the threshold being part of the frame, installed on or after 1 July 2010, must be installed so that the gap under the door does not exceed 25 mm.

4.1.2.2 Cabin doors in class "B" divisions must be self-closing. Door holders are not allowed.

4.1.2.3 The Class 'B' fire resistance requirements for the outer boundaries of a ship do not apply to glass partitions, windows and portholes, nor do the Class 'B' fire resistance requirements apply to external doors in superstructures and deckhouses. For ships carrying not more than 36 passengers, the Administration may permit the use of combustible materials in doors separating the cabin from the separate interior sanitary spaces (shower cabins) forming part of a compartment, such as shower rooms.

4.1.2.4 Where an automatic sprinkler system complying with the provisions of the Fire Test Procedures Code is installed in ships carrying not more than 36 passengers, the following shall apply:

4.1.2.4.1 openings in decks that neither form steps in main vertical zones nor delimit horizontal zones shall be closed reasonably tightly, and these decks shall meet the safety requirements for Class 'B' divisions to the extent that the Administration considers this to be reasonable and practicable; and

4.1.2.4.2 Openings in gangway bulkheads of Class 'B' materials shall be protected in accordance with the provisions of subsection 2.2.2.

4.1.3 Windows and portholes

4.1.3.1 All windows and portholes in accommodation and service spaces and control stations bulkheads, except those covered by subsections 4.1.1.7 and 4.1.2.3, shall be so arranged as to fulfil the fire resistance requirements for the type of bulkhead in which they are fitted; this shall be determined in accordance with the Fire Test Procedures Code.

4.1.3.2 Regardless of the requirements set out in tables 9.1 to 9.4, all windows and portholes in bulkheads separating accommodation, service spaces and control stations from the open air shall be fitted with frames of steel or other suitable material. The glass must be held in a metal frame or angle.

4.1.3.3 Windows facing life-saving appliances, launching and muster stations, external stairways and open decks used as escape routes and windows located below the embarkation areas of liferafts and evacuation slides shall have the same fire resistance as required in table 9.1. Where automatic special sprinkler nozzles are installed to protect the windows, "A-0" windows can be accepted as equivalent. To fulfil this, the sprinkler nozzles must either be:

. 1 exclusively intended for and positioned above the window and installed in addition to the standard ceiling sprinklers; or

. 2 standard ceiling sprinklers positioned such that the window is protected by an average water distribution of at least 5 litres/min./m^2 and the additional window area is included in the calculation of the coverage area; or

. 3 water mist nozzles that have been tested and approved according to guidelines approved by the Administration 20)

Windows located in the ship's side below the lifeboat launching area shall have a fire resistance at least equivalent to class "A-0".

4.1.3.4 Regardless of the requirements in subsection 4.1.3.3, the requirements in subsections 4.1.3.5 and 4.1.3.6 shall apply to ships built on or after 1 January 2020.

4.1.3.5 On ships carrying more than 36 passengers, windows facing survival craft, launching and muster stations, external stairways and open decks used as escape routes, and windows located below the liferafts embarkation areas and evacuation slides shall have the dimensions shown in table 9.1 required fire resistance. Where automatic special sprinkler nozzles are installed to protect the windows, "A-0" windows can be accepted as equivalent. To fulfil this, the sprinkler nozzles must either be:

. 1 exclusively intended for and positioned above the windows and installed in addition to the standard ceiling sprinklers; or

. 2 standard ceiling sprinklers positioned such that the window is protected by an average water distribution of at least 5 litres/min./m^2 and the additional window area is included in the calculation of the coverage area; or

. 3 water mist nozzles tested and approved in accordance with guidelines approved by the Organisation;[21]) and

Windows located in the ship's side below the lifeboat launching area shall have a band resistance at least equivalent to class "A-0".

4.1.3.6 On ships carrying not more than 36 passengers, windows facing survival craft and evacuation slides, embarkation areas and windows below such areas shall have a fire resistance rating at least equivalent to class 'A-0'.

4.2 Fire bulkhead doors on cargo ships

4.2.1 Doors must have the same fire resistance as the bulkhead in which they are installed; this must be determined according to the Fire Test Procedures Code. Doors and door frames in class "A" divisions must be made of steel. Doors in class "B" divisions must be made of non-combustible material. Doors fitted in bulkheads bounding category A machinery spaces shall be self-closing and reasonably gastight. In ships constructed in accordance with Method IC, the Administration may permit the use of combustible materials in doors to spaces separating the cabin from the separate interior sanitary spaces forming part of a compartment, e.g. shower rooms. Doors approved as class "A" doors without the threshold being part of the frame, which are installed on or after 1 July 2010, the gap under the door must not exceed 12 mm, and a non-combustible threshold must be installed under such doors to prevent the floor covering from extending under a closed door. Doors approved as class "B" doors without the threshold being part of the frame, installed on or after 1 July 2010, must be installed so that the gap under the door does not exceed 25 mm.

4.2.2 Doors that must be self-closing must not be fitted with door holders. However, door holder arrangements designed according to the fail-safe principle and capable of being triggered from the wheelhouse or fire control room can be used.

4.2.3 Ventilation openings can be allowed in and under doors in corridor bulkheads to chambers and public spaces. Ventilation openings are also allowed in class "B" doors leading to toilets, offices, pantries, closets and storerooms. Except as permitted below, the openings shall be located in the lower half of the door and the total net area of such openings shall not exceed 0.05 m^2 . Alternatively, it is permitted to have a non-combustible air balance duct that runs between the cabin and the corridor and is located under the sanitary unit (shower cabin) when the cross-sectional area of the duct does not exceed 0.05 m^2. Ventilation openings, except those under the door, must be fitted with grilles made of a non-combustible material.

4.2.4 Insulation of watertight doors is not required.

5 Protection of openings in machinery space boundaries

5.1 Application

5.1.1 The provisions of this subsection shall apply to machinery spaces of category A and, where the Administration considers it necessary, to other machinery spaces.

5.2 Protection of openings in machinery space boundaries

5.2.1 The number of skylights, doors, ventilators, openings in funnels for exhaust ventilation and other openings to machinery spaces shall be limited to the extent compatible with the ventilation requirements and the safe operation of the ship.

5.2.2 Skylights must be made of steel and must not contain glass sections.

5.2.3 Controls shall be provided for the closing of power-operated doors or the activation of release mechanisms on all doors that are not power-operated watertight doors. The controls must be located outside the room in question, where access to them will not be cut off in the event of a fire in the room they serve.

5.2.4 On passenger ships, the controls required in subsection 5.2.3 shall be located at one control position or grouped in a manner satisfactory to the Administration in as few locations as possible. There must be safe access to these locations from the open deck.

5.2.5 On passenger ships, doors, except power-operated watertight doors, shall be so arranged that they close securely in the event of fire in the compartment concerned by means of power-operated closing devices or by means of self-closing doors capable of closing against a pitch of 3.5º and having a hold-open device, designed according to the fail-safe principle, equipped with a remote-controlled release device.

5.2.6 There must be no windows in machinery space casings. However, this does not preclude the use of glass in control rooms within machinery spaces.

6 Insulation of cargo hold boundaries

6.1 On passenger ships carrying more than 36 passengers, bulkheads and decks delimiting special cargo holds shall be insulated to class "A-60" standard. Where category (5), (9) or (10) rooms as defined in subsection
2.2.3 is found on one side of the division; the standard can, however, be reduced to "A-0". Where there are fuel oil tanks under a special cargo hold, the fire resistance of the deck between these spaces can be reduced to "A-0" standard.

6.2 On passenger ships, indicators shall be placed on the bridge to show whether each fire door leading to or from the special cargo holds is closed.

6.3 On tankers and for the protection of cargo tanks containing crude oil and petroleum products having a flashpoint below 60ºC, materials that become instantly ineffective under the influence of heat shall not be used for valves, fittings, tank covers, cargo vent pipes and cargo pipes to prevent fire from spreading to the cargo.

7 Ventilation systems

(This subsection applies to ships built on or after 1 January 2016.)

7.1 General

7.1.1 Ventilation ducts, including single- and double-walled ducts, shall be made of steel or an equivalent material, except for flexible bellows with a short length not exceeding 600 mm, used to connect fans to the ducting in air-conditioning rooms. Unless explicitly stated otherwise in subsection 7.1.6, all other materials used in the construction of ducts, including insulation, shall also be non-combustible. However, short ducts, generally not exceeding 2 metres in length and with a maximum free cross-sectional area[22)] of 0.02 m^2 , need not be made of steel or equivalent material under the following conditions:

1) ducts shall be made of a non-combustible material, which may be coated internally and externally with membranes with a low flame spread characteristic and in each case a calorific value,[23]) not exceeding 45 MJ/m^2 of the surface area at the material thickness used;

2) the ducts are only used in the ventilation system endpoints; and

3) the ducts are located no closer than 600 mm, measured in the longitudinal direction of the duct, from a penetration in a class 'A' or 'B' division, including continuous class 'B' ceilings.

7.1.2 The following arrangements must be tested according to the Fire Test Procedures Code:

1) Fire dampers, including their relevant controls, except that the test is not required for dampers located at the lower end of the duct in exhaust ducts to galley areas, which shall be of steel and capable of stopping the flow in the duct; and

2) duct penetrations in class "A" divisions. However, steel penetrations that are directly attached to the ventilation duct by riveting, threaded flanges or welding are not required to be tested.

7.1.3 Fire dampers must be easily accessible. Where they are located behind ceilings or inner skins, these ceilings or inner skins must be equipped with an inspection hatch on which the fire damper identification number is printed. The fire damper's identification number must also be printed on any remote control devices.

7.1.4 Ventilation ducts must be fitted with hatches for inspection and cleaning. The hatches must be located close to the fire dampers.

7.1.5 The main inlets and outlets of ventilation systems must be able to be closed from outside the ventilated spaces. Closing devices must be easily accessible and clearly and permanently labelled and must indicate the operating position of the closing device.

7.1.6 Combustible gaskets in ventilation duct flange joints are not allowed closer than 600 mm from a penetration in a class "A" or "B" division and in ducts that must be of "A" class design.

7.1.7 There shall be no ventilation openings or air distribution ducts between two enclosed spaces, except as permitted in subsections 4.1.2.1 and 4.2.3.

7.2 Duct arrangements

7.2.1 Ventilation systems for category A machinery spaces, motor vehicle spaces, ro-ro deck spaces, galleys, special cargo holds and cargo holds shall generally be separated from each other and from the ventilation systems serving other spaces. However, the galley ventilation system on cargo ships with a gross tonnage below
4,000 and on passenger ships carrying not more than 36 passengers, are not to be completely separated from other ventilation systems, but may be served by separate ducts from a ventilation unit serving other spaces. In such cases, an automatic fire damper must be installed in the galley ventilation duct near the ventilation unit.

7.2.2 Ducts intended for ventilation of category A machinery spaces, galleys, motor vehicle spaces, ro-ro deck spaces or special cargo holds shall not pass through accommodation spaces, service spaces or control stations unless they fulfil the requirements of subsection 7.2.4.

7.2.3 Ducts intended for ventilation of accommodation spaces, service spaces or control stations shall not pass through category A machinery spaces, galleys, motor vehicle spaces, ro-ro deck spaces or special cargo holds unless they fulfil the requirements of subsection 7.2.4.

7.2.4 As allowed in subsections 7.2.2 and 7.2.3, ducts must be either:

7.2.4.1.1 made of steel with a wall thickness of at least 3 mm for ducts with a free cross-sectional area below 0.075 m^2, at least 4 mm for ducts with a free cross-sectional area between 0.075 m^2 and 0.45 m^2 and at least 5 mm for ducts with a free cross-sectional area above 0.45 m^2;

7.2.4.1.2 appropriately supported and braced;

7.2.4.1.3 fitted with automatic fire dampers close to penetrating bulkheads; and

7.2.4.1.4 insulated to category 'A-60' from the separation from the spaces they serve to a point at least 5 metres after each fire damper;

or

7.2.4.2.1 made of steel in accordance with subsections 7.2.4.1.1 and 7.2.4.1.2; and

7.2.4.2.2 insulated to class "A-60" throughout the spaces they pass through, except for ducts passing through spaces of category (9) or (10) as defined in subsection 2.2.3.2.2.

7.2.5 When applying subsections 7.2.4.1.4 and 7.2.4.2.2, ducts shall be insulated over their entire external cross-sectional surface. Ducts outside, but adjacent to, the specified space which have one or more surfaces in common with the space shall be considered to pass through the specified space and shall be insulated over the entire surface in common with the space for a distance of 450 mm beyond the duct.[24)]

7.2.6 Where it is necessary for a ventilation shaft to pass through a vertical main zone, an automatically operating fire damper must be installed in its immediate vicinity. The damper must also be able to be closed manually from both sides of the division. The location of the control device must be immediately accessible and clearly labelled. The duct between the division and the damper shall be constructed of steel in accordance with subsections 7.2.4.1.1 and 7.2.4.1.2 and insulated to at least the same fire resistance as the division being penetrated. The damper must be placed on at least one side of the division with a visible indicator showing the operating position of the damper.

7.3 More details about fire dampers and duct penetrations

7.3.1 Ducts passing through 'A' class divisions must fulfil the following requirements:

7.3.1.1 Where thin-plate ventilation ducts with a free cross-sectional area equal to or less than 0.02 m^2 are routed through class 'A' bulkheads or decks, the openings shall be fitted with a steel penetration with a thickness of at least 3 mm thick and at least 200 mm long, preferably 100 mm on each side of the bulkhead or, in the case of decks, the full length of the underside of the deck being penetrated.

7.3.1.2 Where ventilation ducts with a free cross-sectional area exceeding 0.02 m^2 but not exceeding 0.075 m^2 penetrate class 'A' bulkheads or decks, the opening shall be provided with a steel penetration. The ducts and penetrations must be at least 3 mm thick and at least 900 mm long. When passing through bulkheads, the length should preferably be distributed with 450 mm on each side of the bulkhead. These ducts or steel penetrations must be fire-insulated. The insulation must have at least the same fire resistance as the bulkhead or deck being penetrated.

7.3.1.3 Automatically operating fire dampers must be installed in all ducts with a free cross-sectional area of more than 0.075 m^2 passing through class "A" divisions. Each damper shall be installed close to the division being penetrated and the duct between the damper and the penetrated division shall be made of steel in accordance with subsections 7.2.4.2.1 and 7.2.4.2.2. The fire damper must operate automatically, but it must also be possible to close it manually from either side of the bulkhead or deck. The fire damper must be fitted with a visible indicator that shows whether the damper is open or closed. However, fire dampers are not required where a duct passes through spaces surrounded by Class 'A' divisions without the duct having openings to these spaces, provided the ducts have the same fire resistance as the bulkheads being penetrated. A duct with a cross-sectional area greater than 0.075 m^2 shall not be divided into smaller ducts by passing through a class 'A' division and then recombined with the original duct after passing through the division in order to avoid installing the damper required by this provision.

7.3.2 Ventilation ducts with a free cross-sectional area exceeding 0.02 m^2 that are routed through class "B" bulkheads shall be fitted with steel penetrations 900 mm long, preferably 450 mm on each side of the bulkheads, unless the duct is steel for this length.

7.3.3 All fire dampers must be manually operated. The dampers must be fitted with a direct mechanical operating mechanism or be able to be closed electrically, hydraulically or pneumatically. All dampers must be manually operated from both sides of the division. Automatic fire dampers, including those operated remotely, shall be fitted with a fail-safe mechanism that closes the damper in case of fire, even if electrical power or hydraulic or pneumatic pressure is lost. It must be possible to manually reopen remote controlled fire dampers at the dampers.

7.4 Ventilation systems on passenger ships carrying more than 36 passengers

7.4.1 Ventilation systems on passenger ships carrying more than 36 passengers shall fulfil the following requirements in addition to the requirements in subsections 7.1, 7.2 and 7.3:

7.4.2 Fans should generally be positioned so that the ducts to the different rooms remain within the same main vertical zone.

7.4.3 Stairwells must be served by an independent fan and ductwork (inlets and outlets) that must not serve any other room in the ventilation system.

7.4.4 Ducts (regardless of cross-section) serving more than one between deck accommodation space, service space or control room shall be fitted near the penetration of each deck in such spaces with an automatically operating smoke damper which shall also be capable of being closed manually from the protected deck above the damper. Where a fan serves more than one between deck space via separate ducts within a main vertical zone, each intended for a single between deck space, each duct must be equipped with a manually operated smoke damper close to the fan.

7.4.5 Vertical ducts shall, if necessary, be insulated as required in tables 9.1 and 9.2. Ducts shall be insulated as required for the decks between the space they serve and the space under consideration, as applicable.

7.5 Exhaust ducts from galley areas

7.5.1 Requirements for passenger ships carrying more than 36 passengers

7.5.1.1 In addition to the requirements of subsections 7.1, 7.2 and 7.3, exhaust ducts from galley areas shall be constructed in accordance with subsections 7.2.4.2.1 and 7.2.4.2.2 and insulated to category 'A-60' in all accommodation spaces, service spaces or control stations they penetrate. They must also be fitted with:

1) A grease filter that is easy to remove for cleaning, unless an alternative approved grease removal arrangement is installed;

2) a fire damper located at the lower end of the duct at the connection between the duct and the galley hood, which is automatic and remotely controlled, and another remotely controlled fire damper located at the upper end of the duct close to its outlet;

3) a fixed arrangement for extinguishing a fire in the duct;[25)]

4) a remote control arrangement, which shall be located close to the galley entrance, to stop the exhaust and supply fans, to operate the fire dampers required by subsection 7.5.1.1.2 and to operate the fire extinguishing system. In multiple branch systems with a common main exhaust duct, means shall be provided to shut off all branches discharging into the main duct by remote control located in conjunction with the remote control arrangement mentioned above, before the fire extinguishing medium is released into the ventilation system; and

5) Appropriately placed hatches for inspection and cleaning, including one close to the exhaust fan and one at the lower end where grease collects.

7.5.1.2 Exhaust ducts from cooking equipment areas installed on open deck shall comply with subsection 7.5.1.1, as applicable, when passing through accommodation spaces or spaces containing combustible materials.

7.5.2 Requirements for cargo ships and passenger ships carrying 36 passengers or less

Where exhaust ducts from galley areas pass through accommodation spaces or spaces containing combustible materials, they shall be designed in accordance with subsections 7.2.4.1.1 and 7.2.4.1.2. Each exhaust duct must be fitted with:

1) a grease filter that can be easily removed for cleaning;

2) an automatic and remote-controlled fire damper located at the lower end of the duct at the connection between the duct and the galley hood, and another remote-controlled fire damper located at the upper end of the duct close to its outlet;

3) a device that can be operated from inside the galley to stop the exhaust and supply fans; and

4) a fixed arrangement for extinguishing a fire in the duct.[26)]

7.5.3 Ventilation room for serving category "A" machinery spaces containing combustion machinery

7.6.1 Where a ventilation space serves only one such adjacent machinery space and there is no fire separation between the ventilation space and the machinery space, the means of closing the ventilation duct or ducts serving the machinery space shall be located outside the ventilation space and machinery space.

7.6.2 Where a ventilation space serves such a machinery space, as well as other spaces and is separated from the machinery space by a class 'A-0' division, including penetrations, the means of closing the ventilation duct or ducts to the machinery space may be located in the ventilation space.

7.7 Ventilation systems for laundry facilities in passenger ships carrying more than 36 passengers

Drainage ducts from laundry and drying rooms of category (13), as defined in subsection 2.2.3.2.2, shall be fitted with:

1) filters that are easy to remove for cleaning;

2) a fire damper located at the lower end of the duct that operates automatically and remotely;

3) a remotely controlled arrangement to stop the exhaust and supply air fans from inside the room and to operate the fire damper referred to in subsection 7.7.2; and

4) Appropriately placed hatches for inspection and cleaning.

Regulation 10 Firefighting

1 Purpose

1.1 The purpose of this regulation is to suppress and quickly extinguish a fire in the room where it has occurred, with the exception of subsection 1.2. With this in mind, the following functional requirements must be met:

1) fixed fire extinguishing systems must be installed taking into account the flammability of the protected spaces; and

2) Fire extinguishing equipment must be easily accessible.

1.2 For open container holds[27)] and container stowage areas on deck of ships designed to carry containers on or above the weather deck, constructed on or after 1 January 2016, fire protection arrangements shall be provided to contain a fire in the space or area where it originates and to cool adjacent areas to prevent the spread of the fire and structural damage.

2 Water supply systems

Ships shall be provided with fire pumps, fire mains, hydrants and fire hoses which fulfil the relevant requirements of this regulation.

2.1 Fire mains and hydrants

2.1.1 General provisions

Materials that decompose easily when exposed to heat must not be used in fire mains and hydrants unless they are adequately protected. Pipes and hydrants must be positioned so that fire hoses can be easily connected. Pipes and hydrants must be arranged to avoid freezing. The main fire line must have suitable drains. On open decks, fire main branches used for purposes other than firefighting shall be fitted with shut-off valves. On ships capable of carrying deck cargo, hydrants shall be located so that they are always readily accessible, and pipes shall, as far as practicable, be arranged so that there is no risk of them being damaged by the cargo.

2.1.2 Quickly accessible water supply

The arrangements for quickly accessible water supply must be:

2.1.2.1 on passenger ships:

2.1.2.1.1 of 1000 gross tonnage and above, so arranged that at least one effective jet of water is immediately available from an internal hydrant and so that the continuous supply of water is ensured by the automatic starting of a required fire pump;

2.1.2.1.2 with a gross tonnage of less than 1000 by automatic start-up of at least one pump or by remote start-up from the bridge of at least one fire pump. If the pump starts automatically or if the seacock cannot be opened from the remote start location, the seacock must always be open; and

2.1.2.1.3 which are fitted with periodically unattended machinery spaces in accordance with regulation 54 of chapter II-1, the Administration shall prescribe fixed water-extinguishing arrangements for such spaces equivalent to those prescribed for normally manned machinery spaces.

2.1.2.2 on cargo ships:

2.1.2.2.1 To the satisfaction of the Administration; and

2.1.2.2.2 with a periodically unattended machinery space or where only one person on duty is required, water shall be immediately available from the fire main at an appropriate pressure either by remote starting of one of the main fire pumps from the bridge and the fire control station, if any, or by maintaining permanent pressure in the fire main at one of the main fire pumps. However, the Administration may waive this requirement for cargo ships of less than 1600 gross tonnage if the arrangements for access to the machinery space make it unnecessary to require compliance with this requirement.

2.1.3 Diameter of the main fire line

The diameter of the main fire main and branch lines must be sufficient to ensure efficient distribution of the prescribed maximum water volume from two fire pumps operating simultaneously. However, in cargo ships, except those covered by subsection 7.3.2, the diameter need only be sufficient to ensure a water volume of 140 m^3 per hour.

2.1.4 Shut-off valves and safety valves

2.1.4.1 Shut-off valves shall be provided in an easily accessible and safe location outside the machinery spaces to separate the main fire mains section of the machinery space containing the main fire pump from the rest of the main fire mains. The fire main shall be so arranged that all hydrants on the ship can be supplied with water from another fire pump or emergency fire pump when the shut-off valves are closed. The emergency fire pump, its seacock, inlet and outlet valves and shut-off valves must be located outside the machinery space. If this arrangement cannot be made, the seacock may be placed in the machinery space, provided it is remotely controlled from the same room where the emergency fire pump is located and the suction line is as short as practically possible. Short suction and discharge pipes may be routed through the machinery space if it is not possible to route them outside this space, provided that the fire resistance of the fire main is maintained by enclosing the pipework in a solid steel casing or insulated to 'A-60' class. The pipes must have a significant wall thickness, which in no case should be less than 11 mm, and they must be welded, with the exception of the connection to the seacock.

2.1.4.2 There must be a valve for each fire hose so that a fire hose can be removed while the fire pumps are in operation.

2.1.4.3 Safety valves must be provided in connection with all fire pumps if the pumps can develop a pressure that exceeds the pressure for which pipelines, hydrants and fire hoses are designed. These valves must be positioned and adjusted to prevent harmful overpressure in any part of the fire main.

2.1.4.4 On tankers, shut-off valves shall be located in the fire main in protected positions, on the forward edge of the superstructure and on the tank deck, at a distance not exceeding 40 metres, to maintain the integrity of the fire main in the event of a fire or explosion.

2.1.5 Number and locations of hydrants

2.1.5.1 Hydrants shall be provided in such numbers and be so located that at least two jets of water not emanating from the same hydrant, one of which shall be from a single length of hose, can reach any part of the ship normally accessible to passengers or crew during navigation and any part of a cargo hold when empty. However, in a ro-ro space or a special cargo hold, the two water jets must be able to reach any part of the space from a few hose lengths. Furthermore, these hydrants must be located near the access routes to the protected spaces.

2.1.5.2 In addition to the requirements of subsection 2.1.5.1, passenger ships shall fulfil the following requirements:

2.1.5.2.1 in accommodation spaces, service spaces and machinery spaces, hydrants shall be provided in such numbers and so located that the requirements of subsection 2.1.5.1 can be met when all watertight doors and all doors in bulkheads in main vertical zones are closed; and

2.1.5.2.2 where access to a category A machinery space is provided at low level from an adjacent shaft alley, two hydrants shall be located outside but close to the entrance to that machinery space. When this access is from other spaces, two hydrants shall be provided in one of these spaces near the entrance to the category A machinery space. Such placement is not necessary if the shaft alley or adjacent compartments do not form part of the exit route.

2.1.6 Pressure at fire hydrants

With two fire pumps in operation simultaneously delivering through the nozzles prescribed in subsection 2.3.3 the maximum volume of water prescribed in subsection 2.1.3 from a sufficient number of hydrants, the following minimum pressures shall be maintained at all hydrants:

2.1.6.1 for passenger ships:

with a gross tonnage of 4000 and above 0.40 N/mm^2

with a gross tonnage below 4000 0.30 N/mm^2,

2.1.6.2 for cargo ships:

with a gross tonnage of 6000 and above 0.27 N/mm^2

with a gross tonnage below 6000 0.25 N/mm^2,

and

2.1.6.3 the maximum pressure at a fire hydrant shall not exceed the pressure at which the effective handling of a fire hose can be demonstrated.

2.1.7 International shore connection

2.1.7.1 Ships of 500 gross tonnage and above must be fitted with at least one international shore connection that fulfils the provisions of the Fire Safety Systems Code.

2.1.7.2 It must be possible to use such a connection on both sides of the ship.

2.2 Fire pumps

2.2.1 Pumps that can be used as fire pumps

Sanitary, ballast, bilge and general service pumps are acceptable as fire pumps provided that they are not normally used for pumping oil and, if they are occasionally used for pumping fuel oil, suitable change-over devices are provided.

2.2.2 Number of fire pumps

Ships shall be equipped with independently driven fire pumps as follows:

2.2.2.1 On passenger ships with:

a gross tonnage of 4000 and above at least 3,

and a gross tonnage below 4000 at least 2

2.2.2.2 On cargo ships with:

a gross tonnage of 1000 and above at least 2

a gross tonnage below 1000 *but above 150* at least 2

mechanically driven pumps, one of which must be independently driven

2.2.3 Arrangement of fire pumps and fire main lines

2.2.3.1 Fire pumps

The arrangement of sea connections, fire pumps and their energy sources must be such that it is ensured that,

2.2.3.1.1 all fire pumps on passenger ships of 1,000 gross tonnage and above will not be disabled in the event of a fire in one of the compartments; and

2.2.3.1.2 on passenger ships of less than 1000 gross tonnage and in cargo ships *of more than 150* gross tonnage where a fire in any one compartment could render all pumps inoperative, an alternative means consisting of an emergency pump complying with the requirements of the Fire Safety Systems Code, with power source and sea connections located outside the compartment where the main fire pumps or their power sources are located.

2.2.3.2 Requirements for rooms containing the emergency fire pump

2.2.3.2.1 Location of the room

The room in which the emergency fire pump is located shall not be adjacent to category A machinery spaces or to spaces where main fire pumps are located. Where this is not practicable, the bulkhead between the two spaces shall be fire-insulated to a standard equivalent to that required for control stations in the provisions of regulation 9.2.3.3.

2.2.3.2.2 Access to the emergency fire pump

There must be no direct access between the machinery space and the room containing the emergency fire pump and its energy source. Where this is not possible, the Administration may accept an arrangement where access is by means of an airlock with one door to the machinery space of class "A-60" and where the second door is at least a steel door. Both doors must be reasonably gas-tight, self-closing and without retaining hooks for the open position. Alternatively, access can be through a watertight door that can be operated from a room remote from the machinery space and the room containing the emergency fire pump and to which access will not be easily cut off in case of fire in these rooms. In such cases, a second means of access to the room containing the emergency fire pump and its energy source must be provided.

2.2.3.2.3 Ventilation of the emergency fire pump room

The ventilation system for the space containing the independent power source for the emergency fire pump shall be so arranged as to minimise the possibility of smoke from a machinery space fire entering or being drawn into that space.

2.3.3.3 Use of other pumps on cargo ships

In addition, on cargo ships where other pumps such as general service pumps, bilge pumps, ballast pumps, etc., are located in a machinery space, arrangements shall be made to ensure that at least one of these pumps having the capacity and pressure prescribed in subsections 2.1.6.2 and 2.2.4.2 can supply water to the fire main.

2.2.4 Capacity of fire pumps

2.2.4.1 Total capacity of the required fire pumps

The required fire pumps shall be capable of delivering a volume of water for firefighting at the pressure specified in subsection 2.1.6:

2.2.4.1.1 Passenger ship pumps: at least 2/3 of the volume that the bilge pumps must be capable of delivering when used for bilge pumping; and

2.2.4.1.2 pumps on cargo ships other than those covered by subsection 7.3.2 (other than an emergency pump, if any): at least four-thirds of the capacity which each independent bilge pump in a passenger ship of the same dimensions shall be capable of delivering in accordance with regulation II-1/35-1 when used for drainage. However, the required total output of the fire pumps need not exceed 180 m^3 per hour.

2.2.4.2 Capacity of each fire pump

Each of the required fire pumps (other than any emergency fire pump required by subsection 2.2.3.1.2 for cargo ships) shall have a capacity of at least 80% of the total required capacity divided by the minimum number of required fire pumps, but in any case at least 25 m^3 per hour and each such pump shall in any case be capable of delivering at least the two required jets of water. These fire pumps must be able to supply the fire main under the prescribed conditions. Where more pumps than the prescribed minimum number are installed, the capacity of such additional pumps shall be at least 25 m^3 per hour, and they shall be capable of delivering two water jets as required in subsection 2.1.5.1.

2.3 Fire hoses and jets

2.3.1 General provisions

2.3.1.1 Fire hoses shall be of a non-degradable material approved by the Administration and shall be of sufficient length to direct a jet of water to any part of the ship where fire hoses may be required to be used. Every fire hose must be fitted with a jet spray and the necessary couplings. Hoses referred to in this chapter as "fire hoses", together with any necessary accessories and tools, must be placed ready for use in conspicuous places near fire hydrants. In the interior spaces of passenger ships carrying more than 36 passengers, fire hoses must also be permanently connected to the hydrants. Fire hoses must be at least 10 metres long, but not more than that:

2.3.1.1.1 15 metres in the machinery space,

2.3.1.1.2 20 metres elsewhere and on open decks, and

2.3.1.1.3 25 m on open decks on ships with a width of more than 30 m.

2.3.1.2 Unless there is a hose and jet for each hydrant, couplings and nozzles must be interchangeable.

2.3.2 Number and diameter of fire hoses

2.3.2.1 Ships shall be fitted with fire hoses, the number and diameter of which shall be to the satisfaction of the Administration.

2.3.2.2 On passenger ships, there shall be at least one fire hose for each of the hydrants prescribed in subsection 2.15, and these hoses shall only be used for extinguishing fire or testing the fire extinguishing arrangement during firefighting drills and inspections.

2.3.2.3 On cargo ships:

2.3.2.3.1 of 1000 gross tonnage and above, the number of fire hoses shall be one for every 30 metres of ship length and one in reserve, but never less than five in total. This number does not include hoses required to be placed in machinery spaces or boiler rooms. The Administration may increase the number of required hoses to ensure that a sufficient number of hoses are available and accessible at all times, taking into account the type of ship and the nature of the service the ship is engaged in. Ships carrying dangerous goods in accordance with regulation 19 shall be fitted with three fire hoses and jets in addition to those required above; and

2.3.2.3.2 with a gross tonnage below 1000 *but above 150*, the number of fire hoses shall be determined in accordance with the provisions of subsection 2.3.2.3.1. However, in no case should the number be less than 3.

2.3.3 Jet size and type

2.3.3.1 For the purposes of this chapter, the standard sizes for the jet spray diameter shall be 12 mm, 16 mm and 19 mm or as close as possible. A larger diameter may be allowed at the discretion of the Administration.

2.3.3.2 In accommodation and service rooms, it is not necessary to use jet spray with a diameter larger than 12 mm.

2.3.3.3 In machinery spaces and on deck, the diameter of the jey sprays shall be such that, at the pressure referred to in subsection 2.1.6 above from the smallest pump, the maximum possible volume of water is obtained from two jets. However, it is not necessary to use jet sprays with a diameter larger than 19 mm.

2.3.3.4 All jet sprays must be of an approved combination type and be fitted with a shut-off device.

3 Portable fire extinguishers[28)]

3.1 Type and construction

Portable fire extinguishers must fulfil the requirements of the Fire Safety Systems Code.

3.2 Location of fire extinguishers

3.2.1 Accommodation, service rooms and control rooms shall be equipped with fire extinguishers of the appropriate type and in sufficient number to the satisfaction of the Administration. Ships with a gross tonnage of 1000 and above must have at least five portable fire extinguishers.

3.2.2 One of the fire extinguishers for use in specific rooms must be placed near the entrance to that room.

3.2.3 CO_2 extinguishers must not be placed in accommodation areas. Control rooms and other locations containing electrical or electronic equipment necessary for the safety of the ship must be fitted with portable fire extinguishers whose extinguishing medium is not electrically conductive or harmful to equipment and fittings.

3.2.4 Fire extinguishers must be placed ready for use in visible locations that can be reached quickly and easily at all times in the event of a fire and in such a way that their usability is not affected by the weather, vibrations and external factors. Fire extinguishers must be fitted with a device that shows whether they have been used.

3.3 Spare refills

3.3.1 There must be 100% spare charges for the first ten extinguishers and 50% for the remaining extinguishers, which are recharged on board. A maximum of 60 spare refills are required. Refill instructions must be available on board.

3.3.2 For fire extinguishers that cannot be refilled on board, spare refills shall be replaced by spare fire extinguishers of the same extinguishing quantity, type, capacity and number as required in subsection 3.3.1.

4 Fixed fire extinguishing systems

4.1 Types of fixed fire extinguishing systems

4.1.1 A fixed fire extinguishing system required by subsection 5 may be one of the following systems:

4.1.1.1 a fixed fire extinguishing system that fulfils the provisions of the Fire Safety Systems Code;

4.1.1.2 *fire extinguishing systems with mixed atmospheric gases in ships' machinery spaces must also fulfil the provisions of the Danish Maritime Authority's Order on the installation and testing of fire extinguishing systems with mixed atmospheric gases in ships' machinery spaces,*

4.1.1.3 a fixed high expansion foam extinguishing system that fulfils the provisions of the Fire Safety Systems Code; and

4.1.1.4 a fixed pressurised water atomisation system that complies with the provisions of the Fire Safety Systems Code.

4.1.2 Where a fixed fire extinguishing system is installed that is not required to be installed under the provisions of this chapter, such system shall comply with the relevant provisions of the Fire Safety Systems Code.

4.1.3 Fire extinguishing systems with halon 1211, 1301 and 2402 and perfluorocarbons must not be used.

4.1.4 The Administration must not normally allow the use of vapour as a fire extinguishing agent in fixed fire extinguishing installations. Where the use of vapour is permitted by the Administration, it may only be used in restricted areas to supplement the prescribed fire extinguishing agent and must comply with the provisions of the Fire Safety Systems Code.

4.1.5 For the first scheduled dry-docking after 1 January 2010, fixed fire extinguishing systems using carbon dioxide as a fire extinguishing medium for the protection of machinery spaces and cargo pump rooms in ships constructed before 1 July 2002 shall comply with the provisions of chapter 5, subsection 2.2.2 of the Fire Safety System Code.

4.2 Closure arrangements for fixed systems with fire extinguishing gases.

Where fixed fire-extinguishing systems using fire-extinguishing gases are used, means shall be provided for closing all openings from which air may flow into a protected space or gases may escape from such a space.

4.3 Room for fixed fire extinguishing systems

When the fire extinguisher is located outside a protected room, it must be located in a room behind the forward collision bulkhead that cannot be used for other purposes. Any entrance to such a room shall preferably be from the open deck and shall in any case be independent of the protected space. If the storage room is located below deck, the room must not be located more than one deck below the open deck, and there must be direct access via a staircase or ladder from the open deck. Rooms located below deck or in places not accessible from the open deck shall have mechanical ventilation with extraction from the bottom of the room and with six air changes per hour. Access doors must open outwards. Bulkheads and decks, including doors and other means of closing an opening therein, separating these spaces from adjacent enclosed spaces, shall be gastight. When using the fire safety tables
9.1 to 9.8, these storage rooms shall be treated as control rooms.

4.4 Water pumps for other fire extinguishing systems

Pumps other than those connected to the fire main required to supply water to the fire-extinguishing systems required by this chapter, their power supply and operating arrangements shall be located outside the space(s) protected by such systems and so arranged that a fire in the protected space(s) will not render such systems inoperative.

5 Fixed fire extinguishing systems in machinery spaces

5.1 Machinery spaces containing oil-fired boilers or fuel oil units

5.1.1 Fixed fire extinguishing systems

Category A machinery spaces containing oil-fired boilers or fuel oil units shall be fitted with one of the fixed fire extinguishing systems required by subsection 4.1. In cases where the machinery space and boiler room are not completely separated or where fuel oil can flow from the boiler room to the machinery space, these two rooms shall be considered as one room

5.1.2 Additional fire extinguishing arrangements[29)]

5.1.2.1 In each boiler room or in an anteroom outside the boiler room, there must be at least one portable foam unit that fulfils the provisions of the Fire Safety Systems Code.

5.1.2.2 At least two portable foam extinguishers or equivalent devices shall be provided at each fuel installation in each boiler room and in any room where part of the fuel installation is located. Every boiler room must have at least one approved foam extinguisher with a capacity of at least 135 litres or an equivalent device. These extinguishers must be fitted with hoses coiled on reels, allowing them to reach any point in the boiler room. In the case of central heating boilers of less than 175 kW or boilers protected by fixed water-based fire extinguishing systems for local use as required in subsection 5.6, an approved foam extinguisher with a capacity of at least 135 litres is not required.

5.1.2.3 A container containing 0.1 m^3 of sand, soda-saturated sawdust or other approved dry material and a shovel suitable for spreading the material must be available at each fireplace. Instead of such a container, an approved portable fire extinguisher can be used.

5.2 Category A machinery spaces containing combustion machinery

5.2.1 Fixed fire extinguishing systems

Category A machinery spaces containing combustion machinery shall be fitted with one of the fixed fire extinguishing systems referred to in subsection 4.1.

5.2.2 Additional fire extinguishing arrangements [29)].

5.2.2.1 There must be at least one portable foam unit that fulfils the provisions of the Fire Safety Systems Code.

Approved foam-type fire extinguishers shall be provided in each such space, each with a capacity of at least 45 litres, or equivalent appliances in sufficient number to allow foam or equivalent extinguishing agent to be directed against any part of the fuel and pressure lubricating oil systems, gear arrangement and other flammable installations. There shall also be a sufficient number of portable foam extinguishers or equivalent appliances, located so that no more than 10 metres from any part of the room is required to reach an extinguisher; there shall be at least two such extinguishers in each room. In the case of smaller rooms on cargo ships, the Administration may consider a relaxation of this requirement.

5.3 Machinery spaces containing steam turbines or enclosed steam engines

5.3.1 Fixed fire extinguishing systems

In spaces containing steam turbines or enclosed steam engines used for main propulsion or other purposes, where such machinery has a combined output of not less than 375 kW and the space is periodically unattended, there shall be one of the fixed fire-extinguishing systems referred to in subsection 4.1.

5.3.2 Additional firefighting arrangements

5.3.2.1 There shall be approved foam extinguishers, each with a capacity of at least 45 litres, or equivalent appliances in sufficient number to allow foam or its equivalent to be directed against any part of the pressure lubrication system and against any part of the casings containing pressure lubricated parts of turbines, machinery or associated gear and any other flammable installations. These

fire extinguishers are, however, not required if these spaces are equally well protected by a fixed fire extinguishing system installed in accordance with the provisions of subsection 4.1.

5.3.2.2 There shall be a sufficient number of portable foam fire extinguishers[30)] or equivalent appliances located so that no more than 10 metres from any part of the room is required to reach an extinguisher, and there are at least two such extinguishers in each room. However, such extinguishers are not necessary if fire extinguishers are already installed according to subsection 5.1.2.2.

5.4 Other machinery spaces

Where the Administration considers that a fire hazard exists in a machinery space for which no special provisions for fire extinguishing appliances are prescribed in 5.1, 5.2 and 5.3, such number of approved portable fire extinguishers or other means of extinguishing fire as the Administration may consider sufficient shall be provided in or adjacent to such space.

5.5 Additional requirements for passenger ships

On passenger ships carrying more than 36 passengers, each category A machinery space shall be fitted with at least two suitable mist nozzles with extension pipes.[31)]

5.6 Fixed local fire extinguishing systems

5.6.1 Subsection 5.6 applies to passenger ships of 500 gross tonnage and above and cargo ships of 2000 gross tonnage and above.

5.6.2 Category A machinery spaces having a volume of 500 m^3 shall, in addition to the fixed fire-extinguishing system required by subsection 5.1.1, be protected by an approved fixed water-based local application fire-extinguishing system or an equivalent extinguishing medium complying with the guidelines of the Organisation.[32)] In the case of periodically unattended machinery spaces, the fire extinguishing system shall be capable of both automatic and manual activation. In the case of manned machinery spaces, the fire extinguishing system only requires manual activation.

5.6.3 Fixed local fire extinguishing systems shall protect such areas as mentioned below without the need to stop the engines, evacuate personnel or seal the room tightly:

5.6.3.1 Flammable areas on internal combustion engines; and for ships built before 1 July 2014, flammable areas on internal combustion engines used for propulsion and generator operation;

5.6.3.2 boiler fronts;

5.6.3.3 flammable areas on waste incinerators; and

5.6.3.4 centrifuges for processing heated fuel oil.

5.6.4 Activation of any local fire extinguishing system shall provide a visual and clearly audible alarm in the protected space and in the manned control rooms. The alarm should indicate which system has been activated. The alarm system required by this subsection is in addition to and not in lieu of the fire alarm and fire detection system required elsewhere in this chapter.

6 Fire extinguishing arrangements in control rooms and accommodation and service rooms

6.1 Sprinkler systems and pressurised water atomisation systems on passenger ships

6.1.1 Passenger ships carrying more than 36 passengers shall be fitted with an automatic sprinkler, fire detection and fire alarm system of an approved type complying with the provisions of the Fire Safety Systems Code in all control stations and accommodation and service spaces, including corridors and stairway shafts. Alternatively, control rooms containing critical equipment that will be damaged by water may be protected by another approved fixed fire extinguishing system. Spaces that have little or no fire risk, such as empty rooms, public toilets and similar spaces, do not need to be protected by an automatic sprinkler system.

6.1.2 On passenger ships carrying not more than 36 passengers, an automatic sprinkler system shall be installed in accordance with regulation 7.5.3.2 when a fixed smoke detection and fire alarm system complying with the provisions of the Fire Safety Systems Code is installed only in corridors, stairway shafts, and escape routes within the accommodation area.

6.1.3 A fixed pressurised water spraying system complying with the provisions of the Fire Safety Systems Code shall be installed in cabin balconies on ships to which regulation 5.3.4 applies, where the furniture and fittings of such cabins are not as defined in regulations 3.40.1, 3.40.2, 3.40.3, 3.40.6 and 3.40.7.

6.2 Sprinkler systems on cargo ships

On cargo ships where method IIC of regulation 9.2.3.1.1.2 is applied, an automatic sprinkler, fire detection and fire alarm system shall be installed in accordance with the requirements of regulation 7.5.3.2.

6.3 Rooms containing flammable liquids

6.3.1 Paint storerooms must be protected by:

6.3.1.1 A CO2 system that is dimensioned to provide a volume of free gas equivalent to 40% of the gross volume of the protected space;

6.3.1.2 a dry powder system dimensioned with at least 0.5 kg powder/m^3;

6.3.1.3 a water sprinkler system rated at 5 litres/m^2/minute, which may be connected to the ship's fire main; or

6.3.1.4 a system that provides the same protection, as determined by the Administration. In all cases, it must be possible to operate the system from outside the protected space.

6.3.2 Rooms for storing flammable liquids must be protected by a suitable fire extinguishing system approved by the Administration.

6.3.3 In large spaces with a deck area less than 4 m^2 and from which there is no access to an air conditioning room, a portable CO_2 extinguisher of a size that provides a minimum free gas volume of 40% of the gross volume of the space is acceptable instead of a fixed installation. An entry hatch must be arranged in the room so that the extinguisher can be triggered without having to enter the protected space. The required extinguisher must be placed close to the inlet clamp. Alternatively, a hose strap or permanent hose connection can be fitted so that water from the fire line can be used.

6.4 Deep fat fryers

Deep fat fryers installed in enclosed spaces or on open deck must be equipped as follows:

6.4.1 An automatic or manually operated fire extinguishing system tested to an international standard

acceptable to the Organisation,[33)]

6.4.2 a main thermostat and a backup thermostat, as well as an alarm that activates if one of the thermostats fails;

6.4.3 a device that automatically cuts off the electrical supply when the fire extinguishing system is activated;

6.4.4 an alarm in the galley where the equipment is located that indicates when the fire extinguishing system is activated; and

6.4.5 a control arrangement for manual operation of the fire extinguishing system with clear instructions so that the system can be quickly operated by the crew.

7 Fire extinguishing arrangements in cargo holds

7.1 Fixed fire extinguishing systems for cargo holds

7.1.1 Except as required in subsection 7.2, the cargo holds on passenger ships of 1000 gross tonnage and above shall be protected by a fixed CO_2 system or inert gas system complying with the provisions of the Fire Safety Systems Code or by a fixed high expansion foam fire extinguishing system providing equivalent protection.

7.1.2 Where it is proved to the satisfaction of the Administration that it would be unreasonable to require the requirements of subsection 7.1.1 for a passenger ship engaged on short voyages of short duration, in the holds of such passenger ships and in the holds of passenger ships of less than 1000 gross tonnage there shall be such fire-extinguishing appliances deemed necessary by the Administration, provided that the ship is fitted with steel hatches and effective means of closing all ventilation openings and other openings leading to the cargo holds.

7.1.3 Except for ro-ro spaces and vehicle deck spaces, cargo holds on cargo ships of 2000 gross tonnage and above shall be protected by a fixed CO_2 system or inert gas system complying with the provisions of the Fire Safety Systems Code or by a fire extinguishing system providing equivalent protection.

7.1.4 The Administration may exempt from the requirements of subsections 7.1.3 and 7.2 the cargo holds on ships designed and intended exclusively for the carriage of ore, coal, grain, unstored timber and non-combustible cargo or cargo which, in the judgement of the Administration, presents little fire risk.[34)] Such exemptions can only be granted if the ship is equipped with steel hatch covers and effective means of closing all vents and other openings leading to the cargo holds. When such exceptions have been allowed, the Administration shall issue an Exemption Certificate in accordance with chapter I, regulation 12(a)(vii), irrespective of the date of construction of the ship concerned and shall ensure that the Exemption Certificate is accompanied by a list of the cargoes the ship is authorised to carry.

7.2 Fixed gas extinguishing systems for dangerous goods

A ship engaged in the carriage of dangerous goods shall be fitted with a fixed CO_2, an inert gas system complying with the provisions of the Fire Safety Systems Code or a fire extinguishing system system in all cargo holds that, in the judgement of the Administration, provides equivalent protection for the cargo carried.

7.3 Firefighting on ships designed to carry containers on or above the weather deck and built on or after 1 January 2016

7.3.1 In addition to the equipment and arrangements required in subsections 1 and 2, ships shall carry at least one water mist nozzle.

7.3.1.1 The water mist nozzle must consist of a pipe with a piercing jet spray capable of penetrating a container wall and producing water mist in a limited area (container, etc.) when connected to the fire main.

7.3.2 Ships designed to carry five or more layers of containers on or above the weather deck shall, in addition to the requirements of subsection 7.3.1, carry portable water cannons,[35)] as follows:

Ships with a beam of less than 30 metres: At least two portable water cannons

Ships with a beam of 30 metres or more: At least four portable water cannons

7.3.2.1 The portable water cannons, all necessary hoses, fittings and required attachment hardware must be stored and ready for use in a space outside the cargo hold area that is unlikely to be cut off in case of fire in the cargo holds.

7.3.2.2 There must be a sufficient number of fire hydrants so that:

1) All available portable water cannons can be operated simultaneously to create effective water barriers in front and behind each container compartment;

2) the two water jets required in subsection 2.1.5.1 can be delivered at the pressure required in subsection 2.1.6; and

3) Each of the required portable water cannons can be supplied from separate hydrants at the pressure required to reach the top layer of containers on deck.

7.3.2.3 The portable water cannons can be supplied from the fire main, provided that the capacity of the fire pumps and the diameter of the fire main are sufficient to simultaneously power the portable water cannons and two water jets from the fire hoses at the required pressure. If dangerous goods are carried, the capacity of the fire pumps and the diameter of the fire main shall also fulfil the provisions of subsection 19.3.1.5 as far as they apply to deck cargo areas.

7.3.2.4 The operational performance of each portable water cannon shall be tested by a first survey on board the ship to the satisfaction of the Administration. The test must verify that:

1) it is possible to securely attach the portable water cannon to the ship's structure, thereby ensuring its efficient and safe operation; and

2) The jet from the portable water cannon reaches the top container layer when all required water cannons and water jets from fire hoses are operated simultaneously.

8 Protection of cargo tanks

8.1 Fixed foam extinguishing systems on deck

8.1.1 Tankers of 20,000 tonnes deadweight and above shall be provided with a fixed foam fire-extinguishing system on deck in accordance with the requirements of the Fire Safety Systems Code, except that the Administration may, after considering the applicable ship's arrangement and equipment, the Administration may authorise other fixed fire-extinguishing systems which provide an equivalent level of protection to the above in accordance with regulation I/5 in lieu of the above requirements. Alternative fixed fire extinguishing systems shall fulfil the requirements of subsection 8.1.2.

8.1.2 According to subsection 8.1.1, where the Administration allows an equivalent fixed fire extinguishing system instead of a fixed foam extinguishing system on deck, the system shall:

8.1.2.1 Be able to extinguish fires in spilt oils and prevent ignition of unignited oil; and

8.1.2.2 Be able to fight fires in explosion-damaged tanks.

8.1.3 Tankers with a deadweight tonnage of less than 20,000 tonnes must be fitted with a foam extinguishing system on deck that meets the requirements of the Fire Safety Systems Code.

9 Protection of cargo pump rooms on tankers

9.1 Fixed fire extinguishing systems

Each cargo pump room shall be fitted with one of the following fixed fire extinguishing systems, which shall be operable from an easily accessible location outside the pump room. Cargo pump rooms must be fitted with a system suitable for category A machinery spaces.

9.1.1 A CO_2 fire extinguishing system that fulfils the provisions of the Fire Safety Systems Code and the following provisions:

9.1.1.1 The alarms, which give an audible warning when the fire extinguishing system is activated, shall be safe to use in a flammable mixture of cargo vapours and atmospheric air; and

9.1.1.2 A notice must be posted at the release points stating that, due to the electrostatic ignition hazard, the system may only be used for fire extinguishing and not for inerting.

9.1.2 A high-expansion foam extinguishing system must fulfil the provisions of the Fire Safety Systems Code, provided that the foam concentrate is suitable for extinguishing fires in the cargo carried.

9.1.3 A fixed vapourisation system that complies with the provisions of the Fire Safety Systems Code.

9.2 Quantity of extinguishing agent

Where the extinguishing agent used in the cargo pump room system is also used in systems serving other compartments, the quantity of that agent available or its delivery rate need not exceed the maximum required for the largest compartment.

10 Fire-fighter's outfit

10.1 Types of fire-fighter's outfits

1. Fire-fighter's outfits must fulfil the requirements of the Fire Safety Systems Code; and

2. Fire-fighter's smoke diving apparatus must meet the requirements of subsection 2.1.2.2 of chapter 3 of the Fire Safety Systems Code as of 1 July 2019.

10.2 Number of fire-fighter's outfits

10.2.1 Every ship must have at least two fire-fighter's outfits.

10.2.2 Furthermore, passenger ships must be equipped with:

10.2.2.1 Two sets of fire-fighter's outfits and two sets of personal equipment, each comprising the items required by the Fire Safety Systems Code for every 80 metres or part thereof of the total length of the passenger and

service spaces on the deck on which such spaces are located, or, if there is more than one such deck, on the deck with the greatest total length of such spaces. Passenger ships carrying more than 36 passengers must also be equipped with two fire-fighter's outfits for each main vertical zone. However, such additional fire-fighter's outfits are not required for stairway enclosures forming a separate main vertical zone of fire and for main vertical zones of fire in the fore and aft end of the ship not containing spaces of category (6), (7), (8) or (12) as defined in regulation 9.2.2.3; and

10.2.2.2 On passenger ships carrying more than 36 passengers, for every two breathing apparatuses, there shall be one fog nozzle with an extension pipe, which shall be placed next to the breathing apparatus.

10.2.3 In addition, tankers must have two sets of fire-fighter's outfits.

10.2.4 The Administration may require additional personal equipment and breathing apparatus with due regard to the size and type of ship.

10.2.5 There must be two spare refills for each required breathing apparatus containing at least 3600 litres *of air.* Passenger ships carrying not more than 36 passengers and cargo ships equipped with suitable means to refill the air cylinders with clean air need only carry one spare refill for each breathing apparatus. *The suitable means to refill the air cylinders with clean air shall consist of at least one air compressor connected to the emergency power source with a capacity of 3,600 litres times the number of required fire-fighter's outfits, but need not exceed 25,000 litres.* Passenger ships carrying more than 36 passengers shall be equipped with at least two spare refills for each required breathing apparatus *and the air compressor mentioned above.*

10.2.6 Passenger ships carrying more than 36 passengers, built on or after 1 July 2010, shall be equipped with suitably located means to refill the air cylinders with clean air. The means of refilling must be either:

10.2.6.1 breathing air compressors, supplied from the main and emergency power source, or independently driven, with a minimum capacity of 60 l/min per required breathing apparatus, the capacity need not exceed 420 l/min; or

10.2.6.2 an independent high pressure storage system, of suitable pressure, to refill the breathing apparatus used on board with a capacity of at least 1200 litres per required breathing apparatus, the capacity need not exceed 50,000 litres of free air.

10.2.6.3 *Subsection 10.2.6 also applies to passenger ships carrying more than 36 passengers built before 1. July 2010.*

10.3 Fire-fighter's outfit storage

10.3.1 Fire-fighter's outfits and personal equipment must be ready for use and stored in an easily accessible place that is clearly labelled in a durable manner. Where there is more than one fire-fighter's outfit or more than one set of personal equipment, they should be stored far apart.

10.3.2 On passenger ships, there must be at least two fire-fighter outfits and one set of personal equipment at each storage location. At least two fire-fighter outfits must be located in each main vertical zone.

10.4 Fire-fighter communication

On ships built on or after 1 July 2014, at least two portable two-way radiotelephone sets must be carried for each fire team for communication between fire-fighters. Such portable two-way radiotelephone sets must be of an explosion-proof type or substantially safe. Ships built before 1 July 2014 shall comply with the provisions of this section no later than the first survey after 1 July 2018.

Regulation 11 Fire resistance of construction 1

Purpose

The purpose of this regulation is to maintain the structural fire resistance of the ship and prevent total or partial collapse of the ship structure due to strength failure caused by heat. To this end, the materials used in ship construction must ensure that the structural fire resistance is not degraded due to fire.

2 Material for hulls, superstructures, bulkheads, decks and deckhouses

Hulls, superstructures, bulkheads, decks and deckhouses must be made of steel or other equivalent material. When applying the definition of steel or other equivalent material in regulation 3.43, the "prescribed fire test" shall comply with the durability and insulation standards specified in tables 9.1 to 9.4. For example, where divisions such as decks or sides and ends of deckhouses may have "B-0" fire safety, the "prescribed fire test" must be half an hour.

3 Aluminium alloy constructions

Unless otherwise specified in subsection 2, where part of the structure is made of an aluminium alloy, the following shall apply:

3.1 The insulation of aluminium alloy components of Class "A" or "B" divisions, other than parts which, in the opinion of the Administration, have no strength loading, shall be such that at no time during the prescribed standard fire test shall the temperature of the core of the load-bearing structural members rise more than 200°C above the ambient temperature; and

3.2 Particular attention shall be paid to the insulation of aluminium alloy components used for columns, supports and other structural elements necessary to support the stowage of lifeboats and liferafts and lowering and embarkation points for lifeboats and liferafts, as well as Class 'A' and Class 'B' divisions to ensure

3.2.1 that for elements supporting lifeboat and liferaft areas and 'A' class divisions, the temperature rise limit specified in subsection 3.1 shall be met until after the expiry of one hour; and

3.2.2 that for elements required to support class 'B' divisions, the temperature rise limit specified in subsection 3.1 shall be met until after half an hour has elapsed.

4 Category A machinery space

4.1 Casingtop and casing

Casingtops and sides in category A machinery spaces shall be made of steel insulated according to the relevant requirements in tables 9.5 and 9.7.

4.2 Door panels

Door panels for the common gangways in category A machinery spaces must be made of steel.

5 Materials for overboard fittings

Materials that quickly become unusable due to heat must not be used for gutter drains, sanitary drains, overboard and other outlets that are close to the waterline and where failure of the material in case of fire would cause a risk of water filling.

6 Protecting the cargo tank structure against over- and underpressure on tankers

6.1 General provisions

The pressure equalisation arrangements shall be so designed and operated as to ensure that neither overpressure nor underpressure in cargo tanks exceeds the design parameters and shall be so arranged:

6.1.1 That small quantities of vapour, air or inert gas mixtures caused by thermal variations in a cargo tank can flow out through pressure/vacuum valves in all cases; and

6.1.2 Large amounts of vapour, air or inert gas mixtures can escape during loading and ballasting or during emptying.

6.2 Openings for smaller outflows due to temperature fluctuations. On tankers built on or after 1 January 2017, the openings shall be arranged in accordance with regulation 4.5.3.4.1.

Openings for pressure reliefs as prescribed in subsection 6.1.1 shall:

6.2.1 be located as high as possible above the cargo tank deck to maximise the dispersion of flammable vapours, but never below 2 m above the cargo tank deck; and

6.2.2 be located as far as possible and not less than 5 metres from the nearest air inlets and openings to enclosed spaces containing a source of ignition and from machinery and equipment on deck that may present an ignition hazard. Windlasses and chain box openings pose a risk of ignition.

6.3 Security measures on cargo tanks

6.3.1 Preventive measures against liquid rising in ventilation systems

Measures must be taken to ensure that liquid in the pressure equalisation system does not rise to a height exceeding the design pressure of the cargo tank. This shall be achieved by high liquid level alarms, by overflow control systems or by other equivalent means, together with independent metering devices and procedures for filling cargo tanks. For the purposes of this regulation, overflow valves are not considered equivalent to an overflow system.

6.3.2 Other means of pressure equalisation

Another arrangement for the complete escape of vapour, air or inert gas mixtures shall be provided to prevent overpressure or underpressure in the event of failure of the arrangement referred to in subsection 6.1.2. Furthermore, on tankers constructed on or after 1 January 2017, the second arrangement shall be capable of preventing overpressure or underpressure in the event that the shut-off means required in regulation 4.5.3.2.2 are damaged or inadvertently closed. Alternatively, pressure switches can be installed in each tank, protected by the arrangement specified in subsection 6.1.2. The control equipment shall be located in the ship's cargo control room or at the place from where loading operations are normally carried out. Such a control function must also be fitted with an alarm that is activated in case of over- or underpressure in one of the tanks.

6.3.3 Bypass in the main vent pipe

The pressure/vacuum relief valves prescribed in subsection 6.1.1 may be fitted with a bypass arrangement when installed in a main vent pipe or a master pipe. Where such a device exists, there must be suitable indicators to show whether it is open or closed.

6.3.4 Pressure/vacuum switches

One or more pressure/vacuum breakers must be provided to prevent the cargo tanks from being exposed to:

6.3.4.1 a direct overpressure exceeding the cargo tank test pressure if the cargo tank were to be loaded to its maximum capacity and all other vents are closed; and

6.3.4.2 a negative pressure of over 700 mm water column if the cargo tank were to be unloaded at the maximum capacity of the cargo pumps and the inert gas blowers were to fail.

Such devices shall be installed on the main line of the inert gas system unless installed in the venting system required in regulation 4.5.3.1 or on each individual cargo tank. The location and construction of such devices shall be in accordance with regulation 4.5.3 and subsection 6.

6.4 Size of the vent outlet

The loading, unloading and ballasting vents required in subsection 6.1.2 shall be designed on the basis of the maximum loading speed for which the ship is designed multiplied by a factor of at least 1.25 to take account of the evolution of gas and to prevent the pressure in any tank exceeding the pressure for which it is designed. The master shall be provided with information on the maximum permissible loading speed for each cargo tank and, in the case of combined venting systems, for each group of cargo tanks.

Section D Escape routes

Regulation 12 Crew and passenger

notification 1 Purpose

The purpose of this regulation is to alert crew and passengers to a fire in order to achieve a safe evacuation. For this purpose, a general alarm and public address system is required.

2 General alarm system

A general alarm system as required in regulation III/6.4.2 shall be used to alert crew and passengers to a fire.

3 Public address systems on passenger ships

A public address system or other effective means of communication complying with the requirements of regulation III/6.5 shall be available throughout the accommodation and in all service spaces, control stations and open deck areas.

Regulation 13 Escape routes/exit routes

1 Purpose

The purpose of this regulation is to prescribe escape/exit routes so that persons on board can safely and quickly escape to the lifeboats and liferaft embarkation deck. To this end, the following functional requirements must be fulfilled:

1.1 Safe escape routes must be ensured;

1.2 escape routes must be maintained in a safe condition, free of obstructions; and

1.3 additional aids should be provided where necessary to ensure accessibility, clear signage and adequate layout for emergency situations.

2 General requirements

2.1 Except as expressly provided elsewhere in this regulation, there shall be at least two means of escape/exit from every compartment spaced as far apart as possible and ready for use.

2.2 Lifts shall not constitute one of the escape routes required by this regulation.

3 Escape routes from control rooms, processing and service rooms

3.1 General requirements

3.1.1 Stairways and ladders shall be so arranged as to provide easy access to the lifeboat and liferaft embarkation decks from passenger and crew accommodation and from spaces normally occupied by the crew other than machinery spaces.

3.1.2 Except as expressly provided elsewhere in this regulation, corridors, vestibules or parts of a corridor from which there is only one escape route are prohibited. Blind corridors used in service areas necessary for the practical operation of the ship, such as fuel oil stations and cross-ship supply corridors, shall be permitted provided that such blind corridors are separated from crew accommodation areas and are inaccessible from passenger accommodation areas. A part of a corridor that has a depth not exceeding the width is considered to be a recess or local extension and is permitted.

3.1.3 All stairs in accommodation areas and service and control rooms shall be of steel frame construction, except where the Administration approves the use of other equivalent materials.

3.1.4 If a radio station does not have direct access to the open deck, there shall be two means of escape from or access to that station, one of which may be a porthole or window of sufficient size or such other means as the Administration may consider satisfactory.

3.1.5 Doors in escape routes must generally open in the direction of escape, except:

3.1.5.1 individual cabin doors may open into the cabin to avoid injury to persons in the corridor when the door is opened; and

3.1.5.2 that doors in vertical emergency exit shafts may open out from the shaft to allow the shaft to be used for both emergency exit and access.

3.2 Escape routes/exit routes in passenger ships.

3.2.1 Escape routes/exits from spaces below the bulkhead deck.

3.2.1.1 Below the bulkhead deck, there shall be two escape routes/exits from each watertight compartment or similar confined space or group of spaces, at least one of which shall be independent of watertight doors. Exceptionally, the Administration may allow one of these escape routes to be omitted for crew spaces that are only occasionally occupied if the required escape route is independent of watertight doors.

3.2.1.2 Where the Administration has authorised the exemption of one of the escape routes under the application of subsection 3.2.1.1, the single escape route shall be a safe exit. However, stairs must not be less than 800 mm in clear width, and they must have handrails on both sides.

3.2.2 Escape/exit routes from spaces above the bulkhead deck

Above the bulkhead deck, there shall be at least two means of escape/exit routes from each main vertical zone or similarly restricted space or group of spaces, at least one of which shall provide access to a stairway forming a direct vertical escape route.

3.2.3 Direct access to enclosed stairwells

Stairwells in accommodation and service spaces shall have direct access to corridors and have sufficient space to prevent congestion, taking into account the number of people expected to use them in case of emergency. Within the perimeter of such stairwells, only shared toilets, lockers made of non-combustible materials for storing non-hazardous safety equipment and open information desks are allowed. Only corridors, lifts, public toilets, special cargo holds, open ro-ro spaces accessible to any passenger, other escape stairways as required in subsection 3.2.4.1 and exterior areas shall have direct access to these stairways. Publicly accessible spaces can also have direct access to stairwells except in theatres behind the stage. Small corridors or anterooms (lobbies) used to separate an enclosed staircase from galleys or larger laundries may have direct access to the staircase provided they have a minimum deck area of 4.5 m^2, a minimum width of 900 mm and contain a fire hose station.

3.2.4 Details about escape/exit routes

3.2.4.1 At least one of the means of escape required by subsections 3.2.1.1 and 3.2.2 shall consist of an easily accessible stairway enclosed by bulkheads which shall provide continuous fire protection from the deck from which the stairway exits to the appropriate lifeboat and liferaft embarkation decks or the upper weather deck if the launching deck does not extend to the main vertical zone concerned. In the latter case, direct access to the launching deck shall be provided by external stairs and routes, which shall be fitted with emergency lighting in accordance with regulation III/11.5 and with non-slip flooring. Divisions adjacent to external open stairways and routes forming part of an escape route and other divisions so located that their failure during a fire would prevent access to the launching deck shall have a fire resistance, including insulation in accordance with tables 9.1 to 9.4, as applicable.

3.2.4.2 Access from enclosed stairway enclosures to lifeboat and liferaft embarkation areas shall be protected either directly or by protected internal routes, which shall have the same fire resistance and insulation as stairway enclosures in accordance with tables 9.1 to 9.4, as applicable.

3.2.4.3 Stairs that serve only one room and a balcony in that room shall not be considered as one of the required escape routes.

3.2.4.4 Each level within an atrium shall have two escape routes, one of which shall provide direct access to an enclosed vertical escape route that fulfils the requirements of subsection 3.2.4.1.

3.2.4.5 The width, number and continuity of escape/exit routes must comply with the requirements of the Fire Safety Systems Code.

3.2.5 Marking escape/exit routes

3.2.5.1 In addition to the emergency lighting required by regulations II-1/42 and III/11.5, escape routes, including stairways and exits, shall be marked with lights or luminous stripes which shall be placed at a height above deck not exceeding 0.3 metres at any point in the evacuation route, including corners and corridor intersections. The marking should enable passengers to identify all escape routes and quickly identify the escape exits. If electric lighting is used, it must be powered from the emergency energy source

and shall be installed in such a way that the failure of any single light unit or the cutting of a light strip does not result in the labelling becoming ineffective. In addition, all signs indicating escape routes and the location of fire equipment must be luminescent or illuminated. The Administration must ensure that such beacons or luminescent materials have been assessed, tested and installed in accordance with the Fire Safety Systems Code.

3.2.5.2 On passenger ships carrying more than 36 passengers, the requirements of subsection 3.2.5.1 shall also apply to the crew accommodation area.

3.2.5.3 Instead of the escape route lighting system required in subsection 3.2.5.1, alternative escape route guidance systems may be accepted if approved by the Administration in accordance with the guidelines developed by the Organisation.[36)]

3.2.6 Doors that are usually locked and form part of an escape route

3.2.6.1 Cabin doors and doors from similar spaces must not require the use of keys to open from inside the space. There must also be no doors on a designated escape route that require a key to unlock when travelling in the direction of escape.

3.2.6.2 Exit doors from publicly accessible rooms that are normally closed with a latch must be fitted with a quick-release (disengagement) option. Such means shall consist of a door latch mechanism containing a device that releases the latch when a force is applied in the direction of the escape route. Quick release mechanisms must be designed and installed to the satisfaction of the Administration and especially:

3.2.6.2.1 consist of crossbars or plates whose release part extends across at least half the width of the door leaf at a height of at least 760 mm and not more than 1120 mm above the deck;

3.2.6.2.2 cause the door latch to release when hit with a force of 67 N or less; and

3.2.6.2.3 not be fitted with any locking mechanism, screws or other devices that prevent the latch from releasing when a compressive force is applied to the release mechanism.

3.2.7 Evacuation analysis for passenger ships[37)]

3.2.7.1 Escape routes should be assessed using an evacuation analysis early in the design phase. The analysis must apply to:

. 1 ro-ro passenger ships built on or after 1 July 1999; and

. 2 other passenger ships built on or after 1 January 2020 and carrying more than 36 passengers.

3.2.7.2 The analysis shall be used to identify and eliminate, as far as practicable, evacuation problems that may arise during a disembarkation in connection with the normal movement of passengers and crew along escape routes, including the possibility that crew members may need to move along these routes in the opposite direction to passengers. In addition, the analysis should be used to demonstrate that the evacuation arrangement is flexible enough to account for the fact that certain escape routes, muster stations, launch stations or rescue equipment may not be used due to damage or a casualty.

3.3 Escape/exit routes on cargo ships

3.3.1 General provisions

On all levels of the accommodation, there must be at least two escape/exit routes from each confined room or group of rooms located as far apart as possible.

3.3.2 Escape routes/exit routes from rooms below the lowest open deck

Below the lowest open deck, the main escape route must be a staircase and the secondary escape route can be a shaft or staircase.

3.3.3 Escape/exit routes from rooms above the lowest open deck

Above the lowest open deck, escape routes must be stairs or doors to an open deck or a combination of both.

3.3.4 Corridors that end blindly must not be longer than 7 metres.

3.3.5 Width and continuity of escape/exit routes

The width, number and continuity of escape routes must comply with the requirements of the Fire Safety Systems Code.

3.3.6 Exception to two escape/exit routes

In exceptional cases, the Administration may dispense with one of the escape routes from crew compartments used only occasionally if the required escape route is independent of watertight doors.

3.4 Escape devices

3.4.1 Escape devices must fulfil the Fire Safety Systems Code. Auxiliary escape devices must be available on board.

3.4.2 All ships must carry at least two escape devices within the accommodation area.

3.4.3 Passenger ships must have at least two escape devices in each main vertical zone.

3.4.4 On passenger ships carrying more than 36 passengers, there shall be two escape devices in each main vertical zone in addition to those required in subsection 3.4.3 above.

3.4.5 Subsections 3.4.3 and 3.4.4 shall not apply to bulkheaded stairways which form separate main vertical zones and to the main vertical zones in the fore and aft end of a ship not containing spaces of categories (6), (7), (8) or (12) as defined in regulation 9.2.2.3.

4 Escape routes/exit routes from machinery spaces

4.1 Escape/exit routes on passenger ships

Escape/exit routes from each machinery space on passenger ships shall fulfil the following requirements:

4.1.1 Escape routes/exits from spaces below the bulkhead deck

When the room is below the bulkhead deck, the two escape routes must consist of either:

4.1.1.1 Two sets of steel ladders, spaced as far apart as possible, leading up to doors in the upper part of the compartment at similar distances from which access to the respective lifeboat and liferaft embarkation decks is possible. One of these ladders shall be located within a protected bulkhead complying with regulation 9.2.2.3, category (2), or regulation 9.2.2.4, category (4), whichever is applicable, from the lower part of the space it serves to a safe position outside the space. Self-closing fire doors

of the same fire class standard must be installed in the bulkhead. The ladder must be fixed in such a way that heat is not transferred into the bulkhead through non-insulated fixing points. The protected bulkhead must have a minimum internal dimension of 800 × 800 mm and must be fitted with emergency lighting; or

4.1.1.2 a steel ladder leading to a door in the upper part of the compartment from which access to the launching deck is possible, and a further steel door in the lower part of the compartment and at a location well separated from said ladder. The steel door must be able to open and close from both sides and provide access to a safe escape route from the lower part of the room to the launching deck.

4.1.2 Escape routes/exits from spaces above the bulkhead deck

Where the space is above the bulkhead deck, the two escape routes/exits shall be as far apart as possible, and the doors leading from these exits shall be located in a position to provide access to the appropriate lifeboat and liferaft embarkation decks. Where these escape routes require the use of ladders, these must be made of steel.

4.1.3 Exemption for two escape/exit routes

In a ship of less than 1000 gross tonnage, the Administration may allow only one escape route/exit, taking into account the width and layout of the upper part of the compartment. In a ship of 1000 gross tonnage and over, the Administration may exempt one escape route from any such space, including a normally unattended auxiliary machinery space, provided that either a door or a steel ladder provides safe egress to the launching deck, taking into account the nature and location of the space and whether the space is normally occupied by persons. In the steering gear space, a second escape route must be provided when the emergency steering position is located in this compartment, unless there is direct access to the open deck.

4.1.4 Escape/exit routes from the engine control room

There must be two escape/exit routes from the engine control room, which is located within a machinery space section. At least one escape route must provide continuous fire protection to a safe location outside the machinery space section.

4.1.5 Inclined ladders and stairs

For ships constructed on or after 1 January 2016, all inclined ladders/stairs fitted to comply with subsection 4.1.1 with open steps in machinery spaces which form part of or provide access to escape routes but which are not located in a protected bulkhead shall be of steel. Such ladders/stairs must be fitted with steel protection on the underside to protect escaping personnel from fire and flames from below.

4.1.6 Escape routes from main workshops in machinery spaces

For ships built on or after 1 January 2016, there must be two escape routes from the main workshop in a machinery space. At least one of these escape routes must provide uninterrupted fire protection to a safe position outside the machinery space.

4.2 Escape/exit routes on cargo ships

Escape routes/exit routes from each machinery space on cargo ships must fulfil the following requirements.

4.2.1 Escape routes/exit routes from category A machinery spaces Except as specified in subsection 4.22,

there shall be two escape/exit routes from each category A machinery space. In particular, one of the following provisions must be met:

4.2.1.1 Two sets of steel ladders, spaced as far apart as possible, leading up to doors in the upper part of the room, which are also separated and from which there is access to the open deck. One of these ladders shall be in a protected bulkhead (shaft) complying with regulation 9.2.3.3, category (4) from the lower part of the room it serves to a safe place outside the room. Self-closing fire doors of the same fire class standard must be installed in the bulkhead. The ladder must be fixed in such a way that heat is not transferred into the bulkhead through non-insulated fixing points. The protected bulkhead must have a minimum internal dimension of 800 × 800 mm and must be fitted with emergency lighting; or

4.2.1.2 a steel ladder leading up to a door in the upper part of the room from which there is access to the open deck, and a further steel door in the lower part of the room and at a location well separated from said ladder. The steel door must be able to open and close from both sides, providing access to a safe escape route from the lower part of the room to the open deck.

4.2.2 Exemption for two escape/exit routes

In a ship of less than 1000 gross tonnage, the Administration may dispense with one of the requirements under subsection
4.2.1 required escape/exit routes, taking due account of the dimension and layout of the upper part of the room. Furthermore, escape routes from category A machinery spaces need not fulfil the requirements for closed fire protection specified in subsection 4.2.1.1. In the steering gear space, a second escape route must be provided when the emergency steering position is located in this compartment, unless there is direct access to the open deck.

4.2.3 Escape routes/exit routes from machinery spaces that are not category A.

Two means of escape/exit shall be provided from machinery spaces other than category A, except that a single means of escape is acceptable from intermittently manned spaces and from spaces where the maximum distance to be travelled to the door is 5 m or less.

4.2.4 Inclined ladders and stairs

For ships constructed on or after 1 January 2016, all inclined ladders/stairs fitted to comply with subsection 4.2.1 with open steps in machinery spaces which form part of or provide access to escape routes but which are not located in a protected bulkhead shall be of steel. Such ladders/stairs must be fitted with steel protection on the underside to protect escaping personnel from fire and flames from below.

4.2.5 Escape routes from engine control rooms in category "A" machinery spaces

For ships built on or after 1 January 2016, there must be two escape routes from the engine control room in a machinery space. At least one of these escape routes must provide uninterrupted fire protection to a safe position outside the machinery space.

4.2.6 Escape routes from main workshops in category "A" machinery spaces

For ships built on or after 1 January 2016, there must be two escape routes from the main workshop in a machinery space. At least one of these escape routes must provide uninterrupted fire protection to a safe position outside the machinery space.

4.3 Escape devices

4.3.1 All ships must have escape devices located in conspicuous places within the machinery spaces that can be reached quickly and easily at any time in the event of a fire. The location of escape devices must take into account the layout of the machinery space and the number of people normally working in the spaces[38)]

4.3.2 The number and location of these appliances shall be indicated on the fire control plan required by v 15.2.4.

4.3.3 Escape devices must fulfil the requirements of the Fire Safety Systems Code.

5 Escape routes/exit routes on passenger ships from special cargo holds and open ro-ro cargo holds accessible to all passengers

5.1 In special cargo holds and open ro-ro spaces to which all passengers on board may have access, the number and location of escape routes/exit routes both below and above the bulkhead deck shall be to the satisfaction of the Administration and the safety of access to the launching deck shall be at least equivalent to that required by subsections 3.2.1.1, 3.2.2, 3.2.4.1 and 3.2.4.2. These spaces must have marked walkways with a minimum width of 600 mm for escape routes. The parking arrangements for vehicles must be such that the walkways are always kept clear.

5.2 One of the escape/exit routes from machinery spaces where crew members are normally employed shall avoid direct access to any special cargo hold.

6 Escape/exit routes from ro-ro spaces

There must be at least two escape/exit routes from the ro-ro space where the crew usually is working. Escape routes shall provide a safe escape route to the lifeboat and liferaft embarkation decks and shall be located in the forward and aft part of the compartment.

7 Additional requirements for ro-ro passenger ships

7.1 General requirements

7.1.1 From any normal public spaces on the ship, there must be escape routes to a muster station. These escape routes shall be arranged to provide as direct a route as possible to the muster station[39)] and shall be marked with the symbols established by the Organisation.[40)]

7.1.2 The escape route from cabins to stairwells should be as direct as possible with a minimum number of direction changes. It must not be necessary to walk from one side of the ship to the other to get to an escape route. It must not be necessary to go up or down more than two decks to get to the muster station or to the open deck from any passenger space.

7.1.3 External routes shall be provided from open decks, as specified in subsection 7.1.2, to the life-saving appliance launching stations.

7.1.4 Where an enclosed space is adjacent to an open deck, openings from the enclosed space to the open deck should, where possible, be used as emergency exits.

7.1.5 Escape routes must not be blocked by furniture and other obstacles. With the exception of tables and chairs, which can be moved out of the way to provide passage space, cabinets and other heavy furniture in public spaces and along escape routes must be secured to prevent them from slipping during the rolling and heeling of the ship. Floor coverings must also be secured. During sailing, the ship's evacuation routes must be cleared of obstructions such as cleaning trolleys, bed linen, luggage and other goods.

7.2 Instructions for securing escape/exit routes

7.2.1 Decks must be numbered consecutively, starting with "1" at the tank top or lower deck. These numbers should be prominently displayed at stair landings and lift foyers. Decks can also be indicated by a name designation, but the deck number must always be indicated by the name.

7.2.2 Simple "You are here" position plans, marked escape routes with arrows, should be prominently displayed on the inside of each cabin door and in commonly accessible spaces. The plan must show the escape directions and must be correctly orientated in relation to its location on the ship.

7.3 Strength of handrails and corridors

7.3.1 Handrails or other handholds shall be provided in all corridors along the entire length of the escape route so that a fixed handhold is present wherever possible on any part of the route to the muster and launching stations. Such handrails shall be provided on both sides of gangways more than 1.8 metres wide in the longitudinal direction and in gangways more than 1 metre wide in the transverse direction. Special attention should be paid to the need to be able to cross foyers, atria and other large open areas along escape routes. Handrails and other handholds must be strong enough to withstand an evenly distributed horizontal load of 750 N/m applied in the direction of the centre of the corridor or room and an evenly distributed vertical load of 750 N/m applied in the downward direction. The two loads do not need to be applied simultaneously.

7.3.2 The lower 0.5 m of bulkheads and other divisions that form vertical divisions along escape routes shall be capable of withstanding a load of 750 N/m so that they can be used for walking on at the ship's maximum heeling angle.

Section E Operational requirements

Regulation 14 Operational readiness and maintenance

1 Purpose

The purpose of this regulation is to maintain and monitor the effectiveness of the ship's fire safety preparedness. To this end, the following functional requirements must be fulfilled:

1.1 fire protection systems and firefighting systems and tools/equipment must be ready for use; and

1.2 Fire protection systems and firefighting systems and tools/equipment must be properly tested and checked.

2 General provisions

The requirements in subsection 1.1 must always be met while the ship is in operation. A ship is not operational when:

1. it is under repair or laid up (either at anchor or in port), or in dry dock;

2. it has been declared inoperative by the shipping company or the shipping company's representative; and

3. for passenger ships when there are no passengers on board.

2.1 Operational readiness

2.1.1 The following fire protection systems must be kept in good condition to ensure the required performance if a fire occurs:

2.1.1.1 Structural fire protection, including the fire resistance of fire divisions and the protection of openings and penetrations in these divisions

2.1.1.2 fire detection and fire alarm systems; and

2.1.1.3 evacuation systems and devices.

2.1.2 Fire suppression systems and devices must be kept in good working order and easily accessible for immediate use. Portable extinguishers that have been triggered must be refilled immediately or replaced with an equivalent device.

2.2 Maintenance, testing and inspection

2.2.1 Maintenance, testing and inspection shall be carried out on the basis of guidelines established by the organisation[41)] and in a manner that ensures the reliability of the firefighting systems and devices.

2.2.2 The maintenance schedule shall be kept on board the ship and shall be available for inspection whenever required by the Administration.

2.2.3 The maintenance plan shall include at least the following fire protection systems, fire suppression systems and equipment, if installed:

2.2.3.1 fire mains, fire pumps and hydrants, as well as hoses, jets and international shore connection;

2.2.3.2 fixed fire detection and fire alarm systems;

2.2.3.3 fixed fire extinguishing systems and other fire extinguishing devices;

2.2.3.4 automatic sprinklers, fire detection and fire alarm systems;

2.2.3.5 ventilation systems, including fire and smoke dampers, fans and their controls;

2.2.3.6 emergency shutdown of fuel supplies;

2.2.3.7 fire doors including their operation (control);

2.2.3.8 general alarm systems;

2.2.3.9 excape devices;

2.2.3.10 portable fire extinguishers including spare refills; and

2.2.3.11 fire-fighter's outfits.

2.2.4 The maintenance programme can be computer-based.

3 Additional requirements for passenger ships

In addition to the fire protection systems and equipment mentioned in subsection 2.2.3, for ships carrying more than 36 passengers, a maintenance plan shall be developed for low level guiding lights and public address systems.

4 Additional requirements for tankers

In addition to the fire protection systems and equipment mentioned in subsection 2.2.3, a maintenance plan shall be prepared for tankers:

4.1 inert gas systems;

4.2 foam extinguishing system on deck;

4.3 fire protection systems in cargo pump rooms; and

4.4 detectors for combustible gases.

Regulation 15 Instructions, on-board training and drills

1 Purpose

The purpose of this regulation is to minimise the consequences of fire through proper education, training and drills for persons on board in correct emergency procedures. For this purpose, the crew must have the necessary knowledge and skills to handle emergency situations in case of fire, including taking care of passengers.

2 General provisions

2.1 Instructions/training, duties and organisation

2.1.1 Crew members must receive instruction on fire safety on board the ship.

2.1.2 Crew members must be instructed on their specific duties.

2.1.3 Teams must be organised that are responsible for fire extinguishing. These teams must always be able to fulfil their duties when the ship is in operation.

2.2 Training and drills on board

2.2.1 Crew members shall be trained to be familiar with the layout of the ship, as well as the location and operation of any firefighting systems and equipment they may be required to use.

2.2.2 Training in the use of escape devices must be part of the on-board training.

2.2.3 The performance of crew members assigned firefighting duties must be periodically evaluated by conducting training and drills on board to identify areas requiring improvement, ensure that firefighting skills are maintained, and ensure the operational readiness of the firefighting organisation.

2.2.4 On-board training in the use of the ship's fire-extinguishing systems and equipment shall be planned and conducted in accordance with the requirements of regulation III/19.4.1.

2.2.5 Fire drills shall be conducted and recorded in accordance with the provisions of regulations III/19.3 and III/19.5.

2.2.6 A means shall be provided for refilling breathing apparatus cylinders used during drills or an adequate number of spare cylinders shall be carried on board to replace those already in use.

2.3 Instruction manuals on firefighting

2.3.1 Instruction manuals must be available in all crew mess and recreation rooms or in each crew member's cabin.

2.3.2 Instruction manuals must be written in the ship's working language.

2.3.3 The instruction manual, which may consist of several volumes, shall contain the instructions and information required in subsection 2.3.4 in easily understandable terms and, as far as possible, illustrated. Any part of such information may be made available in the form of audiovisual aids instead of the instruction manual.

2.3.4 The instruction manual should explain the following in detail:

2.3.4.1 Common practices on fire safety and precautions related to smoking hazards, electrical hazards, flammable liquids and similar common risks on board ships;

2.3.4.2 General instructions on firefighting activities and firefighting procedures, including alerting to a fire and the use of manual fire alarm buttons;

2.3.4.3 the meaning of the ship's alarms;

2.3.4.4 operation and use of fire extinguishing systems and equipment;

2.3.4.5 operation and use of fire doors;

2.3.4.6 operation and use of fire and smoke dampers; and

2.3.4.7 evacuation systems and equipment.

2.4 Fire control plans[42)]

2.4.1 For the guidance of the ship's officers, general arrangement drawings shall be permanently exhibited showing clearly for each deck the control stations, the various fire compartments surrounded by 'A' class divisions, the compartments enclosed by class 'B' divisions and details of fire detection and fire alarm systems, sprinkler systems, firefighting equipment, access routes to the various spaces, decks, etc., and the ventilation system, including details of the centralised control of fans, the location of dampers and the numbers of the fans serving each compartment. At the discretion of the Administration, the above information may instead be provided in a booklet of which each of the ship's officers must have a copy, while a copy must always be displayed on board in an accessible place. Fire control plans and booklets shall be kept up to date, with any changes made as soon as possible. The description in such plans and booklets shall be in the language or languages determined by the Administration. If this language is neither English nor French, a translation into one of these languages must be attached.

2.4.2 In all ships, a duplicate fire plan or a booklet containing these plans shall be permanently stored in a conspicuously marked weathertight enclosure outside the deckhouse for the assistance of shore-based firefighting personnel.[43)]

3 Additional requirements for passenger ships

3.1 Fire drills

In addition to the requirements of subsection 2.2.3, fire drills shall be conducted in accordance with the requirements of regulation III/30 with particular regard to passenger alerting and passenger movement to muster stations and launching decks.

3.2 Fire control plans

On ships carrying more than 36 passengers, the fire control plan or booklet required by this regulation shall include information on structural fire protection, fire detection and fire extinguishing in accordance with the guidelines issued by the Organisation.[44)]

Regulation 16 Work operations

1 Purpose

The purpose of this regulation is to provide information and instructions on proper ship and cargo handling operations in relation to fire safety. To this end, the following functional requirements must be fulfilled:

1.1 Fire safety operations booklets must be available on board; and

1.2 The release of flammable vapours during pressure equalisation of cargo tanks must be controlled.

2 Booklets on the fire safety operation of the ship

2.1 The required fire safety operations booklet must contain the necessary information and instructions on the safe operational management of the ship and loading operations in relation to fire safety. The booklet must contain information on the crew's responsibility for the general fire safety of the ship during loading and unloading and while at sea. Necessary precautions for handling normal cargo must be explained. For ships carrying dangerous goods and flammable cargoes in bulk, the fire safety operational booklet shall also include references to the relevant instructions on firefighting and emergency loading operations contained in the International Maritime Solid Bulk Cargoes (IMSBC) Code, the International Bulk Chemical Code, the International Gas Carrier Code and the International Dangerous Goods Code, as applicable.

2.2 The fire safety operations booklet should be in each crew mess and recreation room or each crew member's cabin.

2.3 The fire safety operations booklet must be written in the working language of the ship.

2.4 The fire safety operations booklet may be combined with the training and instruction manuals required in regulation 15.2.3.

3 Additional requirements for tankers

3.1 General provisions

The fire safe operations booklet referred to in subsection 2 shall include measures to prevent the spread of fire to the cargo area due to the ignition of flammable vapours and shall include procedures for purging cargo tanks of gas and/or gas venting taking into account subsection 3.2.

3.2 Procedures for cleaning cargo tanks and/or gas release

3.2.1 When the ship is fitted with an inert gas system, the cargo tanks shall first be purged in accordance with the requirements of regulation 4.5.6 until the concentration of hydrocarbon vapours in the cargo tanks is reduced to below 2% by volume. Gas release can then be done at the deck level of the cargo tank.

3.2.2 When the ship is not equipped with an inert gas system, the operation must be carried out so that the flammable vapours are initially removed through:

3.2.2.1 The air vents as specified in regulation 4.5.3.4;

3.2.2.2 Venting openings at least 2 m above load deck level with a vertical escape velocity of at least 30 m/s maintained during gas release; or

3.2.2.3 Venting openings at least 2 metres above the load deck level with a vertical discharge velocity of at least 20 m/s, protected by suitable devices to prevent the passage of flames.

3.2.3 The vents mentioned above shall be located at least 10 metres horizontally from the nearest air intake and openings to enclosed spaces containing a source of ignition, as well as from deck machinery, including windlass and chain box openings, and equipment that may present an ignition hazard.

3.2.4 Once the concentration of the flammable vapours at the outlets has been reduced to 30% of the lower flammable limit, gas release can continue at the level of the cargo tank deck.

3.3 Operation of inert gas systems

3.3.1 The inert gas system for tankers required in regulation 4.5.5.1 shall be operated in such a manner that the atmosphere in the cargo tanks remains non-combustible, except when these tanks are required to be gas-free.

3.3.2 Regardless of the above, inert gas may be used in chemical tankers after the loading of the cargo tank but before discharge, and shall continue to be used until the cargo tank in question has been purged of all flammable vapours before degassing. Only nitrogen can be accepted as an inert gas in the application of this provision.

3.3.3 Notwithstanding the provision of regulation 1.2.2.2, the provisions of this subsection apply only to tankers constructed on or after 1 January 2016. If the oxygen content of the inert gas exceeds 5% by volume, take immediate action to improve the gas quality. Unless gas quality is improved, all operations in the cargo tanks supplied with inert gas shall be suspended to prevent air being drawn into the cargo tanks, any gas control valves shall be closed and the off-specification gas shall be vented to atmosphere.

3.3.4 If the inert gas system cannot meet the requirements of subsection 16.3.3.1 and it is considered impracticable to effect a repair, unloading of cargo and purging of tanks requiring inerting shall only be resumed after appropriate emergency procedures have been followed taking into account the guidelines developed by the Organisation.[45)]

Section F Alternative constructions and arrangements

Regulation 17 Alternative constructions and arrangements

1. Purpose

The purpose of this regulation is to authorise a method of using alternative designs and arrangements for fire safety. General provisions

2.1 Fire safety designs and arrangements may deviate from the prescribed requirements given in sections B, C, D, E or G of this chapter, provided that the design and arrangements fulfil the fire protection purpose and functional requirements of this chapter.

2.2 When the construction (design) or arrangements deviate from the prescribed requirements of this chapter, a fire safety analysis, evaluation and approval shall be performed in accordance with this regulation.

3 Fire safety analysis

The fire safety analysis shall be prepared and submitted to the Administration on the basis of guidelines prepared by the Organisation[46)] and shall, as a minimum, include the following elements:

3.1 determining the type of ship and which spaces are involved;

3.2 identifying which statutory requirements the ship or spaces will not fulfil;

3.3 identifying the fire and explosion hazard of the ship or spaces involved, including

3.3.1 identifying the possible ignition sources;

3.3.2 identifying opportunities for fire development in each space covered;

3.3.3 identifying the potential for smoke and toxic gases to develop in each designated space;

3.3.4 identifying the potential for the spread of fire, smoke or toxic gases from each of the spaces in question to other spaces;

3.4 the determination of the criteria for the fulfilment of the fire safety requirements of the ships or spaces concerned which are addressed in the prescribed requirements, in particular

3.4.1 the criteria for fulfilment shall be based on the fire safety objectives and functional requirements of this chapter;

3.4.2 the fulfilment criteria must result in a level of safety that is not less than that which would be achieved by applying the prescribed requirements; and

3.4.3 the fulfilment criteria must be definable in terms of scope and measurable;

3.5 detailed description of the alternative designs and arrangements, including a list of the assumptions used in the design and any proposed operational limitation or condition; and

3.6 technical justification demonstrating that the alternative design and arrangements fulfil the fire safety criteria.

4 Evaluation of alternative designs and arrangements

4.1 The fire safety analysis required in subsection 3 shall be evaluated and approved by the Administration taking into account the guidance developed by the Organisation.[47)]

4.2 A copy of the documentation approved by the Administration indicating that the alternative design and arrangements comply with this regulation shall be carried on board the ship.

5 Exchange of information

The Administration shall communicate relevant information concerning alternative designs and arrangements approved by the Organisation to the Organisation for circulation to all Contracting Governments.

6 Re-evaluation due to a change of conditions

If the assumptions and operational restrictions set for the alternative designs and arrangements change, the fire safety analysis shall be performed under the changed conditions and approved by the Administration.

Section G Special requirements

Regulation 18 Helicopter facility

1 Purpose

The purpose of this regulation is to provide additional fire security measures in this chapter for ships equipped with special facilities for helicopters. To this end, the following functional requirements must be fulfilled:

1.1 The structure of the helideck must be sufficient to protect the ship from the fire risk associated with helicopter operations;

1.2 Firefighting equipment shall be provided to adequately protect the ship against the fire risk associated with helicopter operations;

1.3 refuelling and hangar facilities and operations must ensure the necessary precautions to protect the ship from the fire risk associated with helicopter operations; and

1.4 Instruction manuals and training must be provided.

2 Application

2.1 In addition to complying with the requirements of the relevant regulations contained in sections B, C, D and E of this chapter, ships fitted with helidecks shall comply with the requirements of this regulation.

2.2 Where helicopters occasionally or in an emergency land or perform winching operations on a ship without a helideck, firefighting equipment located in accordance with the requirements of section C may be used. This equipment must be made readily available in close proximity to the landing or hoisting area used for helicopter operations.

2.3 Regardless of the requirements of subsection 2.2 above, ships constructed on or after 1 January 2020 with helicopter landing areas shall be fitted with a foam extinguishing system complying with the relevant provisions of chapter 17 of the Fire Safety Systems Code.

2.4 Regardless of the requirements of subsection 2.2 above, ro-ro passenger ships not fitted with helidecks shall comply with regulation III/28.

3 Construction and building

3.1 Construction of steel or other equivalent material

In general, the construction of helidecks should be made of steel or other similar materials. If the helideck forms the top of a deckhouse or superstructure, it must be insulated to class "A-60" standard.

3.2 Construction of aluminium or other low melting point metals

If the Administration allows the use of aluminium or other low-melting-point metals in the construction that are not made equivalent to steel, the following precautions must be met:

3.2.1 If the platform is overhanging the side of the ship, after each fire on the ship or platform, the platform must undergo a structural analysis to determine its suitability for future use; and

3.2.2 if the platform is located above the ship's deckhouse or equivalent building, the following conditions must be met:

3.2.2.1 There must be no openings in the deckhouse top and bulkheads under the platform;

3.2.2.2 windows under the platform must be fitted with steel shutters; and

3.2.2.3 after every fire on the platform or in its immediate vicinity, the platform must be structurally analysed to determine its suitability for future use.

4 Escape routes

A helideck must be equipped with both a main and emergency exit, as well as an access route for fire and rescue personnel. These should be located as far apart as practical and preferably on opposite sides of the helideck.

5 Fire extinguishing equipment

5.1 In the immediate vicinity of the helideck, the following firefighting equipment must be available and stored close to the access to the helideck:

5.1.1 at least two powder extinguishers with a total capacity of not less than 45kg,[48)]

5.1.2 CO_2 extinguishers with a total capacity of not less than 18kg or equivalent;

5.1.3 A suitable foam extinguishing system consisting of foam cannons or foam pipes capable of delivering foam to all parts of the helideck in all weather conditions in which helicopters can operate. The system must be capable of providing a flow rate as required in table 18.1 for at least 5 minutes;

Table 18.1 - Foam flow rates

Catego-ry	Helicopter length in general	Foam outflow rate (l/ min)
H1	Up to, but less than 15 m	250
H2	From 15 m up to, but not including 24 m	500
H3	From 24 m up to but not including 35 m	800

5.1.4 the head foam fluid shall be suitable for use with salt water and comply with performance standards not inferior to those acceptable to the Organisation,[49)]

5.1.5 At least two jets of an approved combination type (jet/atomiser) and hoses of sufficient length to reach any part of the helideck;

5.1.6 instead of the requirements of subsections 5.1.3 to 5.1.5, on ships with helidecks constructed on or after 1 January 2020, a foam extinguishing system complying with the provisions of the Fire Safety Systems Code;

5.1.7 in addition to the requirements of regulation 10.10, two sets of fire-fighter's outfits; and

5.1.8 at a minimum, the following equipment must be stored in a way that allows for immediate use and is protected from the elements:

5.1.8.1 adjustable spanner;

5.1.8.2 fire blanket;

5.1.8.3 bolt cutter, 60 cm;

5.1.8.4 hook, **grab bucket** or boat hook;

5.1.8.5 heavy-duty hacksaw, complete with six spare blades;

5.1.8.6 ladder

5.1.8.7 lifting rope, 5 mm in diameter x 15 m in length;

5.1.8.8 side-cutting nippers / wire cutters;

5.1.8.9 a set of different screwdrivers; and

5.1.8.10 harness knife complete with sheath.

6 Drainage systems

Helideck drainage systems shall be constructed of steel and shall lead directly overboard independently of any other system and shall be designed so that the discharge does not affect any part of the ship.

7 Helicopter refuelling and hangar facilities

Where the ship has helicopter refuelling and hangar facilities, the following requirements must be met:

7.1 There must be a specific designated area for storing fuel tanks and this must be:

7.1.1 as far away from living areas, escape routes and launching stations as practicable; and

7.1.2 isolated from areas containing a source of ignition vapours.

7.2 the fuel storage area shall be equipped with arrangements for the collection and disposal of spilled fuel to a safe place;

7.3 tanks and associated equipment must be protected against physical damage and against a fire in an adjacent room or area;

7.4 where portable fuel storage tanks are used, special attention must be paid to:

7.4.1 the design of the tank for its intended purpose;

7.4.2 mounting and securing arrangements;

7.4.3 electrical connection; and

7.4.4 inspection procedures;

7.5 fuel pumps for storage tanks shall be fitted with means to deactivate them from a safe remote control location in case of fire. Where a gravity refuelling system is installed, a corresponding closure arrangement must be provided to separate the fuel source;

7.6 the fuel pump unit may only be connected to one tank at a time. The pipes between the tank and the pump unit must be made of steel or similar material, as short as possible and protected against damage;

7.7 electric fuel pump units and associated controls must be of a type suitable for the location and possible risks;

7.8 fuel pump units shall include a device to prevent overpressurisation of the fuelling hose;

7.9 equipment used in refuelling operations must be electrically connected;

7.10 "NO SMOKING" signs must be posted in appropriate locations;

7.11 hangars, refuelling and maintenance facilities shall be treated as category A machinery spaces with regard to structural fire protection requirements and fixed fire extinguishing and fire detection systems;

7.12 enclosed hangar spaces or enclosed spaces containing refuelling installations shall be provided with mechanical ventilation as required in regulation 20.3 for enclosed ro-ro spaces on cargo ships. Fans must be of a non-sparking type; and

7.13 electrical equipment and cables in enclosed hangars or enclosed spaces containing refuelling installations shall comply with regulations 20.3.2, 20.3.3 and 20.3.4.

8 Operations manual and firefighting arrangements

8.1 Each helicopter facility must have an operations manual, including a description and checklist of safety precautions, procedures and equipment requirements. The manual can be part of the ship's emergency procedures.

8.2 The procedures and measures to be followed during refuelling operations shall be in accordance with a recognised safe practice and contained in the operations manual.

8.3 Firefighting personnel consisting of at least two people trained in rescue and firefighting tasks, as well as firefighting equipment, must be immediately available at all times when helicopter operations are expected.

8.4 Firefighting personnel must be present during refuelling operations. However, firefighting personnel should not be involved in refuelling activities.

8.5 Refresher training shall be conducted on board and additional supplies of fire extinguishing media shall be provided for such training and testing of equipment.

Regulation 19 Transport of

dangerous goods[50)] **1 Purpose**

The purpose of this regulation is to prescribe additional fire safety requirements for ships carrying dangerous goods. For this purpose, the following functional requirements must be met:

1.1 Fire protection systems must be in place to protect the ship from the increased fire risk associated with the transport of dangerous goods;

1.2 dangerous goods must be adequately separated from ignition sources; and

1.3 suitable personal protective equipment must be available for the risks associated with the transport of dangerous goods.

2 General provisions

2.1 In addition to complying with the relevant requirements of the vs in sections B, C, D and E and regulations 18 and 20[51)], the types of ships referred to in subsection 2.2 and cargo holds intended for the carriage of dangerous goods shall comply with the relevant requirements of this regulation, except when dangerous goods are carried in limited quantities,[52)] and in excepted quantities[53)] unless these requirements are already satisfied by compliance with other requirements elsewhere in this chapter. The types of vessels and methods of transporting dangerous goods are mentioned in subsection 2.2 and table (19.1). Cargo ships of less than 500 gross tonnage shall comply with this v, but the Administration may reduce the requirements, and such reduced requirements shall be recorded in the authorisation document referred to in subsection 4.

2.2 Tables 19.1 and 19.2 apply to the following ship types and cargo holds:

2.2.1 Ships and cargo holds not specially designed for the transport of freight containers but intended for the transport of dangerous goods in packaged form, including goods in freight containers and portable tanks;

2.2.2 Purpose-built container ships and cargo holds designed to transport goods in freight containers and portable tanks;

2.2.3 Ro-ro vessels and ro-ro spaces intended for the transport of dangerous goods;

2.2.4 Ships and cargo holds intended for the transport of solid dangerous goods in bulk; and

2.2.5 Ships and cargo holds intended for the transport of dangerous goods, other than liquids and gases in bulk, in shipborne barges.

3 Special requirements

Unless otherwise specified, the following requirements shall apply when using tables 19.1, 19.2 and 19.3 on stowage of dangerous goods both "on deck" and "below deck", where the numbers of the following pieces are listed in the first column of the tables.

3.1 Water supply

3.1.1 Care shall be taken to ensure that a water supply from the fire main is immediately available at the prescribed pressure either by permanent pressurisation or by suitably located, remote-controlled starting devices for the fire pumps.

3.1.2 The quantity of water supplied shall be capable of supplying four jet sprays of a size and pressure as specified in regulation 10.2 and shall be capable of being directed at any part of the cargo hold when empty. This amount of water can be supplied by similar means that the Administration may find satisfactory.

3.1.3 Means shall be provided for the effective cooling of the relevant cargo holds below deck at a rate of at least 5 litres/min per square metre of the horizontal area of the cargo hold either by means of a fixed arrangement of nozzles or by flooding the cargo hold with water. At the discretion of the Administration, hoses can be used for this purpose in smaller cargo holds and in smaller areas in larger cargo holds. However, the bilge drainage system must be designed so that no free surfaces build up. The bilge drainage system must be sized to remove at least 125% of the total capacity of both the sprinkler water pumps and the required number of fire hoses with jets. The valves of the bilge drainage system must be operable from outside the protected space and in the vicinity of the fire extinguishing system controls. Bilge wells must have

sufficient capacity and must be placed at the side plating at a distance not exceeding 40 metres in each watertight division. If this is not possible, the Administration, when approving the stability information, shall take into account the adverse effect on stability of the increased weight and free water surface to the extent it considers necessary.[54)]

3.1.4 Measures to fill lower deck cargo holds with suitable specified media may replace the requirements of subsection 3.1.3.

3.1.5 The total required water supply capacity shall fulfil subsections 3.1.2 and 3.1.3 simultaneously when applicable, calculated for the largest of the declared cargo holds. The capacity requirement of subsection 3.1.2 shall be met by the total capacity of the main fire pump or pumps without taking into account the capacity of the emergency fire pump, if any. If a sprinkler system (drencher system) is used to fulfil subsection 3.1.3, the sprinkler pump shall also be included in the calculation of the total capacity.

3.2 Ignition sources

Electrical equipment and wiring shall not be installed in bulkheaded cargo holds or vehicle deck spaces unless, in the judgement of the Administration, it is necessary for operational purposes. If electrical equipment is installed in such rooms, it must be of a certified safe type[55)] for use in the hazardous environment to which it may be exposed, unless it is possible to completely isolate the electrical installation (e.g. by removing demountable parts of the installation other than fuses). Cable penetrations in decks and bulkheads must be sealed tightly against the passage of gases or vapour. Continuous cable runs and cables in cargo holds must be protected against impact damage. The use of other equipment that can cause ignition of flammable vapours is not permitted.

3.3 Fire detection systems

Ro/ro spaces must be fitted with a fixed fire detection and fire alarm system that fulfils the requirements of the Fire Safety Systems Code. All other types of cargo holds shall be fitted with either a fixed fire detection and fire alarm system or a smoke alarm system with continuous sampling of the atmosphere meeting the requirements of the Fire Safety Systems Code. If such a smoke alarm system with continuous sampling of the atmosphere is installed, special consideration shall be given to subsection 2.1.3 of chapter 10 of the Fire Safety Systems Code to prevent the escape of toxic vapours into areas where persons may be present.

3.4 Ventilation arrangement

3.4.1 An efficient system for mechanical ventilation of confined cargo holds must be found. The system shall be so arranged that it can exchange the air at least six times per hour in the cargo hold, based on an empty cargo hold, and that it can remove vapours from the upper or lower part of the cargo hold, as appropriate.

3.4.2 Fans must be designed to prevent ignition of flammable gas/air mixtures. Appropriate wire mesh screens must be placed over the ventilation inlet and outlet openings.

3.4.3 Enclosed cargo holds intended for the transport of dangerous goods in bulk must be fitted with natural ventilation where mechanical ventilation is not required.

3.5 Lubricants

3.5.1 Where it is intended to carry flammable or toxic liquids in bulkheaded cargo holds, the bilge drainage system shall be so designed that such liquids cannot be inadvertently discharged through the piping system or pumps in the machinery space. Where large quantities of such liquids are carried, consideration should be given to providing additional means of draining these cargo holds.

3.5.2 If the bilge drainage system supplements the system served by pumps in the machinery space, the capacity of the system shall be not less than 10 m^3/h per cargo hold it serves. If the additional system is common, the capacity need not exceed 25 m^3/h. The additional bilge drainage system does not need to be arranged with redundancy.

3.5.3 When transporting flammable or toxic liquids, the bilge line leading into the machinery space must always be isolated either by fitting a blank flange or by a closed, lockable valve.

3.5.4 Enclosed spaces outside machinery spaces containing bilge pumps serving cargo holds intended for the carriage of flammable or toxic liquids shall be provided with separate mechanical ventilation providing at least six air changes per hour. If the space has access from another enclosed space, the door must be self-closing.

3.5.5 If the discharge of bilge gutters in cargo holds is carried out by gravity discharge, the discharge must either be led directly overboard or to an enclosed tank located outside the machinery spaces. The tank must be fitted with a vent pipe for safe placement on an open deck. Discharge from a cargo hold into a manhole in a lower compartment is only permitted if such compartment fulfils the same requirements as the cargo hold above.

3.6 Personal protection

3.6.1 In addition to the fire-fighter's outfits required by regulation 10.10, there shall be provided four sets of protective clothing fully resistant to chemical attack which shall be selected taking into account the hazards associated with the chemicals carried and the standards developed by the Organisation according to the class and physical condition.[56)]

3.6.2 At least two breathing apparatus shall be provided in addition to those prescribed in regulation 10. Two spare refills suitable for use in the breathing apparatus must be available for each required breathing apparatus. Passenger ships carrying not more than 36 passengers and cargo ships provided with suitably located means to fully refill the air tanks so that they are free from contamination need carry only one spare refill for each appliance required.

3.6.3 *For cargo ships with a gross tonnage of less than 500, the extent of this equipment will be assessed on a case-by-case basis.*

3.7 Portable fire extinguishers[57)]

In addition to the portable fire extinguishers required by other provisions of this chapter, approved portable fire extinguishers with a total capacity of at least 12 kg of powder or equivalent extinguishing capacity shall be provided in the cargo holds.

3.8 Insulation of bulkheads and decks that delimit machinery spaces

Bulkheads separating cargo holds and category A machinery spaces shall be insulated to class "A-60" standard unless the dangerous goods are stowed at least 3 metres horizontally from the bulkheads. Other boundaries between these rooms must be insulated according to class "A-60" division.

3.9 Fine atomisation system (Vehicle deck sprinkler system)

Every open ro-ro space with a deck above it and every space considered to be an enclosed ro-ro space which cannot be closed tightly shall be fitted with an approved fixed fine spray system for manual operation which shall protect all parts of each deck and car platform in that space. However, the Administration may authorise the use of another fixed fire extinguishing system that has proven to be equally effective in a full-scale test. However, the bilge drainage system must be designed so that there are no exposed surfaces. The bilge drainage system must be sized to remove at least 125% of the total capacity of both the sprinkler system pumps and the required number of fire hose jets. The valves of the bilge drainage system must be operable from outside the protected space and close to the fire extinguishing system controls. Bilge wells shall have sufficient capacity and shall be located at the plating in tables spaced no more than 40 metres apart within each watertight compartment. If this is not possible, the Administration, when approving the stability information, shall take into account the adverse effect on stability of the increased weight and free water surface to the extent deemed necessary.[58)]

3.10 Separation of ro-ro spaces

3.10.1 In ships with ro-ro spaces, there must be a separation between an enclosed ro-ro space and an open ro-ro space. Separation must be such that it minimises the passage of hazardous vapours and liquids between such spaces. Alternatively, however, such a separation is not necessary where the entire length of the ro-ro space is considered to be an enclosed cargo hold that fully complies with the relevant special requirements of this regulation.

3.10.2 In ships with ro-ro spaces, there must be a separation between an enclosed ro-ro space and an adjacent weather deck. The separation must be such that it minimises the passage of hazardous vapours between such spaces. However, such separation is not necessary if the enclosed ro-ro space fulfils what is required for the dangerous goods transported on adjacent weather decks.

4 Authorisation document[59)]

The Administration shall provide the ship with a document certifying that the ship's construction and equipment fulfil the requirements of this regulation. Documentation for the transport of dangerous goods - with the exception of dangerous goods in solid form in bulk - is not required for the types of loads classified as belonging to classes
6.2 and 7, and for dangerous goods in limited or exempted quantities.

Table 19.1 - Application of requirements to different types of transport of dangerous goods on ships and in cargo holds

Where the designation "X" appears in table 19.1, it means that this requirement applies to all classes of dangerous goods as indicated in the appropriate line of table 19.3, except as noted in the notes.

Regulation 19.2.2 →		. 1	. 2	. 3		. 4	. 5
Regulation 19 ↓	Weather decks (. 1 to . 5 inclusive)	Not specially fitted out	Container cargo hold	Enclosed ro-ro spaces5	Open ro-ro spaces	Solid dangerous goods in bulk	Shipborne barges
. 3.1.1	X	X	X	X	X	For the	X

. 3.1.2	X	X	X	X	X	fulfilment of regulation 19 by	-

. 3.1.3	-	X	X	X	X	different classes of dangerous goods, see table 19.2	X
. 3.1.4	-	X	X	X	X		X
. 3.2	-	X	X	X	X		X4
. 3.3	-	X	X	X	-		X4
. 3.4.1	-	X	X1	X	-		X4
. 3.4.2	-	X	X1	X	-		X4
. 3.5	-	X	X	X	-		-
. 3.6.1	X	X	X	X	X		-
. 3.6.2	X	X	X	X	X		-
. 3.7	X	X	-	-	X		-
. 3.8	X	X	X2	X	X		-
. 3.9	-	-	-	X3	X		-
. 3.10.1	-	-	-	X	-		-
. 3.10.2	-	-	-	X	-		-

Notes to table 19.1:	
1)	Does not apply to closed containers for solid goods of classes 4 and 5.1. For classes 2, 3, 6.1 and 8, when transported in closed freight containers, the ventilation rate can be reduced to at least two air changes per hour. As far as liquid goods of class 4 and 5.1, the ventilation rate can be increased when transported in closed freight containers, be reduced to at least two air changes per hour. For the purposes of this requirement, a portable tank is considered a closed cargo container.
2)	Applies to decks only.
3)	Only applies to enclosed ro-ro spaces that cannot be closed tightly.
4)	In the special case where the barges may contain flammable vapours or if they are able to discharge flammable vapours to a safe area outside the barge's cargo hold by using ventilation ducts connected to the barges, these requirements can be relaxed or waived to Satisfaction of the Administration.
5)	Special cargo holds must be treated as enclosed ro-ro spaces when transporting dangerous goods.

Table 19.2 - Application of requirements to different classes of dangerous goods for ships and cargo holds, transporting solid dangerous goods in bulk							
Class Regulatio	4.1	4.2	4.3[6)]	5.1	6.1	8	9

n 19							
. 3.1.1	x	x	-	x	-	-	x
. 3.1.2	x	x	-	x	-	-	x
. 3.2	x	x[7]	x	x[8]	-	-	x[8]
. 3.4.1	-	x[7]	x	-	-	-	-
. 3.4.2	x[9]	x[7]	x	x[7.9]	-	-	x[7.9]
. 3.4.3	x	x	x	x	x	x	x

. 3.6	x	x	x	x	x	x	x
. 3.8	x	x	x	x[7]	-	-	x[10]

Notes to table 19.2	
6)	The substances in this class, which may be carried in bulk, present such hazards that the Administration must pay particular attention to the design and construction of the ships concerned. equipment in addition to meeting the requirements listed in this table.
7)	Only applies to "Seedcake" containing solvents, "Ammonium nitrate" and "Ammonium nitrate fertilisers".
8)	Only applies to "Ammonium nitrate" and "Ammonium nitrate fertilisers". Protection according to: EC standard 60079, electrical apparatus in explosive gas atmospheres, is sufficient.
9)	Only suitable wire mesh is required.
10)	The requirements of the International Maritime Solid Bulk Cargoes (IMSBC) Code as amended are sufficient.

Table 19.3 - Application of requirements to different classes of dangerous goods other than solid dangerous goods in bulk

Classes →	1.1-1.6	1.4S	2.1	2.2	2.3	2.3	3	3	4.1	4.2	4.3	4.3	5.1	5.2	6.1	6.1	6.1	6.1	8	8	8	8	9
Regulation 19 ↓					Flammable 20	non flammable	liquids ≤23º C 15	liquids >23ºC 15 ≤61ºC			Liquids 21	solid substances			Liquids ≤23ºC 15	liquids >23ºC 15 ≤61ºC	Liquids	solid substances	liquids ≤23ºC 15	Liquids 23ºC 15 ≤61º C	Liquids	solid substances	
. 3.1.1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

. 3.1.2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	-
. 3.1.3	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
. 3.1.4	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
. 3.2	x	-	x	-	x	-	x	-	-	-	x[18]	-	-	-	x	-	-	-	x	-	-	-	x[17]
. 3.3	x	x	x	x	-	x	x	x	x	x	x	x	x	-	x	x	x	x	x	x	x	x	-
. 3.4.1	-	-	x	-	-	x	x	-	x[11]	x[11]	x	x	x[11]	-	x	x	-	x[11]	x	x	-	-	x[11]
. 3.4.2	-	-	x	-	-	-	x	-	-	-	-	-	-	-	x	-	-	-	x	-	-	-	x[11]
. 3.5	-	-	-	-	-	-	x	-	-	-	-	-	-	-	x	x	x	-	x	x[19]	x[19]	-	-
. 3.6	-	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x[14]
. 3.7	-	-	-	-	-	-	x	x	x	x	x	x	x	-	x	x	-	-	x	x	-	-	-
. 3.8	x[12]	-	x	x	x	x	x	x	x	x	x	x	x[13]	-	x	x	-	-	x	x	-	-	-
. 3.9	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
. 3.10.1	x	x	x	x	x	x	x	x	x	x	x	x	x	x[16]	x	x	x	x	x	x	x	x	x
. 3.10.2	x	x	x	x	x	x	x	x	x	x	x	x	x	x[16]	x	x	x	x	x	x	x	x	x

Notes to table 19.3	
11)	When a "mechanically ventilated space" is required, cf. the IMDG Code, as amended.
12)	Stow at a distance of 3 metres horizontally from machinery space bulkheads in all cases.
13)	Reference to the IMDG Code, as amended.
14)	According to the goods being transported.
15)	Refers to flashpoint.
16)	According to the provisions of the IMDG Code, as amended, it is prohibited to stow dangerous goods of class 5.2 below deck or in enclosed ro-ro spaces.
17)	Only applies to dangerous goods that produce flammable vapours as specified in the IMDG Code.
18)	Only applies to dangerous goods that have a flashpoint below 23 degrees C as specified in the IMDG Code.
19)	Only applies to dangerous goods that have a subordinate risk class 6.1.
20)	According to the provisions of the IMDG Code, it is prohibited to stow dangerous goods of class 2.3 with a substandard risk class 2.1 below deck or in enclosed ro-ro spaces.
21)	According to the IMDG Code, it is prohibited to stow dangerous goods class 4.3 liquids with a flashpoint

	below 23 degrees C below deck or in enclosed ro-ro spaces.

Regulation 20 Protection of vehicle deck spaces, special cargo holds

and ro-ro spaces 1 Purpose

The purpose of this regulation is to prescribe additional fire safety requirements for ships fitted with vehicle deck spaces, special cargo holds and ro-ro spaces. For this purpose, the following functional requirements must be met:

1.1 Fire protection systems must be provided to adequately protect the ship against the fire risk associated with vehicle deck spaces, special cargo holds and ro-ro spaces;

1.2 ignition sources must be separated from vehicle deck spaces, special cargo holds and ro-ro spaces; and

1.3 Vehicle deck spaces, special cargo holds and ro-ro spaces must be adequately ventilated.

2 General requirements

Application

2.1.1. In addition to meeting the relevant requirements of the regulations in sections B, C, D and E, vehicle deck spaces, special cargo holds and ro/ro spaces must fulfil the requirements of this regulation.

2.1.2 All ships may carry vehicles with fuel in their tanks for self-propulsion in cargo holds with the exception of vehicle deck spaces, special cargo holds and ro-ro spaces - provided that all the following conditions are met:

. 1 The vehicles do not use their own propulsion in the cargo holds;

. 2 The cargo holds fulfil the relevant requirements of regulation 19; and

. 3 the vehicles are transported in accordance with the IMDG Code as defined in regulation VII/1.1.

2.2 Basic principles for passenger ships

2.2.1 The main principle underlying the provisions of this regulation is that the main vertical zoning required by regulation 9.2 may be impracticable in car deck spaces of passenger ships and that equivalent protection shall therefore be provided by horizontal zoning and by the installation of an efficient fixed fire-extinguishing system. For the application of the provisions of this regulation, a horizontal zone may then include special cargo holds on more than one deck provided that the total clear height of the zone for vehicles does not exceed 10 metres.

2.2.2 The basic principle underlying subsection 2.2.1 must also be applied to ro/ro spaces.

2.2.3 The requirements for ventilation systems, openings in 'A' class divisions and penetrations in 'A' class divisions to maintain the integrity of main vertical zones in this chapter shall apply mutatis mutandis to decks and bulkheads forming boundaries separating horizontal zones from each other and from the rest of the ship.

3 Precautions against ignition of flammable vapours in enclosed vehicle deck spaces, enclosed ro/ro spaces and special cargo holds

3.1 Capacity of ventilation systems[60)]

3.1.1 Capacity of ventilation systems

An efficient mechanical ventilation system with sufficient capacity to provide at least the following air changes shall be provided:

3.1.1.1 Passenger ships:

Special cargo hold 10 air changes per hour

Enclosed ro-ro spaces and vehicle spaces other than special cargo holds on ships carrying more than 36 passengers 10 air changes per hour

Enclosed ro-ro spaces and vehicle spaces other than special cargo holds on ships carrying not more than 36 passengers 6 air changes per hour

3.1.1.2 Cargo ships: 6 air changes per hour

The Administration may require an increased number of air changes when loading and unloading vehicles.

3.1.2 Performance of ventilation systems

3.1.2.1 On passenger ships, the mechanical ventilation system must be separate from other ventilation systems. The mechanical ventilation system shall be operated so as to provide at least the number of air changes required in subsection 3.1.1. at all times when vehicles are in such spaces, except when an air quality control system is installed in accordance with subsection 3.1.2.4 Ventilation ducts serving such closable cargo holds shall be separate for each such spaces. The system must be operable from a location outside the spaces.

3.1.2.2 On cargo ships, the fans shall normally operate continuously and provide at least the number of air changes required in subsection 3.1.1 at all times when vehicles are on board, except when an air quality control system is installed in accordance with subsection 3.1.2.4. When this is not possible, they shall be in opera_tion daily for a limited time, weather permitting, and at least for a reasonable time prior to unloading, after which time the ro-ro space or motor vehicle space shall be gas-free. For this purpose, one or more portable flammable gas detection devices must be available. The system must be completely separate from other ventilation systems. Ventilation ducts to ro-ro spaces or motor vehicle spaces must be able to be closed tightly for each individual cargo hold. The system must be operable from a location outside such spaces.

3.1.2.3 The ventilation system must be designed to prevent stratification and the formation of air pockets.

3.1.2.4 On all ships where an air quality control system is installed in accordance with the guidelines developed by the Organisation[61)], it is permitted to operate the system with a reduced number of air changes and/or a reduced ventilation rate. This relaxation does not apply to spaces where at least ten air changes per hour are required by subsection 3.2.2 of this regulation and to spaces to which regulations 19.3.4.1 and 20-1 apply.

3.1.3 Indication of ventilation systems

Means shall be provided on the bridge to indicate any loss of the required ventilation capacity.

3.1.4 Closing devices and ducts

3.1.4.1 Means shall be provided to allow the ventilation system to be stopped quickly and shut down effectively from outside the space in case of fire, taking into account weather and sea conditions.

3.1.4.2 Ventilation ducts within a common horizontal zone, including dampers, must be made of steel. On passenger ships, ventilation ducts passing through other horizontal zones or machinery spaces shall be 'A-60' class steel ducts constructed in accordance with regulations 9.7.4.1.1 and 9.7.2.4.1.2.

3.1.5 Permanent openings

Permanent openings in side plating, ends or decks shall be so arranged that a fire in the cargo hold does not endanger stowage areas and survival craft launching stations, accommodation spaces, service spaces and control stations in superstructures and deckhouses above the cargo holds.

3.2 Electrical equipment and wiring

3.2.1 Except as provided by the provisions in subsection 3.2.2, electrical equipment and wiring shall be of a type suitable for use in explosive petrol and air mixtures.[62)]

3.2.2 Regardless of the provisions of subsection 3.2.1, if there are other than special cargo holds below the bulkhead deck, the following shall apply: Above a height of 450 mm from the deck and from any vehicle platform where one is fitted, except platforms with openings of a size to allow petrol vapour

to flow downwards, electrical equipment of a type that is closed and protected to prevent the escape of sparks is permitted as an alternative, provided that the ventilation system is designed and operates so that the cargo hold is continuously ventilated with at least ten air changes per hour when vehicles are on board.

3.3 Electrical equipment and wiring in ventilation ducts

Electrical equipment and wiring, if installed in a ventilation duct, shall be of a type approved for use in explosive mixtures of petrol and air, and the outlet of any ventilation duct shall be located in a safe place, taking into account any other sources of ignition.

3.4 Other ignition sources

Other equipment that can cause ignition of flammable vapours is not allowed.

3.5 Scuppers and drains

Scuppers must not be routed to machinery spaces or other spaces where there is a risk of ignition.

4 Fire detection and alarms

4.1 Fixed fire detection and fire alarm systems

Except as provided in subsection 4.3.1, a fixed fire detection and fire alarm system meeting the requirements of the Fire Safety Systems Code shall be provided. The fixed fire detection system must be able to quickly detect a developing fire. The type of detectors and their spacing and location shall be to the satisfaction of the Administration, taking into account the effect of ventilation and other relevant factors. After installation, the system must be tested under normal ventilation conditions and must provide a total alarm time that is to the satisfaction of the Administration.

4.2 Fire detection system for sampling

Except in open ro-ro spaces, open deck spaces and in special cargo holds, a fire detection sampling system complying with the requirements of the Fire Safety Systems Code may be used as an alternative to the fixed fire detection and fire alarm system required in subsection 4.1.

4.3 Special cargo holds

4.3.1 An effective patrol system must be maintained in special cargo holds. However, if an effective patrol system is maintained with a constant fire watch at all times while travelling, it is not required to install a fixed fire detection and fire alarm system.

4.3.2 There shall be manually operated alarm buttons at a distance so that no part of the room is more than 20 metres from a manually operated alarm button and one shall be located near each exit from such spaces.

5 Constructive protection

Regardless of the requirements of regulation 9.2.2, on passenger ships carrying more than 36 passengers, bulkheads and decks bounding special cargo holds and ro-ro spaces shall be insulated to 'A-60' standard. However, where spaces of category (5), (9) or (10) as defined in regulation 9.2.2.3 are adjacent to the boundary, the standard may be reduced to 'A-0'. Where fuel oil tanks are under a special cargo hold or a ro-ro space, the integrity of the deck between such spaces and fuel oil tanks can be reduced to "A-0".

6 Fire extinguishing

6.1 Fixed fire extinguishing systems

(The requirements of subsections 6.1.1 and 6.1.2 shall apply to ships built on or after 1 July 2014. Ships built before 1 July 2014 must comply with the previously applicable requirements in subsections 6.1.1 and 6.1.2).

6.1.1 Vehicle deck spaces and ro-ro spaces which are not special cargo holds and which can be tightly closed from a position outside the cargo holds shall be fitted with one of the following fixed fire extinguishing systems:

. 1 a fixed gas-fuelled fire extinguishing system that meets the requirements of the Fire Safety Systems Code;

. 2 a fixed fire extinguishing system using high expansion foam as a fire extinguishing agent that meets the requirements of the Fire Safety Systems Code; or

. 3 a fixed water-based fire extinguishing system for ro-ro spaces and special cargo holds complying with the requirements of the Fire Safety Systems Code and of subsections 6.1.2.1 to 6.1.2.4.

6.1.2 Vehicle deck spaces and ro-ro spaces which cannot be closed tightly and special cargo holds shall have a fixed water-based fire extinguishing system for ro-ro spaces and special cargo holds complying with the requirements of the Fire Safety Systems Code to protect all parts of any deck and vehicle platform deck in such spaces. Such water-based fire extinguishing systems must have:

. A pressure gauge on the valve manifold;

. 2 clear labelling on each valve on the manifold about which spaces it serves;

. 3 instruction in the valve room on maintenance and operation; and

.4 a sufficient number of drain valves to ensure complete drainage of the system.

6.1.3 The Administration may authorise the use of other fixed fire extinguishing systems,[63]) which have been demonstrated to be no less effective in a full-scale test under conditions simulating a fire on the deck of a vehicle or in a ro-ro compartment with petrol flowing and which demonstrate that they are no less effective in controlling fires likely to occur in such spaces.

6.1.4 The provisions of this subsection shall apply to ships built on or after 1 January 2010. Ships constructed on or after 1 July 2002 and before 1 January 2010 shall comply with the previously applicable requirements of subsection 6.1.4 as amended by resolution MSC. 99(73). Where fixed sprinkler systems are used, due to the serious loss of stability that can result from the accumulation of large amounts of water on the deck or decks when the fixed sprinkler system comes into operation, the following arrangements shall be provided:

6.1.4.1 On passenger ships:

6.1.4.1.1 scuppers shall be fitted in the spaces above the bulkhead deck to ensure that such water is rapidly discharged directly overboard, taking into account the guidelines developed by the Organisation[64]);

6.1.4.1.2.1 In ro-ro passenger ships, scupper drain valves fitted with closing means operable from a position above the bulkhead deck in accordance with the requirements of the applicable International Convention on Load Lines shall be kept open while the ship is at sea;

6.1.4.1.2.2 any operation of the valves referred to in subsection 6.1.4.1.2.1 shall be recorded in the ship's logbook;

6.1.4.1.3 The Administration may require pumping and drainage systems to be provided in the spaces below the bulkhead deck in addition to those required by regulation II-1/35-1. In these cases, the bilge drainage

system must be sized to remove at least 125% of the total capacity of both the sprinkler system and the required number of fire hose connections. Jets taking into account the guidelines developed by the Organisation[65]. The valves of the bilge drainage system must be operable from outside the protected area and located close to the fire extinguishing system controls. Bilge wells must have sufficient capacity and must be placed at the plating in tables spaced no more than 40 metres apart in each watertight compartment;

6.1.4.2 On cargo ships, the bilge and pump systems must be such that the build-up of free surfaces is prevented. In these cases, the bilge drainage system shall be sized to remove at least 125% of the total capacity of both the sprinkler system and the required number of fire hose jets, taking into account the guidelines developed by the Organisation[66]. The valves of the bilge drainage system must be operable from outside the protected area and located close to the fire extinguishing system controls. Bilge wells must have sufficient capacity and must be placed at the plating in tables spaced no more than 40 metres apart in each watertight compartment. If this is not possible, the detrimental effect on stability of the added weight and free surface shall be taken into account to the extent deemed necessary by the Administration in its approval of the stability information.[67]) Such information shall be included in the stability information to the master required by regulation II-1/5-1.

6.1.5 Means shall be provided on all ships to prevent obstruction of the bilge drainage systems of enclosed car decks and ro-ro spaces and special cargo holds where fixed sprinkler systems are installed, taking into account the guidelines developed by the Organisation[68]. Ships built before 1 January 2010 shall comply with the provisions of this subsection at the first survey after 1 January 2010.

6.1.5.1 *Ships built before 1 January 2010 but after 1 July 2002, and which comply with the requirements of subsections*
6.1.5.3 and 6.1.5.4 shall be deemed to fulfil the requirements of subsection 6.1.5.

6.1.5.2 *In enclosed vehicle deck spaces, ro-ro spaces and special cargo holds on ships built before 1 July 2002, the following applies:*

6.1.5.3 *From the car deck/ro-ro deck, the drains must be of such a size that with only two thirds of the number of scuppers, bilge ports or similar on the SB or BB side in operation, these must be able to discharge a volume of water from the sprinkler pump and fire pumps, taking into account a list of approx. 1° for ships over 20 metres wide and approx. 1.5° to 2° for ships less than 20 metres wide and trim fore and aft of approx. 0.5°. A maximum water column of 100 mm is allowed above the scupper/splashwell in tables.*

6.1.5.4 *Scuppers on the vehicle deck must be fitted with a removable grill with "vertical" ribs above the drain grate to prevent larger objects from blocking the drain. The grill can be tilted towards the ship side. The grill must have a height of at least 1 metre above the deck and must have a free flow area of min. 0.4 m 2, the distance between the individual bars of the grill must be a maximum of 25 mm.*

6.2 Portable fire extinguishers

6.2.1 Portable fire extinguishers shall be provided at each deck level in each cargo hold or space where vehicles are carried, spaced not more than 20 metres apart on both sides of the space. At least one portable fire extinguisher must be placed at each access to such cargo holds.[69]

6.2.2 In addition to the requirements in subsection 6.2.1, the following fire extinguishing equipment shall be provided in vehicle deck spaces, ro-ro spaces and in special cargo holds for the transport of motor vehicles with fuel in the tanks for their own propulsion:

6.2.2.1 At least three mist nozzles with extension pipes; and

6.2.2.2 a portable foam extinguisher complying with the provisions of the Fire Safety Systems Code, provided that at least two such extinguishers are available in the ship for use in the spaces concerned.

Regulation 20-1 Requirements for car carriers carrying as cargo motor vehicles with compressed hydrogen or natural gas in the tanks intended for self-propulsion

Regulation 1 Purpose

The purpose of this regulation is to provide additional security measures to address the fire safety objectives of this chapter for car carriers with car deck spaces and ro-ro spaces intended to carry as cargo motor vehicles with compressed hydrogen or compressed natural gas in their tanks for self-propulsion.

Regulation 2 Application

2.1 In addition to complying with the requirements of regulation 20, as applicable, car carriers constructed on or after 1 January 2016 and intended to carry as cargo motor vehicles with compressed hydrogen or compressed natural gas in their tanks for their own propulsion shall comply with the requirements of subsections 3 to 5 of this regulation.

2.2 In addition to complying with the requirements of regulation 20, as applicable, car carriers built before 1 January 2016, including those built before 1 July 2012,[70)] shall comply with the requirements of subsection 5 of this regulation.

3 Requirements for spaces intended for the transport as cargo of motor vehicles with compressed natural gas in their own propulsion tanks

3.1 Electrical equipment and wiring

All electrical equipment and wiring must be of a certified safe type for use in an explosive methane and air mixture.[71)]

3.2 Ventilation arrangement

3.2.1 If electrical equipment and wiring is installed in ventilation ducts, it must be of a certified safe type that can be used in explosive methane and air mixtures.

3.2.2 The fans must be such that the possibility of ignition of methane and air mixtures is avoided. Appropriate wire mesh protection must be installed over inlet and outlet ventilation openings.

3.3 Other ignition sources

Other equipment that may be a source of ignition of methane and air mixtures is not allowed.

4 Requirements for spaces intended for the transport as cargo of motor vehicles with compressed hydrogen in the tanks for self-propulsion

4.1 Electrical equipment and wiring

All electrical equipment and wiring must be of a certified safe type for use in an explosive methane and air mixture.[72)]

4.2 Ventilation arrangement

4.2.1 If electrical equipment and wiring is installed in ventilation ducts, it must be of a certified safe type suitable for use in explosive hydrogen and air mixtures, and the outlet of exhaust ducts must be located in a safe place taking into account any other ignition sources.

4.2.2 Fans must be designed to avoid the possibility of ignition of hydrogen and air mixtures. Appropriate wire mesh protection must be installed over inlet and outlet ventilation openings.

4.3 Other ignition sources

Other equipment that may be a source of ignition of hydrogen and air mixtures is not allowed.

5 Detection

Regardless of the requirements of regulation 9.2.2, bulkheads and decks bounding special cargo holds and ro-ro spaces shall be insulated to "A-60" standard in passenger ships carrying more than 36 passengers. However, where spaces of category (5), (9) or (10) as defined in regulation 9.2.2.3 are adjacent to the boundary, the standard may be reduced to 'A-0'. Where fuel oil tanks are under a special cargo hold or a ro-ro space, the integrity of the deck between such spaces and fuel oil tanks can be reduced to "A-0".

Regulation 21 - Damage threshold, safe return to port and safe areas 1

Application

Passenger ships constructed on or after 1 July 2010, having a length as defined in regulation II-1/2.5 of 120 metres or more, or three or more main vertical zones shall comply with the provisions of this regulation.

2 Purpose

The purpose of this regulation is to establish design criteria for the safe return of ships to port under their own power after a casualty not exceeding the damage threshold defined in subsection 3, and to establish functional requirements and performance standards for safe areas.

3 Damage threshold

In the case of fire, the damage threshold includes:

3.1 loss of the space in which the fire originated up to the nearest Class 'A' boundaries which may form part of the space in which the fire originated if that space is protected by a fixed fire-extinguishing system; or

3.2 loss of the space in which the fire originated and adjacent spaces up to the nearest Class 'A' boundaries that are not part of the space in which the fire originated.

4. Safe return to port[73)] When the fire damage does not exceed the damage threshold specified in subsection 3, the ship shall be allowed to return to port while providing a safe area as defined in regulation 3. For the ship to be considered fit to return to port, the following systems must remain operational in the remaining part of the ship not affected by the fire:

4.1 forward propulsion;

4.2 steering systems and steering control systems;

4.3 navigation systems;

4.4 fuel oil filling, transfer and utilisation systems;

4.5 Internal communication between the bridge, machinery spaces, safety centres, firefighting and damage control teams and whatever is required for passenger and crew briefing and muster;

4.6 external communication;

4.7 main fire systems;

4.8 permanently installed fire extinguishing systems;

4.9 fire and smoke detection systems;

4.10 bilge water and ballast water drainage systems;

4.11 power-operated watertight and semi-watertight doors;

4.12 systems designed to support 'safe areas' as specified in subsection 5.1.2;

4.13 water filling detection systems; and

4.14 other systems that the Administration may deem essential to the efforts to control the damage.

5 Secure areas

5.1 Functional requirements:

5.1 The safe area(s) shall generally be one or more indoor areas; however, the Administration may allow an outdoor area to be used as a safe area, taking into account any restrictions due to the speed range and relevant expected environmental conditions;

5.1.2 The safe area(s) shall provide all persons in the area with access to the following basic necessities[74)] to ensure that the health of passengers and crew is maintained:

5.1.2.1 sanitation;

5.1.2.2 water;

5.1.2.3 food;

5.1.2.4 alternative area for medical treatment;

5.1.2.5 protection from the weather;

5.1.2.6 means to prevent heat build-up and cooling;

5.1.2.7 light; and

5.1.2.8 ventilation;

5.1.3 the design of the ventilation system must limit the risk of smoke and hot gases affecting the use of the safe area(s); and

5.1.4 from any area designated or used as a safe area, there must be access to life-saving appliances, taking into account that a main vertical zone may not be accessible for inboard transfer.

5.2 Alternative area for medical treatment

An alternative area for medical treatment must comply with a standard acceptable to the Administration[75)]

Regulation 22 - Design criteria for systems intended to remain functional after a fire 1

Application

Passenger ships constructed on or after 1 July 2010, having a length as defined in regulation II-1/2.2 of 120 metres or more, or three or more main vertical zones, shall comply with the provisions of this regulation.

2 Purpose

The purpose of this regulation is to establish design criteria for systems which shall remain operational for the regular evacuation and abandonment of a ship if the damage threshold as defined in regulation 21.3 is exceeded.

3 Systems[76)]

3.1 If a main vertical zone cannot be operated due to fire, the following systems must be arranged and compartmentalised to remain operational:

3.1.1 the main fire system;

3.1.2 the internal communication system (to support firefighting, as required for passenger and crew briefing and evacuation);

3.1.3 resources for external communication;

3.1.4 bilge drainage systems for removing water used for firefighting;

3.1.5 lighting along escape routes, at muster stations and at launching points of rescue equipment; and

3.1.6 guidance systems for use during evacuation must be available.

3.2 The above systems must be operational for at least 3 hours, assuming there is no damage outside the main vertical zone that cannot be operated. These systems are not required to remain operational within the main vertical inoperable zone.

3.3 Cables and piping system in trunks of 'A-60' standard shall be deemed to remain intact and serviceable when passing through the main vertical non-serviceable zone for the purposes of the requirements of the subsection's
3.1 stated purpose. An equivalent degree of protection for cables and piping systems may be approved by the Administration.

Regulation 23 - Safety centres on passenger ships

1 Application

Passenger ships constructed on or after 1 July 2010 shall have an on-board safety centre that meets the requirements of this regulation.

2 Purpose

The purpose of this regulation is to provide a space from which assistance can be provided with the management of emergency situations.

3 Location and layout

The safety centre should either be part of the bridge or located in a separate room adjacent to and with direct access to the bridge, so that emergencies can be handled without diverting the attention of the officers on duty from their navigational duties.

4 Arrangement and ergonomic design

The arrangement and ergonomic design of the safety centre shall take into account the guidelines developed by the Organisation[77)], as applicable.

5 Communication

Means of communication shall be provided between the safety centre, central control station, bridge, engine control room, fire extinguishing system storage rooms and fire equipment lockers.

6 Control and monitoring of safety systems

Regardless of the provisions specified elsewhere in the SOLAS Convention, the full functionality (operation, control, monitoring or any combination thereof, as required) of the following safety systems shall be accessible from the safety centre:

6.1 all power-driven ventilation systems;

6.2 fire doors;

6.3 general emergency alarm systems;

6.4 public address system;

6.5 electrically powered evacuation guidance systems;

6.6 watertight and semi-watertight doors;

6.7 indicators for external doors, cargo doors and other closing mechanisms;

6.8 water ingress at inner/outer bow doors, bow doors and other external doors;

6.9 CCTV system;

6.10 fire detection and alarm system;

6.11 fixed local fire extinguishing systems;

6.12 sprinkler systems and similar systems;

6.13 Water-based systems for machinery spaces;

6.14 alarm to summon the crew;

6.15 atrium smoke extraction system;

6.16 signalling systems for water filling; and

6.17 fire pumps and emergency fire pumps.

[1] Chap. II-2. The application date of 1 July 2012 was introduced by resolution MSC. 308(88). However, for chapter II-2, this resolution only amended regulation II-2/3.23 (definition of "Fire Test Procedures Code") and II-2/. 7.4.1 /new subsection 3), and all other regulations with the original application date of 1 July 2002 were not amended.

[2] Chap. II-2. *For cargo ships laid down on or after 1 June 1985 but before 1 July 2002, the corresponding applicable provisions are contained in the Danish Maritime Authority Notices C as amended.*

[3] Chap. II-2. Reference is made to MSC. 1/Circ. 1290 on the Unified Interpretations of the term "first survey" referred to in SOLAS regulations.

[4] Chap. II-2. Refer to chapter 3.4 of the IMDG Code.

[5] Chap. II-2. Refer to chapter 3.5 of the IMDG Code.

[6] Chap. II-2. Refer to MSC/Circ. 606, port state adherence to SOLAS exemptions.

[7] Chap. II-2. Refer to Revised Guidelines for the performance and testing criteria, surveys of foam concentrates for fixed fire-extinguishing systems (MSC. 1/Circ. 1312 and Corr. 1).

[8] Chap. II-2. Refer to: MSC/Circ. 553, Information on flashpoint and recommended firefighting media for chemicals to which neither the IBC nor BCH Codes apply.

[9] Chap. II-2. Reference is made to: MSC/Circ. 353, Guidelines for inert gas systems, as amended by MSC/Circ. 387.

[10] Chap. II-2. Refer to Guidelines for measures to prevent fire in engine rooms and cargo-pump rooms (MSC. 1/Circ. 1321).

[11] Chap. II-2. Refer to: Resolution A. 565(14), Recommended procedures to prevent the illegal or accidental use of low flashpoint cargo oil as fuel.

[12] Chap. II-2. Refer to Unified Interpretations of SOLAS, chapter II-2 (MSC. 1(Circ. 1322).

[13] Chap. II-2. Refer to: Recommendations published by the International Organisation for Standardisation, ISO, especially standards ISO 15540:1999, Test methods for fire resistance of hose assemblies and ISO 15541:1999, Requirements for the test bench of fire resistance of hose assemblies.

[14] Chap. II-2. Reference is made to: MSC/Circ. 677, Revised standards for the design, testing and locating of devices to prevent the passage of flame into cargo tanks in tankers as amended, and to: MSC/Circ. 731, Revised factors to be taken into consideration when designing cargo tank venting and gas-freeing arrangements.

[15] Chap. II-2. Refer to "Regulation for inert gas systems on chemical tankers" as adopted by the Organisation by resolution A. 567(14), and Corr. 1.

[16] Chap. II-2. Refer to recommendations published by the International Organisation for Standardisation, in particular (ISO/DIS 1716) Reactions to fire tests for building and transport products - Determination of the heat of combustion.

[17] Chap. II-2. Refer to Code on alerts and indicators 2009 (resolution A. 1021(26).

[18] Chap. II-2. *There shall be at least two main zones unless the Danish Maritime Authority, in each individual case and with reference to the provisions of regulation 1.4.1 and associated footnote, considers that this does not increase the fire safety of the ship.*

[19] Chap. II-2. *There shall be at least two main zones unless the Danish Maritime Authority, in each individual case and with reference to the provisions of regulation 1.4.1 and associated footnote, considers that this does not increase the fire safety of the ship.*

[20] Chap. II-2. Reference is made to the Revised Guidelines on evacuation analyses for new and existing passenger ships (MSC. 1/Circ. 1533), as amended.

[21] Chap. II-2. Refer to the guidance for approval of sprinkler systems, resolution A. 800(19) as amended by MSC 265(84) and MSC 284(86).

[22] Chap. II-2. The term "free cross-sectional area" means - even in the case of pre-insulated ducts - the area calculated on the basis of the internal dimensions of the duct itself and not the insulation.

[23] Chap. II-2. Refer to the recommendations published by the International Organisation for Standardisation, especially the publication ISO 1716:2002, "Reaction to the fire tests for building products - Determination of the heat of combustion".

[24] Chap. II-2. Outlines of such arrangements can be found in the "Unified Interpretations of SOLAS chapter II-2" (MSC. 1. /Circ. 1276).

[25] Chap. II-2. Refer to the recommendations published by the International Organisation for Standardisation, in particular the publication ISO 15371:2009, "Ships and marine technology - Fire-extinguishing systems for protection of galley cooking equipment".

[26] Chap. II-2. Refer to the recommendations published by the International Organisation for Standardisation, in particular the publication ISO 15371:2009, "Ships and marine technology - Fire-extinguishing systems for protection of galley cooking equipment".

[27] Chap. II-2. For a definition of this term, reference is made to the "Interim guidelines for open-top containerships" (MSC/Circ. 608/Rev. 1).

[28] Annex 4. Refer to Improved Guidelines for marine portable fire extinguishers Resolution A. 951(23) and Unified interpretation of SOLAS, Chapter II-2, on the number and arrangement of portable fire extinguishers on board ships (MSC. 1/Circ. 1275).

[29] Chap. II-2. Refer to Unified interpretation of SOLAS, Chapter II-2, on the number and arrangement of portable fire extinguishers on board ships (MSC. 1/Circ. 1275).

[30] Chap. II-2. Refer to Unified interpretation of SOLAS, Chapter II-2, on the number and arrangement of portable fire extinguishers on board ships (MSC. 1/Circ. 1275).

[31] Chap. II-2. An extension pipe can consist of an L-shaped metal pipe where the long part is approximately 2 metres long and can be connected to a fire hose, and the short part is approximately 250 mm and fitted with a water mist nozzle or can be fitted with a water spray nozzle.

[32] Chap. II-2. Refer to Revised Guidelines for the approval of fixed water-based local application firefighting systems for use in category A machinery spaces (MSC/Circ. 913) (MSC. 1/Circ. 1387), Unified interpretations of the Guidelines for the approval of fixed water-based local application firefighting systems (MSC/Circ. 913) (MSC/Circ. 1082) and Unified interpretations of SOLAS Chapter II-2 (MSC. 1/Circ. 1276).

[33] Chap. II-2. Refer to the International Organisation for Standardisation and, i the publication ISO 15371:2009 on fire extinguishing systems for the protection of deep fat fryers in galleys.

[34] Chap. II-2. Reference is made to the IMSBC Code (resolution MSC. 268(85)), as amended, annex 1, entry for coal, and to the Lists of solid bulk cargoes for which a fixed gas fire-extinguishing system may be exempted or for which a fixed gas fire-extinguishing system is ineffective (MSC. 1/Circ. 1395/ Rev. 1).

[35] Chap. II-2. Reference is made to "Guidelines for the design, performance, testing and approval of mobile water monitors used for the protection of on-deck cargo areas of ships designed and constructed to carry five or more tiers of containers on or above the weather deck" (MSC. 1/Circ. 1472).

[36] Chap. II-2. Refer to Functional requirements and performance standards for the assessment of evacuation guidance systems (MSC/Circ. 1167) and Interim guidelines for the testing, approval and maintenance of evacuation guidance systems used as an alternative to low-location lighting systems (MSC/Circ. 1168).

[37] Chap. II-2. Reference is made to the Revised Guidelines on evacuation analyses for new and existing passenger ships (MSC. 1/Circ. 1533), as amended.

[38] Chap. II-2. Refer to: MSC/Circ. 849, Guidelines for the performance, location, use and care of emergency escape breathing devices.

[39] Chap. II-2. Refer to: MSC/Circ. 777, Indication of the muster stations on passenger ships.

[40] Chap. II-2. Refer to: Resolution A. 760(18), Symbols related to life-saving appliances and arrangements as amended by resolution MSC. 82(70).

[41] Chap. II-2. Refer to: MSC. 1/Circ. 1432, revised guidelines on maintenance and inspection of fire protection systems and appliances and MSC. 1/ Circ. 1318/Rev. 1, Revised guidelines for the maintenance and inspection of fixed carbon dioxide fire-extinguishing systems.

[42] Chap. II-2. Refer to: Resolution A. 952(23), Graphical symbols for fire control plans.

[43] Chap. II-2. Refer to: MSC/Circ. 451, Guidance concerning the location of fire control plans for assistance of shoreside firefighting personnel.

[44] Chap. II-2. Refer to: Resolution A. 756(18), Guidelines on the information to be provided with fire control plans and booklets required by SOLAS regulations II-2/20 and 41-2.
[45] Chap. II-2. Refer to "Clarification of inert gas system requirements under the Convention" (MSC/Circ. 387) and to "Revised Guidelines for inert gas systems" (MSC/Circ. 353), as amended by MSC/Circ. 387.
[46] Chap. II-2. Refer to: MSC/Circ. 1002, Guidelines on alternative design and arrangements for fire safety.
[47] Chap. II-2. Refer to: MSC/Circ. 1002, Guidelines on alternative design and arrangements for fire safety.
[48] Chap. II-2. Refer to Unified interpretation of SOLAS Chapter II-2 on the number and arrangement of portable fire extinguishers on board ships (MSC. 1/Circ. 1275).
[49] Chap. II-2. Refer to: the International Civil Aviation Organisation Airport Services Manual, part 1 - Rescue and Fire Fighting, Chapter 8 - Extinguishing Agent Characteristics, subsection 8.1.5 - Foam Specifications table 8-1, Level 'B'.
[50] Chap. II-2. Refer to: MSC/Circ. 608/Rev. 1, the Interim guidelines for open-top container ships.
[51] Chap. II-2. Refer to: Part 7 of the International Maritime Dangerous Goods Code.
[52] Chap. II-2. Refer to: Chapter 3.4 of the International Maritime Dangerous Goods Code.
[53] Chap. II-2. Refer to: Chapter 3.5 of the International Maritime Dangerous Goods Code.
[54] Chap. II-2. Refer to: Resolution A. 123 (V), the Recommendation on fixed fire-extinguishing systems for special cargo spaces.
[55] Chap. II-2. Refer to: the Recommendations of the International Electrotechnical Commission, especially publication IEC 60092, Electrical installation in ships.
[56] Chap. II-2. For solid dry bulk cargoes, the protective clothing should fulfil the equipment requirements detailed in the relevant IMSBC Code inventories for each substance. For packaged goods, the protective clothing should fulfil the equipment requirements detailed in the Emergency Procedures (EmS) in the Supplement to the IMDG Code for each substance.
[57] Chap. II-2. Refer to Unified interpretation of SOLAS Chapter II-2 on the number and arrangement of portable fire extinguishers on board ships (MSC. 1/Circ. 1275).
[58] Chap. II-2. Refer to: Resolution A. 123 (V), the Recommendation on fixed fire-extinguishing systems for special cargo spaces.
[59] Chap. II-2. Refer to: Document of compliance with the special requirements for ships carrying dangerous goods under the provisions of regulation 19, as amended, and subsection 7.17 of the 2000 HSC Code, as amended (MSC. 1/Circ. 1266).
[60] Chap. II-2. Refer to: MSC/Circ. 729, Recommendation on design and operational guidelines for ventilation systems in ro-ro spaces*, and DS/EN ISO 9785, Ventilation of cargo holds of internal combustion engine vehicles - Calculation of theoretical air volume. For air purity control, refer to the Danish regulation on working environment in ships (Limit values for substances and materials).*
[61] Chap. II-2. Refer to "Revised design guidelines and operational recommendations for ventilation systems in ro-ro cargo spaces" (MSC/Circ. 1515).
[62] Chap. II-2. Refer to: Recommendations of the International Electrotechnical Commission, in particular publication IEC60079, Electrical apparatus for explosive gas atmospheres.
[63] Chap. II-2. Refer to: Guidelines for the approval of fixed water-based firefighting systems for ro-ro spaces and special category spaces equivalent to that referred to in resolution A. 123(V) (MSC. 1/Circ. 1272) and Revised Guidelines for the design and approval of fixed water-based firefighting systems for ro-ro spaces and special category spaces (MSC. 1/Circ. 1430).
[64] Chap. II-2. Refer to: Guidelines for drainage systems in enclosed vehicle and ro-ro spaces and special category spaces prepared by the Organisation (MSC. 1/Circ. 1234).
[65] Chap. II-2. Refer to: Guidelines for drainage systems in enclosed vehicle and ro-ro spaces and special category spaces prepared by the Organisation (MSC. 1/Circ. 1234).
[66] Chap. II-2. Refer to: Guidelines for drainage systems in enclosed vehicle and ro-ro spaces and special category spaces prepared by the Organisation (MSC. 1/Circ. 1234).
[67] Chap. II-2. Refer to: Resolution A. 123(V), Recommendation on fixed fire-extinguishing systems for special cargo spaces.
[68] Chap. II-2. Refer to: Guidelines for drainage systems in enclosed vehicle and ro-ro spaces and special category spaces prepared by the Organisation (MSC. 1/Circ. 1234).
[69] Chap. II-2. Refer to Unified interpretation of SOLAS Chapter II-2 on the number and arrangement of portable fire extinguishers on board ships (MSC. 1/Circ. 1275).
[70] Chap. II-2. Reference is made to Recommendation on security measures for existing vehicle carriers carrying motor vehicles with compressed hydrogen or natural gas in their tanks for their own propulsion as cargo (MSC. 1/Circ. 1471).
[71] Chap. II-2. Refer to the Recommendation of the International Electrotechnical Commission, especially the publication IEC 60079.
[72] Chap. II-2. Refer to the Recommendation of the International Electrotechnical Commission, especially the publication IEC 60079.
[73] Chap. II-2. Refer to "Performance standards for the systems and services to remain operational on passenger ships for safe return to port and orderly evacuation and abandonment after a casualty" (MSC. 1/Circ. 1369/Add. 1).
[74] Chap. II-2. Refer to "Performance standards for the systems and services to remain operational on passenger ships for safe return to port and orderly evacuation and abandonment after a casualty" (MSC. 1/Circ. 1369/Add. 1).
[75] Chap. II-2. Refer to "Guidance on the establishment of medical and sanitation related programmes for passenger ships" (MSC/Circ. 1129).
[76] Chap. II-2. Refer to "Performance standards for the systems and services to remain operational on passenger ships for safe return to port and orderly evacuation and abandonment after a casualty" (MSC. 1/Circ. 1369/Add. 1).
[77] Chap. II-2. Refer to guidelines to be developed by the Organisation.

Annex 5

Chapter III - Life-saving appliances and arrangements

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Life-saving appliances and arrangements

Section A General

Regulation 1 Scope of application

1 Unless expressly provided otherwise, this chapter shall apply *to passenger ships of all sizes and cargo ships of 500 gross tonnage and upwards the* keel of which is laid or which are at a similar stage of construction on or after 1 July 1998, *and to cargo ships of less than 500 gross tonnage, the keel of which is laid on or after 1 January 2002.*

2 In this chapter, "a corresponding build stage" means the stage where:

2.1 a construction project that can be identified with a specific ship is commenced; and

2.2 assembly of this ship has commenced, comprising at least 50 tonnes or 1% of the estimated total hull weight, whichever is less.

3 In this chapter,

3.1 the term 'ships constructed' means ships whose keel is laid or which are at a similar stage of construction;

3.2 the term 'all ships' means passenger ships of any size and cargo *ships of 500 gross tonnage and upwards* built before, on or after 1 July 1998, *and cargo ships of less than 500 gross tonnage built on or after 1 January 2002;* the terms 'all passenger ships' and 'all cargo ships' shall be interpreted accordingly;

3.3 a cargo ship, irrespective of when built, which is converted into a passenger ship shall be treated as a passenger ship built on the date on which such a conversion begins.

4 For ships built before 1 July 1998, the Administration shall:

. 1 ensure that, subject to the provisions of subsection 4.2, the requirements of chapter III of the International Convention for the Safety of Life at Sea, 1974, in force before 1 July 1998 for new or existing ships as prescribed by that chapter are complied with;

.2 ensure that when life-saving appliances or arrangements on such ships are replaced or such ships undergo major repairs, alterations or modifications involving replacement or extension of the existing life-saving appliances or arrangements, such life-saving appliances or arrangements comply, so far as is reasonable and practicable, with the provisions of this chapter. However, if a survival craft other than inflatable liferafts is replaced without replacing the launching appliance or vice versa, the survival craft or launching appliance may be of the same type as the one being replaced; and

. 3 ensure that the requirements of regulations 30.3 and 37.3.9 are met.

5 Regardless of subsection 4.2, lifeboats under load release arrangements not complying with subsections 4.4.7.6.4 to 4.4.7.6.6 of the Code shall be replaced on all ships not later than the first scheduled dry-docking after 1 July 2014 but not later than 1 July 2019 with equipment complying with the requirements of the Code.

Regulation 2 Exceptions

1 If, in the judgement of the Administration, the voyage is undertaken under such protected conditions that it would be unreasonable or unnecessary to apply specific requirements of this chapter, it may exempt from these requirements certain ships or classes of ships not more than 20 nautical miles from the nearest land.

2 With regard to passenger ships used for the carriage of large numbers of passengers on special voyages, such as pilgrim trade, the Administration may, if it is satisfied that it is impracticable to implement the requirements of this chapter, exempt such ships based in its own country from compliance with these requirements, provided that they fully comply:

2.1 the regulations in the Annex to the "Agreement on Passenger Ships Travelling on Special Service, 1971"; and

2.2 the regulations in the Annex to the "Protocol on Space Requirements for Passenger Ships engaged on Special Voyages, 1973".

Regultion 3 Definitions

Unless expressly provided otherwise, the following definitions apply in this chapter:

1 Anti exposure suit (AES) is a protective suit designed for use by the crew of rescue boats and marine evacuation systems.

2 Trained person means a person who holds a certificate of proficiency in the operation of lifeboats and liferafts issued under the authority of, or recognised as valid by, the Administration in accordance with the regulations of the International Convention (STCW Convention); or a person holding a certificate of proficiency issued by, or recognised for the same purposes as the Convention certificate of proficiency by, the Administration of a State which is not a Party to that convention.

3 Localisation is the determination of the position of survivors, lifeboats or liferafts.

4 Embarkation ladder is the ladder provided at lifeboat and liferaft embarkation points to allow safe access after launching.

5 Self-release launching is the method of launching lifeboats and liferafts whereby they are automatically released from a sinking ship and are ready for use.

6 Free-fall launching is the method of launching a lifeboat whereby the boat with the full load of people and equipment on board is released and can fall into the sea without any means of restraint.

7 Immersion suit is a protective suit that reduces the user's body heat loss in cold water.

8 Inflatable rescue device is a rescue device whose buoyancy is provided by means of non-solid, air-filled compartments and which is normally kept uninflated until it is needed.

9 Permanently inflated rescue device is a rescue device whose buoyancy is provided by means of non-solid, air-filled compartments and which is kept inflated and ready for use at all times.

10 International Life-Saving Appliance (LSA) Code (referred to as the "Code" in this chapter) means "International Life-Saving Appliances (LSA) Code" adopted by the Maritime Safety Committee of the Organisation by resolution MSC. 48(66), which may be amended by the Organisation provided that such amendments are adopted, enter into force and operate in accordance with the provisions of article VIII of this Convention concerning the amendment procedures for this annex other than chapter I.

11 Launching device or arrangement is a means by which a lifeboat and liferaft or rescue boat is safely transferred from its stowed position to the water.

12 Length is 96% of the total length of a waterline at 85% of the minimum side height measured from the top of the keel or the length from the front of the bow to the axis of the rudder stock on the waterline, whichever is greater. If the ship is designed with a steerage, the waterline on which this is measured shall be parallel to the design waterline.

13 Lightest seagoing condition is the loading conditions with the ship on an even keel, without cargo, with 10% provisions and fuel, and in case it is a passenger ship, with full number of passengers and crew with luggage.

14 Marine evacuation system (MES) is a means of rapidly transferring people from the ship's embarkation deck to a floating lifeboat or raft.

15 Depth (moulded)

15.1 The depth (moulded) is the vertical distance from the top of the keel to the top of the freeboard deck beam. On wooden and composite ships, the distance is measured from the bottom edge of the rabbet. Where the lower part of the centre frame has a concave shape or where heavy keel planks are fitted, measure the distance from the point where the flat bottom continues to intersect the side of the keel.

15.2 On ships where the deck/side connection is rounded, the depth (moulded) is measured to the intersection of the deck and side construction lines (moulded lines), extending the lines as if there were a gutter angle.

15.3 If the freeboard deck has steps and the raised part of the deck extends over the point where the depth (moulded) is to be determined, this must be measured to a reference line running parallel to the raised part from the lowest part of the deck.

16 A completely new type of rescue device or arrangement is a rescue device or arrangement that incorporates new features not fully covered by the provisions of this chapter or the Code, but which provides an equivalent or higher standard of safety.

17 Positive stability is the ability of a vessel to return to its original position after removing a heeling moment.

18 Recovery time for a rescue boat is the time it takes to lift the boat to a position where people on board can be transferred to the deck of the ship. The recovery time includes time to prepare the rescue boat for boarding, e.g. feeding and attaching a safety line, hooking the rescue boat to the launching device and lifting the rescue boat. The recovery time does not include time to lower the launching device to a position from which recovery of the rescue boat can take place.

19 A rescue boat is a boat designed to rescue people in distress and to assist lifeboats and liferafts.

20 Recovery is the safe boarding of survivors.

21 Ro-ro passenger ship means a passenger ship with ro-ro cargo holds or special cargo holds as defined in regulation II-2/3.

22 Short international voyage is an international voyage during which a ship travels no more than 200 nautical miles from a port or place where passengers and crew can be brought to safety. Neither the distance between the last port of call in the country from which the journey begins and the final destination port nor the return journey may exceed 600 nautical miles. The final destination port is the last port of call on the planned voyage, from where the ship begins its return journey to the country where the voyage began.

23 Survival craft is a lifeboat or raft that can keep people in distress alive from the moment the ship is abandoned.

24 Thermal Protective Apparatus (TPA) is a bag or suit that is made of waterproof material with low thermal conductivity and also fulfils the provisions of regulation 34.

25 *Requirements for maintenance, thorough examination, operational testing, overhaul and* repair means "Requirements for maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear", as adopted by the Maritime Safety Committee (MSC) of the Organisation by Resolution MSC. 402(96), which may be amended by the Organisation, provided that such amendments have been adopted, entered into force and given effect in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to Annexes other than chapter I.

Regulation 4 Evaluation, testing and approval of life-saving appliances and arrangements

1 With the exception of the provisions of subsections 5 and 6, life-saving appliances and arrangements prescribed in this chapter shall be approved by the Administration.

2 Before approving life-saving appliances and arrangements, the Administration shall ensure that such life-saving appliances and arrangements:

2.1 have been tested to determine that they meet the requirements of this chapter and the regulation in accordance with the Organisation's recommendations,[1)]

2.2 have successfully completed, to the satisfaction of the Administration, tests substantially equivalent to those specified in these recommendations.

3 Before approving completely new types of life-saving appliances or arrangements, the Administration shall ensure that such:

3.1 means provide safety standards at least equivalent to the requirements of this chapter and the Code and that they have been evaluated and tested in accordance with the guidelines developed by the Organisation[2)]

3.2 successful arrangements have undergone technical analysis, evaluation and approval in accordance with regulation 38.

4 The authorisation procedures adopted by the Administration shall also include the conditions under which the authorisation shall continue or be revoked.

5 Before the Administration accepts life-saving appliances and arrangements not previously approved by it, it must be demonstrated to the Administration that the life-saving appliances and arrangements fulfil the regulations of this chapter and the code.

6 Life-saving appliances prescribed in this chapter for which detailed specifications are not contained in the code shall be to the satisfaction of the Administration.

Regulation 5 Production samples

The Administration shall prescribe that life-saving appliances be subjected to such production tests as are necessary to ensure that they are manufactured to the same standard as the approved prototype.

Section B Regulations for ships and life-saving appliances

Section I - Passenger ships and cargo ships

Regulation 6 Communication equipment

1 Reserved[3)]

2 Reserved

3 Emergency signals

A minimum of 12 parachute signals that fulfil the regulations of subsection 3.1 of the Code must be carried. These should be stored on or near the bridge and should be positioned so that they are as protected as possible from moisture.

4 Onboard communication equipment and alarm systems

4.1 Emergency equipment consisting of either fixed or portable equipment or both shall be provided for two-way communication between control stations, muster and embarkation stations and strategic locations on board.

4.2 A main alarm signalling system complying with the regulations of subsection 7.2.1 of the Code shall be provided and shall be used to call passengers and crew to muster stations and to initiate actions included in the muster list. The system shall be supplemented with either a public address system that fulfils the requirements of subsection 7.2.2 of the Code or other suitable means of communication. Speaker entertainment should be automatically switched off when the main alarm signalling system is activated.

4.3 The main alarm system must be audible in living areas and in places where the crew normally works. On passenger ships, the main alarm system must also be audible on all open decks.

4.4 In ships equipped with marine evacuation systems (MES), ensure that communication between the embarkation station and the platform or liferafts is possible.

5 Public address systems on passenger ships

5.1 In addition to the requirements of regulations II-2/40.5 or II-2/41-2[4)] and subsection 4.2 respectively, all passenger ships shall have a public address system installed. For passenger ships built before 1 July 1997, the provisions of subsections 5.2
5.2 and 5.4 shall apply, taking into account the provisions of subsection 5.5, shall apply no later than the date of the first main periodic survey after 1 July 1997.

5.2 The public address system shall be clearly audible above the background noise in all compartments prescribed in subsection 7.2.2.1 of the Code, and shall be provided with an override function controlled from a position on the ship's bridge and such other places on board as the Administration may deem necessary so that all emergency messages will be broadcast even if the loudspeakers in the compartments concerned are switched off, the volume is turned down or public accessible spaces are used for other purposes.

5.3 On passenger ships built on or after 1 July 1997:

5.3.1 The public address system shall have at least two circuits, which shall be adequately separated throughout their length and shall have two separate and independent amplifiers; and

5.3.2 The loudspeaker system and its performance standards shall be approved by the Administration taking into account the recommendations adopted by the Organisation.[5)]

5.4 The public address system shall be connected to the emergency power supply required in regulation II-1/42.2.2.

5.5 Ships constructed before 1 July 1997, which are already fitted with a public address system approved by the Administration and which substantially comply with the requirements of subsections 5.2 and 5.4 and subsection 7.2.2.1 of the Code, need not replace their system.

Regulation 7 Personal life-saving appliances

1 Lifebuoys

1.1 Lifebuoys that fulfil the regulations of subsection 2.1.1 of the Code shall be:

1.1.1 distributed so that they are easily accessible on both sides of the ship and, as far as practicable, on all open decks along the ship's side; at least one shall be located near the stern; and

1.1.2 positioned in such a way that they can be released quickly and they must not be permanently attached in any way.

1.2 At least one lifebuoy on each side of the ship shall be fitted with a lifeline that floats on the water and fulfils the regulations of subsection 2.1.4 of the Code. The length of the lifeline shall be at least twice the height at which the lifebuoy is positioned above the waterline when the ship is in its lightest seagoing condition or 30 metres, whichever is greater.

1.3 At least half of all lifebuoys shall be fitted with self-igniting life-saving lights complying with the regulations of subsection 2.1.2 of the Code; at least two of these shall also be fitted with floating self-acting smoke signals complying with the regulations of subsection 2.1.3 of the Code and shall be capable of rapid release from the bridge. Lifebuoys with lights and lifebuoys with lights and smoke signals shall be equally distributed on both sides of the ship and shall not be the lifebuoys fitted with lifelines in accordance with

the regulations of subsection 1.2.

1.4 Each lifebuoy shall be labelled with the name and home port of the ship to which it belongs in legible letters of the Latin alphabet.

2 Lifejackets

2.1 Each person on board shall be provided with a lifejacket that fulfils the requirements of the regulation. 2.2.1 or 2.2.2 of the Code, and in addition:

2.1.1 for passenger ships on voyages of less than 24 hours, a number of infant lifejackets shall be provided equal to at least 2.5% of the number of passengers on board;

2.1.2 for passenger ships on voyages of 24 hours or more, vests must be provided for each infant on board;

2.1.3 child lifejackets are provided in a number equal to at least 10% of the number of passengers on board, or such greater number as may be necessary to provide a lifejacket for each child on board; and

2.1.4 carry a sufficient number of lifejackets for persons on duty and for use at remote lifeboat and liferaft muster stations. The lifejackets carried for persons on duty must be placed on the bridge, in the engine control room and at all manned lookouts.

2.1.5 if the adult lifejacket is not designed to fit persons weighing up to 140 kg and with a chest measurement up to 1750 mm, an adequate number of accessories shall be available on board to ensure that the jackets can be adapted to such persons.

2.2 Lifejackets must be positioned so that they are easily accessible. Their location shall be clearly marked. If the lifejackets provided in accordance with the regulations of subsection 2.1 become inaccessible due to the particular configuration of the ship, alternative arrangements shall be made to the satisfaction of the Administration, which may include increasing the number of lifejackets to be carried.

2.3 Lifejackets for use in fully enclosed survival craft, except free-fall survival craft, shall not obstruct access to the survival craft or seating area. This also applies to the operation of seat belts in the survival craft.

2.4 Lifejackets selected for free-fall survival craft and the manner in which they are worn or used shall not impede access to the survival craft, the safety of its occupants or the operation of the survival craft.

3 Immersion suits and protective suits

3.1 An immersion suit complying with subsection 2.3 of the Code or a suit complying with subsection 2.4 of the Code of appropriate size shall be provided for each person assigned to man overboard boats or marine evacuation systems (MES). If the ship is always employed in hot climates,[6]) where, in the opinion of the Administration, thermal protection is not necessary, this protective clothing is unnecessary.

Regulation 8 Muster lists and emergency instructions 1

This regulation applies to all ships.

2 There must be clear instructions on what each person on board should do in an emergency situation. In the case of passenger ships, these instructions must be in the language or languages required by the ship's flag State and in English.

3 Muster lists and emergency instructions complying with the provisions of regulation 37 shall be posted in conspicuous places on board the ship, including the bridge, machinery spaces and crew accommodation spaces.

4 Illustrations and instructions in appropriate languages shall be displayed in passenger cabins and posted in conspicuous places at muster stations and other passenger areas to inform passengers:

4.1 their muster station;

4.2 the necessary measures they need to take in an emergency; and

4.3 how to put on a lifejacket.

Regulation 9 Operating instructions

1 This regulation applies to all ships.

2 Posters or signs shall be displayed on or near lifeboats and liferafts and their launching systems, which shall:

1. illustrate the purpose of the controls and the procedure for operating the systems, and provide relevant instructions or warnings;

2. be easily visible in conditions where only emergency lighting is switched on; and

3. use symbols in accordance with the Organisation's recommendations.[7)]

Regulation 10 Manning and control of lifeboats and liferafts

1 This regulation applies to all ships.

2 There must be a sufficient number of trained persons on board who can muster and provide assistance to untrained persons in an emergency.

3 A sufficient number of crew members, who may be deck officers or persons certificated in the operation of lifeboats and liferafts, shall be on board to operate the lifeboats and liferafts and launching arrangements necessary for the total number of persons on board to leave the ship.

4 A deck officer or a person certificated in the operation of lifeboats and liferafts shall be given command of each lifeboat and liferaft to be used. However, having due regard to the nature of the voyage, the number of persons on board and the characteristics of the ship, the Administration may authorise the transfer of command of liferafts to persons experienced in handling and operating liferafts instead of persons with the above qualifications. For lifeboats, a second-in-command must also be appointed.

5 The person in command of the lifeboat or raft shall have a list of the lifeboat or raft crew and shall ensure that the crew is familiar with their duties. For lifeboats, the second-in-command must also have a list of the lifeboat crew.

6 For each motorised lifeboat, a person capable of operating the engine and making minor adjustments to it must be designated.

7 The master shall ensure an equitable distribution of the persons referred to in subsections 2, 3 and 4 among the ship's lifeboats and liferafts.

Regulation 11 Muster and embarkation arrangements for lifeboats and liferafts

1 Lifeboats and liferafts for which approved launching appliances are prescribed shall be stowed as close as possible to the accommodation and service spaces.

2 Muster stations must be located close to the embarkation points. There must be sufficient space at each muster station for all persons destined to muster at that location, with a minimum of 0.35 m^2 per person.

3 Muster and embarkation stations must be easily accessible from accommodation areas and workstations.

4 Muster and embarkation stations shall be adequately illuminated by light supplied from the emergency source of electrical power prescribed in regulations II-1/42 or II-1/43, respectively.

5 Corridors, stairs and exits providing access to muster and embarkation stations must be illuminated. The power supply for such lighting shall be capable of being provided by the emergency source of electrical power prescribed in regulation II-1/42 or II-1/43. In addition, and as part of the marking prescribed in regulation II-2/28.1.10,[8)] routes to the muster stations shall be marked with the muster station symbol intended for that purpose, in accordance with the Organisation's recommendations.[9)]

6 Muster and embarkation stations for davit-launched and free-fall survival craft shall be so arranged that a person on a stretcher can be placed in the survival craft.

7 At each embarkation station or every two neighbouring embarkation stations for lifeboats or life-rafts launched down the side of the ship, there shall be a boarding ladder complying with the provisions of subsection 6.1.6 of the Code and extending in single ladder length from the deck to the waterline when the ship is in its lightest seagoing condition under all conditions of trim of up to 10° and list of up to 20° either way. However, the Administration may authorise the replacement of such ladders by approved devices giving access to lifeboats or liferafts when in the water, provided that there is at least one embarkation ladder on each side of the ship. Other means of embarkation which enable safe descent to the water may be permitted for liferafts prescribed in regulation 31.1.4.

8 If necessary, means shall be provided to bring lifeboats and davit-launched liferafts to the ship's side and to keep them there so that persons can be safely embarked.

Regulation 12 Launching stations

Launching stations shall be located so that lifeboats and liferafts can be safely launched, taking into account in particular the distance from the propeller and any heavily overhanging parts of the hull and such that lifeboats, except lifeboats specially designed for free-fall launching, can be launched as far as possible along the vertical side of the ship. If they are positioned at the front, they must be positioned aft of the collision bulkhead in a protected location, and a special assessment of the strength of the launching device must be carried out for this purpose. The Administration must pay special attention to the strength of the launching device.

Regulation 13 Location of lifeboats and liferafts

1 Each lifeboat and liferaft must be positioned:

1.1 such that neither the boat or raft nor their stowage arrangements impede the operation of any other lifeboat, liferaft or rescue boat at any of the other launching sites;

1.2 as close to the water surface as is safe and practical. A lifeboat or lowerable liferaft shall be stowed in such a position that in the embarkation position the lifeboat or liferaft is at least 2 metres above the waterline when the ship is fully loaded and in unfavourable conditions of trim up to 10° and list up to 20°, or to the angle at which the edge of the ship's weather deck is submerged, whichever is less.

1.3 in permanent standby mode so that two crew members can perform boarding and launch preparation in less than 5 minutes:

1.4 fully equipped as required by this chapter and the Code; and

1.5 as far as practicable in a safe and protected position and protected against damage from fire and explosion. In particular, lifeboats and liferafts on tankers shall not be stowed on or above cargo tanks, slop tanks or other tanks containing explosives or dangerous goods, except liferafts prescribed in regulation 31.1.4.

2 Lifeboats intended for launching alongside the ship shall be positioned as far forward of the propeller as practicable. On cargo ships of 80 metres in length and over but less than 120 metres in length, each lifeboat shall be so arranged that the stern of the lifeboat is at least the length of the lifeboat forward of the propeller. On cargo ships 120 metres in length and over and passenger ships 80 metres in length and over, each lifeboat shall be arranged so that the stern of the lifeboat is at least 1.5 times the length of the lifeboat forward of the propeller. As far as practicable, the ship shall be so arranged that lifeboats in their stowed positions are protected from damage due to heavy seas.

3 Lifeboats must be secured to launching devices.

4.1 Each liferaft must be stowed with its safety line permanently attached to the ship.

4.2 Each liferaft or group of liferafts shall be stowed with a float-free arrangement as prescribed in subsection 4.1.6 of the Code so that they float freely and, if inflatable, inflate automatically when the ship sinks.

4.3 Liferafts shall be stowed to allow manual release of one liferaft or container at a time from their securing arrangements.

4.4 Subsections 4.1 and 4.2 shall not apply to liferafts prescribed in regulation 31.1.4.

5 Davit-launched liferafts shall be stowed within reach of the lifting hooks unless transfer means are provided which are not rendered inoperative within the limits prescribed in subsection 1.2 with respect to trim and list or by ship motion or power failure.

6 Liferafts intended for launching by overboard throwing shall be so stowed that they can be readily transferred for launching from either side of the ship unless liferafts of a total capacity as prescribed in regulation 31.1 are stowed on both sides of the ship.

Regulation 14 Location of rescue boats

Rescue boats must be positioned:

1. In a permanent state of readiness so that they can be deployed in under 5 minutes, and if it is an inflatable type, it must be fully inflated at all times;

2. in a position suitable for launching and boarding;

3. such that neither the rescue boat nor its stowage arrangements impede the operation of any lifeboat or liferaft at any other launching site; and

4. in accordance with regulation 13, if it is also a lifeboat.

Regulation 15 Location of marine evacuation systems (MES)

1 The ship side shall have no openings between the marine evacuation system (MES), embarkation station and the waterline in the lightest seagoing condition, and means shall be provided to protect the system from any protrusion.

2 Marine evacuation systems (MES) shall be positioned so as to ensure safe launching, taking particular account of the need for the system to be clear of the ship's propeller and steep overhangs of the hull, and so that the system can be launched down the straight side of the ship as far as practicable.

3 Each marine evacuation system (MES) shall be positioned so that neither the passage nor the platform, nor its positioning or operational arrangements, will impede the use of other life-saving appliances at other launching stations.

4 Where appropriate, the ship shall be arranged so that stowed marine evacuation systems (MES) are protected from being damaged by high waves.

Regulation 16 Launching and boarding arrangements for lifeboats and liferafts

1 Unless otherwise expressly required, launching and embarkation appliances complying with the regulations of subsection 6.1 of the Code shall be provided for all lifeboats and liferafts except those which are

1.1 boarded from a position on deck lower than 4.5 metres above the waterline in the lightest seagoing condition and having a weight not exceeding 185 kg; or

1.2 boarded from a position on deck lower than 4.5 metres above the waterline in the lightest seagoing condition and stowed for launching directly from stowed position under unfavourable conditions of trim of up to 10° and list of at least 20° to either side; or

1.3 carried in addition to lifeboats and liferafts for 200% of the total number of persons on board the ship and weighing not more than 185 kg; or

1.4 carried in addition to lifeboats and liferafts for 200% of the total number of persons on board the ship and stowed for launching directly from stowed position under unfavourable conditions of trim of up to 10° and list of at least 20° either way; or

1.5 intended for use in conjunction with a marine evacuation system in accordance with the requirements of subsection
6.2 of the Code and positioned for launching directly from stowed position under unfavourable trim conditions of up to 10° and with a list of up to 20° to either side.

2 Each lifeboat shall be fitted with a device for launching and recovering the lifeboat. It must also be possible to suspend the lifeboat so that the release device can be released for maintenance.

3 Launching and boarding arrangements shall be such that the person operating the arrangement can observe the survival craft at all times during launching and, in the case of lifeboats *and rescue boats,* also during boarding.

4 Only one type of release mechanism may be used for the lifeboats and liferafts of the same type carried by the ship.

5 The preparation and handling of a lifeboat or liferaft at a launching site shall not impede the preparation and handling of any other lifeboat, liferaft or man overboard boat at any other site.

6 Runners shall be of such length that the lifeboat and liferaft can reach the water when the ship is in its lightest seagoing condition under unfavourable conditions of trim of up to 10° and list of at least 20° to either side.

7 During preparation and launching, the lifeboat or liferaft, its launching appliance and the part of the sea into which it is to be launched shall be adequately illuminated by light supplied from the emergency source of electrical power required by regulation II-1/42 or II-1/43.

8 Means shall be provided to prevent any discharge of water into lifeboats or liferafts while the ship is abandoned.

9 Where there is a risk of lifeboats or liferafts being damaged by the ship's stabilising fins, means powered from an emergency source shall be provided to bring the stabilising fins inboard; indicators powered from an emergency source shall be provided on the bridge showing the position of the stabilising fins.

10 Where partly covered lifeboats complying with the regulations of subsection 4.5 of the Code, there shall be an intermediate halyard between the davits to which are attached at least two knotted ropes of sufficient length to reach the water when the ship is in its lightest seagoing condition under unfavourable conditions of trim of up to 10° and list of up to 20° either way.

Regulation 17 Embarkation, launching and boarding arrangements for rescue boats

1 The embarkation and launching arrangements for the rescue boat shall be such that the embarkation and launching of the rescue boat can take place in the shortest possible time.

2 If the rescue boat is one of the ship's lifeboats, the embarkation arrangements and launching site shall fulfil the requirements of regulations 11 and 12.

3 Launching arrangements must fulfil the regulations of regulation 16. However, all rescue boats shall be capable of being launched, if necessary, by the use of safety lines, when the ship is moving forward on calm water at a speed of up to 5 knots.

4 Boarding the rescue boat shall be no more than 5 minutes in a steady wind with a full load of people and equipment. If the rescue boat is also a lifeboat, this boarding shall be possible when it is loaded with its lifeboat equipment and the approved rescue boat load of at least 6 persons.

5 Embarkation and disembarkation arrangements for rescue boats must allow a stretcher to be handled in a safe and efficient manner. If heavy halyard blocks are a hazard, there must be a lanyard available for boarding the boat in bad weather.

Regulation 17-1 - Rescuing persons from the sea

1 All ships shall have ship-specific plans for procedures for rescuing persons from the sea, taking into account the guidelines developed by the Organisation[10)]. These plans and procedures shall identify the equipment intended to be used for rescue purposes and the precautions to be taken to minimise the risk to shipboard personnel involved in rescue from the sea. Ships built before 1 July 2014 shall comply with this requirement at the first periodical or renewal survey of the ship's safety equipment to be carried out after 1 July 2014, whichever occurs first.

2 Ro-ro passenger ships complying with regulation 26.4 shall be deemed to comply with this regulation.

Regulation 18 Line-throwing applicances

A line-throwing appliance that fulfils the regulations of subsection 7.1 of the Code must be provided. *Ships with a gross tonnage of less than 250 do not need a line-throwing appliance.*

Regulation 19 Emergency training and drills

1 This regulation applies to all ships.

2 Knowledge of safety installations and mustering

2.1 Each crew member with safety obligations must familiarise themselves with these obligations before the voyage begins.

2.2 On a ship in service where passengers are to be on board for more than 24 hours, the muster of new passengers shall take place before or immediately after departure. Passengers must be instructed on the use of lifejackets and what to do in an emergency.

2.3 When new passengers board, they must be given safety instructions immediately before sailing or immediately after sailing. The safety instruction must include instructions required in regulations 8.2 and 8.4 and shall be provided in the form of an announcement in a language or languages likely to be understood by passengers. The safety announcement must be made over the ship's public address system or other similar means likely to be heard by at least those passengers who have not yet heard it during the voyage. The safety announcement can be included in the muster required in subsection 2.2. Information leaflets, notices or video programmes displayed on ships' video projectors may be used to supplement the safety announcement but shall not replace the safety announcement.

3 Drills

3.1 Drills should be conducted as much as possible as if there was a real emergency situation.

3.2 Each crew member must participate in at least one boat drill and fire drill every month. If more than 25% of the crew have not participated in boat and fire drills on board the ship in question in the previous month, a crew drill must be conducted within 24 hours of the ship's departure from port. When a ship enters service for the first time, after a major refit, or when a new crew is hired, these drills must be held before sailing. For classes of ships where this is not possible, other arrangements which are at least equivalent may be approved by the Administration.

3.3 Crew members with duties involving confined space entry and evacuation shall participate in a confined space entry and evacuation drill to be held on board the ship at least every two months.

3.4 Boat drill

3.4.1 Each boat drill must include:

3.4.1.1 passengers and crew are summoned to muster stations by means of the alarm prescribed in regulation 6.4.2 followed by an evacuation announcement over the public address system or other communication system which ensures that they are aware of the order to abandon ship,

3.4.1.2 everyone reports to the stations and gets ready for the tasks described in the muster list,

3.4.1.3 check that passengers and crew are appropriately dressed,

3.4.1.4 check that the lifejackets are put on correctly,

3.4.1.5 after any necessary preparation for launching, launch at least one lifeboat,

3.4.1.6 start and operate the lifeboat engine,

3.4.1.7 operating davits used for launching liferafts,

3.4.1.8 a mock search and rescue of passengers trapped in their cabin, and

3.4.1.9 practice using the radio life-saving devices.

3.4.2 During successive boat drills, different lifeboats shall be launched in accordance with the regulations of subsection 3.4.1.5 as far as practicable.

3.4.3 Except as provided in subsections 3.4.4 and 3.4.5, each lifeboat shall be launched and manoeuvred in the water by the assigned crew at least once every three months as part of an evacuation drill.

3.4.4 For lifeboats designed for free-fall launching, at least once every three months during an evacuation drill, the crew must climb into the lifeboat and secure themselves in the seats and perform launching procedures up to, but not including, the actual release of the boat (the hook shall not be released). The lifeboat must then either be launched in free fall with only the required lifeboat crew on board, or lowered to the sea surface using the secondary launching arrangement, with or without the required lifeboat crew on board. In both cases, the lifeboat must then be manoeuvred in the water by the lifeboat crew. At least every six months, the lifeboat must either be launched in free fall with the lifeboat crew on board or, alternatively, a simulated launch must be carried out according to the guidelines established by the Organisation.[11)]

3.4.5 The Administration may permit ships in short international trade to refrain from launching lifeboats on one side, provided that the port's mooring arrangements and route pattern do not permit lifeboats to be launched on that side. However, all such lifeboats must be launched at least once every 3 months and deployed at least once a year.

3.4.6 As far as reasonably and practicable, man overboard boats, with the exception of lifeboats, which are also man overboard boats, shall be launched monthly with the designated crew on board and manoeuvred on the water. In any case, this requirement must be met at least once every 3 months.

3.4.7 If launching drills with a lifeboat and a rescue boat are carried out while the ship is travelling through the water, such drills shall, for reasons of risk, only be carried out in protected waters and shall be supervised by an officer experienced in such drills.[12)]

3.4.8 If a ship is equipped with marine evacuation systems (MES), drills should include training in the procedures required for using such a system up to a point just prior to actual deployment of the system. This type of drill shall be supplemented by general instruction using the on-board training aids required by regulation 35.4. Each Marine Evacuation System (MES) crew member shall be further trained - as much as practicable - to participate in the deployment of such a system in the water, either on board a ship or on land at intervals of 2 years, but in no case at intervals greater than 3 years. This training is equivalent to the extension required in regulation 20.8.2.

3.4.9 The emergency lighting for muster and evacuation must be tested at every evacuation drill

3.5 Fire drills

3.5.1 Fire drills should be planned in a way that emphasises regular practice for various emergency situations that may occur, depending on the type of ship and cargo.

3.5.2 Every fire drill must include:

3.4.2.1 Everyone reports to the fire stations and prepares for the tasks described in the muster lists in regulation 8,

3.5.2.2 starting a fire pump and using at least two water jets to show that the system is in proper working order,

3.5.2.3 checking fire-fighter's outfits and other personal rescue equipment,

3.5.2.4 checking relevant communication devices,

3.5.2.5 checking the function of watertight doors, fire doors, fire dampers and main entrances and exits to the ventilation system in the training area, and

3.5.2.6 checking arrangements necessary for a subsequent evacuation of the ship.

3.5.3 Equipment used during drills must be immediately restored to full operational readiness and any faults and defects discovered during drills must be rectified as soon as possible.

3.6 Confined space entry and evacuation drills

3.6.1 Confined space entry and evacuation drills shall be planned and conducted safely with due regard to the guidance provided in the recommendations developed by the Organisation.[13)]

3.6.2 All confined space entry and evacuation drills must include the following:

3.6.2.1 check and use of personal protective equipment required for confined space entry;

3.6.2.2 check and use of communication equipment and procedures;

3.6.2.3 check and use of air measurement instruments in confined spaces;

3.6.2.4 check and use of evacuation equipment and procedures; and

3.6.2.5 instruction in first aid and resuscitation techniques.

4 Training and instruction on board

4.1 Training and instruction on board in the use of the ship's life-saving appliances, including lifeboat and liferaft equipment, and in the use of the ship's firefighting equipment shall be given as soon as possible and not later than 2 weeks after a crew member joins the ship. However, if the crew member is on a scheduled, regularly recurring duty on board the ship, such training must be given no later than 2 weeks after the crew member first takes up duty on the ship. Instruction in the use of the ship's firefighting equipment, rescue equipment and rescue at sea shall be given at the same interval as the drills. Each instruction may cover different parts of the ship's life-saving and firefighting equipment, but all the ship's life-saving and firefighting equipment must be covered within a period of 2 months.

4.2 Each member of the crew shall be given instructions which shall include, but are not necessarily limited to:

4.2.1 operation and use of the ship's inflatable liferafts,

4.2.2 hypothermia issues, first aid treatment for hypothermia and other relevant first aid procedures,

4.2.3 special instructions necessary for the use of the ship's life-saving appliances in heavy weather and sea conditions,

4.2.4 operation and use of fire extinguishing equipment; and

4.2.5 the risks associated with confined spaces and the procedures on board for safe access to such spaces, which should take due account of the guidance given in the recommendations developed by the Organisation.[14)]

4.3 On board ships equipped with davit-launched liferafts, training in their use shall take place at intervals not exceeding 4 months. Whenever practical, training should include inflating and launching a liferaft. This liferaft may be a specialised liferaft intended solely for training purposes and not included in the ship's life-saving appliances; such specialised liferaft shall be conspicuously marked.

5 Recording

The date of muster drills and details of boat and fire drills, confined space entry and evacuation drills, drills with other life-saving appliances and on-board training shall be recorded *in the ship's logbook or equivalent.* If a complete muster, drill or practice is not held at the prescribed time, the circumstances and extent of the muster, drill or practice shall be recorded *in the ship's logbook or* equivalent.

Regulation 20 Emergency response, maintenance and inspection

1 This regulation applies to all ships. The requirements of regulations 3.2, 3.3 and 6.2 shall, as far as possible, also be met on ships built before 1 July 1986.

2 Emergency preparedness

All life-saving appliances must be in serviceable condition and ready for immediate use before the ship leaves port and at all times during the voyage.

3 Maintenance

3.1 Maintenance, testing and inspection of life-saving appliances must be carried out in a way that ensures the reliability of the life-saving appliances.

3.2 Instructions for the maintenance of life-saving appliances on board, complying with regulation 36, shall be provided, and maintenance shall be carried out accordingly.

3.3 The Administration may accept, in accordance with the requirements of subsection 3.2, an on-board maintenance programme which complies with the requirements of regulation 36.

4 Maintenance of runners

Runners used in launching appliances shall be checked periodically,[15)] with particular attention to the areas running over blocks and discs, and renewed where deemed necessary due to degradation, but not more than after 5 years, whichever is the earliest. *For stainless steel runners, wire ropes of grade AISI 316 or better with steel calliper are allowed to be renewed after a maximum of 15 years from the date stated on the wire rope certificate. The wire must be turned upside down/shifted in length at intervals of no more than 30 months so that a "new" piece of wire is placed over the blocks and discs. Talurit splices are not allowed to have a service life of more than 5 years. If mechanical damage, corrosion or other defects are found during inspection, the wire must be replaced immediately.*

5 Spare parts and repair equipment

Spare parts and repair equipment must be available for the life-saving appliances and their components that are subject to heavy wear or consumption and require regular replacement.

6 Weekly inspections

The following tests and inspections must be performed weekly and an inspection report must be written in the logbook:

6.1 All lifeboats and liferafts, rescue boats and launching appliances must be inspected to ensure they are ready for use. The inspection must include, but is not limited to, the condition of the hooks, their attachment to the lifeboat and that the on-load release mechanism is fully reset;

6.2 All engines on lifeboats and rescue boats must be started and run for at least three minutes if the ambient temperature is above the minimum temperature required to start the engine. During the three minutes, check that the gearbox and transmission shafts are working properly. If a lifeboat outboard motor cannot run for three minutes without the propeller being in the water, a suitable water supply can be provided instead. In special cases, the Administration may waive this requirement for ships built before 1 July 1986;

6.3 lifeboats on cargo ships, except free-fall launching lifeboats, shall, weather permitting, be moved from their stowed position without persons on board to demonstrate the satisfactory operation of the launching appliances; and

6.4 the main alarm must be tested.

7 Monthly inspections

7.1 All lifeboats, except free-fall lifeboats, shall be swung over the side of the ship without persons on board if weather and sea conditions permit.

7.2 Life-saving appliances, including lifeboat appliances, shall be inspected monthly, using the checklist prescribed in regulation 36.1 to ensure that they are complete and in good working order. A report of the inspection must be entered in *the ship's logbook or equivalent.*

8 Inspection of inflatable liferafts, inflatable lifejackets, marine evacuation systems (MES) and maintenance and repair of inflatable rescue boats[16)]

8.1 All inflatable liferafts, inflatable lifejackets and marine evacuation systems (MES) must be inspected:

8.1.1 at intervals not exceeding 12 months, provided that where this is not practicable, the Administration may extend the period to 17 months;

8.1.2 at an authorised service station that is competent to inspect them, has the necessary facilities for the inspection and uses only properly trained personnel.[17)]

8.1.3 *documentation of the last inspection must be kept on board;*

8.1.4 *in Denmark and Greenland, inspections may only be carried out by persons or service stations that are also authorised by the Danish Maritime Authority.*

8.2 Alternating deployment of marine evacuation systems (MES)

In addition to or at the same time as the service checks on marine evacuation systems (MES) required in subsection 1.1.2.1.1.
8.1 each marine evacuation system shall be deployed from the ship in turn and at intervals approved by the Administration, provided that each system is utilised at least once every 6 years.

8.3 An Administration which approves new and novel inflatable life-saving appliances under regulation 4 may allow longer intervals between inspections if the following are met:

8.3.1 The new and unprecedented rescue arrangement has been proven to be of the same standard as required for test procedures during extended inspection intervals.

8.3.2 The liferaft system shall be examined on board by authorised persons in accordance with subsection 8.1.1.

8.3.3 Inspections at intervals not exceeding 5 years must be performed in accordance with the Organisation's recommendations.[18)]

8.4 All repairs and maintenance of inflated rescue boats must be carried out in accordance with the manufacturer's instructions. Emergency repairs can be carried out on board the vessel, but permanent repairs must be carried out at an authorised service station.

8.5 An Administration permitting the extension of intervals between lifeboat overhauls in accordance with subsection 8.3 shall notify the Organisation in accordance with regulation I/5(b).

9 Periodic inspections of hydrostatic releases

Hydrostatic releases - with the exception of disposable hydrostatic releases - must be inspected:

9.1 at intervals not exceeding 12 months, provided that where this is not practicable, the Administration may extend the period to 17 months,[19)]

9.2 at a service station that is competent to inspect them, has the necessary facilities for the inspection and uses only properly trained personnel;

9.3 *documentation of the last inspection performed must be kept on board; and*

9.4 *in Denmark and Greenland, inspections may only be carried out by persons or service stations that are also authorised by the Danish Maritime Authority.*

10 Labelling of stowage positions

Containers, racks, shelves and other similar places intended for the stowage of life-saving appliances shall be marked with symbols in accordance with the recommendations of the Organisation,[20]) indicating the equipment stowed in the place. If more than one piece of equipment is placed in one location, the amount of equipment must also be stated.

11 Maintenance, thorough inspection, operational testing, thorough overhaul and repair of lifeboats, rescue boats and fast rescue boats, launching appliances and release devices

11.1 Launching appliances must:

. 1 undergo a thorough inspection in connection with the annual surveys required by chapter 1, regulation 7 or 8, as applicable; and

. 2 after the inspection referred to in subsection 11.1.1 has been completed, the winch brake shall be subjected to a dynamic test at maximum brake launching speed. The weight to be used shall be the weight of the lifeboat or rescue boat without persons on board; however, the test shall be carried out at least every five years with a test load corresponding to 1.1 times the weight of the lifeboat or rescue boat with the full number of persons and equipment.

11.2 Lifeboat and rescue boat release devices, including fast rescue boat release devices and free-fall lifeboat release systems, shall:

. 1 be thoroughly inspected and operationally tested during the annual surveys required by chapter 1, regulations 7 and 8;

. 2 in the case of on-load release devices, operationally tested with a weight equivalent to 1.1 times the weight of the boat with the full number of persons and equipment when the release device is inspected. The thorough inspection and operational testing must be performed at least every five years; and

. 3 regardless of the provisions of subsection 11.2.2, the operational testing of the free-fall lifeboat release systems shall be carried out either as a free-fall launch with only the operational crew on board or as a test without launching the lifeboat, carried out in accordance with the requirements for maintenance, a thorough inspection, operational testing, thorough overhaul and repair.

11.3 Automatic release hooks for davit-launched liferafts must:

. 1 undergo a thorough inspection and operational testing during the annual surveys required by chapter 1, regulations 7 and 8; and

. 2 be operationally tested with a weight equivalent to 1.1 times the weight of the liferaft with the full number of persons and equipment when the automatic release hook is checked. The thorough inspection and operational testing must be performed at least every five years.

11.4 Lifeboats and rescue boats, including fast rescue boats, shall be subject to a thorough inspection and operational testing in connection with the annual surveys required by chapter 1, regulations 7 and 8.

11.5 The thorough inspection, operational testing and overhaul required in subsections 11.1 to 11.4 and the maintenance and repair of equipment as detailed in subsections 11.1 to 11.4 shall be performed

in accordance with the requirements for maintenance, thorough inspection, operational testing, thorough overhaul and repair and the instructions for shipboard maintenance as required by regulation 36.

Section II - Passenger ships

(additional regulations)

Regulation 21 Lifeboats, liferafts and rescue boats

1 Lifeboats and liferafts

1.1 Passenger ships in international trade outside short international trade must carry:

1.1.1 partly or fully enclosed lifeboats complying with the regulations of subsections 4.5 or 4.6 of the Code on each side of the ship of such total capacity that they can accommodate at least 50% of all persons on board. The Administration may authorise the replacement of lifeboats by liferafts of equivalent capacity, provided that there are never fewer lifeboats on each side of the ship than are sufficient to accommodate 37.5% of all persons on board. The liferafts shall fulfil the provisions of subsections 4.2 or 4.3 of the Code and shall be operated by launching appliances equally distributed on each side of the ship; and

1.1.2 in addition, inflatable or rigid liferafts meeting the requirements of the regulations in subsections 4.2 or 4.3 of the Code of such total capacity that they can accommodate at least 25% of all persons on board. These liferafts shall be served by at least one launching appliance on each side, which may be the launching appliances provided in accordance with the regulations of subsection 1.1.1 or equivalent approved appliances that can be used on both sides. However, the stowage of these liferafts need not fulfil the requirements of regulation 13.5.

1.2 Passenger ships in short international trade must carry:

1.2.1 lifeboats complying with the regulations of subsection 4.5 or 4.6 of the Code, partly or wholly covered, equally distributed, as far as practicable, on each side of the ship and of such aggregate capacity that they can accommodate at least 30% of the total persons on board; and inflatable or rigid liferafts complying with the regulations in subsections 4.2 or 4.3 of the Code of such aggregate capacity that together with the lifeboat capacity, the lifeboats and liferafts can accommodate all persons on board. The liferafts shall be operated by launching appliances equally distributed on each side of the ship; and

1.2.2 in addition, inflatable or rigid liferafts complying with the regulations in subsections 4.2 or 4.3 of the Code of such total capacity that they can accommodate at least 25% of all persons on board. These liferafts shall be served by at least one launching appliance on each side, which may be the launching appliances provided in accordance with the regulations of subsection 1.2.1 or equivalent approved appliances that can be used on both sides. However, the stowage of these liferafts need not fulfil the requirements of regulation 13.5.

1.3 All lifeboats and liferafts necessary for the abandonment of the ship by all persons on board shall be capable of being launched with a full complement of persons and equipment within 30 minutes from the time the abandon ship signal is given after all persons have assembled and are wearing lifejackets.

1.4 Instead of complying with the requirements of regulations in 1.1, 1.2 or 1.3, passenger ships of less than 500 tonnes with fewer than 200 persons on board may comply with the following:

1.4.1 They shall carry on each side of the ship inflatable or rigid liferafts complying with the regulations in subsections 4.2 or 4.3 of the Code and of such total capacity as to accommodate all persons on board;

1.4.2 Unless the liferafts required by subsection 1.5 are stowed in a position which permits easy side-to-side transfer at a single open deck level, additional liferafts shall be provided so that the total capacity available on each side can accommodate 150% of all persons on board;

1.4.3 If the rescue boat prescribed in subsection 2.2 is also a fully or partly enclosed lifeboat complying with the regulations in subsections 4.5 or 4.6 of the Code, it may be included in the total capacity prescribed in subsection 1.5, provided that the total capacity available on each side of the ship is at least 150% of the total persons on board; and

1.4.4 If one of the lifeboats or liferafts is lost or becomes unserviceable, a sufficient number of lifeboats or liferafts shall be available for use on each side of the ship to accommodate all persons on board; this number shall also include those liferafts which are stowed in a position which allows easy access for transfer from side to side on a single open deck.

1.5 A marine evacuation system (MES) or systems complying with the provisions of subsection 6.2 of the Code may replace an equivalent capacity of liferafts and launching appliances required by subsections 1.1.1 or 1.2.1.

2 Rescue boats

2.1 Passenger ships of 500 tonnes and above shall carry on each side of the ship at least one rescue boat complying with the regulations in subsection 5.1 of the Code.

2.2 Passenger ships of less than 500 tonnes shall carry at least one rescue boat complying with the regulations in subsection 5.1 of the Code.

2.3 A lifeboat may be approved as a rescue boat if it and its launch and recovery arrangement also fulfil the regulations for a rescue boat.

3 Accompanying liferafts

3.1 The number of lifeboats and rescue boats on passenger ships shall be sufficient to ensure that each lifeboat or rescue boat does not need to accompany more than six liferafts to enable all persons on board to abandon ship.

3.2 The number of lifeboats and rescue boats carried on passenger ships engaged in short international trade shall be sufficient to ensure that each lifeboat or rescue boat does not need to accompany more than nine life-rafts to enable all persons on board to abandon ship.

Regulation 22 Personal life-saving

appliances 1 Lifebuoys

1.1 A passenger ship shall carry lifebuoys complying with the regulations of regulation 7.1 and subsection 2.1 of the Code in a number not less than that prescribed in the following table:

Length of the ship in metres	Minimum number of lifebuoys
Under 60	8
60 and under 120	12
120 and under 180	18
180 and under 240	24
240 and above	30

1.2 Regardless of regulation 7.1.3, passenger ships of less than 60 metres in length shall carry at least six lifebuoys fitted with self-igniting lights.

2 Lifejackets

2.1 In addition to the lifejackets prescribed in regulation 7.2, every passenger ship shall carry lifejackets for at least 5% of all persons on board. These lifejackets must be placed in conspicuous places on deck or at muster stations.

2.2 Where lifejackets for passengers are stowed in cabins remote from direct routes between public spaces and muster stations, additional lifejackets for such passengers required by regulation 7.2.2 shall be stowed either in public spaces, muster stations or on direct routes between them. Lifejackets must be positioned so that they can be distributed and donned without disturbing the quiet passage to the muster station and survival craft launching station.

3 Lights on lifejackets

3.1 On all passenger ships, each lifejacket shall be fitted with a light complying with the provisions of subsection 2.2.3 of the Code.

3.2 Lights fitted to lifejackets before 1 July 1998 which do not fully comply with subsection 2.2.3 of the Code may be accepted by the Administration until the earlier of the time when the lifejacket light would normally be replaced or the first periodical main survey after 1 July 2002.

4 Immersion suits and thermal protection

4.1 Every passenger ship shall carry at least three immersion suits for each lifeboat on board, complying with the provisions of subsection 2.3 of the Code, and, in addition, one thermal protective device complying with the regulations of subsection 2.5 of the Code for each person the lifeboat can accommodate who is not provided with an immersion suit. *On passenger ships sailing in Greenlandic, Arctic and comparable waters, an immersion suit meeting the requirements of the regulations in subsection 2.3 of the Code. However, from 1 May to 30 September, passenger ships may make one-way journeys without providing lifejackets for all persons on condition that those not provided with an immersion suit are provided with a thermal protection device.* These suits and thermal protection aids do not need to be carried:

4.1.1 for persons to be accommodated in fully or partially enclosed lifeboats; or

4.1.2 if the ship operates exclusively in hot climates,[21]) where the Administration deems that thermal protection means are unnecessary.

4.2 The provisions of subsection 4.1.1 shall also apply to fully or partly enclosed lifeboats not complying with the regulations of subsections 4.5 or 4.6 of the Code when carried on ships constructed before 1 July 1986.

Regulation 23 Embarkation arrangements for lifeboats, liferafts and rescue boats

1 Embarkation arrangements for lifeboats and liferafts shall be provided on passenger ships designed so that

1.1 All lifeboats can be boarded and launched either directly from their stowed position or from an embarkation deck, but not both;

1.2 davit-launched liferafts may be boarded and launched from a position immediately adjacent to the stowed position or from a position to which the liferaft has been transferred in accordance with the regulations of regulation 13.5 before launching.

2 Rescue boat arrangements shall be such that the rescue boat can be boarded and launched directly from the stowed position with the number of persons on board designated the to rescue boat. If the rescue boat is also a lifeboat and the other lifeboats are boarded and launched from one embarkation deck, the arrangements shall be such that the rescue boat can also be boarded and launched from the embarkation deck, regardless of the regulations of subsection 1.1.

Regulation 24 Location of survival craft

The stowage height of lifeboats and liferafts on a passenger ship shall take into account the provisions of regulation 13.1.2, the evacuation provisions of regulation II-2/28,[22]) the size of the ship and the weather conditions likely to occur in the ship's trading area. For a davit-launched lifeboat or liferaft, the height from the davit head to the waterline when the boat or raft is in the embarkation position shall, as far as practicable, not exceed 15 metres when the ship is in its lightest seagoing condition.

Regulation 25 Muster stations

Every passenger ship shall, in addition to complying with the requirements of regulation 11, have muster stations which shall:

1. Be close to and provide easy access for passengers to embarkation stations, unless they are in the same location as the embarkation points;

2. Have ample space to gather and instruct passengers, and at least 0.35m^2 per passenger.

Regulation 26 Additional provisions for ro-ro passenger ships

1 This regulation applies to all ro-ro passenger ships. Ro-ro passenger ships built:

1.1 on or after 1 July 1998 shall comply with the provisions of subsections 2.3, 2.4, 3.1, 3.2, 3.3, 4 and 5;

1.2 on or after 1 July 1986 and before 1 July 1998 shall comply with the provisions of subsection 5 no later than the first periodic inspection after 1 July 1998 and the provisions of subsections 2.3, 2.4, 3 and 4 no later than the first periodic inspection after 1 July 2000; and

1.3 before 1 July 1986 shall comply with the provisions of subsection 5 no later than the first periodic inspection after 1 July 1998 and with the provisions of subsections 2.1, 2.2, 2.3, 2.4, 3 and 4 no later than the first periodic inspection after 1 July 2000.

1.4 before 1 July 2004 shall comply with the provisions of subsection 2.5 at the first inspection on or after that date.

2 Liferafts

2.1 The liferafts of ro-ro passenger ships shall be served by marine evacuation systems (MES) complying with the provisions of subsection 6.2 of the Code, or launching appliances complying with the provisions of subsection
6.1.5 of the Code, equally distributed on both sides of the ship.

2.2 Every liferaft on board ro-ro passenger ships shall be provided with an arrangement which allows the liferaft to float free and which complies with the provisions of regulation 13.4.

2.3 Every liferaft on board ro-ro passenger ships shall be of a type fitted with an access ramp complying with the provisions of subsections 4.2.4.1 or 4.3.4.1 of the Code, respectively.

2.4 All liferafts on board ro-ro passenger ships must either be automatically self-righting or be a covered, reversible liferaft that is stable at sea and capable of operating safely whichever side is up when floating. Alternatively, the ship may carry automatic self-righting liferafts or covered reversible liferafts in addition to the normal equipment with liferafts in such numbers that the total capacity will be able to accommodate at least 50% of the persons not accommodated by lifeboats. The capacity of these additional liferafts shall be determined on the basis of the difference between the total number of persons on board and the number of persons accommodated in lifeboats. Every such liferaft shall be approved by the Administration taking into account the recommendations adopted by the Organisation.[23)]

2.5 Liferafts on ro-ro passenger ships shall be equipped with a search and rescue locator device,[24)]) so that there is one search and rescue locator device for every four liferafts. The locator device shall be located inside the liferaft so that its antenna is more than 1 metre above the sea surface when the liferaft is deployed; however, in the case of covered reversible liferafts, the locator device shall be arranged so that survivors can immediately reach it and set it up. Each search and rescue locator device shall be arranged so that it can be manually deployed when the liferaft is deployed. Containers for liferafts with search and rescue locator beacons must be clearly labelled.

3 Fast rescue boat (FRB)

3.1 At least one of the rescue boats on a ro-ro passenger ship shall be a fast rescue boat complying with subsection 5.1.4 of the Code.

3.2 Each fast rescue boat shall be served by an appropriate launching arrangement complying with subsection 6.1.7 of the Code.

3.3 At least two crews for each fast rescue boat (FRB) shall be trained and drilled regularly, taking into account the Seafarers' Training, Certification and Watchkeeping(STCW) and the recommendations adopted by the Organisation,[25)]) including all aspects of rescuing, handling, manoeuvring and steering these craft in varying conditions and their recovery after capsizing.

3.4 In the event that a ro-ro passenger ship constructed before 1 July 1997 is of such a nature or size that the installation of a fast rescue boat (FRB) as required in subsection 3.1 is not possible, the fast rescue boat (FRB) may be installed in place of an existing lifeboat accepted as a rescue boat or, in the case of a ship constructed before 1 July 1986, boats for use in emergency situations provided that all the following conditions are met:

3.4.1 The fast rescue boat (FRB) installed shall be operated by a launching device in accordance with the provisions of subsection 3.2;

3.4.2 The capacity of the survival craft lost by the above replacement shall be compensated by the installation of liferafts capable of carrying at least the same number of persons as the replaced lifeboat; and

3.4.3 Such liferafts must be operated by the existing launching devices or by evacuation systems.

4 Means of rescue[26)]

4.1 Every ro-ro passenger ship shall have an effective means for the rapid recovery of survivors from the water and for transferring survivors from rescueboats, lifeboats, or rafts to the ship.

4.2 The means of boarding survivors to the ship can be part of an evacuation system or part of a system designed for rescue purposes.

4.3 If the slide of a marine evacuation system (MES) is to serve as a means of transferring survivors to the ship's deck, the slide must be equipped with handlines or ladders to help climb up the slide.

5 Lifejackets

5.1 Regardless of the provisions of regulations 7.2 and 22.2, a sufficient number of lifejackets shall be provided near the muster stations so that passengers do not have to return to their cabins to find their lifejackets.

5.2 On ro-ro passenger ships, each lifejacket shall be fitted with a light in accordance with the provisions of subsection 2.2.3 of the Code.

Regulation 27 Passenger information

1 All persons on board passenger ships must be counted before departure.

2 Information about persons who have declared a need for special treatment or assistance in emergency situations must be recorded and passed on to the master of the ship before departure.

3 In addition, the name and gender of all persons on board, distinguishing between adults, children and infants, must be recorded by 1 January 1999 for search and rescue purposes.

4 The information required in subsections 1, 2 and 3 shall be kept ashore and be readily available to search and rescue services when needed.

5 The Administration may exempt passenger ships from the provisions of subsection 3 if the planned voyages of the ships do not make it practicable for them to keep such records.

Regulation 28 Helicopter landing and pick-up area

1 All ro-ro passenger ships must be equipped with a helicopter pick-up area approved by the Administration, taking into account the recommendations adopted by the Organisation.[27)]

2 Ro-ro passenger ships of 130 m in length and above, constructed on or after 1 July 1999, shall have a helicopter landing area approved by the Administration taking into account the recommendations adopted by the Organisation.[28)]

Regulation 29 Decision-support system for masters of passenger ships

1 This regulation applies to all passenger ships. Passenger ships built before 1 July 1997 shall comply with the provisions of this regulation not later than the date of the first periodical survey after 1 July 1999.

2 All passenger ships must have a decision support system for crisis management on the bridge.

3 As a minimum, the system shall consist of a printed emergency plan or plans.[29]) All foreseeable emergencies shall be included in the emergency plan or plans, including, but not limited to, the following main groups of emergencies:

3.1 fire;

3.2 shipwreck;

3.3 pollution;

3.4 unlawful acts that jeopardise the safety of the ship and the safety of passengers and crew;

3.5 personal casualties;

3.6 cargo-related casualties; and

3.7 emergency assistance to other ships.

4 The emergency procedures specified in the emergency plan or plans must provide decision support to masters for handling any combination of emergency situations.

5 The emergency plan or plans should have a consistent structure and be easy to use. Where applicable, the actual cargo conditions as calculated for the stability of the passenger ship during the voyage shall be used for casualty control purposes.

6 In addition to the printed emergency plan or plans, the Administration may also accept the use of a computerised decision support system on the bridge that provides all the information contained in the emergency plan or plans, procedures, checklists, etc., that can provide a list of actions recommended to be taken in foreseeable emergency situations.

Regulation 30 Drills

1 This regulation applies to all passenger ships.

2 On passenger ships, an evacuation drill and a fire drill must take place every week. The entire crew need not be involved in every drill, but each crew member must participate in one evacuation drill and one fire drill every month, as required by regulation 19.3.2. Passengers are strongly encouraged to participate in the drills.

3 Casualty control drills shall be conducted as defined in regulation II-1/19-1.

Section III - Cargo ships

(additional provisions)

Regulation 31 Lifeboats, liferafts and rescue boats

1 Lifeboats and liferafts

1.1 Cargo ships must carry:

1.1.1 one or more fully enclosed lifeboats complying with the regulations in subsection 4.6 of the Code of such total capacity on each side of the ship as to accommodate all persons on board; and

1.1.2 in addition, one or more inflatable or rigid life-rafts complying with the regulations in subsections 4.2 or 4.3 of the Code, and weighing less than 185 kg and arranged in such a position that they can be easily moved from side to side on a single open deck and have a total capacity to accommodate all persons on board. If the liferaft or liferafts do not weigh less than 185 kg and are placed in a position that allows them to be easily moved from side to side on a single open deck, the total capacity available on each side shall be sufficient to accommodate all persons on board.

1.2 Instead of complying with the requirements of regulation 1.1, cargo ships may carry:

1.2.1 one or more free-fall lifeboats complying with the regulations in subsection 4.7 of the Code, which are capable of being launched in free fall over the stern of the ship and have a total capacity to accommodate all persons on board; and

1.2.2 in addition, one or more inflatable or rigid life-rafts complying with the regulations in subsections 4.2 or 4.3 of the Code on each side of the ship and of such total capacity as to accommodate all persons on board. The liferafts on at least one side of the ship shall be operated by launching devices.

1.3 Instead of complying with the provisions of subsections 1.1 or 1.2, cargo ships of less than 85 metres in length, except oil tankers, chemical tankers and gas carriers *of 500 gross tonnage or* more, may comply with the following:

1.3.1 They shall carry on each side of the ship one or more inflatable or rigid life-rafts complying with the regulations in subsections 4.2 or 4.3 of the Code and of such total capacity as to accommodate all persons on board.

1.3.2 Unless the liferafts required by subsection 1.3.1 weigh less than 185 kg and are stowed in a position where they can be easily moved from side to side on a single open deck, additional liferafts shall be provided so that the total capacity available on each side can accommodate 150% of all persons on board.

1.3.3 If the rescue boat prescribed in subsection 2 is also a fully enclosed lifeboat complying with the regulations in subsection 4.6 of the Code, it may be included in the total capacity prescribed in subsection 1.3.1, provided that the total capacity available on either side of the ship is not less than 150% of the total persons on board.

1.3.4 If one of the lifeboats or liferafts is lost or becomes unusable, there must be a sufficient

1.3.5 number of lifeboats and liferafts available on each side, including those weighing less than 185 kg and arranged in a position where they can be easily moved from side to side on a single open deck, to accommodate all persons on board.

1.4 Cargo ships in which the horizontal distance from the bow or stern of the ship to the nearest end of the nearest lifeboats or liferafts is more than 100 metres shall, in addition to the liferafts prescribed in subsections 1.1.2 and 1.2.2, one liferaft shall be carried as far forward or aft, or one as far forward and one as far aft as is reasonable and practicable. Such a liferaft or liferafts may be securely attached so that manual release is possible and need not be of the type that can be launched from an authorised launching appliance.

1.5 With the exception of the lifeboats and liferafts referred to in regulation 16.1.1, all lifeboats and liferafts necessary for the abandonment of the ship by all persons on board shall be capable of

be launched with a full load of persons and equipment within 10 minutes from the time the signal to abandon ship is given.

1.6 Chemical tankers and gas carriers carrying cargoes which emit toxic vapours and gases[30)] shall, instead of fully enclosed lifeboats complying with the regulations in subsection 4.6 of the Code, carry lifeboats with an independent air supply system complying with the regulations in subsection 4.8 of the Code.

1.7 Oil tankers, chemical tankers and gas carriers of *more than 500 gross* tonnage carrying cargoes with a flashpoint not exceeding 60 °C (closed cup test) shall, instead of fully enclosed lifeboats complying with the regulations of subsection 4.6 of the Code, carry fire protected lifeboats complying with the regulations of subsection 4.9 of the Code.

1.8 Regardless of the provisions of subsection 1.1, bulk carriers as defined in regulation IX/1.6, constructed on or after 1 July 2006, shall comply with the provisions of subsection 1.2.

2 Rescue boats

Cargo ships *of 100 gross tonnage and* above shall carry at least one man overboard boat complying with the provisions of subsection 5.1 of the Code. A lifeboat may be approved as a rescue boat if it and its launching and recovery arrangements also fulfil the regulations for a rescue boat.

3 In addition to their lifeboats, cargo ships *of 500 gross tonnage and above* built before 1 July 1986 must carry:

3.1 One or more liferafts that can be deployed on both sides of the ship with a total capacity to accommodate all persons on board. The liferaft or liferafts shall be fitted with a lashing or equivalent means of securing the liferaft, which will automatically release the liferaft from a sinking ship;

3.2 If the lifeboats and liferafts are stowed in a position more than 100 metres from the bow or stern in addition to the liferafts prescribed in subsection 3.1, one liferaft may be stowed as far forward or aft, or one as far forward and one as far aft as is reasonable and practicable. Regardless of the regulations of subsection 3.1, such liferaft or liferafts may be securely attached so that manual release is possible.

Regulation 32 Personal life-saving

appliances 1 Lifebuoys

1.1 Cargo ships shall carry lifebuoys complying with the requirements of regulation 7.1 and subsection 2.1 of the Code in a number not less than that prescribed in the following table:

Length of the ship in metres	Minimum number of lifebuoys
15 and under 30	4
30 and under 50	6
50 and under 100	8
100 and under 150	10
150 and under 200	12
200 and above	14

1.2 Self-igniting lights on lifebuoys on tankers, as prescribed in regulation 7.1.3, shall be of an electric battery type.

2 Lights on lifejackets

2.1 This section applies to all cargo ships.

2.2 On cargo ships, each lifejacket shall be fitted with a light complying with the regulations of subsection 2.2.3 of the Code.

2.3 Lights fitted on lifejackets on board cargo ships before 1 July 1998, which do not fully comply with subsection 2.2.3 of the Code, may be accepted by the Administration until the earlier of the time when either the lifejacket light would normally be replaced or the first periodical main survey after 1 July 2001.

3 Immersion suits

3.1 This subsection applies to *new and existing* cargo ships. Cargo ships built before 1 July 2006 shall comply with subsections 3.2 to 3.5 not later than the first safety equipment inspection on or after 1 July 2006.

3.2 An appropriately sized immersion suit that complies with the requirements of subsection 2.3 of the Code shall be provided for all persons on board the ship. However, for ships other than bulk carriers as defined in regulation IX/1, these suits are not required if the ship operates continuously in hot climates where the Administration considers immersion suits unnecessary.

3.3 Where the watch-keeping or working stations of a ship are located remote from the place or places where the immersion suits are normally stowed, including remote survival craft required by regulation 31.1.4, additional immersion suits of appropriate size shall be provided at such places for the number of persons normally on watch or working at such stations.

3.4 Immersion suits must be placed in such a way that they are easily accessible and their position must be clearly marked.

3.5 Immersion suits required by this regulation may be used to fulfil the requirements of regulation 7.3.

Regulation 33 Embarkation and launching arrangements for lifeboats and liferafts

1 Embarkation arrangements for lifeboats and liferafts on cargo ships shall be so designed that lifeboats can be boarded and launched directly from the stowed position and davit-launched liferafts can be boarded and launched from a position immediately adjacent to the stowed position or from a position to which the liferaft, in accordance with the regulations of 13.5, is transferred before launching.

2 On cargo ships of 20,000 gross tonnage and above, davit-launched lifeboats must be capable of launching, using safety lines, if necessary, while the ship is moving forward at a speed of up to 5 knots on calm water.

Section IV - Provisions for life-saving appliances and arrangements

Regulation 34 Use of the LSA Code

1 All life-saving appliances and arrangements must fulfil the relevant provisions of the Code.[31)]

SECTION V - VARIOUS PROVISIONS

Regulation 35 Instruction manual and on-board training aids

1 This regulation applies to all ships.

2 An instruction manual that complies with the provisions of subsection 3 shall be available in each crew mess, recreation room, or crew compartment.

3 The manual, which may consist of several volumes, shall provide instructions and information in plain language and, where possible, with illustrations, on the life-saving appliances available on the ship and on the best methods of survival. Instead of the instruction manual, any part of such information can be provided in the form of audiovisual means. The following must be explained in detail:

3.1 wearing lifejackets, immersion suits and protective suits;

3.2 muster at the prescribed stations;

3.3 Entry, launch and release of lifeboats, liferafts and rescue boats, including, where applicable, the use of marine evacuation system (MES);

3.4 launch method from inside the lifeboats or liferafts;

3.5 release from the launching release devices;

3.6 methods and use of means of protection in the launching areas, where applicable;

3.7 lighting of launching sites;

3.8 the use of all rescue equipment;

3.9 the use of all localisation equipment;

3.10 using illustrations, using radio;

3.11 the use of drive anchors;

3.12 the use of engines with accessories;

3.13 boarding lifeboats and liferafts and rescue boats, including positioning and lashing;

3.14 dangers of weather exposure and the need for warm clothing;

3.15 best use of lifeboat and liferaft facilities to be rescued;

3.16 recovery methods, including the use of helicopter rescue equipment (slings, baskets, stretchers), rescue chairs and coastal rescue equipment, as well as the ship's line-throwing appliance;

3.17 all other functions in the muster list and emergency instructions;

3.18 instructions for emergency repair of life-saving appliances.

4 Every ship equipped with a marine evacuation system (MES) must have training and drill aids on board *(e.g. instruction manuals and videos).*

5 The training manual must be written in the ship's working language.

Regulation 36 Instructions for maintenance on board

Instructions for on-board maintenance of life-saving appliances shall be easy to understand, illustrated where possible and, where applicable, include the following for each life-saving appliance:

1. a checklist for use when performing the inspections required by regulation 20.7;

2. maintenance and repair instructions;

3. schedule for periodic maintenance;

4. diagram of lubrication points with recommended lubricants;

5. list of replaceable parts (spare parts list);

6. list of spare parts suppliers; and

7. logbook for recording inspections and maintenance.

Regulation 37 Muster list and emergency instructions

1 The muster list shall specify details of the main alarm signal prescribed in subsection 7.2 of the Code and also the actions to be taken by the crew and passengers when the alarm sounds. The muster list must also indicate how the order to abandon ship will be given.

2 Each passenger ship must have procedures in place for the search and rescue of passengers trapped in their compartments.

3 The muster list shall indicate the duties of the various crew members, including:

3.1 Closing watertight doors, fire doors, valves, scuppers, side hatches, skylights, portholes and other similar openings in the ship;

3.2 equipping lifeboats and liferafts and other life-saving appliances.

3.3 Preparation and launching of lifeboats and liferafts;

3.4 General preparation of other life-saving appliances;

3.5 muster of passengers;

3.6 Use of communication equipment;

3.7 manning firefighting teams assigned to deal with fires;

3.8 specific, assigned tasks regarding the operation of fire extinguishing equipment and installations; and

3.9 for passenger ships only: damage limitation in case of emergency caused by flooding.

4 The muster list shall indicate which officers are responsible for ensuring that rescue and firefighting equipment is maintained in good condition and ready for immediate use.

5 The muster list shall list deputies for key personnel who may become incapacitated, taking into account that different emergency situations may require different measures.

6 The muster list must indicate the tasks that the crew member must perform in relation to the passengers in an emergency situation. These tasks include, but are not limited to:

6.1 alert the passengers;

6.2 ensure that passengers are appropriately dressed and have correctly donned their lifejackets;

6.3 gather passengers at the muster stations;

6.4 maintaining order in corridors and on stairs and generally monitoring the movement of passengers; and

6.5 ensure a supply of blankets to be carried on lifeboats and liferafts.

7 The muster list must be completed before the ship sails. If there is a change in the crew which necessitates a change to the muster list, the master must either revise the list or prepare a new one.

8 The muster list for each passenger ship shall be in a form approved by the Administration.

Regulation 38 Alternative design and alternative

arrangements 1 Purpose

The purpose of this regulation is to provide a methodology for alternative design and arrangements for life-saving appliances and arrangements.

2 General

2.1 Life-saving appliances and arrangements may deviate from the requirements set out in section B, provided that the alternative design and arrangements fulfil the intent of the relevant requirements and provide a level of safety equivalent to that intended by this chapter.

2.2 When an alternative design or alternative arrangements deviate from the prescriptive requirements set out in Section B, a technical analysis, evaluation and approval of the design and arrangements shall be performed in accordance with this regulation.

3 Technical analysis

The technical analysis shall be prepared and submitted to the Administration in accordance with the guidelines established by the Organisation[32)] and shall contain at least the following elements:

3.1 determining the type of ship and rescue equipment and arrangements;

3.2 determining which prescriptive requirement(s) the rescue device and arrangements will not fulfil;

3.3 determining the reason why the proposed design will not fulfil the prescriptive requirements, supported by compliance with other recognised technical or industry standards;

3.4 determining the functional criteria for the ship and the rescue equipment and arrangements addressed in the relevant prescriptive requirement(s):

3.4.1 the functional criteria shall provide a level of safety not inferior to the relevant prescriptive requirements in section B; and

3.4.2 The performance criteria must be quantifiable and measurable;

3.5 detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational constraints or conditions;

3.6 technical justification demonstrating that the alternative design and arrangements fulfil the functional criteria related to safety; and

3.7 a risk assessment based on a determination of possible errors and hazards associated with the proposal.

4 Evaluation of the alternative design and alternative arrangements

4.1 The technical analysis required in subsection 3 shall be evaluated and approved by the Administration taking into account in accordance with the guidelines developed by the Organisation[33)].

4.2 A copy of the documentation approved by the Administration indicating that the alternative design and arrangements comply with this regulation shall be kept on board the ship.

5 Exchange of information

The Administration shall send relevant information on alternative designs and arrangements approved by it to the Organisation for circulation to all Contracting Governments.

6 Re-evaluation due to changed conditions

If the assumptions and operational constraints stated in the alternative design and arrangements are changed, the technical analysis shall be performed under the changed conditions and approved by the Administration.

[1] Chap. III. Refer to the "Revised recommendation on testing of life-saving appliances", adopted by the IMO by resolution MSC. 81(70).
[2] Chap. III. Refer to the guidelines to be prepared by the Organisation.
[3] The provisions related to two-way VHF radiotelephone apparatus and search and rescue locating devices have been relocated under chapter IV (refer to resolution MSC. 496(105)). Paragraphs 1 and 2 were intentionally left blank to avoid renumbering of existing regulations.
[4] Chap. III. These references apply to chapter II-2 in force before 1 July 2002. The corresponding ones in the amended chapter II-2 are 12.3.
[5] Chap. III. Refer to MSC/Circ. 808 "Recommendation on performance standards for public address systems on passenger ships, including cabeling".
[6] Chap. III. Refer to MSC/Circ. 1046, "Guidelines for assessment of thermal protection".
[7] Chap. III. Reference is made to resolution A. 760(18) 'Symbols related to life-saving appliances and arrangements', as amended by resolution MSC. 82(70).
[8] Chap. III. The reference is to chapter II-2 in force before 1 July 2002. The equivalent in the amended chapter II-2 is 13.3.2.5.1.
[9] Chap. III. Refer to "Symbols related to life-saving appliances and arrangements" and to "Guidelines for the evaluation, testing and application of low-location lighting on passenger ships" adopted by the IMO by resolutions A. 760(18), as amended by resolution MSC 82(70) and A. 752(18).
[10] Chap. III. This note character is only in the body of the text, not in the actual note list at the back.
[11] Chap. III. Refer to the relevant parts of MSC. 1/Circ. 1206/Rev. 1, Measures to prevent accidents with lifeboats.
[12] Chap. III. Refer to the "Guidelines on training for the purpose of launching lifeboats and rescue boats from ships making headway through the water" adopted by the IMO by resolution A. 624(15).
[13] Chap. III. Supplement. Refer to the Revised Recommendations for entering enclosed spaces aboard ship as adopted by the Organisation by resolution A. 1050 (27).
[14] Chap. III. Supplement. Refer to the Revised Recommendations for entering enclosed spaces aboard ship as adopted by the Organisation by resolution A. 1050(27).
[15] Chap. III. Refer to the relevant parts of MSC. 1/Circ. 1206/Rev. 1, Measures to prevent accidents with lifeboats.
[16] Chap. III. For ships covered by the Harmonised System of Survey and Certification (HSSC), the service intervals for inflatable liferafts, inflatable lifejackets, marine evacuation systems (MES), inflatable man overboard boats, hydrostatic release relays and satellite EPIRBs may follow the annual, periodical and renewal survey intervals prescribed in the 1988 SOLAS Protocol, regardless of the provisions of regulations III/20.8, III/20.9 and IV/15.9 of the 1974 SOLAS Convention, as amended, cf. IMO MSC/Circ. 955 of 23 June 2000.
[17] Chap. III. Refer to "Recommendation on conditions for the approval of servicing stations for inflatable liferafts" adopted by the IMO by resolution A. 761(18) and amended by resolution MSC. 388(94).
[18] Chap. III. Refer to "Recommendation on conditions for the approval of servicing stations for inflatable liferafts" adopted by the IMO by resolution A. 761(18) and amended by resolution MSC. 388(94).
[19] Chap. III. Refer to MSC/Circ. 955, "Servicing of life-saving appliances and radiocommunication equipment under the harmonised system of survey and certification (HSSC)".
[20] Chap. III. Refer to "Symbols related to life-saving appliances and arrangements" adopted by the IMO by resolution A. 760(18) and resolution MSC. 82(70).
[21] Chap. III. Refer to MSC/Circ. 1046, "Guidelines for the assessment of thermal protection".
[22] Chap. III. The reference is to chapter II-2 in force before 1 July 2002. The corresponding regulation in the amended chapter II-2 is 13.
[23] Chap. III. Refer to "Recommendation for canopied reversible liferafts, automatically self- righting liferafts and fast rescue boats, including testing on ro-ro passenger ships" adopted by the IMO by MSC/Circ. 809.
[24] Chap. III. Refer to the Performance standards for survival craft radar transponders for use in search and rescue operations, as adopted by the Organisation by resolution A. 802(19), and amended by MSC. 247(83).
[25] Chap. III. Refer to the "Recommendation on training requirements for crews of fast rescue boats" as adopted by the Organisation by resolution A. 771(18) and section A-VI/2, table A-VI/2-2 "Specification of the minimum standard of competence in fast rescue boats" of the Seafarers' Training, Certification and Watchkeeping (STCW) Code.
[26] Chap. III. Refer to "Recommendation on means of rescue on ro-ro passenger ships", MSC/Circ. 810.
[27] Chap. III. Refer to the International Aeronautical and Maritime Search and Rescue Manual (IAMSAR Manual).
[28] Chap. III. Refer to the "Recommendation on helicopter landing areas on ro-ro passenger ships" adopted by the IMO by MSC/Circ. 895.
[29] Chap. III. Reference is made to IMO's "Revised Guidelines for a structure of an integrated system of contingency planning for shipboard Emergencies" adopted by the IMO by resolution A. 1072(28).
[30] Chap. III. Refer to products for which respiratory protection in the event of a spill is prescribed in chapter 17 of the International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk (IBC Code), adopted by the Maritime Safety Committee with resolution MSC. 4(48) and chapter 19 of the International Code for the Construction and Equipment of Ships carrying Liquefied Gases in Bulk (IGC Code), adopted by the Maritime Safety Committee by resolution MSC. 5(48).
[31] Chap. III. Refer to the LSA Code, MSC48(66), as amended by res. MSC. 425(98).
[32] Chap. III. Refer to "Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III" (MSC. 1/Circ. 1212).
[33] Chap. III. Refer to "Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III" (MSC. 1/Circ. 1212).

Annex 6

Chapter IV - Radio communication GMDSS

Section A	**General**
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Regulation 3	*Exceptions*
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Regulation 6	*Radio installations*
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Regulation 17	*Radio registrations*
Regulation 18	*Position update*

Section A General

Regulation 1 Application

1 Unless expressly provided otherwise, this chapter applies to all ships to which these regulations apply and to cargo ships of 300 gross tonnage and upwards.

2 This chapter shall not apply to ships which would otherwise be subject to these provisions when such ships navigate the Great Lakes of North America and the rivers flowing into or adjacent to them as far east as the lower mouth of the St. Lawrence River. The Lambert Lock near Montreal in the province of Quebec, Canada[1)].

3 No provisions in this chapter shall prevent ships, survival craft or persons in distress from using any available means to attract attention, indicate their position and obtain assistance.

Regulation 2 Terms and definitions

1 In this chapter, the following terms have the meaning defined below.

. 1*AIS-SART* means an automatic identification system search and rescue transmitter that can use frequencies intended for AIS (161.975 MHz (AIS1) and 162.025 MHz (AIS2)).

. 2 *Bridge-to-bridge communication* means safety radio communication between ships from the position from which the ships are normally navigated.

. 3*Uninterrupted radio watch* means that the radio watch in question may only be interrupted for short periods when the ship's reception is degraded or blocked by its own communications or if the equipment is undergoing periodic maintenance or overhaul.

. 4 *DSC: Digital Selective Calling* is a technique using digital codes that enables a radio station to establish contact with and transmit information to another station or group of stations, and which complies with the relevant recommendations of the International Radio Regulations Committee (ITU-R).

. 5 *Emergency Position Indicating Radio Beacon (EPIRB*) is a transmitter operating in the frequency band 406.0-406.1 MHz that can transmit an emergency alert via satellite to a rescue coordination centre and send signals for localisation on site.

. 6*General radio communication* means communication other than emergency, fire and safety communication.

.**7** *Global Maritime Distress and Safety System (GMDSS*) means a system performing the functions set out in regulation 4.1.1.

. 8 *GMDSS identities* means information that can be transmitted to uniquely identify the ship or its associated lifeboats and craft. These identities are the ship call sign, Maritime Mobile Service Identity (MMSI), EPIRB hexadecimal identity, identities of recognised mobile satellite services and equipment serial numbers.

. 9 *Localisation* means locating ships, aircraft, units or people in distress.

. 10 *Maritime Safety Information (MSI)*[2)] means navigational or meteorological warnings, meteorological forecasts and other urgent messages of safety significance issued to ships.

. 11 *Radar-SART* means a search and rescue transponder using radar frequencies in the 9.2-9.5 GHz frequency band.

. 12 *Radio Regulations* means the radio regulations attached to, or deemed to be attached to, the most recent International Telecommunication Union (ITU) Convention in force from time to time.

. 13 *Recognised mobile satellite service* means a service operating through a satellite system and recognised by the IMO for use in the Global Maritime Distress and Safety System (GMDSS)

. 14*406 MHz Satellite Service* means a service operated via a global availability satellite system designed to detect EPIRBs transmitting in the 406.0-406.1 MHz frequency band.

. 15*Sea area A1* means an area defined as such by a Contracting Government within radiotelephone coverage of at least one coast VHF station where continuous DSC[3] alerting is possible.

. 16 *Sea area A2* means an area, other than sea area A1, within the radiotelephone coverage of at least one coast station on medium frequency (MF) where continuous DSC alerting is possible, as defined by a Contracting Government.[4)].

. 17 *Sea area A3* means an area, other than sea areas A1 and A2, within the coverage of a recognised mobile satellite service supported by the ship's earth station on board and where continuous alerting is possible.

. 18 *Sea area A4* means an area outside sea areas A1, A2 and A3.

2 All other terms and abbreviations used in this chapter and defined in the Radio Regulations and the International SAR (Search and Rescue) Convention, 1979, as amended, shall have the meanings given in the said Regulations and SAR Convention.

Regulation 3 Exceptions

1 The Contracting Governments consider it highly desirable that the provisions of this chapter should not be derogated from. However, the Administration may partially or conditionally exempt certain ships from complying with the requirements of regulations 7 to 11, provided:

. 1 such ships fulfil the functional requirements of regulation 4; and

. 2 that the Administration has taken into account the impact that such exemptions may have on the effectiveness of the safety services for all ships.

2 An exemption may only be granted in accordance with subsection 1:

. 1 if the safety conditions are such that it would be unreasonable or unnecessary to require full compliance with the provisions of regulations 7 to 11; or

. 2 in exceptional circumstances for a single voyage outside the sea area or areas for which the ship is equipped.

3 Each administration shall report to the Organisation on all exemptions granted under subsections 1 and 2, stating the reasons for the exemptions granted[5)]

Regulation 4 Functional requirements[6)]

1 Every ship, when at sea, shall be capable of:

. 1 performing the GMDSS functions, which are the following:

. 1 to transmit ship-to-shore distress alerts using at least two separate and independent methods, each utilising different radio communication services;

. 2 to receive coast-to-ship distress alerts;

. 3 to send and receive ship-to-ship distress alerts;

. 4 to send and receive coordinating communications for search and rescue operations;

. 5 to send and receive communications at the scene of a rescue operation;

. 6 to send and receive signals for localisation,[7)]

. 7 to receive MSI[8]);

. 8 sending and receiving of fire- and safety communications, and

. 9 sending and receiving bridge-to-bridge communication and

. 2 to send and receive general radio communications.

Regulation 4-1 GMDSS satellite providers

The Maritime Safety Committee shall establish criteria, procedures and arrangements for the evaluation, recognition, assessment and supervision of the provision of GMDSS mobile maritime satellite services in accordance with the provisions of this chapter[9)].

Section B Obligations of Contracting Governments[10]

Regulation 5 Provision of radiocommunication services

1 Each Contracting Government undertakes to provide, as it considers practical and necessary, either individually or in collaboration with other Contracting Governments, appropriate land-based facilities for the mobile satellite service and the maritime mobile service with due regard to the recommendations of the Organisation.[11]) These services are:

- **. 1** recognised mobile satellite services;
  - **. 1** a satellite service on 406 MHz;
  - **. 2** the maritime mobile service in the frequency bands between 156 MHz and 174 MHz;
  - **. 3** the maritime mobile service in the frequency bands between 4000 kHz and 27500 kHz; and
  - **. 4** the maritime mobile service in the frequency bands between 415 kHz and 535 kHz[12)] and between 1605 kHz and 4000 kHz.

2 Each Contracting Government undertakes to provide the Organisation with relevant information on the land-based facilities of the mobile satellite service and the maritime mobile service established for sea areas it has designated off its coasts[13)]. Each Contracting Government also undertakes to provide the Organisation with timely and adequate notice prior to the planned withdrawal of any of these services or of certain land-based facilities.

Regulation 5-1 - GMDSS identifications

1 This v applies to all ships on all voyages.

2 Each Contracting Government undertakes to ensure that appropriate measures are taken to record GMDSS identifications and to make information on these identifications available to Rescue Coordination Centres (RCC) 24 hours a day. Where appropriate, international organisations maintaining a registry of these identities, such as the ITU's Maritime Mobile Access and Retrieval System (MARS), shall be notified by the Contracting Government of these identity assignments.

Section C Technical requirements

Regulation 6 - Radio installations

1 Every ship shall be provided with radio installations capable of fulfilling the functional requirements of regulation 4 throughout its intended voyage. Unless the ship is exempted under regulation 3, radio installations shall comply with the requirements of regulation 7 and, depending on the sea areas through which the ship is expected to pass during the voyage, also with the requirements of either regulation 8, 9, 10 or 11.

2 Any radio installation must:

- **. 1** be located so as to prevent harmful interference, whether mechanical, electrical or other, to its intended use and to ensure electromagnetic compatibility and to avoid harmful interaction with other equipment and systems;
- **. 2** be positioned to maximise safety and operational accessibility;
- **. 3** be protected against the harmful effects of water, extreme temperatures and other unfavourable environmental conditions;

. 4 be provided with reliable fixed electrical lighting, independent of main and emergency power sources, to ensure adequate illumination of the radio controls for operation of the radio installation; and

. 5 be clearly labelled with the GMDSS identities that may be relevant to the use of the radio installation.

3 Operation of the VHF radiotelephone channels necessary for safe navigation shall be readily available on the ship's navigating bridge at a location convenient to the bridge, and, if necessary, radio communication shall be available from the bridge wings. Portable VHF equipment can be used for the latter purpose.

4 On passenger ships, an emergency panel must be installed at the steering position, which must:

. 1 contain either a single button that, when pressed, activates an emergency alarm using all the radio installations required on board for this purpose, or a button for each individual installation;

. 2 clearly and visually indicate when one or more buttons have been activated; and

. 3 be equipped with means to prevent inadvertent activation of the button(s) referred to in subsections 4.1 and 4.2.

5 On passenger ships where the prescribed satellite EPIRB is used as a secondary emergency alerting method and is not remotely controlled from the emergency alarm panel, it is permitted to have an additional EPIRB installed in the wheelhouse near the steering position.

6 On passenger ships, an emergency alarm panel must be installed at the steering position, which:

. 1 shall provide visual and audible indication of all emergency alarms received on board;

. **2** shall indicate through which radio communication service the emergency alarms have been received; and

. 3 may be combined with the emergency alarm panel referred to in subsection 4.

Regulation 7 - Radio equipment - general

1 Every ship shall be equipped with:

. 1 a VHF radio installation capable of transmitting and receiving emergency, fire and safety communications for emergency, fire and safety communication purposes:

. 1 DSC on the frequency 156.525 MHz (channel 70). It shall be possible to transmit a distress alert on channel 70 from the place where the ship is normally navigated; and

. 2 radio telephony on the frequencies 156.300 MHz (channel 6), 156.650 MHz (channel 13) and 156.800 MHz
(channel 16);

. 2 a radio installation capable of maintaining an uninterrupted DSC watch on VHF channel 70, which may be separate from or integrated with that required in subsection 1.1;

. 3 a radar SART or an AIS SART that:

. 1 must be positioned so that it can be easily used and

. 2 may be one of those required under subsections 2.1 or 3.1;

. 4 one or more receivers capable of receiving MSI and search and rescue related information throughout the voyage of the ship[14)];

. 5 an EPIR[B15)], which must be:

. 1 mounted in an easily accessible location;

. 2 be ready for manual release can be transported by one person to a survival craft;

. 3 be able to float free of the ship if it sinks and be activated automatically when floating (float-free) and

. 4 can be activated manually and

. 6 a radio installation capable of transmitting and receiving general radio communications on frequencies in the band between 156 MHz and 174 MHz. This requirement can be fulfilled by adding this feature to the device required under subsection 1.1.

2 Any cargo ship of 300 gross tonnage and above but below 500 gross tonnage must be equipped with at least:

. 1 a radar SART or AIS SART and

. 2 two VHF radiotelephone sets for two-way radiotelephony.

3 Every passenger ship and every cargo ship of 500 gross tonnage and above must be equipped with at least:

. 1 a radar SART or AIS SART on each side of the ship, and

. 2 three two-way VHF radiotelephone sets.

4 The two-way VHF radiotelephone apparatus required by subsections 2.2 and 3.2 may be portable or installed in a survival craft. The portable device can be stored on the bridge.

5 The radar SART' or AIS SART' required under subsections 2.1 or 3.1 shall be stowed in such a position that it can be readily accommodated in any survival craft other than a liferaft required under regulation III/31.1.4. Alternatively, a radar SART or AIS SART shall be fitted in every survival craft other than a liferaft as required in regulation III/31.1.4. On ships carrying two or more radar SARTs or AIS SARTs and equipped with free-fall lifeboats, one of the radar SARTs or AIS SARTs shall be placed in a free-fall lifeboat and the other shall be located in the immediate vicinity of the bridge so that it can be used on board and is ready for transfer to one of the other survival craft, other than a liferaft required by regulation III/31.1.4.

6 Every passenger ship shall be equipped with means for on-site two-way radio communication for search and rescue purposes using the aeronautical frequencies

121.5 MHz and 123.1 MHz from the position from which the vessel is normally navigated. These tools can be portable.

Regulation 8 - Radio equipment - sea area A1

1 In addition to complying with the requirements of regulation 7, every ship engaged exclusively on trade within sea area A1 shall be fitted with a radio installation capable of initiating the broadcast of ship-to-shore distress alerts from the position from which the ship is normally navigated, either

. 1 via the 406 MHz satellite service or

. 2 if the ship is travelling within the coverage of MF coast stations equipped with DSC, on MF with DSC, or

. 3 on high frequency (HF) using DSC, or

. 4 through a recognised earth station for a mobile satellite communication vessel.

2 The requirement in subsection 1.1 can be fulfilled by installing:

. 1 the EPIRB required by regulation 7.1.5 close to the position from which the ship is normally navigated, but in a place where it can still float free from the ship in an emergency; or

. 2 the EPIRB required by regulation 7.1.5 elsewhere on the ship, provided that this EPIRB has a remote activation device installed near the position from which the ship is normally navigated; or

. 3 another EPIRB in the vicinity of the position from which the ship is normally navigated.

Regulation 9 - Radio equipment - sea area A2

1 another EPIRB near the position from which the ship is normally navigated.

. 1 an MF radio installation capable of transmitting and receiving emergency, fire and safety communications on frequencies for emergency, fire and safety communication purposes:

. 1 2187.5 kHz using DSC and

. 2 2182 kHz using radiotelephony;

. 2 a radio installation capable of maintaining an uninterrupted DSC watch on the frequency 2187,5 kHz, which may be separate from or collocated with that required under subsection 1.1; and

. 3 a secondary means of initiating the transmission of ship-to-shore distress alerts from a radio service other than the MF operator, either:

. 1 via the 406 MHz satellite service or

. 2 on HF using DSC, or

. 3 through a recognised earth station for a mobile satellite communication vessel.

2 It shall be possible to initiate the transmission of distress alerts via the radio installations specified in subsections 1.1 and 1.3 from the position from which the ship is normally navigated.

3 The requirement in subsection 1.3.1 can be fulfilled by installing:

. 1 the EPIRB required by regulation 7.1.5 close to the position from which the ship is normally navigated, but in a place where it can still float free from the ship in an emergency; or

. 2 the EPIRB required by regulation 7.1.5 elsewhere on the ship, provided that this EPIRB has a remote activation device installed near the position from which the ship is normally navigated; or

. 3 another EPIRB in the vicinity of the position from which the ship is normally navigated.

4 The ship must also be able to send and receive general radio communication using either:

. 1 a radio installation using frequencies in the bands between 1605 kHz and 4000 kHz or between 4000 kHz and 27500 kHz. This requirement can be fulfilled by adding this feature in the device required under subsection 1.1, or**.**

. 2 a recognised mobile satellite service ship-earth station

Regulation 10 - Radio equipment - sea area A3

1 In addition to complying with the requirements of regulation 7, every ship engaged on trade in sea area A3 shall be fitted with:

. 1 a recognised mobile satellite service ship earth station capable of:

. 1 to send and receive emergency, fire and safety communications;

. 2 initiate and receive prioritised emergency calls; and

. 3 monitoring shore-to-ship emergency alarm relays, including those directed to specifically defined geographical areas;

. 2 an MF radio installation capable of transmitting and receiving emergency, fire and safety communications on frequencies for emergency, fire and safety communication purposes:

. 1 2187.5 kHz using DSC and

. 2 2182 kHz using radiotelephony;

. 3 a radio installation capable of maintaining an uninterrupted DSC watch on the frequency 2187,5 kHz, which may be separate or collocated with that required under subsection 1.2; and

. 4 a secondary means of initiating the transmission of ship-to-shore distress alerts from a radio service, either:

. 1 via the 406 MHz satellite service or
. 2 on HF using DSC, or
. 3 through any recognised mobile satellite service at an additional ship earth station.

2 It shall be possible to initiate the transmission of distress alerts via the radio installations specified in subsections 1.1, 1.2 and 1.4 from the position from which the ship normally sails.

3 The requirement in subsection 1.4.1 can be fulfilled by installing:
. 1 the EPIRB required by regulation 7.1.5 close to the position from which the ship is normally navigated, but in a place where it can still float free from the ship in an emergency; or
. 2 the EPIRB required by regulation 7.1.5 elsewhere on the ship, provided that this EPIRB has a remote activation device installed near the position from which the ship is normally navigated; or
. 3 another EPIRB in the vicinity of the position from which the ship is normally navigated.

4 The ship must also be able to send and receive general radio communication using either:
. 1 a ship earth station of a recognised mobile satellite service; or
. 2 a radio installation using frequencies in the bands between 1605 kHz and 4000 kHz or between 4000 kHz and 27500 kHz.

5 The requirements of subsections 4.1 and 4.2 may be fulfilled by adding this characteristic to the device required under subsections 1.1 or 1.2, respectively.

Regulation 11 - Radio equipment - sea area A4

1 In addition to complying with the requirements of regulation 7, every ship sailing in sea area A4 shall be equipped with:
. 1 an MF/HF radio installation capable of transmitting and receiving for emergency, fire and safety communication purposes on all emergency, fire and safety frequencies in the frequency bands between 1605 kHz and 4000 kHz and between 4000 kHz and 27500 kHz:
. 1 using DSC and
. 2 using radiotelephony;
. 2 equipment capable of maintaining DSC watchkeeping on 2187.5 kHz, 8414.5 kHz and on at least one of the DSC frequencies 4207.5 kHz, 6312 kHz, 12577 kHz or 16804.5 kHz; it shall be possible to select one of these DSC frequencies for emergency, fire and safety communication purposes at any time. This equipment may be separate from or integrated with the equipment required under subsection 1.1; and
. 3 a secondary means of initiating the transmission of distress alerts from ship to shore via the 406 MHz satellite service.

2 The ship must also be capable of transmitting and receiving general radio communications by means of a radio installation using frequencies in the bands between 1605 kHz and 4000 kHz and between 4000 kHz and 27500 kHz. This requirement can be fulfilled by adding this feature to the device required under subsection 1.1.

3 It shall be possible to initiate the transmission of distress alerts via the radio installations specified in subsections 1.1 and 1.3 from the position from which the ship is normally navigated.

4 The requirement in subsection 1.3 can be fulfilled by installing:
. 1 the EPIRB required by regulation 7.1.5 close to the position from which the ship is normally navigated, but in a place where it can still float free from the ship in an emergency; or

. 2 the EPIRB required by regulation 7.1.5 elsewhere on the ship, provided that this EPIRB has a remote activation device installed near the position from which the ship is normally navigated; or

. 3 another EPIRB in the vicinity of the position from which the ship is normally navigated.

Regulation 12 - Watch team

1 Every ship shall, while at sea, maintain an uninterrupted radio watch for emergency, fire and safety communications:

. 1 on VHF DSC channel 70;

. 2 on the DSC frequency 2187.5 kHz if, in accordance with the requirements of regulation 9.1.1.1 or 10.1.2 is equipped with an MF radio installation;

. 3 on DSC frequencies 2187.5 kHz and 8414.5 kHz, and on at least one of the DSC frequencies 4207.5 kHz, 6312 kHz, 12577 kHz or 16804.5 kHz, appropriate to the time of day and the geographical position of the ship if the ship is equipped with an MF/HF radio installation in accordance with the requirements of regulation 11.1.2. This monitoring can be done using a scanning receiver and

. 4 for shore-to-ship satellite emergency alarm relays if, in accordance with the requirements of regulation 10.1.1, the ship is equipped with a recognised earth station for mobile satellite services for ships.

2 Every ship shall, while at sea, keep a radio watch for broadcasts of MSI and search and rescue-related information on the appropriate frequency or frequencies where such information is broadcast for the area in which the ship is operating.

3 Every ship shall, whenever practicable, maintain a continuous listening watch at sea, which shall be kept at the position from which the ship is normally navigated, on:

. 1 VHF channel 16, and

. 2 other appropriate frequencies for urgent and safety communications for the area from which the ship is normally navigated.

Regulation 13 - Energy sources

1 While the ship is at sea, sufficient electrical energy shall be available at all times to operate the radio installations and to charge any batteries used as part of one or more back-up power sources for the radio installations.

2 One or more back-up power sources shall be provided on each ship to supply radio installations for emergency, fire and safety communications in the event of failure of the ship's main and emergency power sources. The back-up power source or sources shall be capable of simultaneously powering the VHF radio installation required by regulation 7.1.1 and, as appropriate for the sea area or areas for which the ship is equipped, either the MF radio installation required by regulations 9.1.1.1 or 10.1.2, the MF/HF radio installation required by regulation 11.1.1 or the ship earth station required by regulation 10.1.1 and any of the additional loads referred to in subsections 4, 5 and 8 for a period of at least

. 1 one hour on ships fitted with an emergency source of electrical power if this source of power fully complies with all relevant provisions of regulations II-1/42 or 43, including the supply of power to the radio installations; and

. 2 six hours on ships which are not fitted with an emergency source of electrical power fully complying with all relevant provisions of regulations II-1/42 or 43, including the supply of such power to the radio installations[16)].

The backup power source or sources do not necessarily have to supply independent HF and MF radio installations at the same time.

3 The backup energy source or sources must be independent of the ship's propulsion power and the ship's electrical system.

4 If, in addition to the VHF radio installation, two or more other radio installations referred to in subsection 2 can be connected to the back-up power source(s), they shall be capable of simultaneously supplying the VHF radio installation for the period specified in subsections 2.1 or 2.2, as applicable; and

. 1 all other radio installations that may be connected to the backup power source(s) simultaneously, or

. 2 which of the other radio installations will consume the most power if only one of the other radio installations can be connected to the backup power source(s) simultaneously with the VHF radio installation.

5 The back-up power source(s) may be used to provide the electric lighting required in accordance with regulation 6.2.4.

6 Where a backup energy source consists of a rechargeable accumulator battery or batteries:

. 1 there shall be a device for automatically charging such batteries, which shall be capable of recharging them to the required minimum capacity within 10 hours; and

. 2 the capacity of the battery or batteries shall be checked by an appropriate method[17)] at intervals not exceeding 12 months when the ship is not at sea.

7 The location and installation of accumulator batteries, which provide a backup energy source, must ensure that:

. 1 the best possible performance;

. 2 a reasonable service life;

. 3 reasonable reliability;

. 4 battery temperatures are maintained within the manufacturer's specifications, whether they are charged or not in use; and

. 5 that the batteries, when fully charged, provide at least the required minimum operating hours in all weather conditions.

8 If continuous input of information from the ship's navigational or other equipment to a radio installation required by this chapter, including the navigational receiver referred to in regulation 18, is necessary to ensure its proper functioning, means shall be provided to ensure an uninterrupted supply of such information in the event of failure of the ship's main or emergency source of electrical power.

Regulation 14 - Functional standards

All equipment to which this chapter applies shall be of a type approved by the Administration. Such equipment shall comply with appropriate performance standards not inferior to those adopted by the Organisation[18)].

Regulation 15 - Maintenance

1 The equipment should be designed so that the main units can be easily replaced without extensive recalibration or adjustment.

2 Equipment shall, as far as possible, be designed and installed in such a way that it is easily accessible for inspection and maintenance on board.

3 Sufficient information shall be provided to enable proper operation and maintenance of the equipment, taking into account the Organisation's recommendations[19)].

4 Sufficient tools and spare parts must be available to enable maintenance of the equipment.

5 The Administration shall ensure that the radio equipment required by this chapter is maintained so that the functional requirements specified in regulation 4 are available and that the recommended performance standards for such equipment are met.

6 On ships operating in sea areas A1 or A2, accessibility shall be ensured by methods such as duplication of equipment, shore-based maintenance or electronic maintenance at sea, or a combination of these, which may be approved by the Administration.

7 On ships operating in sea areas A3 or A4, accessibility shall be ensured by a combination of at least two methods such as duplication of equipment, shore-based maintenance or electronic maintenance capability at sea, as approved by the Administration.

8 While all reasonable steps shall be taken to maintain the equipment in effective working order to ensure compliance with all the functional requirements specified in regulation 4, the malfunction of the equipment for the provision of the general radio communications required by regulation 4.1.2 shall not be considered to render a ship unseaworthy or as a reason for delaying the ship in ports where repair facilities are not readily available, provided that the ship is capable of performing all emergency, fire and safety functions.

9 EPIRBs must:

. 1 annually, either on board the ship[20)] or at an approved test station, for all aspects of operational effectiveness with particular emphasis on checking the emission of operating frequencies, coding and recording at the intervals specified below:

. 1 on passenger ships no later than three months before the expiry date of the Passenger Ship Safety Certificate; and

. 2 on cargo ships within three months before the expiry date or within three months before or after the anniversary date of the Cargo Ship Safety Radio Safety Certificate; and

. 2 shall be maintained at intervals not exceeding five years, which shall be performed at an authorised shore-based maintenance facility[21)].

Regulation 16 - Radio personnel

1 Every ship must have personnel on board qualified in emergency, fire and safety communications to the satisfaction of the administration[22)]. Personnel must hold the relevant certificates specified in the radio regulations; one of the personnel must be designated to have primary responsibility for communication during emergencies.

2 On passenger ships, at least one person qualified in accordance with subsection 1 shall be exclusively assigned to perform communication duties during emergency situations.

Regulation 17 - Radio registrations

To the satisfaction of the Administration and as required by the Radio Regulations, a record shall be kept on board of all incidents relating to the radio communication services which appear to be of importance to the safety of life at sea.

Regulation 18 Position update

1 Any two-way communication equipment on board a ship to which this chapter applies and which is capable of automatically including the ship's position in a distress alert shall be automatically provided with this information from an internal or external navigation receiver[23)].

2 In case of failure of the internal or external navigation receiver, the ship's position and the time at which the position was determined must be updated manually at intervals of no more than four hours while the ship is underway so that it is always ready to be transmitted by the equipment.

[1] Such ships are subject to the specific radio safety requirements contained in the relevant agreement between Canada and the United States.

[2] Reference is made to the joint IMO/IHO/WMO Manual on Maritime Safety Information (MSI) (MSC. 1/Circ. 1310, as amended)

[3] Refer to resolution A. 509(105) on the recommendation on the provision of radiocommunication services for the Global Maritime Distress and Safety System (GMDSS)

[4] Refer to resolution A. 509(105) on the recommendation on the provision of radiocommunication services for the Global Maritime Distress and Safety System (GMDSS)

[5] Exemptions shall be reported through the Organisation's Global Integrated Shipping Information System (GISIS) with reference to *Issue of Exemption Certificates under the 1974 SOLAS Convention and Amendments* thereto (SLS. 14/Circ. 115, as amended)

[6] It should be noted that ships performing GMDSS functional requirements should apply the Guidance on Avoidance of Unintentional Emergency Alarms approved by the Organisation by resolution MSC. 514(105))

[7] Refer to chapter 5, regulation 19.2.3.2 and chapter 5, regulation 19.2.4 as appropriate

[8] Attention is drawn to the possible need for ships to receive certain maritime safety information while in port.

[9] Refer to resolution A. 1001(25) "Criteria for the provision of mobile satellite communication systems in the global maritime distress and safety system (GMDSS)" and *Guidance to prospective GMDSS satellite service* providers (MSC. 1/Circ. 1414).

[10] 1) Each Contracting Government is not required to provide all radiocommunication services.
2) Provision No. 48.1 of the Radio Regulations applies to the operation of coast stations and coast earth stations.

[11] Refer to resolution A. 509(105) on the recommendation on the provision of radio communication services for the Global Maritime Distress and Safety System (GMDSS)

[12] Refer to resolution A. 617(15) regarding the implementation of the NAVTEX system as a component of the World-Wide Navigational Warning Service.

[13] Information communicated by Contracting States shall be made available through GISIS.

[14] Refer to MSC. 1/Circ. 1645 for guidance on receiving maritime safety information and search and rescue related information as required by the Global Maritime Distress and Safety System (GMDSS)

[15] Refer to resolution A. 616(15) on direction finding for search and rescue.

[16] The following formula is recommended for determining the electrical load that the backup power source must supply to each radio installation required in an emergency: 1/2 of the transmit power consumption + receive power consumption + power consumption of other, additional loads.

[17] One method of checking the capacity of an accumulator battery is to fully discharge the battery and then charge it with normal charging current and time (e.g. 10 hours). A state of charge assessment can be performed at any time, but should be done without significant discharge of the battery when the ship is at sea.

[18] Refer to the following resolutions adopted by the Organisation:

General requirements

1. *General requirements for shipborne radio equipment forming part of the Global Maritime Distress and Safety System (GMDSS) and for electronic navigational aids* (resolution A. 694(17));

2. *Performance standards for the presentation of navigation-related information on shipborne navigational displays* (resolution MSC. 191(79), as amended);

3. *Performance standards for bridge alert management* (resolution MSC. 302(87));

VHF equipment

4. *Performance standards for shipborne VHF radio installations capable of voice communication and digital selective calling* (resolution MSC. 511(105));

5. *Performance standards for survival craft portable two-way VHF radiotelephone apparatus* (Resolution MSC. 515(105));

6. *Recommendation on Performance standards for on-scene (aeronautical) portable two-way VHF radiotelephone apparatus* (annex 1 to resolution MSC. 80(70), as amended);

MF and HF equipment

7. *System performance standard for the promulgation and coordination of maritime safety information using high-frequency narrow-band direct-printing* (resolution MSC. 507(105));

8. *Performance standards for shipborne MF and MF/HF radio installations capable of voice communication, digital selective calling and reception of maritime safety information and search and rescue related information* (resolution MSC. 512(105));

9. *Performance standards for the reception of maritime safety information and search and rescue related information by MF (NAVTEX) and H* (resolution MSC. 508(105));

Ship earth stations and enhanced group call (EGC) equipment

10. *Performance standards for Inmarsat-C ship earth stations capable of transmitting and receiving direct-printing communications* (resolution MSC. 513(105));

11. *Revised performance standards for enhanced group call (EGC) equipment* (resolution MSC. 306(87), as amended);

12. *Performance standards for a ship earth station for use in the GMDSS* (resolution MSC. 434(98));

Integrated radio communication systems

13. *Performance standards for a shipborne integrated communication system (ICS) when used in the Global Maritime Distress and Safety System (GMDSS)* (resolution MSC. 517(105));

Emergency position-indicating radio beacons - EPIRB

14. *Performance standards for float-free release and activation arrangements for emergency radio equipment* (resolution A. 662(16));

15. *Performance standards for float-free emergency position-indicating radio beacons (EPIRBs) operating on 406 MHz* (resolution MSC. 471(101));

Search and rescue transmitters and transponders - SART

16. *Performance standards for search and rescue radar transponder* (resolution MSC. 510(105)); and

17. *Performance standards for survival craft AIS search and rescue transmitters (AIS-SART) for use in search and rescue operations* (resolution MSC. 246(83)).

[19] Refer to the Recommendation on general requirements for marine radio equipment forming part of the future global maritime distress and safety system and for electronic navigational equipment, approved by the Organisation by resolution A. 694(17), resolution A. 813(19) on general electromagnetic compatibility (EMC) requirements for all electrical and electronic marine equipment and MSC/Circ. 862 on clarification of certain requirements in the IMO performance standards for GMDSS equipment.

[20] Refer to MSC. 1/Circ. 1040/Rev. 2 on guidance for annual testing of *emergency position-indicating radio beacons (EPIRBs)* and resolution MSC. 514(105) on guidelines to avoid false distress alerts.

[21] Refer to MSC. 1/Circ. 1039/Rev. 1 on guidelines for shore-based maintenance of *emergency position-indicating radio beacons (EPIRBs)*

[22] Refer to the STCW Code, chapter IV, section B-IV/2.

[23] Requirements for automatic updating of ship position are laid down in the following resolutions: MSC. 511(105), MSC. 512(105) and MSC. 513(105).

Annex 7

Chapter V - Safety of navigation

Regulation 1	Scope of application
Regulation 2	Definitions
Regulation 3	Exceptions and equivalents
Regulation 4	Navigation warnings
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Regulation 10	Ships' routing systems
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Regulation 15	Bridge design principles, design and layout of navigation systems and equipment and bridge procedures
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Regulation 17	Electromagnetic compatibility
Regulation 18	Approval, inspection and performance standards for navigation systems and equipment, and Voyage Data Recorder (VDR)
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Regulation 21	International Signal Book and IAMSAR manual
Regulation 22	View from the wheelhouse
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Regulation 34	Safe navigation and prevention of dangerous situations
Regulation 34-1	The master's discretion
Regulation 35	Misuse of distress signals

Regulation 36	Navigation lights
Appendices to chapter V	Regulations for the management, operation and financing of the North Atlantic Ice Patrol

As these regulations, in addition to being an implementation of the International Convention on Safety of Life at Sea (SOLAS Convention), also serve the purpose of being a translation of the SOLAS Convention into Danish, chapter V is reproduced in its entirety. Regulations 4 to 14 are thus mainly aimed at governments, but are included for information purposes. The search and rescue provisions in regulations 7.1, 7.2, 8 and 33.1-1 are administered by the Ministry of Defence. These provisions are also included for information purposes only.

Regulation 1 Scope of application

1 Unless expressly provided otherwise elsewhere, this chapter applies to all ships on all voyages, with the

exception of:

1.1 warships, naval auxiliaries and other ships owned or operated by a Contracting Government and used exclusively for non-commercial purposes by that Government; and

1.2 ships navigating the great North American lakes and the waterways flowing into or adjacent to them, as far east as the lower mouth of the St. Lambert Lock near Montreal in the province of Quebec, Canada.

Nevertheless, warships, naval auxiliaries or other ships owned or operated by a Contracting Government and used exclusively for the non-commercial purposes of that Government are encouraged to act, to the maximum extent practicable, in a manner consistent with this chapter.

2 *The provisions of this chapter shall also apply to all ships operating exclusively in waters within the baseline established in accordance with international law.*

3 A permanently joined composite unit consisting of a pushing ship and a pushed ship, when designed as an integrated tug/barge combination, shall be considered as a single ship for the purpose of this chapter.

4 The Administration shall determine to what extent the provisions of regulations 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27 and 28 shall not apply to the following categories of ships:

4.1 ships of less than 150 gross tonnage on all voyages;

4.2 ships of less than 500 gross tonnage that are not used for international voyages; and

4.3 fishing ships.

5 *Although the Convention in this chapter applies to all ships irrespective of size and trade area, the equipment requirements of regulations 15, 17, 18, 19, 20, 21, 22, 23, 24, 27, 29 and 36 of this chapter apply only to cargo ships of 15 metres in length (L) or respectively a scantling number*[1)] *of 100 and above, as well as passenger ships regardless of size when used for international voyages. For equipment requirements for ships other than those mentioned above, refer to the regulations for the ships in question.*[2)]

Regulation 2 Definitions

For the purposes of this chapter, the following definitions apply:

1 "Constructed" with regard to ships means the point in the construction when:

1.1 the keel is laid; or

1.2 a construction identifiable with a specific ship is commenced; or

1.3 assembly of the ship has commenced, comprising at least 50 tonnes or 1% of the estimated total hull weight, whichever is less.

2 A chart or nautical publication is a specially prepared chart or book, or a specially prepared database from which such a chart or book may be extracted, which has been officially issued by or under the authority of a Government, an authorised hydrographic office or other relevant Government institution, and which has been prepared for the purpose of meeting the requirements of maritime navigation.[3)]

3 "All ships" means any ship or vessel regardless of type and purpose.

4 "Length" in this chapter means length everywhere.

5 "Search and rescue service". Performing emergency monitoring, communication, coordination and search and rescue functions, including medical guidance, initial medical treatment or evacuation. The service is provided by public and private resources and includes co-operation between aircraft, ships, other vessels and installations.

6 "High-speed craft" means a craft as defined in regulation X/1.3.

7 "Mobile offshore drilling unit (MODU)" means a MODU as defined in regulation XI-2/1.1.5.

Regulation 3 Exceptions and equivalences

1 The Administration may grant general exemptions to ships without mechanical means of propulsion from the requirements of regulations 15, 17, 18, 19 (except 19.2.1.7), 20, 22, 24, 25, 26, 27 and 28.

2 The Administration may grant partial or conditional exemptions or equivalents to individual ships when such ships are operating on a voyage where the maximum distance from the coast, the length and nature of the voyage, the absence of general hazards to navigation and other factors affecting safety are such that the full application of this chapter would be unreasonable or unnecessary, provided that the Administration has taken into account the effect that such exemptions and equivalences may have on the safety of all other ships.

3 Each Administration shall, as soon as practicable after 1 January of each year, submit a report to the Organisation listing all new exemptions and equivalences granted on the basis of subsection 2 of this regulation during the previous calendar year, including the reasons for the granting of these exemptions and equivalences. The Organisation shall circulate this information to other Contracting Governments for their information.

Regulation 4 Navigation warnings

Each Contracting Government shall take all necessary steps to ensure that when information concerning any danger is received from any credible source, it shall be brought to the notice of those concerned as soon as possible and communicated to other interested governments.[4)]

Regulation 5 Meteorological services and warnings

1 Contracting Governments undertake to encourage ships at sea to collect meteorological information and to ensure that such information is analysed, disseminated and exchanged in such a way as to benefit shipping to the maximum extent possible.[5)] Administrations shall encourage the use of high-accuracy instruments and shall facilitate access to the testing of such instruments on request. The relevant national meteorological service may establish arrangements to ensure that such checks are at no cost to the ship.

2 In particular, the Contracting Governments undertake to collaborate to the fullest extent possible in the implementation of the following meteorological measures:

2.1 To warn ships of gales, storms and tropical cyclones by broadcasting information in text and, as far as practicable, in graphic form using appropriate land-based facilities for terrestrial or space-based radio communication services.

2.2 At least twice a day, using appropriate terrestrial facilities for terrestrial or space-based radio communication services[6)] broadcast weather reports suitable for shipping containing data, analyses, warnings and forecasts on weather, sea and ice conditions. This information shall be transmitted in text and, as far as practicable, in graphical form and include meteorological analyses and forecast charts transmitted in facsimile or digital form for retrieval on board the ship's data processing system.

2.3 To prepare and issue such publications as may be necessary to ensure the efficient conduct of meteorological work at sea and, where practicable, to ensure that daily weather charts are issued for the information of departing ships.

2.4 Ensure that a number of selected ships are equipped with tested meteorological instruments for use in this service (such as a barometer, a barograph, a hygrometer and a suitable apparatus for measuring sea water temperature) and that they take, record and broadcast meteorological observations at the normal times of surface synoptic observations (at least four times a day when conditions permit) and encourage other ships, particularly when in less frequented waters, to take, record and transmit observations in an adapted form.

2.5 To encourage shipping companies to involve as many of their ships as practicable in the preparation and recording of weather observations; and to transmit these observations using the ship's ground or space-based radio communications for the benefit of the various national meteorological services.

2.6 That the transmission of these weather observations is at no cost to the ship concerned.

2.7 That ships be encouraged, where practicable, to take and transmit their observations at more frequent intervals when in or believed to be in the neighbourhood of a tropical storm, bearing in mind, however, that in storm conditions officers may be heavily engaged in navigational duties.

2.8 To provide for the reception and transmission of weather information from and to ships using the appropriate terrestrial or space-based radio communication services.

2.9 To encourage all masters to notify both nearby ships and coastal stations when encountering wind speeds of 50 knots or more (wind force 10 on the Beaufort scale *(25 m/sec)*).

2.10 To endeavour to establish a uniform approach to the said international meteorological service and to comply as far as possible with the technical regulations and recommendations drawn up

by the World Meteorological Organisation to which the Contracting Governments may refer for consideration and opinion any meteorological question arising from the application of these regulations.

3 The information referred to in this regulation shall be given in the form and order of priority prescribed in the Radio Regulations. When broadcasting meteorological reports, forecasts and warnings "to all stations", all ships must observe the provisions of the Radio Regulations.

4 Forecasts, warnings, synoptic and other meteorological data intended for ships shall be issued and disseminated by the meteorological service of the country whose location is best suited to serve the various zones and areas, in accordance with the mutual agreements of the contracting countries, in particular, as defined by the World Meteorological Organisation's Global Maritime Distress and Safety System (GMDSS) marine meteorological forecast and warning dissemination system.

Regulation 6 Ice patrol service

1 The Ice Patrol Service contributes to the safety of human life at sea, safe and efficient navigation, and the protection of the maritime environment in the North Atlantic. Ships passing the ice area monitored by the ice patrol during the ice season shall make use of the services provided by the ice patrol.

2 The Contracting Governments undertake to maintain an ice patrol and a service for the study and observation of ice conditions in the North Atlantic. During the entire ice season, i.e. in the period from 15 February to 1 July each year, the south-eastern, southern and south-western limits of the iceberg area in the vicinity of the Grand Banks of Newfoundland shall be monitored in order to inform passing ships of the extent of the danger area, investigate ice conditions in general, and provide assistance to ships and crews requiring assistance within the area of patrol vessels and aircraft. During the rest of the year, surveys and observations of ice conditions should be made as needed.

3 Ships and aircraft used in the patrol service and for the investigation and observation of ice conditions may be assigned other tasks, provided that these do not interfere with the main purpose of the service or increase the cost of that service.

4 The Government of the United States agrees to continue the management of the ice patrol service and the investigation and observation of ice conditions, including the dissemination of the information thus obtained.

5 Terms and conditions regarding the management, operation, and financing of the Ice Patrol are outlined in the regulations for the management, operation, and financing of the North Atlantic Ice Patrol, which are attached to this chapter and shall be considered an integral part of this chapter.

6 If at any time the United States and/or the Government of Canada so desire, they may discontinue the provision of these services, and the Contracting Governments shall determine the continuation of these services in accordance with their mutual interests. The United States and/or the Government of Canada shall give 18 months' written notice to all Contracting Governments whose ships are entitled to fly their flag and whose ships are registered in areas to which those Contracting Governments have extended their regulation and which benefit from these services, before they may cease providing these services.

Regulation 7 Search and rescue operations

1 Each Contracting Government undertakes to ensure that, within its area of responsibility, the necessary measures are in place for emergency communication and coordination, as well as for the rescue of persons in distress at sea along its coasts. These measures shall include the provision, operation and maintenance of

such maritime search and rescue facilities as are deemed feasible and necessary, taking into account the volume of maritime traffic and the dangers to shipping, and shall, as far as possible, provide adequate means to locate and rescue such persons.[7)]

2 Each Contracting Government undertakes to provide information on the search and rescue facilities available to it and on any plans for changes therein.

3 Passenger ships covered by chapter I shall have a plan for cooperation with relevant search and rescue services on board for use in the event of an emergency. The plan shall be developed in cooperation between the ship, the company, as defined in chapter IX, regulation 1, and the search and rescue services. In order to test effectiveness, the plan must include guidelines for organising periodic drills. The plan must be prepared on the basis of the guidelines prepared by the Organisation.

Regulation 8 Rescue signals

Contracting Governments undertake to ensure that rescue signals are used by search and rescue services participating in search and rescue operations when communicating with ships or persons in distress.

Regulation 9 Hydrographic services

1 Contracting Governments undertake to ensure the collection and processing of hydrographic data and the publication, dissemination and updating of all nautical information necessary for safe navigation.

2 In particular, Contracting Governments undertake to collaborate as far as possible in the performance of the following nautical and hydrographic services in a manner most conducive to navigation:

2.1 Ensure that hydrographic surveying is carried out to fulfil the requirements for safe navigation as far as possible;

2.2 to prepare and issue charts, sailing directions, lighthouse lists, tide tables and other nautical publications which, where applicable, fulfil the requirements for safe navigation;

2.3 to publish Notices to Mariners in such a way that charts and nautical publications can be kept up to date as far as possible; and

2.4 provide data management systems to support these services.

3 Contracting Governments undertake to ensure the greatest possible uniformity in nautical charts and nautical publications and, whenever possible, to take into account relevant international resolutions and recommendations.[8)]

4 Contracting Governments undertake to coordinate their activities to the maximum extent possible to ensure that hydrographic and nautical information is made available worldwide as rapidly, reliably and transparently as possible.

Regulation 10 Ships' routing systems

1 Ships' routing systems contribute to the safety of human life at sea, safe and efficient navigation and/or protection of the marine environment. Ships' routing systems are recommended for use and may be made mandatory for all ships, certain categories of ships or ships carrying specific cargoes when adopted and implemented in accordance with the guidelines and criteria developed by the Organisation.[9)]

2 The Organisation is recognised as the only international organisation entitled to develop guidelines, criteria and regulations for ships' routing systems at an international level. Contracting Governments shall refer proposals for the adoption of ships' routing systems to the Organisation. The Organisation will collect and disseminate to Contracting Governments all relevant information on any adopted ships' routing systems.

3 The initiative for measures to establish a ships' route system is the responsibility of the government or governments concerned. When developing such systems, the provisions of guidelines and criteria developed by the Organisation[10)] shall be taken into account.

4 Ships' routing systems should be submitted to the Organisation for adoption. Where one or more Governments introduce ships' routing systems which are not intended to be submitted to the Organisation for adoption or which have not been adopted by the Organisation, they are encouraged to take into account, wherever possible, the guidelines and criteria developed by the Organisation. [10)]

5 When two or more governments share a common interest in a particular area, they should formulate joint proposals for guidelines and the use of a routing system in that area, based on mutual agreement. Upon receipt of such a proposal and before further consideration of its adoption, the Organisation shall ensure that details of the proposal have been circulated to governments having a general interest in the area, including countries in the vicinity of the proposed ships' routing system.

6 Contracting Governments shall comply with the regulations for ships' routing systems adopted by the Organisation. They shall publish all information necessary for the safe and efficient use of agreed ships' routing systems. The relevant government or governments can monitor traffic in these systems. Contracting Governments shall make every effort to ensure the proper use of ships' routing systems adopted by the Organisation.

7 A ship shall use a mandatory ships' routing system adopted by the Organisation as prescribed for its category or its cargo on board and in accordance with applicable precautions, unless there are compelling reasons not to use a particular ships' routing system. Any such cause must be recorded in the ship's logbook.

8 Mandatory ships' routing systems shall be reviewed by the Contracting Government or Governments concerned in accordance with the guidelines and criteria developed by the Organisation[10)].

9 All adopted ships' routing systems and measures taken to enforce compliance with these systems shall comply with international law, including the relevant provisions of the 1982 United Nations Convention on the Law of the Sea.

10 Nothing in this regulation or its associated guidelines and criteria shall prevent a government from exercising its rights and duties under international law or legal regime in straits used for international navigation and shipping lanes in archipelago areas.[11)]

Regulation 11 Ship reporting systems[12)]

1 Ship reporting systems contribute to maritime safety, safe and efficient navigation and protection of the marine environment. A ship reporting system, when adopted and implemented in accordance with the guidelines and criteria developed by the Organisation[13)] under this regulation, shall be used by all ships, categories of ships or ships carrying specific cargoes in accordance with the provisions of each adopted system.

2 The Organisation is recognised as the only international organisation entitled to develop guidelines, criteria and regulations for ship reporting systems at an international level. Contracting Governments

shall refer proposals for the adoption of ship reporting systems to the Organisation. The Organisation will collect and disseminate all relevant information on any adopted ships' reporting systems to Contracting Governments.

3 The initiative for measures to establish a ship reporting system is the responsibility of the government or governments concerned. When developing such systems, the provisions of guidelines and criteria developed by the Organisation[13)] shall be taken into account.

4 Ship reporting systems not submitted to the Organisation for adoption need not comply with this regulation. However, governments putting such systems into operation are encouraged to follow, where possible, the guidelines and criteria developed by the Organisation. [13)] Contracting Governments may submit such systems to the Organisation for recognition.

5 When two or more governments have a shared interest in a particular area, they must formulate proposals for a coordinated ship reporting system based on mutual agreements. Before considering a proposal for the adoption of a ship reporting system, the Organisation shall circulate details of the proposal to governments having a shared interest in the area covered by the proposed system. Where a coordinated ship reporting system is adopted and established, it must have standardised procedures and workflows.

6 Following the adoption of a ship reporting system in accordance with this regulation, the government or governments concerned shall take the necessary measures to disseminate the information required for the proper and effective operation of the system. Any adopted ship reporting system must have the ability to work with and assist ships with information when required. Such systems shall be operated in accordance with the guidelines and criteria developed by the Organisation[14)] in accordance with this regulation.

7 The master of a ship shall comply with the requirements of agreed ship reporting systems and shall provide the relevant authority with the information required in accordance with the regulations of each system.

8 All ship reporting systems adopted and measures taken to enforce compliance with those systems shall comply with international law, including the relevant provisions of the United Nations Convention on the Law of the Sea.

9 Nothing in this regulation or its associated guidelines and criteria shall prevent a government from exercising its rights and duties under international law or legal regimes in straits used for international navigation and shipping lanes in archipelago areas.

10 Participation of ships in accordance with the provisions of agreed ship reporting systems shall be at no cost to the ships.

11 The Organisation shall ensure that adopted ship reporting systems are reviewed taking into account the guidelines and criteria developed by the Organisation.

Regulation 12 Vessel traffic services

1 Vessel Traffic Services (VTS) contribute to the safety of human life at sea, safe and efficient navigation, and the protection of the marine environment, neighbouring coastal areas, working areas and offshore installations from any harmful effects of maritime traffic.

2 Contracting Governments undertake to establish vessel traffic services where an assessment of traffic and hazards in the area justifies the establishment of such services.

3 In planning and implementing vessel traffic services, Contracting Governments shall, as far as possible, follow the recommendations developed by the Organisation.[15)] Mandatory use of vessel traffic services can only take place in sea areas within the territorial sea of the coastal State.

4 Contracting Governments shall endeavour to ensure that ships entitled to fly the flag of the State concerned participate in and comply with provisions governing the vessel traffic services.

5 Nothing in the regulation or in guidelines adopted by the Organisation shall prevent the drill by a Government of its rights and duties under international law or legal regime in straits used for international navigation and shipping lanes in archipelago areas.

Regulation 13 Establishment and operation of aids to navigation

1 Each Contracting Government undertakes to provide, either alone or in collaboration with other Contracting Governments, such systems to assist shipping as it considers reasonable and necessary, taking into account the volume of traffic and the degree of risk involved.

2 With a view to ensuring the greatest possible uniformity in systems to assist shipping, Contracting Governments undertake to take into account the international recommendations and guidelines[16)] in establishing such systems.

3 Contracting Governments undertake to ensure that information concerning systems to aid navigation is made available to all those to whom it relates. Amendments of transmissions in position-fixing systems which may adversely affect the performance of shipborne receivers shall be avoided as far as possible and shall be implemented only after adequate notice has been given sufficiently in advance.

Regulation 14 Manning

1 Contracting Governments undertake, each in respect of its own ships, to maintain or, if necessary, take measures to ensure that all ships have a sufficiently large and able crew from a safety point of view.[17)]

2 For any ship covered by chapter I, the Administration shall:

2.1 determine an appropriate minimum crew complement according to a transparent procedure, taking into account the relevant guidance developed by the Organisation;[18)] and

2.2 issue an appropriate manning determination or equivalent as evidence of the minimum safe manning necessary to comply with the provisions of subsection 1.

3 A working language must be established on all ships to ensure the effective exercise of safety matters by the crew. The working language must be entered in the ship's logbook. The shipping company as defined in chapter IX, regulation 1, or the master, as appropriate, shall determine the working language concerned. All employees on board must be able to understand and, where appropriate, give orders, instructions and feedback in the relevant language. If the working language is not an official language of the country which is the flag State of the ship, all lists, plans and instructions required to be posted must include a translation into the working language.

4 On ships covered by chapter I, English shall be used as the working language on the bridge for bridge-to-bridge and bridge-to-shore safety communications, as well as for communication on board between the pilot and the bridge duty personnel,[19)] unless those directly involved in the communication speak a common language other than English.

Regulation 15 Bridge design principles, design and layout of navigation systems and equipment and bridge procedures

All decisions made to implement the requirements of regulations 19, 22, 24, 25, 27 and 28 of this chapter that affect bridge design, the design and layout of navigation systems and equipment on the bridge, and bridge procedures,[20)] shall be made with a view to:

1. facilitate the tasks to be performed by the bridge team and pilot in order to fully assess the situation and navigate the ship safely in all operating conditions;

2. to promote efficient and safe bridge resource management;

3. enable the bridge team and the pilot to have convenient and continuous access to essential information presented in a clear and easily understandable manner, using standardised symbols and coding systems for control panels and displays;

4. to indicate the operational status of automated functions and integrated components, systems and/or subsystems;

5. enable fast, continuous and efficient information processing and decision making by the bridge team and pilot;

6. prevent or minimise excessive or unnecessary work and any condition or disturbance on the bridge which may cause fatigue or affect the alertness of the bridge watch and pilot; and

7. minimise the risk of human error and, if they occur, detect such errors by monitoring and alarm systems early enough for the bridge team and the pilot to take appropriate action.

Regulation 16 Maintenance of equipment

1 The Administration shall be satisfied that sufficient measures are in place to ensure that the performance is maintained for the devices required by this chapter.

2 Except as provided in regulations I/7(b)(ii), I/8 and I/9, and while all reasonable steps must be taken to maintain the equipment required by this chapter in an efficient and serviceable condition, failure of such equipment shall not be considered to render the ship unseaworthy or as a basis for delaying the ship in ports where repair facilities are not readily available, provided that the master takes appropriate action with regard to the inoperative equipment or the unavailable information when planning and executing a safe voyage to a port where repairs can be made.

Regulation 17 - Electromagnetic compatibility

1 Administrations shall ensure that all electrical and electronic equipment on the bridge or near the bridge of ships constructed on or after 1 July 2002 is tested for electromagnetic compatibility taking into account the recommendations developed by the Organisation.[21)]

2 Electrical and electronic equipment shall be installed so that electronic interference does not prevent navigation systems and equipment from operating effectively.

3 Transportable electrical and electronic equipment shall not be used on the bridge if it may interfere with the effective operation of navigation systems and equipment.

Regulation 18 Approval, survey and performance standards for navigation systems and equipment and Voyage Data Recorder (VDR)

1 The systems and equipment required to fulfil the requirements of regulations 19 and 20 shall be of a type approved by the Administration.

2 Systems and equipment, including associated back-up systems where used, installed on or after 1 July 2002 to meet the functional requirements of regulations 19 and 20 shall comply with appropriate performance standards not inferior to those adopted by the Organisation.[22)]

3 When systems and equipment are replaced or added on ships constructed before 1 July 2002, such systems and equipment shall, as far as is reasonable and practicable, comply with the requirements of subsection 2.

4 Systems and equipment installed prior to the adoption of performance standards by the Organisation may, at the discretion of the Administration, subsequently be exempted from full compliance with such standard, taking due account of the recommended criteria adopted by the Organisation. However, for an electronic chart display and information system (ECDIS) to be recognised as complying with the chart equipment requirements of regulation 19.2.1.4, such system shall comply with the relevant performance standards which shall not be inferior to those adopted by the Organisation and in force at the date of installation or, for systems installed before 1 January 1999, not inferior to the performance standard adopted by the Organisation on 23 November 1995.[23)]

5 The Administration shall require manufacturers to operate a quality management system that is audited by a competent authority to ensure continued conformity with the type-approval conditions. Alternatively, the Administration may initiate an end product verification procedure whereby compliance with the type approval certificate is verified by a competent authority before the product is installed on board ships.

6 Before granting approval to systems or equipment incorporating new features not covered by this chapter, the Administration shall ensure that such features support functions at least as effective as those required by this chapter.

7 When, in addition to the requirements of regulations 19 and 20, ships are fitted with equipment for which performance standards have been developed by the Organisation, such equipment shall be subject to approval and shall, as far as practicable, comply with performance standards not inferior to those adopted by the Organisation.

8 The black box (VDR), including all sensors, must undergo an annual functional test. The test must be performed by an authorised testing or service institution to verify accuracy, duration and the ability to recover recorded data. In addition, tests and inspections must be carried out to determine the condition of all protective enclosures and devices to facilitate localisation. A copy of the certificate of compliance issued by the testing organisation, including the date of compliance and the performance standard used, shall be kept on board the ship.

9 The Automatic Identification System (AIS) must undergo an annual test. The test must be performed by an approved inspector or an approved testing or service organisation. The test should verify the programming of the ship's static information and correct data exchange with connected sensors, as well as verify the functionality of the radio by means of radio frequency measurements and an on-air test, e.g. using a Vessel Traffic Service (VTS). A copy of the test report must be kept on board the vessel.

Regulation 19 Requirements for shipborne navigation systems

and equipment 1 Application and requirements

Subject to the provisions of regulation 1.4:

1.1 Ships constructed on or after 1 July 2002 shall be fitted with navigation systems and equipment complying with the requirements of subsections 2.1 to 2.9.

1.2 Ships constructed before 1 July 2002 must:

1.2.1 subject to the provisions of subsections 1.2.2, 1.2.3 and 1.2.4 and unless they fully comply with the requirements of these regulations, continue to be fitted with equipment which fulfils the requirements of regulations V/11, V/12 and V/20 of the International Convention for the Safety of Life at Sea, 1974, in force prior to
1 July 2002;

1.2.2 be fitted with equipment or systems as required in subsection 2.1.6 not later than the first survey[24)] after 1 July 2002, at which time the radio direction finding equipment required by regulation V/12 (p) of the International Convention for the Safety of Life at Sea, 1974, in force prior to 1 July 2002 shall no longer be required;

1.2.3 be equipped with the system required in subsection 2.4 not later than the dates set out in subsections 2.4.2 and 2.4.3; and

1.2.4 *be equipped with a bridge watch alarm system (BNWAS) in accordance with subsections 2.2.3 and 2.2.4.*

2 Ship-based navigation equipment and systems

2.1 All ships regardless of size must have:

2.1.1 a properly aligned, standard magnetic compass or equivalent, capable of determining the ship's course independently of any power supply and displaying it at the main steering position;

2.1.2 a bearing disc, compass bearing device or equivalent capable of taking bearings independently of any power supply over a 360° arc of the horizon;

2.1.3 means to correct courses and bearings to true at any time;

2.1.4 charts and nautical publications to plan and display the ship's route on the planned voyage and to plot and record positions throughout the journey. An Electronic Chart Display and Information System (ECDIS) is also considered to fulfil the chart requirements of this provision. Ships to which subsection 2.10 applies shall fulfil the ECDIS equipment requirement described therein;

2.1.5 a backup arrangement to fulfil the functional requirements in subsection 4, if this function is fully or partially fulfilled by electronic means,[25)]

2.1.6 a receiver for a global navigation satellite system or a terrestrial radio navigation system or equivalent, capable of automatically determining and updating the ship's position at any time throughout the intended voyage;

2.1.7 if the ship has a gross tonnage of less than 150 and, if practicable, a radar reflector or equivalent to ensure detection on ships navigating using both 9 and 3 GHz radar;

2.1.8 when the wheelhouse of the ship is completely enclosed, and unless the Administration determines otherwise, a sound receiving system or equivalent enabling the navigation officer on duty to hear sound signals and determine their direction;

2.1.9 a telephone or equivalent to communicate course information to the emergency steering position, if available.

2.2 All ships of 150 gross tonnage and above and passenger ships of all sizes shall, in addition to the requirements in subsection 2.1, be fitted with:

2.2.1 a spare magnetic compass interchangeable with the magnetic compass required in subsection 2.1.1 or equivalent capable of performing the functions of subsection 2.1.1 when replacing or duplicating the equipment;

2.2.2 a signalling lamp or equivalent for use in communication by light during the day and at night using an electrical energy source that does not depend solely on the ship's power supply.

2.2.3 Ships with a wheelhouse must be equipped with a bridge watch alarm system, which must be connected when the ship is travelling at sea.

2.2.3.1 The Convention's bridge watch alarm system requirements apply to cargo ships of 150 gross tonnage and above and passenger ships of all sizes built before or on 1 July 2011. *Nationally, the equipment requirement has been in force since 1 March 2006 for cargo ships with a length (L) of 15 m or more, respectively a scantling number*[26)] *of 100 or more and passenger ships of any size when used for international voyages.*

2.2.4 The bridge watch alarm system shall fulfil the technical and operational requirements of the IMO Functional Standard[27)] for Bridge Watch Alarm System (BNWAS).

2.3 All ships of 300 gross tonnage and above and passenger ships of all sizes shall, in addition to the requirements in subsection 2.2, be fitted with:

2.3.1 a sonar or other electronic means to measure and display the available water depth;

2.3.2 a 9 GHz radar or equivalent means to determine and display distance and bearing to radar transponders and to other surface vessels, obstacles, buoys, coastlines and navigational markings to assist navigation and collision avoidance;

2.3.3 an electronic plotting facility or equivalent to electronically plot distance and bearing of targets to determine collision risk;

2.3.4 a device (a log) for indicating speed and distance through the water or equivalent to show speed and distance through the water;

2.3.5 an adequately adjusted heading transmission system or equivalent to transmit heading information to the equipment in subsections 2.3.2, 2.3.3 and 2.4.

2.4 All ships of 300 gross tonnage and above operating in international trade and cargo ships of 500 gross tonnage and above not operating in international trade, as well as passenger ships of any size, shall be fitted with an Automatic Identification System (AIS), as follows:

2.4.1 ships constructed on or after 1 July 2002;

2.4.2 ships operating on international voyages and constructed before 1 July 2002:

2.4.2.1 for passenger ships, no later than 1 July 2003;

2.4.2.2 for tankers, not later than the first survey[28)] under the Safety of Equipment Certificate[29)] after 1 July 2003;

2.4.2.3 for ships - other than passenger ships and tankers - of 50,000 gross tonnage and upwards, not later than 1 July 2004;

2.4.2.4 for other ships, other than passenger ships and tankers, of 300 gross tonnage and upwards but less than 50,000 gross tonnage, not later than the first survey required by the equipment certificate[30)] after 1 July 2004 or 31 December 2004, whichever is the earlier; and

2.4.3 ships constructed before 1 July 2002 not engaged on international voyages by 1 July 2008;

2.4.4 The Administration may exempt ships from the application of the requirements of this regulation when such ships are permanently withdrawn from service within two years after the implementation date in subsections 2 and 3;

2.4.5 AIS must:

2.4.5.1 Automatically provide information including ship identity, type, position, course, speed, navigation status and other security-related information to designated shore stations, other ships and aircraft;

2.4.5.2 automatically receive such information from similarly equipped ships;

2.4.5.3 monitor and track ships; and

2.4.5.4 exchange data with land-based facilities;

2.4.6 the requirements of subsection 2.4.5 shall not apply in cases where international agreements, regulations or standards provide for the protection of navigational information; and

2.4.7 AIS shall be used taking into account the guidelines adopted by the Organisation[31)]. On ships equipped with AIS, this system shall be in operation at all times, except when international agreements, regulations or standards provide for the protection of navigational information.

2.5 All ships of 500 gross tonnage and above shall, in addition to complying with the requirements of subsection 2.3, with the exception of subsections 2.3.3 and 2.3.5 and the requirements of subsection 2.4, have:

2.5.1 a gyrocompass or equivalent to determine and display their course by ship-based non-magnetic means, clearly legible to the helmsman from the main steering position. The means shall also transmit heading information to the equipment in subsections 2.3.2, 2.4 and 2.5.5;

2.5.2 a gyrocompass course repeater or equivalent that can provide visual course information to the emergency steering position, if available;

2.5.3 a gyrocompass bearing repeater or equivalent to take bearings of the horizon over a 360° arc using the gyrocompass or equivalent referred to in subsection 1. Ships with a gross tonnage of less than 1600 must be equipped with these means as far as possible;

2.5.4 rudder, propeller, thrust, pitch and function indicators or equivalent means to determine and display the rudder angle, propeller revolutions, thrust force and direction and, where applicable, thruster force and direction, pitch and function. All these indicators must be readable from the bridge;

2.5.5 an automatic track function or equivalent to automatically plot distance and bearing to other targets to determine collision risk.

2.6 On all ships of 500 gross tonnage and above, the failure of any single instrument shall not limit the ship's ability to fulfil the requirements of subsections 2.1.1, 2.1.2 and 2.1.4.

2.7 All ships of 3000 gross tonnage and above shall, in addition to meeting the requirements of subsection 2.5, have:

2.7.1 a 3 GHz radar or, where the Administration considers it appropriate, an additional 9 GHz radar or equivalent, functionally independent of that referred to in subsection 2.3.2, to determine and display distances and bearings to other surface vessels, obstructions, buoys, coastlines and navigational markings to assist in navigation and collision avoidance; and

2.7.2 an additional automatic track function or equivalent to automatically plot distance and bearing to other targets to determine the collision risk, which is functionally independent of those referred to in subsection 2.5.5.

2.8 All ships of 10,000 gross tonnage and above shall, in addition to meeting the requirements of subsection 2.7 with the exception of subsection 2.7.2, have:

2.8.1 an automatic radar plotting aid or equivalent to automatically plot range and bearing to at least 20 other targets connected to an instrument indicating speed and distance through water to determine collision risk and simulate test manoeuvres; and

2.8.2 a course or route control system or equivalent to automatically control and maintain a course and/or straight route.

2.9 All ships with a gross tonnage of 50,000 and above must, in addition to meeting the requirements in subsection 2.8, have:

2.9.1 a rotational speed indicator or equivalent to determine and display the rotational speed; and

2.9.2 a speed and distance indicating device or equivalent to indicate speed and distance over the ground in the forward and transverse directions.

2.10 ships on international voyages must be fitted with an electronic chart display and information system (ECDIS) as follows:

2.10.1 passenger ships of 500 gross tonnage and above constructed on or after 1 July 2012;

2.10.2 tankers of 3,000 gross tonnage and above, constructed on or after 1 July 2012;

2.10.3 cargo ships other than tankers of 10,000 gross tonnage and above, constructed on or after 1 July 2013;

2.10.4 cargo ships other than tankers of 3,000 gross tonnage and above but less than 10,000 gross tonnage, constructed on or after 1 July 2014;

2.10.5 passenger ships of 500 gross tonnage and upwards constructed before 1 July 2012, not later than at first survey[32)] on or after 1 July 2014;

2.10.6 tankers of 3,000 gross tonnage and above, constructed before 1 July 2012, not later than at first survey[32)] on or after 1 July 2015;

2.10.7 cargo ships other than tankers of 50,000 gross tonnage and upwards, constructed before 1 July 2013, not later than at first survey[32)] on or after 1 July 2016;

2.10.8 cargo ships other than tankers of 20,000 gross tonnage and above but less than 50,000 gross tonnage, constructed before 1 July 2013, not later than at first survey [32)] on or after 1 July 2017; and

2.10.9 cargo ships other than tankers of 10,000 gross tonnage and upwards but less than 20,000 gross tonnage, constructed before 1 July 2013, not later than at first survey[32)] on or after 1 July 2018.

2.11 The Administration may exempt ships from the application of the requirements of subsection 2.10 when such ships will be permanently withdrawn from service within two years after the implementation date in subsections 2.10**.**5 to 2.10.9.

3 When the term "or equivalent" is used in this regulation, such solutions shall be approved by the Administration in accordance with regulation 18.

4 The navigation equipment and systems referred to in this regulation shall be installed, tested and maintained to minimise malfunction.

5 Navigation equipment and systems that provide alternative modes of operation shall indicate the current mode of operation.

6 Integrated bridge systems[33)] shall be organised in such a way that the officer in charge of navigation is immediately alerted to failures in subsystems by sound and light alarms, and such failures shall not cause failures in other subsystems. When a part of an integrated navigation system fails,[34)] it must be possible to use all other individual equipment or parts of the system separately.

Regulation 19-1 Long-range identification and tracking of ships (LRIT)

1 Nothing in this regulation or the provisions of the functional standards and requirements,[35)] as adopted by IMO with respect to LRIT shall prejudice the rights, jurisdiction or obligations of States under international law, in particular the law of the sea, the exclusive economic zone, the contiguous zone, territorial waters or straits used for international navigation and shipping lanes between archipelagic groups.

2.1 With reference to the provisions of subsections 4.1 and 4.2, this regulation applies to the following types of ships[36)] engaged in international trade:

2.1.1 passenger ships, including high-speed passenger vessels;

2.1.2 cargo ships, including high-speed craft, of 300 gross tonnage and upwards,[37)]) and

2.1.3 MODUs.

2.2 When used in subsections 3 to 11.2, the term "ship" includes passenger ships, cargo ships, high-speed craft and MODUs subject to the provisions of this regulation.

3 This regulation establishes provisions enabling Contracting Governments to carry out long-range identification and monitoring of ships.

4.1 Ships[38)] shall be equipped with a system for the automatic transmission of the information specified in subsection 5 as follows:

. 1 ships laid down on 31 December 2008 or later

. 2 ships laid down before 31 December 2008 and certified for operation:

. 1 in sea areas A1 and A2 as defined in regulations IV/2.1.15 and IV/2.1.16, or

. 2 in sea areas A1, A2 and A3 as defined in regulations IV/2.1.15, IV/2.1.16 and IV/2.1.17,

. 3 ships laid down before 31 December 2008 and certified to operate in sea areas A1, A2, A3 and A4 as defined in regulations IV/2.1.15, IV/2.1.16, IV/2.1.17 and IV/2.1.18, not later than the first survey[39)] of the radio installation after 1 July 2009. However, these ships shall comply with the provisions of subsection 2 above while operating in sea areas A1, A2 and A3.

4.2 Ships, irrespective of their date of construction, equipped with an automatic identification system (AIS) as defined in regulation 19.2.4 and operating exclusively within sea area A1, as defined in regulation IV/2.1.15, need not comply with the provisions of this regulation.

5 With reference to the provisions of subsection 4.1, ships shall automatically transmit the following LRIT information:

5.1 the identity of the ship;

5.2 the ship's position (width and length); and

5.3 date and time of the position.

6 Systems and equipment used to fulfil the requirements of this regulation shall comply with standards and performance requirements[40) 35)] which shall not be inferior to those approved by the IMO. All equipment in ships must be of a type approved[38)] by the Administration.

7. Systems and equipment used to fulfil the requirements of this regulation shall be capable of being switched off on board or the transmission of LRIT information interrupted:

7.1 where international agreements, regulations and standards allow for the protection of navigational data; or

7.2 in exceptional circumstances and for the shortest possible duration, where the master judges that the release of the information would jeopardise the safety or security of the ship. In accordance with regulation 28, in such a case, the master shall, without undue delay, inform the Administration and enter it in the ship's logbook together with the reasons for the decision to stop broadcasting and the period during which the system or equipment was switched off.

8.1 Subject to the provisions of subsections 8.2 to 11.2, Contracting Governments shall be able to receive LRIT information on ships for safety and other purposes[41)] that are adopted by the Organisation as follows:

8.1.1 The Administration is entitled to receive such information on ships entitled to fly the flag of the Administration, wherever these ships are located;

8.1.2 a Contracting Government is entitled to receive such information about ships which have indicated their intention to enter a port facility, as defined in regulation XI-2/1.1.9, or a place under the jurisdiction of that Contracting Government, wherever such ships are located, provided they are not located within the internal territorial sea of other Contracting Governments established in accordance with international law; and

8.1.3 a Contracting Government is entitled to receive such information concerning ships flying the flag of other Contracting Governments which do not intend to enter a port facility or place under the jurisdiction of that Contracting Government navigating within a distance not exceeding 1000 nautical miles

of its coast, provided that such ships are not located within the internal territorial sea of other Contracting Governments established in accordance with international law; and

8.1.4 a Contracting Government is not entitled under subsection 8.1.3 to receive such information about a ship located within the territorial sea of the Contracting Government whose flag the ship is entitled to fly.

8.2 To enable LRIT information to be made available under the provisions of subsection 8.1, Contracting Governments shall specify and notify[42)]. Organisation of the relevant details according to the functional standard and functional requirements approved by the Organisation [35)]. The Contracting Governments concerned may, at any time thereafter, modify or withdraw such information. The Organisation shall inform all Contracting Governments of the receipt of such information and the details thereof.

9.1 Regardless of the provisions of subsection 8.1.3, the Administration is entitled at any time to decide that LRIT information relating to ships flying its flag shall not be made available under subsection 8.1.3 to Contracting Governments in order to address security or other issues. The relevant Administration may, at any time thereafter, modify, suspend or cancel such decision.

9.2 The Administration concerned shall notify the Organisation of such a decision under subsection 9.1. The Organisation shall inform all Contracting Governments of the receipt of such notification, together with particulars thereof.

9.3 The rights, duties and obligations under international law of ships whose Administration relies on the provisions of subsection 9.1 shall not be affected as a result of such a decision.

10 Contracting Governments shall always:

10.1 Recognise the importance of LRIT information;

10.2 recognise and respect the commercial confidentiality and sensitivity of any LRIT information they may receive;

10.3 protect the information they receive from unauthorised access and disclosure; and

10.4 use the information they may receive in a manner consistent with international law.

11.1 Contracting Governments shall bear all costs associated with all LRIT information they request and receive. Regardless of the provisions of subsection 11.2, Contracting Governments shall not be able to impose any charges on ships in respect of LRIT information which they may wish to receive.

11.2 Unless otherwise provided by the national law of the Administration, ships entitled to fly the flag of the Administration shall not be charged for transmitting LRIT information in accordance with the provisions of this regulation.

12. Regardless of the provisions of subsection 8.1, search and rescue services[43)] of Contracting Governments shall be entitled to receive LRIT information free of charge in connection with the search and rescue of persons in distress at sea.

13. In cases where Contracting Governments consider that the provisions of this regulation or any related requirement established by the Organisation are not being observed or complied with, they may report this to the Organisation.

14. The Maritime Safety Committee shall establish the criteria, procedures and measures for the establishment, review and revision[44)] of the provisions relating to LRIT information to Contracting Governments under the provisions of this regulation.

Regulation 20 Voyage Data Recorder (VDR)[45)]

1 To assist in casualty investigations, ships operating on international voyages shall, subject to regulation 1.4, be fitted with a Voyage Data Recorder (VDR) as follows:

1.1 passenger ships constructed on or after 1 July 2002;

1.2 ro-ro passenger ships constructed before 1 July 2002, not later than at first survey[46)] on or after 1 July 2002;

1.3 passenger ships other than ro-ro passenger ships constructed before 1 July 2002, not later than 1 January 2004; and

1.4 ships other than passenger ships of 3,000 gross tonnage and upwards constructed on or after 1 July 2002.

2 To assist in casualty investigations, cargo ships when operating on international voyages shall, subject to regulation 1.4, be fitted with a VDR which may be a Simplified Voyage Data Recorder (S-VDR)[47]) as follows:

2.1 cargo ships of 20,000 gross tonnage and upwards constructed before 1 July 2002, for the first dry-docking scheduled after 1 July 2006, not later than 1 July 2009;

2.2 cargo ships of 3,000 gross tonnage and upwards but less than 20,000 gross tonnage, constructed before 1 July 2002, first scheduled dry-docking after 1 July 2007, not later than
1 July 2010;

2.3 The Administration may exempt cargo ships from the requirements of subsections 1 and 2 when such ships will be permanently withdrawn from service within two years after the implementation date referred to in subsections 1 and 2.

3 The Administration may exempt ships other than ro-ro passenger ships constructed before 1 July 2002 from being fitted with a Voyage Data Recorder (VDR) where it can be demonstrated that interfacing a Voyage Data Recorder (VDR) with the existing equipment on the ship is unreasonable and impracticable.

Regulation 21 International signal book and IAMSAR manual

1 All ships required by this Code to be fitted with a radio installation shall be equipped with the International Code of Signals, as amended by the Organisation. The signal book must also be available on any other ship that, in the opinion of the Administration, needs to use it.

2 All ships must carry an updated version of Volume III of the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual[48)].

3 *Ships with a trade area outside the restricted trade area (trade in the North Sea east of 3° E. long. and south of 61°N. br., and in the Baltic Sea and intermediate waters) and ships with a trade area of more than 200 nautical miles from the coast of Greenland must be equipped with a copy of the IMO Maritime Communication Expressions.*[49)]

Regulation 22 View from the wheelhouse

1 Ships of 55 metres in length and above, as defined in regulation 2.4 and constructed on or after 1 July 1998, shall comply with the following requirements:

1.1 The view of the sea surface from the bridge shall not be obscured further forward than either two ship lengths or 500 metres forward of the bow,[50)], whichever is less. This applies in an arc from right ahead to 10º on each side of the ship under all conditions of draft, trim and deck load;

1.2 No blind sector caused by cargo, cargo-handling equipment or other obstructions forward of the wheelhouse that obstruct the view of the sea surface from the bridge shall exceed 10º. The total arc of blind sectors shall not exceed 20º. The visible sectors between blind sectors must be at least 5º. However, the individual blind sector in the visible sectors described in subsection 1 shall not exceed 5º;

1.3 The horizontal field of vision from the bridge shall extend over an arc of not less than 225º, that is, from right ahead to at least 22.5º astern transversely on each side of the ship;

1.4 From each bridge wing, the horizontal field of vision shall extend over an arc of at least 225º, that is, from at least 45º on the opposite side of the bow to dead ahead and from dead ahead to dead astern through 180º on the same side of the ship;

1.5 From the main steering position, the horizontal field of vision shall extend over an arc from straight ahead to at least 60º on each side of the ship;

1.6 The side of the ship must be visible from the bridge wing;

1.7 The height of the lower edge of the wheelhouse front windows above the bridge deck should be kept as low as possible. In no case may the bottom edge obstruct the field of vision described in this regulation;

1.8 The upper edge of the wheelhouse front windows shall allow a person with an eye level of 1800 mm above the bridge deck to see forward to the horizon from the bridge when the ship is in heavy seas. The Administration may authorise a reduction of the eye height if it is satisfied that an eye height of 1800 mm is unreasonable and impractical, but in no case below 1600 mm;

1.9 Windows must fulfil the following requirements:

1.9.1 To avoid reflections, the front windows of the wheelhouse should slope outwards and form an angle with the vertical plane of between 10° and 25°;

1.9.2 Bars between wheelhouse windows should be as narrow as possible and should not be placed directly in front of a workstation;

1.9.3 Polarised and tinted windows must not be installed;

1.9.4 There must always be a clear view through at least two front windows in the wheelhouse, regardless of weather conditions. Depending on the layout of the bridge, a number of additional windows should be fitted with means to ensure clear visibility.

2 Ships built before 1 July 1998 shall, if practicable, meet the requirements of subsections 1.1 and 1.2. However, constructive changes or additional equipment are not necessarily required.

2a *Ships with a length of 15 metres or more but less than 55 metres shall comply with the provisions of subsection 1.*
1. Such ships constructed before 1 July 2006 shall comply with the provisions of subsection 1 as far as practicable, except that the visibility from the wheelhouse shall at least meet the recommendations of the Organisation.[51)]

3 In ships of unconventional design which, in the judgement of the Administration, cannot comply with this regulation, measures shall be taken to achieve a degree of visibility as near as practicable to that required by this regulation.

4 Regardless of the requirements of regulations 1.1, 1.3, 1.4 and 1.5, ballast operations may be performed provided that:

4.1 the master has determined that it is safe to do so, taking into account that a proper lookout can be made at all times, including taking into account any increased blind sectors or reduced horizontal field of vision as a result of the ballasting operation;

4.2 the ballast operation is carried out in accordance with the ship's ballast management plan and taking into account the recommendations on ballast operations adopted by the Organisation; and

4.3 the time of commencement and completion of the ballast operation is recorded in the ship's logbook in accordance with regulation V/28.

Regulation 23 Pilot transfer arrangements 1

Application

1.1 Ships engaged in trade where there is a possibility that pilotage will be used shall be provided with arrangements for the transfer of pilotage.

1.2 Pilot transfer equipment and arrangements installed[52)] on or after 1 July 2012 shall comply with the provisions of this regulation and due account shall be taken of the standards adopted by the Organisation.[53)]

1.3 Except as otherwise provided, pilotage transfer equipment and arrangements installed in ships before 1 July 2012 shall at least comply with the provisions of regulation 17[54] or 23, as applicable, of the International Convention for the Safety of Life at Sea, 1974, in force prior to that date and due account shall be taken of the standards adopted by the Organisation before that date.

1.4 Equipment and arrangements installed on or after 1 July 2012, which are replacements for equipment and arrangements existing on ships before 1 July 2012, shall, as far as reasonably practicable, comply with the provisions of this regulation.

1.5 For ships built before 1 January 1994, subsection 5 shall apply not later than the first survey[55)] held on or after 1 July 2012.

1.6 Subsection 6 applies to all ships.

2 General

2.1 All arrangements used to transfer pilots must effectively fulfil their purpose of enabling pilots to board and disembark safely. Equipment must be kept clean, properly maintained and stowed, and inspected regularly to ensure it is safe to use. The equipment may only be used for boarding and disembarking personnel.

2.2 The rigging of pilot transfer arrangements and the embarkation of pilots must be supervised by a responsible officer who has the means to communicate with the ship's bridge and who must ensure that the pilot is escorted to and from the bridge along a safe route. Personnel involved in the rigging and operation of mechanical equipment must be instructed in the safe procedures to follow and the equipment must be tested before use.

2.3 The manufacturer shall have certified that the pilot ladder complies with this regulation or an international standard acceptable to the Organisation.[56)] Pilot ladders shall be inspected in accordance with chapter I, regulations 6, 7 and 8.

2.4 All pilot ladders used for the transfer of pilots shall be clearly marked with tags or other permanent markings to facilitate the identification of each device for the purposes of survey, inspection and inventory record keeping. An inventory list shall be kept on the ship indicating the date of entry into service of the ladder in question and any repairs carried out on it.

2.5 References in this regulation on gangways include an inclined ladder used as part of the pilot transfer arrangement.

3 Transfer arrangements

3.1 Arrangements must be in place to enable the pilot to board and disembark safely on both sides of the ship.

3.2 In all ships where the distance from the water surface to the point of entry to or exit from the ship exceeds 9 metres and where it is intended to take pilots on board or to discharge pilots by means of a gangway[57)] or other equally safe and convenient means together with a pilot ladder, the ship shall be fitted with such equipment on both sides unless the equipment can be transferred to and used on both sides.

3.3 Safe and convenient access to and egress from the ship must be provided by either:

3.3.1 a pilot ladder that requires the distance to be climbed to be no shorter than 1.5 metres and no longer than 9 metres above the surface of the water and is positioned and secured as such:

3.3.1.1 that it is clear of all discharges from the ship;

3.3.1.2 that it is located within the parallel midship section and, as far as possible, within a quarter of a length forward or aft of the ship's centre frame;

3.3.1.3 that each step rests firmly against the side of the ship; where structures such as fenders would prevent the implementation of this regulation, special precautions shall be taken to the satisfaction of the Administration to ensure that persons are able to embark and disembark safely;

3.3.1.4 a single ladder length can reach the water from the point of entry to or exit from the ship and due account has been taken of all loading and trim conditions of the ship and of adverse heeling up to 15°; lashing fittings, shackles and lashing ropes shall be at least as strong as the side ropes of the pilot ladder; or

3.3.2 a gangway in conjunction with the pilot ladder (i.e. a combined arrangement) or other equally safe and convenient means when the distance from the water surface to the access point on the vessel is over 9 metres
m. The gangway must be positioned so that it leads aft. When used, means shall be provided to secure the lower end of the halyard against the ship's side so as to ensure that the lower end of the gangway and the lower end of the platform are held firmly against the ship's side within the parallel amidships and as far as possible within a quarter of a length forward or aft of the ship's centre frame and clear of all draughts.

3.3.2.1 when a combined arrangement is used for pilot access, means shall be provided to secure the pilot ladder and gangway against the ship's side at a point nominally 1.5 metres above the lowest rest of the halyard. When using a combined arrangement using a gangway with a hatch in the lower platform (i.e. an access platform), the pilot ladder and gangway must be rigged through the hatch that extends above the platform to the height at which the handrail is located.

4 Access to the ship's deck

Means shall be provided to ensure safe, convenient and unobstructed passage for a person embarking or disembarking between the top of the pilot ladder, gangway or other equipment and the deck of the ship. Where such a passage is established with the help of:

4.1 a gate in the railing or gunwale, appropriate handholds must be provided;

4.2 a gunwale ladder, two scepters must be mounted, firmly secured to the ship's structure at or near their base and in places higher up. The gunwale ladder must be securely attached to the ship to prevent it from tipping over.

5 Doors on the ship side

Doors in the side of the ship used for the transfer of pilots must not open outwards.

6 Mechanical pilot hoist

A mechanical pilot hoist must not be used.

7 Associated equipment

7.1 The following associated equipment must be kept ready for immediate use when transferring people:

7.1.1 two hand ropes not less than 28 mm in diameter and not more than 32 mm in diameter, securely fastened to the ship if required by the pilot; hand ropes shall be attached at the rope end to the annular plate fixed on deck and shall be ready for use when the pilot disembarks or when requested by a pilot approaching to board the ship (handlines shall reach the height of the sceptre or gunwale where there is access to the deck before terminating at the annular plate on deck);

7.1.2 a lifebuoy equipped with a self-igniting light;

7.1.3 a throwing line.

7.2 Where required in subsection 4, there shall be a sceptre and a gunwale ladder.

8 Lighting

Sufficient light shall be provided to illuminate transfer arrangements over the side and the point on deck where a person boards or disembarks.

Regulation 24 Use of steering and/or track control systems

1 In congested waters, in conditions of reduced visibility and in all other hazardous situations for navigation, it must be possible to establish immediate manual control of the ship's steering when using self-steering and/or track control systems.

2 In circumstances such as those mentioned above, it must be possible for the officer on duty to immediately call upon a qualified helmsman who must be ready to take control at all times.

3 Switching from automatic to manual steering and vice versa must be done by or under the supervision of a responsible officer.

4 Manual steering should be tested after prolonged use of the automatic steering and before the vessel enters areas where navigation requires extra caution.

Regulation 25 Operation of the steering gear

In areas where navigation requires particular caution, more than one power unit for the steering gear must be in operation when these units can be used simultaneously.

Regulation 26 Steering gear systems - testing and drills

1 Within 12 hours prior to departure, the ship's steering gear system must be checked and tested by the ship's crew. Where applicable, testing shall include the operation of the following:

1.1 the main steering system;

1.2 the auxiliary control system;

1.3 the steering control systems;

1.4 the steering positions in the wheelhouse;

1.5 emergency energy supply;

1.6 the rudder angle indicators in relation to the actual position of the rudder;

1.7 the functioning of alarms in case of failure of the energy supply to the steering control systems;

1.8 the functioning of alarms in the event of failure of prime mover power units; and

1.9 automatically operating isolation devices and other automatic equipment.

2 Checking and testing must include:

2.1 full movement of the rudder in accordance with the required capacity of the steering system;

2.2 visual inspection of the steering system and its connecting links; and

2.3 function of communication means between the wheelhouse and the steering gear room.

3.1 Simple operating instructions, accompanied by a block diagram illustrating the procedure for switching between the steering control systems and the power units of steering gear systems, shall be permanently displayed in the wheelhouse and the steering gear room.

3.2 All ship officers involved in the operation and/or maintenance of steering gear systems shall be familiar with the operation of the ship's steering systems and the procedure for changing from one system to another.

4 In addition to the routine checks and tests prescribed in subsections 1 and 2, emergency management drills shall be conducted at least once every three months to practise the emergency management procedure. These drills should include direct control from inside the steering gear room, communication with the wheelhouse and, where appropriate, the use of alternative energy supplies.

5 The Administration may waive the requirement to carry out the inspections and tests prescribed in subsections 1 and 2 for ships engaged on regular short voyages. *Ships engaged on regular voyages of less than 12 hours duration with less than 12 hours between voyages in port shall be exempted from the inspections and tests prescribed in subsections 1 and 2.* Such ships must carry out these checks and tests at least once a week.

6 The date of completion of the checks and tests prescribed in subsections 1 and 2 and the date of the emergency management drills pursuant to subsection 4 shall be recorded.

Regulation 27 Nautical charts and publications

Charts and nautical publications, such as sailing handbooks, lighthouse lists, notices to mariners, tide tables and any other nautical publication necessary for the intended voyage shall be complete and up-to-date.

Regulation 28 Recording of nautical activities and daily reporting

1 All ships engaged on international voyages shall keep a record on board the ship of nautical activities and incidents of importance to the safety of navigation in sufficient detail to give a complete description of the voyage, taking into account the recommendations adopted by the Organisation.[58]) When such information is not entered in the ship's logbook, it shall be kept in another form approved by the Administration.

2 Every ship of 500 gross tonnage and above operating on international voyages of more than 48 hours duration shall send a daily report to its company as defined in regulation IX/1. The company must keep the report, as well as all other daily reports, for the duration of the ship's voyage. Daily reports may be transmitted by any means provided that they are transmitted to the company as soon as possible after the position determination of the position used in the report. Automatic reporting systems may be used provided that they contain a function that records the transmission and that such functions and interfaces with positioning equipment are periodically verified by the master of the ship. The report must contain the following:

2.1 the ship's position;

2.2 the ship's course and speed; and

2.3 Details relating to any external or internal condition affecting the voyage of the ship or the normal safe operation of the ship.

Regulation 29 - Distress signals for use by ships, aircraft and people in distress

An illustrated chart describing the lifesaving signals[59]) shall be readily available to the officer on duty of any vessel covered by this Annex. The signals shall be used by ships or persons in distress when communicating with rescue stations, maritime rescue units and aircraft engaged in search-and-rescue operations.

Regulation 30 Operational restrictions

1 This regulation applies to all passenger ships covered by chapter I.

2 A list of all restrictions on the operation of a passenger ship, including exceptions to any of these regulations, shall be established before the passenger ship is put into service. The list shall include limitations of trade area, limitations due to weather conditions, limitations due to wave heights, limitations with regard to cargo, trim, speed and any other limitation whether imposed by the Administration or resulting from the design or construction of the ship. The record, together with any necessary explanation, shall be documented in a manner acceptable to the Administration and kept on board ready for use by the master. The inventory must be kept up to date. If the language used is not English or French, the inventory must be prepared in one of these two languages.

Regulation 31 Hazard notifications

1 It shall be the duty of the master of any ship which encounters ice or wreckage of a dangerous nature or any other immediate hazard to navigation or tropical storms, or which is exposed to air temperatures below freezing in gale-force winds causing severe icing of superstructures, or winds of force 10(24-28 m/sec.) or greater on the Beaufort scale, for which no storm warning has been received, to give notice thereof by all means in their power to ships in the vicinity and to the competent authorities. The form in which the notification is given is not mandatory. It can be issued either in clear language (preferably in English) or using the International Signalling Book.

2 Each Contracting Government shall take all necessary measures to ensure that a report received of any of the dangers referred to in subsection 1 is promptly brought to its notice and communicated to other interested governments.

3 The transmission of messages concerning the hazards in question shall be at no cost to the ships concerned.

4 All radio messages transmitted in accordance with subsection 1 shall be preceded by the safety signal using the procedure prescribed in the Radio Regulations as defined in chapter IV, regulation 2.

Regulation 32 Content of the hazard notifications

Hazard notifications shall contain the following information:

1 Ice, wrecks and other direct dangers to navigation:

1.1 Nature of ice, wreck or hazard observed.

1.2 Position of ice, wreck or hazard at last observation.

1.3 Date and time (Universal Co-ordinated Time) of last observation of the hazard.

2 Tropical storms:[60)]

2.1 A message that a tropical storm has been encountered. The obligation to make such a report should be interpreted very broadly and a report should be issued as soon as the master has good reason to believe that a tropical storm is developing or occurring nearby.

2.2 Date and time (Universal Co-ordinated Time) and position of ship at time of observation.

2.3 As much of the following information as possible should be included in the notification:

– barometric reading,[61)], preferably corrected (expressed in millibars, millimetres or inches, indicating whether the reading is corrected or not);

– barometer trend (change in barometer reading over the last three hours);

– wind direction, indicated accurately;

– wind speed (Beaufort scale);

– the sea's condition (smooth, moderate, rough, high);

– swell (slight, moderate, heavy) and the direction from which it is coming are accurately indicated. The period or length of the swell (short, average, long) will also be of interest;

– the true course of the ship and its speed.

Later observations

3 When a master has given notification of a tropical or other dangerous storm, it is desirable, but not obligatory, that observations should thereafter be made and broadcast, if possible hourly, but in any case not less frequently than every three hours, while the ship is under the influence of the storm.

4 Wind force 10 (25 m/sec) or greater on the Beaufort scale for which no storm warning has been received. This refers to storms other than the tropical storms referred to in Subsection 2. When such a storm is encountered, the report should contain information as specified in Subsection 2, but without the details of sea and swell.

5 Air temperatures below freezing during gale force winds causing severe ice formation on superstructures:

5.1 Date and time (Universal Co-ordinated Time).

5.2 The temperature of the air.

5.3 Sea water temperature (if possible).

5.4 Wind speed and wind direction.

Examples

Ice

TTT ICE. LARGE BERG SIGHTED IN 4506N, 4410W, AT 0800 UTC. MAY 15.

Wreckage

TTT DERELICT. OBSERVED DERELICT ALMOST SUBMERGED IN 4006 N, 1243 W, AT 1630 UTC. APRIL 21.

Danger to navigation

TTT NAVIGATION. ALPHA LIGHTSHIP NOT ON STATION. 1800 UTC. JANUARY 3.

Tropical storm

TTT STORM. 0030 UTC. AUGUST 18. 2004 N, 11354 E BAROMETER CORRECTED 994 MILLIBARS, TENDENCY DOWN 6 MILLIBARS. WIND NW, FORCE 9, HEAVY SQUALLS. HEAVY EASTERLY SWELL. COURSE 067, 5 KNOTS.

TTT STORM. APPEARANCES INDICATE APPROACH OF HURRICANE. 1300 UTC. SEPTEMBER 14. 2200 N, 7236 W. BAROMETER CORRECTED 29.64 INCHES, TENDENCY DOWN .015 INCHES. WIND NE, FORCE 8, FREQUENT RAIN SQUALLS. COURSE 035, 9 KNOTS.

TTT STORM. CONDITIONS INDICATE INTENSE CYCLONE HAS FORMED. 0200 UTC. MAY 4. 1620 N, 9203 E. BAROMETER UNCORRECTED 753 MILLIMETRES, TENDENCY DOWN 5 MILLIMETRES. WIND S BY W, FORCE 5. COURSE 300, 8 KNOTS.

TTT STORM. TYPHOON TO SOUTHEAST. 0300 UTC. JUNE 12. 1812 N, 12605 E. BAROMETER FALLING RAPIDLY. WIND INCREASING FROM N.

TTT STORM. WIND FORCE 11, NO STORM WARNING RECEIVED. 0300 UTC. MAY 4. 4830 N, 30 W. BAROMETER CORRECTED 983 MILLIBARS, TENDENCY DOWN 4 MILLIBARS. WIND SW, FORCE 11 VEERING. COURSE 260, 6 KNOTS.

Ice accumulation

TTT EXPERIENCING SEVERE ICING. 1400 UTC. MARCH 2. 69 N, 10 W. AIR TEMPERATURE 18°F (-7.8°C). SEA TEMPERATURE 29°F (-1.7°C). WIND NE, FORCE 8.

Regulation 33 - Emergencies - obligations and procedures

1 Every master of a ship who receives at sea information from any source that persons are in distress at sea and who is in a position to render assistance shall be obliged to come to their assistance with the greatest speed and, as far as possible, to inform them or the search-and-rescue service that they are doing so. The obligation to provide assistance applies irrespective of the nationality or status of such persons or the circumstances in which they are found. If the ship receiving the distress signal is unable, or in the particular circumstances of the case deems it unreasonable or unnecessary, to come to the assistance of the persons in distress, the ship's master shall enter the reason for not going to the rescue in the ship's log and, in accordance with the recommendations of the Organisation, inform the search-and-rescue service concerned.

1.1 Contracting Governments shall coordinate and collaborate to ensure that masters of ships providing assistance by taking persons in distress on board are relieved of their obligation with minimum deviation from the planned voyage. It is assumed that the exemption of the master's obligations does not jeopardise the safety of human life at sea. The Contracting Government responsible for the search and rescue area in which such assistance is provided shall have the primary responsibility for ensuring that such coordination and collaboration is carried out in a manner which ensures that survivors are brought from the assisting ships to a place of safety, taking into account the particular circumstances and guidelines developed by the Organisation[62)]. In such a case, the relevant Contracting Governments shall ensure that the evacuation is reasonably carried out as soon as possible

2 The master of a ship in distress or the search-and-rescue service concerned shall have the right, as far as possible after consultation with the masters of the ships which have responded to the distress signal, to select one or more of the ships, in which case the master or masters of the ship or ships concerned shall be obliged to comply with the request by coming to the assistance of the persons in distress as soon as possible.

3 Masters of ships are released from their obligation under subsection 1 of this regulation when they become aware that their vessel has not been selected to provide assistance and that one or more other ships selected to provide assistance are complying with the request for assistance. This position shall be communicated as far as possible to the other ships selected to provide assistance and to the search-and-rescue service.

4 The master of a ship is released from the obligation imposed on them by subsection 1 of this regulation and, if the ship has been assigned to provide assistance, from the obligation imposed on it by subsection 2 of this regulation, if they are informed by the persons in distress or by the search-and-rescue service or by the master of another ship which has reached those persons that assistance is no longer required.

5 The provisions of this regulation are without prejudice to the International Convention for the establishment of uniform regulations relating to assistance and recovery at sea, signed at Brussels on 23 September 1910, in particular as regards the obligation in article 11 of that Convention to render assistance.[63)]

6 Masters of ships who have taken persons in distress on board at sea shall treat them humanely within the capabilities and limitations of the ship.

Regulation 34 Safe navigation and prevention of dangerous situations

1 Before commencing the voyage, the master shall ensure that the intended voyage is adequately planned using the necessary charts and nautical publications for the area concerned, taking into account the guidance and recommendations developed by the Organisation.[64)]

2 The itinerary must describe a route which:

2.1 takes into account any relevant ship's routing system;

2.2 Ensures that there is sufficient manoeuvring space for the ship to make safe passage throughout the voyage;

2.3 Anticipates all known navigational hazards and adverse weather conditions; and

2.4 Takes into account the measures applicable for the protection of the marine environment and avoids, as far as possible, actions and activities which may cause damage to the environment.

Regulation 34-1 Master's discretion

The owner or charterer or the company operating the ship, as defined in chapter IX, regulation 1, or any other person shall not prevent or restrict the master of the ship from taking or carrying out any decision which, in the professional judgement of the master, is necessary for the safety of navigation and the protection of the marine environment.

Regulation 35 Misuse of distress signals

The use of an international distress signal shall be prohibited except to indicate the distress of a ship, aircraft or person and the use of a signal which may be confused with an international distress signal shall be similarly prohibited.

Regulation 36 Navigation lights

1. *Navigation lights on all ships shall meet functional requirements not inferior to those adopted by the Organisation*[65)]*.*

Annex to chapter V

Regulations for the management, operation and financing of the North Atlantic Ice Patrol

1 In these regulations the following applies**:**

1.1 "*Ice season"* means the annual period between 15 February and 1 July.

1.2 "*Ice Patrol Protected Area"* means the south-eastern, southern and south-western boundaries of the ice area near the Grand Banks of Newfoundland.

1.3 *"Routes that go through ice patrol protected area"* means:

1.3.1 Routes between ports on Canada's Atlantic coast (including inland ports accessed from the North

Atlantic through the Gut of Canso and Cabot Straits) and ports in Europe, Asia or Africa, travelling from the North Atlantic through or north of the Strait of Gibraltar (excluding routes passing south of the outer limits of ice of all types);

1.3.2 Routes via Cape Race, Newfoundland, between ports on the Canadian Atlantic coast (including inland ports accessed from the North Atlantic through the Gut of Canso and Cabot Straits) west of Cape Race, Newfoundland and ports on the Canadian Atlantic coast north of Cape Race, Newfoundland;

1.3.3 Routes between the Atlantic Ocean and ports on the Gulf Coast of the United States (including inland ports accessed from the North Atlantic through the Gut of Canso and Cabot Straits) and ports in Europe, Asia or Africa accessed from the North Atlantic through or north of the Strait of Gibraltar (excluding routes passing south of the outer limits of ice of all types);

1.3.4 Routes via Cape Race, Newfoundland, between the Atlantic Ocean and ports on the US Gulf Coast (including inland ports accessed from the North Atlantic through the Gut of Canso and Cabot Straits) and ports on the Canadian Atlantic coast north of Cape Race, Newfoundland;

1.4 "*Outer limits of ice of all types"* in the North Atlantic are defined by a line connecting the following points:

A - 42°23'. 00N, 59°25'. 00V J - 39°49'. 00N, 41°00'. 00V

B - 41°23'. 00N, 57°00'. 00V K - 40°39'. 00N, 39°00'. 00V

C - 40°47'. 00N, 55°00'. 00V L - 41°19'. 00N, 38°00'. 00V

D - 40°07'. 00N, 53°00'. 00V M - 43°00'. 00N, 37°27'. 00V

E - 39°18'. 00N, 49°39'. 00V N - 44°00'. 00N, 37°29'. 00V

F - 38°00'. 00N, 47°35'. 00V O - 46°00'. 00N, 37°55'. 00V

G - 37°41'. 00N, 46°40'. 00V P - 48°00'. 00N, 38°28'. 00V

H - 38°00'. 00N, 45°33'. 00V Q - 50°00'. 00N, 39°07'. 00V

I - 39°05'. 00N, 43°00'. 00V R - 51°25'. 00N, 39°45'. 00V

1.5 "*Management and operation"* means the maintenance, management and operation of the ice patrol, including the dissemination of information received from it.

1.6 *"Contributing Government"* means a Contracting Government that undertakes to contribute to the costs of the ice patrol service in accordance with these regulations.

2 Each Contracting Government having a special interest in these services and whose ships pass through the iceberg region during the ice season agrees to contribute to the United States Government its proportionate share of the costs of managing and operating the ice patrol service. The contribution to the United States Government shall be based on the ratio that the average annual gross tonnage of ships of the contributing government that passed through the iceberg region monitored by the ice patrol during the preceding three ice seasons by the ice patrol to the total average annual gross tonnage of all ships that passed through the iceberg region monitored by the ice patrol during the previous three ice seasons.

3 All contributions shall be calculated by multiplying the ratio described in subsection 2 by the average annual costs incurred by the Governments of the United States and Canada for the management and operation of the ice patrol service during the preceding three years. This ratio shall be calculated once a year and shall be expressed in the form of an annual one-off payment.

4 Each contributing government has the right to change or stop contributing, and other interested governments may agree to contribute to the costs. Contributing governments exercising this right will continue to be liable for current contributions until 1 September following the date of notification of intention to modify or discontinue its contribution. To exercise this right, the administering government must be notified at least 6 months before the 1 September in question.

5 Each contributing Government shall inform the Secretary-General of its obligations in accordance with subsection 2 and shall inform all Contracting Governments.

6 The Government of the United States shall annually provide each contributing government with a statement of the total costs incurred by the Governments of the United States and Canada for the management and operation of the ice patrol during that year and the annual percentage share for the last three years for each contributing government.

7 The administering government shall publish annual accounts, including a statement of the costs incurred by the governments providing the service during the past three years and the total gross tonnage utilising the service during the past three years. The accounts must be publicly available. Up to three months after receiving the cost statement, contributing governments may request more detailed information regarding the costs incurred in managing and operating the ice patrol.

8 These regulations apply from the beginning of the 2002 ice season.

[1] Chap. V. *See the definition in regulation I/2.*
[2] Chap. V. *Currently Notices from the Danish Maritime Authority D, E and F.*
[3] Chap. V. Refer to the corresponding resolutions and recommendations of the International Hydrographic Organisation concerning the authority and responsibility of coastal States to provide charts in accordance with regulation 9.
[4] Chap. V. Refer to IMO resolution A. 706(17), as amended - IMO, IHO and World-Wide Navigational Warning Service.
[5] Chap. V. Refer to IMO resolution A. 528(13) - Recommendation on weather routing.
[6] Chap. V. Refer to chapter IV, regulations 7.1.4 and 7.1.5.
[7] Chap. V. Refer to the International Convention on Maritime Search and Rescue, 1979 and the following resolutions adopted by the Organisation: Resolution A. 225(VII), "Homing capability of search and rescue (SAR) aircraft"; Resolution A. 530(13), "Use of radar transponders for search and rescue purposes"; Resolution A. 616(15), "Search and rescue homing capability"; and Resolution A. 894(21), "International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual", as amended by MSC/Circ. 999, MSC/Circ. 1044, MSC/Circ. 1124, MSC/Circ. 1173 and MSC. 1/Circ. 1181.
[8] Chap. V. Refer to relevant resolutions and recommendations adopted by the International Hydrographic Organisation (IHO).
[9] Chap. V. Refer to resolution A. 572(14) as amended, "General Provisions on Ships' Routing"
[10] Chap. V. Refer to resolution A. 572(14), as amended, "General Provisions on Ships' Routing".
[11] Chap. V. *Archipelago, sea with many small islands (e.g. the Indonesian Archipelago).*
[12] Chap. V. This regulation does not apply to ship reporting systems established by governments for search and rescue purposes and covered by chapter 5 of the 1979 SAR Convention, as amended.
[13] Chap. V. Refer to the Guidelines and Criteria for Ship Reporting Systems, adopted by the Maritime Safety Committee (MSC) by resolution MSC. 43(64), as amended by resolution MSC. 189(79). Reference is also made to the "General Principles for Ship Reporting Systems and Ship Reporting Requirements, including Guidelines for Reporting Incidents Involving Dangerous Goods, Harmful Substances and/or Marine Pollutants" adopted by the Organisation by resolution A. 851(20), as amended by MEPC. 138(53).
[14] Chap. V. Refer to resolution A. 1158(32) "Guidelines on Vessel Traffic Services".
[15] Chap. V. Refer to resolution A. 1158(32) "Guidelines on Vessel Traffic Services".
[16] Chap. V. Refer to the recommendations and guidelines prepared by IALA and IMO SN/Circ. 107 "Maritime Buoyage System".
[17] Chap. V. Refer to the "Principles of safe manning" adopted by the Organisation by resolution A. 1047(27) and amended by MSC 192(79).
[18] Chap. V. Refer to the "Principles of safe manning" adopted by the Organisation by resolution A. 1047(27).
[19] Chap. V. Refer to resolution A. 918(22) "Standard Marine Communication Phrases (SMCPs), as amended".
[20] Chap. V. Refer to MSC/Circ. 982, "Guidelines on ergonomic criteria for bridge equipment and layout" and resolution MSC. 64(67), as amended by MSC 192(97), annex 1
"Recommendation on performance standards for Integrated Bridge Systems (IBS)" and resolution MSC. 86(70), annex 3 "Recommendation on performance standards for an Integrated Navigation System (INS)", as amended by resolution MSC. 252(83).
[21] Chap. V. Refer to resolution A. 813(19) "General requirements for Electromagnetic Compatibility for all Electrical and Electronic Ships' Equipment".
[22] Chap. V. Refer to the following recommendations as adopted by the Organisation by the resolutions indicated: Resolution A. 694(17) "Recommendations on general requirements for shipborne radio equipment forming part of the Global Maritime Distress and Safety System (GMDSS) and for Electronic Navigational Aids"; Resolution A. 424(XI) "Performance standards for gyro-compasses"; Resolution MSC. 64(67) annex 4 as amended "Recommendation on performance standards for radar equipment"; Resolution MSC. 192(79) 'Revised recommendation on performance standards for radar equipment'; Resolution A. 823(19), as amended 'Performance standards for automatic radar plotting aids'; resolution A. 817(19), as amended by Resolutions MSC. 64(67), annex 5 and MSC. 86(70), annex 4 as appropriate "Recommendation on performance standards for Electronic Chart Display and Information Systems (ECDIS)"; resolution MSC. 232(82) "Revised recommendation on performance standards for Electronic Chart Display and Information Systems (ECDIS)"; resolution A. 1046(27) Worldwide Radionavigation Systems. Resolution A. 818(19) "Recommendation on performance standards for shipborne Loran-C and Chayka receivers"; Resolution A. 819(19) "Recommendation on performance standards for shipborne global positioning system receiver equipment", as amended by Resolution MSC. 112(73); Resolution MSC. 53(66), as amended by Resolution MSC. 113(73)
'Recommendation on performance standards for shipborne GLONASS receiver equipment'; Resolution MSC. 64(67), annex 2 as amended by Resolution MSC. 192(79); Resolution MSC. 74(69), annex 1, as amended by Resolution MSC. 115(73) 'Recommendation on performance standards for combined DGPS/DGLONASS receiver equipment'; Resolution MSC. 233(82) 'Performance standards for shipborne Galileo receiver equipment' Resolution MSC. 64(67), annex 3, "Recommendation on performance standards for heading control systems"; Resolution MSC. 74(69), annex 2, "Recommendation on Performance Standards for track control systems"; Resolution MSC. 74(69), annex 4, "Recommendation on performance standards for universal shipborne automatic identification system (AIS)"; Resolution MSC. 1/Circ. 1252 on "Guidelines on annual testing of the Automatic Identification System (AIS)"; Resolution A. 224(VII), as amended by Resolution MSC. 74(69), annex 4, "Recommendation on performance standards for echo-sounding equipment"; Resolution A. 824(19), as amended by Resolution MSC. 96(72) and Resolution MSC. 334(90); "Recommendation on performance standards for devices to indicate speed and distance"; Resolution A. 526(13) "Performance standards for rate-of-turn indicators"; Resolution A. 575(14) "Recommendation on unification of performance standards for navigational equipment"; Resolution A. 343(IX) "Recommendation on methods of measuring noise levels at listening posts"; Resolution MSC. 164(78) "Recommendation on performance standards for radar reflectors"; Resolution A. 382(X)
"Recommendation on performance standards for magnetic compasses"; Resolution MSC. 95(72) "Recommendation on performance standards for daylight signalling lamps"; Resolution MSC. 86(70), annex 1, "Recommendation on Performance Standards for sound reception systems"; MSC 333(90)
"Adoption of revised performance standards for shipborne Voyage Data Recorders (VDRs)"; Resolution MSC. 163(78) "Performance standards for shipborne simplified voyage data recorders (S-VDRs)" as amended by Resolution MSC. 214(81); Resolution MSC. 116(73) "Performance standards for marine transmitting heading devices (THDs)"; Resolution MSC. 166(78) as amended 'Application of performance standards for marine transmitting heading devices (THDs) to marine transmitting magnetic heading devices (TMHDs)'; Resolution MSC. 191(79) 'Performance standards for the presentation of navigation-related information on ship-borne navigational displays'; Resolution MSC. 128(75) 'Performance standard for a bridge navigational watch alarm system (BNWAS)'.
[23] Chap. V. Chapter V. Resolution A. 817(19), as amended, "Recommendation on performance standards for Electronic Chart Display and Information Systems (ECDIS)".
[24] Chap. V. Refer to circular MSC. 1/Circ. 1290 "Unified interpretation of the term "first survey" referred to in SOLAS regulations".
[25] Chap. V. A sufficient collection of paper charts can be used as backup for ECDIS. Other backup arrangements for ECDIS are acceptable (see Annex 6 to Resolution A. 817(19), as amended).
[26] Chap. V. *Cf. the definition in chapter I, regulation I/2.*
[27] Chap. V. *Refer to Resolution MSC. 128(75), "Performance standards for a Bridge Navigation Watch Alarm System (BNWAS).*
[28] Chap. V. Refer to circular MSC. 1/Circ. 1290 "Unified interpretation of the term "first survey" referred to in SOLAS regulations".

[29] Chap. V. Refer to chapter I, regulation 8.
[30] Chap. V. The first survey under the equipment certificate means the first annual survey, the first periodical survey or the first renewal survey under the equipment certificate, whichever occurs first after 1 July 2004 and, in addition, for ships under construction, the first survey.
[31] Chap. V. Refer to Resolution A. 917(22), "Guidelines for the onboard operational use of Shipborne Automatic Identification Systems", as amended by Resolution A. 956(23).
[32] Chap. V. Refer to MSC. 1/Circ. 1290 "Unified interpretation of the term "first survey" referred to in SOLAS regulations".
[33] Chap. V. Refer to Resolution MSC. 64(67), Annex 1, "Performance standard for Integrated bridge systems", as amended by Circular SN. 1/Circ. 288, as amended by MSC 192(79).
[34] Chap. V. Refer to Resolution MSC. 86(70), annex 3, "Performance standard for Integrated navigational systems", applicable to equipment installed before 1 January 2011, after which Resolution MSC. 252(83) shall apply.
[35] Chap. V. Refer to Resolution MSC. 263(84) 'Revised performance standards and functional requirements for the long-range identification and tracking of ships', as amended.
[36] Chap. V. Refer to Circular MSC. 1/Circ. 1295 "Guidance in relation to certain types of ships which are required to transmit LRIT information on exemptions and equivalents and on certain operational matters", as amended.
[37] Chap. V. The tonnage for determining whether a cargo ship or high-speed craft shall comply with the provisions of this regulation shall be that used in the International Convention on Tonnage Measurement of Ships, 1969, regardless of the date of construction of the ship or high-speed craft.
[38] Refer *to Guidance on the survey and certification of compliance of ships with the requirement to transmit LRIT information* (MSC. 1/Circ. 1307).
[39] Refer *to Unified interpretation of the term "first survey" referred to in SOLAS regulation* (MSC. 1/Circ. 1290).
[40] Chap. V. Refer to Circular MSC. 1/Circ. 1259/Rev. 2 "Interim revised technical specifications for the LRIT system", as amended.
[41] Chap. V. Refer to Resolution MSC. 242(83) "Use of the long-range identification and tracking information for maritime safety and marine environment protection purposes", as may be amended.
[42] Chap. V. Refer to section 8.1 and annex 1 of circular MSC. 1/Circ. 1298 "Guidance on the implementation of the LRIT system", as amended.
[43] Chap. V. Refer to Circular MSC. 1/Circ. 1308 "Guidance to search and rescue services in relation to requesting and receiving LRIT information", as amended.
[44] Chap. V. Refer to Resolution MSC. 275(85) 'Appointment of the LRIT coordinator', as may be amended; Resolution MSC. 263(84) 'Revised performance standards and functional requirements for the long range identification and tracking of ships', as may be amended; and annex 6 of document MSC. 86/26 'Principles and guidelines relating to the review and audit of the performance of LRIT data centres and the international data exchange', as may be amended.
[45] Chap. V. Refer to circular MSC. 1/Circ. 1024 "Guidelines on voyage data recorder (VDR) ownership and recovery".
[46] Chap. V. Refer to circular MSC. 1/Circ. 1290 "Unified interpretation of the term "first survey" referred to in SOLAS regulations".
[47] Chap. V. Refer to Resolution MSC. 163(78) 'Performance standards for shipborne simplified voyage data recorders (S-VDRs)', as amended by Resolution MSC. 214(81).
[48] Chap. V. ICAO and IMO handbook on aeronautical and maritime rescue services.
[49] Chap. V. Refer to Resolution A. 918(22), "Standard Marine Communication Phrases (SMCPs)".
[50] Chap. V. Refer to ISO 8468: 1990 (E), subsection 4.1.2.
[51] Chap. V. Refer to Resolution A. 708(17), "Navigation bridge visibility and functions".
[52] Chap. V. Refer to circular MSC. 1/Circ. 1375 "Unified interpretation of SOLAS regulation V/23".
[53] Chap. V. Refer to resolution A. 1045(27), "Assembly resolution on Pilot transfer arrangements", as amended by A. 1108(29).
[54] Chap. V. Refer to Resolution MSC. 99(73), which renumbers the former regulation 17 to regulation 23, which entered into force on 1 July 2002.
[55] Chap. V. Refer to circular MSC. 1/Circ. 1290 "Unified interpretation of the term "first survey" referred to in SOLAS regulations".
[56] Chap. V. Refer to the recommendations of the International Organisation for Standardisation, in particular the publication ISO 799:2004, "Ships and marine technology - Pilot ladders".
[57] Chap. V. Reference is made to regulation II-1/3-9 on means of access on ships, as adopted by resolution MSC. 256(84), and its associated guidelines (MSC. 1/ Circ. 1331).
[58] Chap. V. Refer to resolution A. 916(22), "Guidelines for recording events related to navigation".
[59] Chap. V. Such rescue signals are described in the International Aeronautical and Maritime Search and Rescue Manual (IAMSAR) Volume III, Mobile Facilities,and illustrated in the International Code of Signals, as amended in accordance with resolution A. 80(IV).
[60] Chap. V. Tropical cyclones are the most common collective term used by meteorological institutes. The terms hurricane, typhoon, cyclone, severe cyclonic storm, etc., are also used depending on the geographical location.
[61] Chap. V. The international unit of measurement for barometric pressure is the Hectopascal (hPa), which is the numerical equivalent of the millibar (mbar).
[62] Chap. V. Refer to resolution MSC. 167(78) 'Guidelines on the treatment of persons rescued at sea'.
[63] Chap. V. "International Convention on Salvage, 1989" drafted in London on 28 April 1989 and entered into force on 14 July 1996.
[64] Chap. V. Refer to resolution A. 893(21), "Guidelines for voyage planning"
[65] Chap. V. *Refer to resolution MSC. 253(83) "Performance Standards for Navigation Lights, Navigation Light Controllers and associated equipment".*

Annex 8

Chapter VI - Transport of cargo and petroleum fuels

Section A	**General provisions**
Regulation 1	Scope of application
Regulation 1-1	Definitions
Regulation 1-2	Requirements for the transport of solid bulk loads other than grain
Regulation 2	Information about cargo
Regulation 3	Oxygen analysers and gas detection equipment
Regulation 4	Pesticide use on ships
Regulation 5	Stowing and securing
Regulation 5-1	Safety data sheets
Regulation 5-2	Ban on mixing bulk liquid cargoes and conducting production processes during the voyage
Section B	**Special provisions for bulk cargoes other than cereals**
Regulation 6	Acceptance criteria for embarkation
Regulation 7	Loading, unloading and stowage of solid bulk cargo
Section C	**Transport of grain**
Regulation 8	Definitions
Regulation 9	Requirements for cargo ships transporting grain

Section A General provisions

Regulation 1 Scope of application

1 Unless otherwise specified, this chapter applies to cargo transport (except liquids in bulk, gases in bulk and those types of carriage covered by other Chapters) which, because of the special hazards they present to ships and persons on board, may require special precautions for all ships covered by these regulations and for cargo ships of less than 500 gross tonnage. However, for cargo ships of less than 500 gross tonnage, the Administration may take other effective measures to ensure the required safety if it considers that the voyage is being undertaken under conditions of such safety that the application of one or more provisions of section A or B of this chapter would be unreasonable or unnecessary.

2 In addition to the provisions of sections A and B of this chapter, each Contracting Government shall ensure that adequate information concerning the cargo, its stowage and securing is available, paying particular attention to the precautions necessary for the safe carriage of such cargoes.

[1)] Regulation 1-1 Definitions

Unless expressly provided otherwise in this chapter, the following definitions shall apply.

1 "IMSBC Code" means the International Maritime Solid Bulk Cargoes (IMSBC) Code adopted by the Maritime Safety Committee of the Organisation by res. MSC. 268(85), which may be amended

by the Organisation[2]) provided that such amendments have been adopted, entered into force and given effect in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to annexes other than chapter I.

2 "Solid bulk cargo" means any cargo, other than liquid or liquefied gas, consisting of a combination of particles, granules or larger pieces of material, usually homogeneous in composition, which is loaded directly into the cargo hold of a ship without any intermediate packaging.

Regulation 1-2 Requirements for the carriage of solid bulk cargoes other than grain

The carriage of solid bulk cargoes other than grain shall be carried out in accordance with the relevant provisions of *the current edition* of the IMSBC Code.

Regulation 2 Cargo information

1 The consignor shall provide the master or its representative, in good time before loading, with the necessary information to enable procedures to be initiated for the safe stowage and carriage of cargo. Such information shall be documented in writing[3]) and by appropriate ship documents in good time before loading commences.

2 Cargo information must include:

2.1 For general cargo and for cargo carried in units, a general description of the cargo, the gross mass of the cargo or unit and any special characteristic of the cargo. In applying this regulation, the cargo information required by CSS Code section 1.9, as amended, shall be duly used. The CSS Code is adopted by the Organisation by resolution A. 714(17). Any amendment to section 1.9 of the Code shall be adopted and brought into force in accordance with the procedures set out in article VIII of the Convention dealing with amendment procedures for the SOLAS annex other than chapter I;

2.2 for solid bulk cargoes, information as defined in section 4 of the IMSBC Code;

3 Before loading cargo units, the shipper shall ensure that the gross mass of such units is in accordance with the gross mass indicated in the ship's documents.

4 In the case of cargo carried in containers[4]) - with the exception of containers carried on a chassis frame or trailer when such containers are carried on or off ro-ro ships on short international voyages as defined in regulation III/3 - the gross mass for the purposes of this regulation's subsection
2.1 is verified by the shipper, either by

1) weighing the stowed container using calibrated and certified equipment; or

2) weigh all packages and cargo items, including the mass of pallets, dunnage and other securing material to be packed in the container and add the tare mass of the container to the sum of the individual masses using a certified method approved by the competent authority of the State where the container was pre-packed.

5 The shipper of the container must ensure that the verified gross mass[5]) is stated in the shipping document. The ship's document must:

1) be signed by a person duly authorised by the shipper; and

2) be communicated to the master or their representative and to the terminal representative in sufficient time, as required by the master or their representative, to be used in the preparation of the ship's stowage plan.[6)]

6 If, in the case of a packed container, the transport document does not indicate the verified gross mass and the master or their representative and the terminal representative have not received the verified gross mass of the packed container, it shall not be loaded on board the ship.

Regulation 3 Oxygen analyses and gas detection equipment

1 When carrying a bulk cargo which may emit toxic or flammable gases or which may cause a reduction in the oxygen content of the cargo holds, measuring equipment shall be carried on board which is capable of measuring the concentration of gases or oxygen in the air. There shall also be detailed instructions for the use of such equipment. The measurement equipment must be to the satisfaction of the Administration.

2 The Administration should take steps to ensure that ship's crews are trained in the use of such equipment.

Regulation 4 Use of pesticides on ships[7)]

Appropriate precautions must be taken when pesticides are used on ships, particularly in connection with fumigation.

Regulation 5 Stowage and securing

1 Cargoes, cargo units[8)] and transport units[9)]) carried on or below deck shall be stowed and secured in such a manner as to prevent, as far as practicable, damage to the ship or injury to persons on board or loss of cargo overboard during the voyage.

2 Cargoes, cargo units and transport units shall be packed and secured in the unit in such a way as to prevent damage or other danger to the ship or persons on board.

3 Due precautions shall be taken during the loading of heavy cargo or cargo of abnormal physical dimensions to ensure that no damage is done to the ship's structure and that adequate stability is maintained throughout the voyage.

4 Due precautions shall be taken during the loading and carriage of cargo units and transport units on ro-ro ships, in particular with regard to lashing arrangements on such ships, cargo units and transport units and with regard to the strength of lashing points and lashings.

5 Freight containers shall not be loaded to more than the maximum permissible gross weight; this is indicated on the Safety Approval Plate in accordance with the provisions of the International Convention for Safe Containers (CSC), as amended.

6 With the exception of solid or liquid bulk cargoes, all cargoes, including cargo units and transport units, shall be loaded, stowed and secured throughout the voyage in accordance with the provisions contained in the cargo securing manual approved by the Administration. In ships with ro-ro cargo spaces as defined in regulation II-2/3.41, all securing of such cargoes, cargo units and cargo transport units shall be completed in accordance with the Cargo Securing Manual before the ship leaves the berth. The load securing manual shall be prepared to a standard that is at least equivalent to the guidelines developed by the Organisation[10)]

Regulation 5-1 Safety data sheets

Ships carrying oil or oil fuel as defined in regulation 1 of annex 1 to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, shall be provided with a safety data sheet prepared on the basis of recommendations of the Organisation prior to loading such oil as cargo in bulk or bunkering oil fuel.[11)]

Regulation 5-2 - Prohibition to mix liquid bulk cargoes and to perform production processes during the voyage

1 It is forbidden to physically mix liquid bulk cargoes during the voyage. Physical blending refers to the process of using the ship's cargo pumps and pipelines to internally circulate two or more different cargoes in order to obtain a cargo with a new product designation. This prohibition does not preclude the master from redistributing the cargo for the safety of the ship or the protection of the marine environment.

2 The prohibition in subsection 1 shall not apply to the mixing of products used in connection with the exploration for and exploitation of seabed mineral resources on board ships used to facilitate such activities.

3 All production processes are prohibited on board ships during the voyage. Production processes refer to any deliberate activity where a chemical reaction occurs between a ship's cargo and another substance or cargo.

4 The prohibition set out in subsection 3 shall not apply to production processes relating to cargoes used in connection with the exploration and exploitation of seabed mineral resources on board ships used to facilitate such activities.[12)]

Section B Special provisions for solid bulk cargoes

Regulation 6 Acceptance criteria for embarkation

Before loading a solid bulk cargo, the master must be in possession of complete information on the stability of the ship and on the cargo distribution at standard conditions. The methods used to obtain such information must be to the satisfaction of the Administration[13)]

Regulation 7 Loading, unloading and stowage of solid bulk cargoes[14)]

1 For the purpose of this regulation, "terminal representative" means a person designated by the terminal or other facility where the ship loads or unloads who has responsibility for the operations carried out at that terminal or facility in relation to that ship.

2 To enable the ship's master to prevent overloading of the ship's hull, the ship must be equipped with an instruction booklet written in a language familiar to the ship's officers responsible for cargo operations. If this language is not English, the ship must have an instruction booklet that is also written in English. As a minimum, the instruction booklet must contain:

2.1 stability data as required under regulation II-1/22;

2.2 capacity and rates for ballasting and deballasting;

2.3 maximum allowable load per surface unit (load per m^2) of the tank top;

2.4 maximum allowable load per cargo hold;

2.5 general loading and unloading instructions for the strength of the ship's hull, including any limitations for worst-case conditions during loading, unloading, ballast operations and the voyage;

2.6 other special restrictions such as restrictions on worst-case operational conditions imposed by the Administration or by an organisation recognised by it, if applicable; and

2.7 where strength calculations, maximum allowable forces and moments on the ship's hull during loading, unloading and the voyage are required.

3 Before a solid bulk cargo is loaded or unloaded, the master of the ship and the terminal representative shall agree on a plan to ensure that the allowable forces and moments on the ship are not exceeded during loading or unloading, which shall include the sequence, quantity and loading or order, quantity and loading or unloading rates, taking into account the speed of loading or unloading, the number of loading pipes and the deballasting or ballasting capacity of the ship. The plan and any subsequent amendments thereto shall be submitted to the appropriate authority of the port State.

4 The master and terminal representative must ensure that loading and unloading operations are carried out according to the agreed plan.

5 If any of the ship's limitations referred to in subsection 2 are exceeded during loading or unloading or are likely to be exceeded if loading or unloading continues, the master has the right to suspend the operation and the obligation to inform the appropriate authority of the port State to which the plan has been submitted. The master and terminal representative must ensure that corrective action is taken. When unloading cargo, the master and terminal representative must ensure that the unloading method does not damage the ship's structure.

6 The master must ensure that the ship's crew constantly monitors cargo operations. Where possible, the ship's draught should be checked regularly during loading or unloading to confirm the received load digits. Each draught and load observation must be recorded in a cargo logbook. If significant deviations from the agreed plan are observed, loading or ballast operations or both must be adjusted to ensure that the deviations are corrected.

Section C Transport of grain

Regulation 8 Definitions

Unless otherwise provided, the following applies to this section:

1 "International Grain Code" means the International Code for the Safe Carriage of Grains in Bulk, as adopted by the Maritime Safety Committee (MSC) of the Organisation by resolution MSC. 23(59), and as it may be amended by the Organisation, provided that such amendments are adopted, brought into force and operate in accordance with the provisions of article VIII of the SOLAS Convention dealing with amendment procedures for the annexes to the Convention other than chapter I.

2 The term 'cereals' includes wheat, maize, oats, rye, barley, rice, pulses, seeds and their products, which react in the same way as cereals in their natural state.

Regulation 9 Requirements for cargo ships carrying grain

1 In addition to any other requirement of these regulations, a cargo ship carrying grain shall comply with the requirements of the International Code for the Safe Carriage of Grain and shall be in possession

of an authorisation document, as required by the code. For the purposes of this regulation, the requirements of the code are mandatory.

2 A ship without an approval document shall not load grain until the master has satisfied the Administration or the contracting authority at the port of loading acting on behalf of the Administration that the ship, in its final cargo condition, meets the requirements of the International Code for the Safe Carriage of Grain in Bulk.

[1] Chap. VI. Reference is made to: **. 1** Resolution A. 714(17) as amended, "Code of Safe Practice for Cargo Stowage and Securing (CSS Code)"; **2** Resolution A. 1048(27) as amended, most recently A. 1048(27), "Code of Safe Practice for Ships Carrying Timber Deck Cargoes" supplemented by MSC/Circ. 525, "Guidance note on precautions to be taken by the masters of ships of below 100 metres in length engaged in the carriage of logs" and MSC/Circ. 548, "Guidance note on precautions to be taken by masters of ships engaged in the carriage of timber cargoes", . **3** Relevant provisions in resolution A. 863(20), Code of Safe Practice for the Carriage of Cargoes and Persons by Offshore Supply Vessels (OSV-Code) as amended.

[2] Chap. VI. As amended by resolution MSC. 354(92).

[3] Chap. VI. References to documents in this regulation do not preclude the use of electronic word processing (EDP) and electronic data interchange (EDI) techniques as an aid to paper documentation.

[4] Chap. VI (01.07.2016). The term 'container' should be considered to have the same meaning as defined and used in the International Convention for Safe Containers (CSC Convention), 1972, as amended, taking into account the Guidelines for the approval of offshore containers handled in open seas (MSC/Circ. 860) and 'Revised recommendations on harmonised interpretation and implementation of the International Convention for Safe Containers', 1972, as amended (CSC. 1/Circ. 138/Rev. 1).

[5] Chap. VI (01.07.2016). Refer to "Guidelines regarding the verified gross mass of a container carrying cargo" (MSC. 1/Circ. 1475).

[6] Chap. VI (01.07.2016). This document can be presented using computerised or edi-transmission techniques. The signature can be an electronic signature or can be replaced by the name of the person authorised to sign, written in block letters.

[7] Chap. VI. Refer to the supplement to the IMDG Code, "Recommendations on the Safe Use of Pesticides in Ships", "Recommendations on the Safe Use of Pesticides in Ships applicable to the Fumigation of Cargo Holds" and "Recommendations on the Safe use of Pesticides in Ships applicable to the Fumigation of Cargo Transport Units", as amended, which has been implemented for Danish ships by Technical regulation no. 9 of 18 August 2000 on the use of pesticides on ships.

[8] Chap. VI. Refer to the Code of Safe Practice for Cargo Stowage and Securing as adopted by the Organisation by resolution A. 714(17), as amended by MSC/Circ. 644, MSC/Circ. 691, MSC/Circ. 740, MSC/Circ. 1026 and MSC/Circ. 1352/Rev. 1.

[9] Chap. VI. Refer to the "International Maritime Dangerous Goods (IMDG) Code", as adopted by the Organisation by resolution MSC. 122(75), as amended, most recently MSC. 328(90).

[10] Chap. VI. Refer to MSC/Circ. 745 "Guidelines for the preparation of the Cargo Securing Manual", as amended by MSC. 1/Circ. 1353/Rev. 1.

[11] Chap. VI. Refer to the Recommendation on Safety Data Sheets for MARPOL Annex I on oil cargoes and fuels, as adopted by the Organisation by Resolution MSC. 286(86).

[12] Chap. VI. Refer to "Guidelines for the transport and handling of limited amounts of hazardous and noxious liquified substances in bulk in offshore support vessels" (resolution A. 673(16), as amended), latest MSC. 236(82).

[13] Chap. VI. Refer to chapter II-1, regulation 5-1 for stability information to be provided to the master of the ship.

[14] Chap. VI. Reference is made to IMO resolution A. 862(20), Code of Practice for the Safe Loading and unloading of Bulk Carriers (BLU Code), as amended by MSC. 238(82), MSC. 304(87) and supplemented by MSC. 1/Circ. 1357, and the IMO developed "BLU Manual", guidance to the terminal representative on the loading and unloading of solid bulk cargoes, as amended by MSC. 1/Circ. 1356.

Annex 9

Chapter VII - Transport of dangerous goods

Section A	**Transport of dangerous goods in packaged form**
Regulation 1	Definitions
Regulation 2	Scope of application
Regulation 3	Requirements for the transport of dangerous goods
Regulation 4	Documents
Regulation 5	Cargo securing manual
Regulation 6	Reporting incidents involving dangerous goods
Section AA	**Transport of packaged dangerous goods by ro-ro ships**
Regulation I	Special provisions for ro-ro ships
Regulation II	Control
Section A-1	**Transport of dangerous goods in solid form in bulk**
Regulation 7	Definitions
Regulation 7-1	Scope of application
Regulation 7-2	Documents
Regulation 7-3	Stowage and separation provisions
Regulation 7-4	Reporting incidents involving dangerous goods
Regulation 7-5	Requirements for the transport of dangerous goods in solid form in bulk
Section B	**Design and equipment of ships carrying dangerous liquid chemicals in bulk**
Regulation 8	Definitions
Regulation 9	Use on chemical tankers
Regulation 10	Requirements for chemical tankers
Section C	**Construction and outfitting of ships carrying liquefied gas in bulk**
Regulation 11	Definitions
Regulation 12	Use on gas carriers
Regulation 13	Requirements for gas carriers
Section D	**Special provisions for the transport of irradiated nuclear fuel, plutonium and high-level radioactive waste on board ships**
Regulation 14	Definitions
Regulation 15	Use on ships carrying INF cargo.
Regulation 16	Requirements for ships carrying INF Cargo

Section A Transport of dangerous goods in packaged form

Regulation 1 Definitions

For the purposes of this Chapter, unless otherwise expressly provided, the following shall apply:

1 "IMDG Code" means the International Maritime Dangerous Goods Code adopted by the Maritime Safety Committee of the Organisation by resolution MSC. 122(75), as may be amended by the Organisation[1)], provided that such amendments have been adopted, brought into force and given effect in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to annexes other than chapter I.

2 "Dangerous goods" means substances, materials and objects covered by the IMDG Code.

3 Packaged form means the use of the form of packaging specified in the IMDG Code.

4 *"Baltic Sea Agreement on the Transport of Dangerous Goods" means the current version of the "Memorandum of Understanding for the Transport of Packaged Dangerous Goods on Ro-Ro ships in the Baltic Sea" on the coordinated application of the regulations for the transport of dangerous goods by road, rail and sea under "bridge-like sea transport" on ro-ro ships in the Baltic Sea area.*

Regulation 2 Scope of application[2)]

1 Unless otherwise specified, this section applies to all ships carrying packaged dangerous goods subject to these regulations and to cargo ships of less than 500 gross tonnage.

2 The provisions of this chapter shall not apply to the stores and equipment of ships.

3 The transport of packaged dangerous goods is not permitted except in accordance with the provisions of this chapter.

4 In addition to the provisions of this section, each Contracting Government shall issue, or cause to be issued, detailed regulations concerning the precautions to be taken in connection with first aid and first aid which may be necessary in the event of a casualty involving packaged dangerous goods. In drawing up such conditions, the guidelines developed by the Organisation should be taken into account[3)].

Regulation 3 Requirements for the transport of dangerous goods

1 The carriage of packaged dangerous goods shall be in accordance with the prescribed provisions of the IMDG Code.

2 *The latest amendment to the IMDG Code adopted by the Organisation and in force shall be used, an adopted version of the IMDG Code may be used for an implementation period of 1 year before the version in question enters into force internationally.*

3 *As an alternative to the IMDG Code, the Baltic Sea Agreement on the Transport of Dangerous Goods can be used within the framework set out in the agreement.*

4 *The IMDG Code, and its supplements regarding "The Emergency Schedules Guide (EmS) and Medical First Aid Guide For Use In Accidents Involving Dangerous Goods (MFAG) as amended[4)] must be carried on board all ships[5)] carrying packaged dangerous goods.*

4.1 *However, for ships that only exceptionally transport dangerous goods or that regularly transport certain types of dangerous goods, it is sufficient that only the information from the IMDG Code, EmS and MFAG necessary for the safe transport of the goods in question is on board.*

5 *For ships transporting dangerous goods under the Baltic Sea Agreement on the Transport of Dangerous Goods, a copy of the agreement must also be available.*

Regulation 4 - Documents

1 Transport information on the transport of packaged dangerous goods and the container/vehicle packing certificate shall be drawn up in accordance with the provisions of the IMDG Code and shall be made available to the person or organisation designated by the port state authority.

2 Every ship carrying packaged dangerous goods shall be provided with a special list, manifest or stowage plan containing information on the dangerous goods on board and their location, in accordance with the relevant provisions of the IMDG Code. A copy of one of these documents must be made available to the person or organisation designated by the port State authority before departure."

3 *In ships carrying packaged dangerous goods, information on the goods and the measures to be taken in the event of an accident involving the goods shall be available to the crew.*

Regulation 5 Cargo securing manual

Cargo, cargo units[6)] and transport units must be loaded, stowed and secured throughout the voyage in accordance with the provisions contained in the cargo securing manual approved by the Administration. The cargo securing manual must be prepared to a standard that is at least equivalent to the guidelines developed by the Organisation.[7)]

Regulation 6 Reporting incidents involving dangerous goods

1 When an incident involving the loss or likely loss of packaged dangerous goods overboard at sea occurs, the master or other person in charge of the ship shall report the details of such incident without delay and to the fullest extent possible to the nearest coastal State. Reporting shall be based on the guidelines and general principles adopted by the Organisation.[8)]

2 In the event that the ship referred to in subsection 1 is abandoned or in the event that a report from such a ship is incomplete or cannot be obtained, the owner of the ship, as defined in regulation 1(2) of chapter IX, shall assume to the maximum extent possible the obligations imposed on the master by this regulation.

Section AA Carriage of packaged dangerous goods on ro-ro ships

Regulation I Special provisions for ro-ro ships

1 *In ships carrying goods in accordance with the provisions of the Baltic Sea Agreement on the Transport of Dangerous Goods, the master must check the type of goods in all ro-ro units, lorries, trailers, railway wagons, etc., for proper stowage of any dangerous goods before boarding. The verification of the nature of the goods can be carried out on the basis of the documentation/declaration belonging to the ro-ro unit and the unit's labelling or a declaration issued by the driver of the vehicle, railway or terminal staff that the unit does not contain dangerous goods. However, the aforementioned inspection may be omitted if there is a proper system in place for sorting and checking goods before they are taken on board. Information about such schemes in Denmark must be submitted to the Danish Maritime Authority before such control can be waived.*

2 *In the case of tank vehicles, railway tank wagons or tank-containers which contain dangerous goods or which are unclean after having last contained dangerous goods, in addition to the declaration referred to in regulation 4(2), a declaration issued by the driver of the vehicle or by the railway or terminal staff stating that the vehicle or container was leak-proof immediately before being taken on board shall be handed over on board. If*

the vehicle or container is permanently labelled as containing dangerous goods, even if it has been cleaned or did not last contain dangerous goods, a declaration to this effect must also be submitted.

3 *For lorries and trailers, railway wagons or containers containing dangerous goods – including possibly different types of dangerous goods – in addition to the declaration mentioned in regulation 4(2), a declaration issued by the driver of the vehicle or by the track personnel or by the terminal personnel must be handed in upon boarding, stating that the vehicle or container was correctly stowed immediately before boarding. If the vehicle or container is permanently labelled as containing dangerous goods, but is empty, a declaration to this effect must also be submitted.*

4 *The driver or the person handing over the transport unit for carriage by sea must, before making the declarations in subsections 1 - 3, ensure that the information in question is correct.*

Regulation II Control

The master shall, except in the cases referred to in regulation I, ensure that dangerous goods are labelled as prescribed and that the visible part of the packaging complies with the requirements for packaging.

Section A-1 Transport of dangerous goods in solid form in bulk

Regulation 7 Definitions

"Dangerous goods in solid form in bulk" is any material covered by the IMDG Code that is not in liquid or vaporised gas form when the material consists of a combination of particles, granules or larger pieces that are normally homogeneous and the material is loaded directly unpackaged into the cargo hold of a ship. Dangerous goods in solid form in bulk also include such material when loaded on a barge carried by a barge carrying ship.

Regulation 7-1 Scope of application[9)]

1 Unless otherwise specified, this section shall apply to all ships carrying dangerous goods in solid form in bulk, as covered by these regulations, and to cargo ships with a gross tonnage of less than 500 tonnes.

2 The transport of dangerous goods in solid form in bulk is not permitted except in accordance with the provisions of this chapter.

3 In addition to the provisions of this section, each Contracting Government shall promulgate or cause to be promulgated measures relating to first aid and first aid which may be necessary in the event of an accident involving dangerous goods in solid form in bulk[10)]. When developing such measures, the guidelines developed by the Organisation should be taken into account.[11)]

Regulation 7-2 Documents[12)]

1 In all documents for the maritime transport of dangerous goods in solid form in bulk, the correct designation of the bulk cargo must be used (trade names alone must not be used). *Where the dangerous goods have a UN number or IMSBC number, this must appear on the document.*

2 Every ship carrying dangerous goods in solid form in bulk shall be provided with a special list or manifest containing information on the dangerous goods and their location on board. A detailed stowage plan indicating the dangerous goods on board - identified by class and location - may be used instead of such a special list or manifest. A copy of one of these

documents must - before departure - be available to the person or organisation designated by the port State authority.

3 *On ships carrying dangerous goods in solid form in bulk, information about the goods and measures to be taken in case of an accident involving the goods must be available to the crew.*[13)]

4 *The IMSBC Code, as amended, must be carried on board all ships carrying dangerous goods in solid form in bulk. However, for ships that only occasionally carry dangerous goods or regularly transport certain types of dangerous goods, it is sufficient that only the information from the IMBC Code necessary for the safe transport of the goods in question is on board.*

Regulation 7-3 Stowage and segregation provisions

1 Dangerous goods in solid form in bulk must be loaded and stowed safely and securely in accordance with the nature of the goods. Cargoes that are incompatible must be kept separate.

2 Dangerous goods in solid form in bulk, where there is a risk of heat generation or spontaneous combustion, must not be transported unless the necessary precautions have been taken to prevent the possibility of the goods catching fire.

3 Dangerous goods in solid bulk that emit hazardous gases or vapours must be loaded in a cargo hold with the necessary ventilation.

4 *The amendment to the IMDG Code and the IMSBC Code last adopted and entered into force by the Organisation shall be used; however, the adopted version of the IMDG Code may be used for an implementation period of 1 year before the version in question enters into force internationally.*

Regulation 7-4 Reporting of incidents involving dangerous goods

1 When an incident involving the loss or likely loss of dangerous goods in solid form in bulk overboard at sea occurs, the master or other person in charge of the ship shall report the details of such incident without delay and to the fullest extent possible to the nearest coastal State. Reporting shall be based on the guidelines and general principles adopted by the Organisation.[14)]

2 In the event that the ship referred to in subsection 1 is abandoned or in the event that a report from such a ship is incomplete or cannot be obtained, the owner of the ship, as defined in chapter IX, regulation 1(2), shall assume the obligations imposed on the master by this regulation to the maximum extent possible.

Regulation 7-5 Requirements for the transport of dangerous goods in solid form in bulk

The transport of dangerous goods in solid form in bulk shall be carried out in accordance with the relevant provisions of the IMSBC Code as defined in chapter VI, regulation 1-1.1.

Section B Construction and fitting out of ships carrying dangerous liquid chemicals in bulk

Regulation 8 Definitions

For the purposes of this section, unless expressly provided otherwise, the following definitions apply:

1 "International Bulk Chemical Code (IBC Code)" means "The International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk" adopted by the Maritime Safety Committee of the Organisation by resolution MSC. 4(48), as may be amended by the Organisation[15)], provided that such amendments have been adopted, entered into force and given effect in accordance with the provisions

in article VIII of the SOLAS Convention concerning the amendment procedures applicable to annexes other than chapter I.

2 "Chemical tanker" means a cargo ship designed or adapted for and used for the carriage of any liquid product listed in chapter 17 of the International Bulk Chemical Code.

3 In regulation 9, "ship which has been built" means a ship in which the keel has been laid or an equivalent stage of construction has been reached.

4 "At a similar stage of construction" means the stage where

4.1 a construction project that can be identified with a specific ship is commenced; and

4.2 assembly of this ship has commenced, comprising at least 50 tonnes or 1% of the estimated total hull weight, whichever is less.

Regulation 9 Use on chemical tankers

1 Unless expressly provided otherwise, this section applies to chemical tankers constructed on or after 1 July 1986 and includes ships of less than 500 gross tonnage. Such tankers shall comply with the provisions of this section and any other relevant provisions of this Code.

2 Any chemical tanker undergoing repairs, alterations, modifications and outfitting related thereto shall, irrespective of the date of construction, continue to comply with the provisions previously applicable to the ship. Such ships, if built before 1 July 1986, shall, as a general rule, comply with the regulations for ships built on or after that date to the same extent as before they underwent such repairs, alterations, modifications or outfitting. Repairs, alterations and modifications of a substantial nature and outfitting related thereto shall comply with the regulations for ships constructed on or after 1 July 1986, in so far as the Administration considers this reasonable and practicable.

3 A ship which is converted into a chemical tanker shall, irrespective of the date of construction, be considered as a chemical tanker built at the time when such a conversion commences.

4 *Existing chemical tankers built before 1 July 1986 must comply with the provisions of the "Code for the construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code)"* as amended.[16)]

Regulation 10 Requirements for chemical tankers

1 Chemical tankers shall comply with the regulations of the International Bulk Chemical Code (IBC Code) and, in addition to complying with the relevant provisions of chapter I, regulations 8, 9 and 10, shall be surveyed and certified as prescribed in this Code.

2 Chemical tankers carrying a certificate issued in accordance with the provisions of subsection 1 shall be subject to the control prescribed in accordance with chapter I, regulation 9. For this purpose, such a certificate shall be considered as a certificate issued under chapter I, regulation 12 or 13.

Section C Construction and fitting out of ships carrying liquefied gases in bulk

Regulation 11 Definitions

For the purposes of this section, unless expressly provided otherwise, the following definitions apply:

1 "International Gas Carrier Code" means "The International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk" (IGC Code) adopted by the Maritime Safety Council of the Organisation by resolution MSC. 5(48), which may be amended by the Organisation provided that such amendments have been adopted, entered into force and given effect in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to annexes other than chapter I.[17)]

2 "Gas carrier" means a cargo ship designed or adapted for and used for the carriage of any liquefied gas or other products listed in chapter 19 of the International Gas Carrier Code.

3 For the purposes of regulation 12, 'ship which has been built' means a ship the keel of which has been laid or which is at a similar stage of construction.

4 "At a similar stage of construction" means the stage where

4.1 a construction project that can be identified with a specific ship is commenced; and

4.2 assembly of this ship has commenced, comprising at least 50 tonnes or 1% of the estimated total hull weight, whichever is less.

Regulation 12 Use on gas carriers

1 Unless expressly provided otherwise, this section applies to gas carriers constructed on or after 1 July 1986 and includes those of less than 500 gross tonnage. Such gas carriers shall comply with the regulations of this section in addition to any other relevant requirements of these regulations.

2 Any gas carrier undergoing repairs, alterations, modifications, and outfitting related thereto shall, irrespective of the date of construction, continue to comply with at least the regulations previously applicable to the ship. Such ships, if built before 1 July 1986, shall, as a general rule, comply with the regulations for ships built on or after that date at least to the same extent as they did before undergoing such repairs, alterations, modifications, or outfitting. Repairs, alterations, modifications of a substantial nature and outfitting related thereto shall comply with the regulations for ships constructed on or after 1 July 1986, in so far as the Administration considers this reasonable and practicable.

3 A ship which is converted into a gas carrier shall, irrespective of the date of construction, be considered a gas carrier built at the time such a conversion commenced.

Regulation 13 Requirements for gas carriers

1 Gas carriers shall comply with the requirements of the International Gas Carrier Code and, in addition to the relevant requirements of regulations I/8, I/9 and I/10, shall be surveyed and certified as prescribed in this Code. When applying this regulation, the regulations of the Code shall be considered mandatory.

2 Gas carriers carrying a certificate issued in accordance with the provisions of subsection 1 shall be subject to the inspection prescribed in regulation I/9. For this purpose, such a certificate shall be considered as a certificate issued under regulation I/12 or I/13.

3 Existing gas carriers built before 1 July 1986 shall comply with the provisions of the "Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (Gas Carrier Code)" as amended[18)]

Section D Special provisions for the carriage of irradiated nuclear fuel, plutonium and high-level radioactive waste on board ships.

Regulation 14 Definitions

For the purposes of this section, unless expressly provided otherwise, the following definitions apply:

1 "INF Code" means the International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Waste on Ships, adopted by the Maritime Safety Council of the Organisation by resolution MSC. 88(71), which may be amended by the Organisation provided that such amendments have been adopted, entered into force and given effect in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to annexes other than chapter I[19)].

2 "INF cargo" means packaged nuclear irradiated fuel, plutonium and high-level radioactive waste transported as cargo in accordance with IMDG Code Class 7.

3 "Irradiated nuclear fuel" means material containing uranium, thorium and/or plutonium isotopes that has been used to sustain a self-sustaining nuclear chain reaction.

4 "Plutonium" means the final mixture of isotopes extracted from irradiated material during reprocessing.

5 "High-level radioactive waste" means liquid waste generated in a plant that reprocesses irradiated nuclear fuel, or solid material from subsequent stages of extraction.

Regulation 15 Use on ships carrying INF cargo

1 Except for the exceptions provided for in subsection 2, this section shall apply to all ships, irrespective of their date of construction and size, including cargo ships of less than 500 gross tonnage carrying INF cargo.

2 This section and the INF Code do not apply to warships, naval auxiliaries or other ships owned or operated by a Contracting Government and currently engaged only on official and non-commercial service. However, by adopting appropriate measures that do not adversely affect the operation or operational conditions of these ships, each Administration shall ensure that ships owned or operated by it act, whenever reasonable and practicable, in a manner consistent with this section and the INF Code when carrying INF cargoes.

3 Nothing in this section or in the INF Code shall prevent a government from exercising its rights and duties under international law, and any measures to enforce compliance with the INF Code shall be consistent with international law.

Regulation 16 Requirements for ships carrying INF cargo

1 Ships carrying INF cargoes shall fulfil the regulations of the INF Code in addition to any other requirement of these regulations and shall be surveyed and certified as prescribed in this Code.

2 Ships carrying a certificate in accordance with the provisions of subsection 1 shall be subject to the control prescribed in accordance with regulations I/9 and XI-1/4. For this purpose, such a certificate shall be considered as a certificate issued under regulation I/12 or I/13.

[1] Chap. VII. Latest version 39-18, as adopted by resolution MSC. 372(93).
[2] Chap. VII. Refer to: Section D, which contains provisions for the carriage of INF cargo; and regulation II-2/19, which contains special provisions for the carriage of dangerous goods.
[3] Chap. VII. Refer to 1. the Emergency Response Procedures for Ships Carrying Dangerous Goods (EmS Guide) (MSC/Circ. 1025) as amended, most recently MSC. 1(Circ. 1360); and 2. the Medical First Aid and the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG) (MSC/Circ. 857) as amended by the Organisation.
[4] Chap. VII. Refer to the IMDG Code adopted by the Organisation by MSC resolution 122(75) as amended, most recently MSC resolution 262(84), as amended.
[5] Chap. VII. These regulations and guidelines can be available in electronic form, for example, in the form of a CD-ROM.
[6] Chap. VII. As defined in the Code of Safe Practice for Cargo Stowage and Securing adopted by the Organisation by resolution A. 715(17) as amended by MSC/Circ. 664, MSC/Circ. 691, MSC/Circ. 740, MSC/Circ. 1076 and MSC. 1/Circ. 1352/Rev. 1.
[7] Chap. VII. Refer to MSC Circular 745, "Guidelines for the preparation of the Cargo Securing Manual", as amended by MSC. 1/Circ. 1353/Rev. 1.
[8] Chap. VII. Reference is made to the General principles for ship reporting systems and ship reporting requirements, including guidelines for reporting incidents involving dangerous goods, harmful substances and/or marine pollutants, adopted by the Organisation by resolution A. 851(20).
[9] Chap. VII. Refer to regulation II-2/19, which contains special provisions for the transport of dangerous goods.
[10] Chap. VII. Refer to the International Maritime Solid Bulk Cargoes (IMSBC) Code adopted by the Organisation by resolution MSC. 268(85), as amended, most recently MSC. 354(92).
[11] Chap. VII. Refer to the Medical First Aid and the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG) (MSC/Circ. 857) published by the Organisation.
[12] Chap. VII. Reference to documents in this regulation does not preclude the use of digital systems to assist with paper documentation.
[13] Chap. VII. Refer to regulation 5 of Chapter II C of Technical regulation A on Occupational Health and Safety on Ships for carcinogens.
[14] Chap. VII. Reference is made to the General principles for ship reporting systems and ship reporting requirements, including guidelines for reporting incidents involving dangerous goods, harmful substances and/or marine pollutants, adopted by the Organisation by resolution A. 851(20).
[15] Chap. VII. Last amended by resolutions MEPC. 250(66) and MSC. 369(93).
[16] Chap. VII. Last amended by resolutions MEPC. 249(66) and MSC. 376(93).
[17] Chap. VII. Last amended by resolution MSC. 370(93).
[18] Chap. VII. Last amended by resolution MSC. 377(93).
[19] Chap. VII. Last amended by resolution MSC. 241(83).

Annex 10

Chapter VIII - Nuclear ships

Regulation 1	Scope of application
Regulation 2	Scope of application of other chapters
Regulation 3	Exemptions
Regulation 4	Approval of reactor installations
Regulation 5	Reactor installation adaptation to shipboard conditions
Regulation 6	Radiation safety
Regulation 7	Safety report
Regulation 8	Instruction manual
Regulation 9	Inspection
Regulation 10	Certificates
Regulation 11	Special control
Regulation 12	Accidents

Regulation 1 Scope of application

This chapter applies to all nuclear ships except warships.

Regulation 2 Scope of application of other chapters

The provisions of the other chapters of this Convention shall apply to nuclear ships with the modifications set out in this chapter[1)].

Regulation 3 Exemptions

Under no circumstances shall a nuclear ship be exempted from compliance with any of the provisions of this Convention.

Regulation 4 Approval of reactor installations

The design and construction of a reactor installation must be approved by the Administration, which must also approve the regulations for inspection and installation of the system. This must take into account the limitations that inspections will be subject to as a result of the corresponding radiation.

Regulation 5 Adaptation of the reactor installation to conditions on board ships

The reactor installation shall be designed for the specific operating conditions on board, both under normal and exceptional navigation conditions.

Regulation 6 Radiation safety

The Administration shall take precautions against any unreasonable risk from radiation or other nuclear hazards, whether at sea or in harbour, to crew, passengers or population, or to waterways, foodstuffs or water supplies.

Regulation 7 Safety report

(a) To ensure that there is no unreasonable risk from radiation or other hazards, whether at sea or in port, to crew, passengers or the public, or to waterways, foodstuffs or water supplies, a safety report shall be prepared to assess the safety of the nuclear installation and the ship. The report must be submitted to the Administration for approval. It must be kept up to date at all times.

(b) The safety report shall be made available to the Contracting Governments of the countries that a nuclear ship intends to visit in sufficient time in advance to enable those governments to assess the safety of the ship.

Regulation 8 Instruction manual

For the information and guidance of the operating staff in their work, a comprehensive and detailed instruction manual shall be prepared covering all aspects of the operation of the nuclear installation, with emphasis on safety aspects. The instruction manual must be submitted to the Administration for approval. It must be kept up to date at all times.

Regulation 9 Surveys

The provisions of regulation 7 of chapter I or of regulations 8 to 10 of Chapter I shall apply mutatis mutandis to surveys of nuclear ships, with the limitation of such surveys resulting from the radiation present. The inspections must also fulfil any special requirements in the safety report. Regardless of the provisions of chapter I, regulations 8 and 10, inspections shall be carried out at least once a year.

Regulation 10 Certificates

(a) The provisions of regulation 12(a) and regulation 14 of chapter I shall not apply to nuclear ships.

(b) A certificate, called a Nuclear Passenger Ship Safety Certificate, shall be issued, after inspection and survey, for a nuclear passenger ship that complies with the requirements of chapters II-1, II-2, III, IV and VIII and any other applicable requirements of these regulations.

(c) A certificate, called a Nuclear Cargo Ship Safety Certificate, shall be issued, after inspection and survey, to a nuclear cargo ship which fulfils the requirements for cargo ships in regulation 10 of chapter I and which meets the requirements of chapters II-1, II-2, III, IV and VIII and any other applicable requirements of these regulations.

(d) Safety certificates for nuclear passenger ships and for nuclear cargo ships shall state: "that the ship concerned, being a nuclear ship, fulfils all the requirements of chapter VIII of the Convention and is in conformity with the safety report approved for the ship".

(e) The period of validity of safety certificates for nuclear passenger ships and for nuclear cargo ships shall not exceed 12 months.

(f) Safety certificates for nuclear passenger ships and for nuclear cargo ships shall be issued by the Administration or by a person or organisation authorised by it. In all cases, the Administration assumes full responsibility for the certificate.

Regulation 11 Special checks[2)]

In addition to the checks set out in regulation 19 of chapter I, nuclear ships are subject to special controls before entering or remaining in the ports of Contracting Governments. The purpose of this inspection is to verify that a valid nuclear ship safety certificate is on board and that the ship does not presents any unreasonable risk from radiation or other hazards, whether at sea or in port, to crew, passengers or the public, or to water care, food or water supply.

Regulation 12 Accidents

In the event of any accident which may endanger the environment, the master of a nuclear ship shall immediately notify the Administration. The master shall also immediately inform the competent governmental authority of the country in whose waters the ship is or whose waters the ship is approaching in a damaged condition.

[1] Chap. VIII. Refer to the Code of Safety for Nuclear Merchant Ships (Assembly resolution A. 491(XII)), which supplements the requirements of this chapter
[2] Chap. VIII. Refer to the IMO/IAEA safety recommendations on the use of ports by nuclear merchant ships.

Annex 11

Chapter IX - Safe operation of ships

Regulation 1	Definitions
Regulation 2	Scope of application
Regulation 3	Safety management requirements
Regulation 4	Certification
Regulation 5	Maintaining conditions
Regulation 6	Verification and control

Introduction

This chapter contains the provisions of Annex IX of the International Convention for the Safety of Life at Sea (SOLAS) 1974, as amended, and related protocols and codes. For non-ro-ro passenger ships engaged on international voyages in sea areas of Class C and D as defined in article 4 of Directive 2009/45/EU , the provisions of this chapter apply in full.

For other passenger ships engaged in international trade and cargo ships and mobile offshore drilling units of 500 gross tonnage and upwards, the provisions of the chapter are implemented by Regulation (EC) No. 336/2006 of the European Parliament and of the Council of 15 February 2006 on the implementation of the International Safety Management Code within the Community and repealing Council Regulation (EC) No. 3051/95.

Regulation 1 Definitions

Unless expressly stated otherwise[1)], the following definitions shall apply for the purposes of this chapter:

1 "International Safety Management Code" (ISM Code) means the International Management Code for the Safe Operation of Ships and for Pollution Prevention, as adopted by the Organisation by resolution A. 741(18), and as it may be amended by the Organisation[2)], provided that such amendments have been adopted, entered into force and given effect in accordance with the provisions of article VIII of this Convention concerning the amendment procedures applicable to annexes other than chapter I.

2 "Company" means the owner of the ship or any other organisation or person, such as the operator or bareboat charterer, who has assumed the responsibility for the operation of the ship from the owner and who, in assuming such responsibility, has agreed to take over all duties and responsibilities imposed by the ISM Code.

3 "Oil tanker" means an oil tanker as defined in regulation II-1/2.22.

4 "Chemical tanker" means a chemical tanker as defined in regulation VII/8.2.

5 "Gas carrier" means a gas carrier as defined in regulation VII/11.2.

6 "Bulk carrier" means a ship which is generally constructed with a single deck, topside tanks and hopper tanks (bilge side tanks) in the cargo holds and whose primary purpose is to carry dry cargo in bulk, and includes ship types such as ore carriers and combination carriers[3)].

7 "Mobile Offshore Drilling Unit (MODU)" means a vessel capable of conducting drilling operations for the exploration or extraction of sub-seabed resources such as liquid or gaseous hydrocarbons, sulphur or salt.

8 "High-speed craft" means craft as defined in regulation X/1.1.

9 *"Document of Compliance" means a document issued to a company which fulfils the requirements of the ISM Code.*[4)]

10 *"Safety Management Certificate" means a certificate issued to a ship documenting that the company and its ship are operated in accordance with the approved Safety Management System (SMS).*[5)]

Regulation 2 Scope of application[6)]

1 This chapter covers ship types, regardless of date of construction, as follows:

1.1 Passenger ships, including high-speed passenger craft, not later than 1 July 1998;

1.2 oil tankers, chemical tankers, gas carriers, bulk carriers and high-speed craft of 500 gross tonnage and upwards not later than 1 July 1998; and

1.3 other cargo ships and MODUs of 500 gross tonnage and upwards, not later than 1 July 2002[7)].

2 This chapter shall not apply to government-operated ships used for non-commercial purposes.

Regulation 3 Safety management requirements[8)]

1 The company and ship must fulfil the requirements of the ISM Code. For the purposes of these regulations, the provisions of the Code shall be considered mandatory.

2 The ship shall be operated by a company holding a Document of Compliance as referred to in regulation 4.

Regulation 4 Certification

1 A Document of Compliance must be issued to any company that fulfils the requirements of the ISM Code. This document shall be issued by the Administration, by an organisation recognised by the Administration or, at the request of the Administration, by another Contracting Government.

2 A copy of the Document of Compliance shall be kept on board so that the master can produce it for verification upon request.

3 A certificate, called a Safety Management Certificate, shall be issued to each ship by the Administration or by an organisation recognised by the Administration. The Administration or the organisation recognised by it shall verify that the company and its ship management operate in accordance with the approved safe ship management system before issuing the Safety Management Certificate.

Regulation 5 Maintenance of conditions

The safe ship operation system shall be maintained in accordance with the provisions of the ISM Code.

Regulation 6 Verification and control[9)]

1 The Administration, or another Contracting Government at the request of the Administration or an organisation recognised by the Administration, shall periodically verify the proper functioning of the ship's safety system.

2 A ship required to carry a certificate issued in accordance with the provisions of regulation 4.3 shall be subject to control in accordance with the provisions of regulation XI-1/4. For this purpose, such a certificate shall be treated as a certificate issued under regulations I/12 or I/13.

[1] Chap. IX. For interpretations and administrative provisions related to the ISM Code, refer to IMO resolution A. 1071(28) "Revised Guidelines on Implementation of the International Safety Management (ISM) Code by Administrations".

[2] Chap. IX. Last amended by resolution MSC. 353(92).

[3] Chap. IX. Refer to Res. MSC. 79(70) on the interpretation of SOLAS chapter XII on additional security measures for bulk carriers.

[4] Chap. IX. *As defined in IMO resolution A. 741(18), subsection 1.1.5.*

[5] Chap. IX. *As defined in IMO resolution A. 741(18), subsection 1.1.6.*

[6] Chap. IX. Refer to IMO Circular MSC. 1/Circ. 1231, on Interim Guidelines on Compliance of Certain Cargo Ships and Special Purpose Ships with regard to Management of Safe Operations of Ships.

[7] Chap. IX. The Maritime Safety Committee has decided at its meeting 66 that MODUs without independent mechanical propulsion machinery do not have to fulfil the requirements of this chapter.

[8] Chap. IX. Reference is also made to resolution MSC-MEPC. 7/Circ. 8 on guidance for the implementation of the ISM Code by Companies, MSC-MEPC. 7/Circ. 6 on guidance on qualifications, training and experience for assuming the role of designated person under the ISM Code, MSC-MEPC. 7/Circ. 8 Revised guidelines for the operational implementation of the international safety management (ISM) Code by Companies, MSC-MEPC. 7/Circ. 9 guidelines for the reactivation of the safety management certificate following an operational interruption of the safety management system due to lay-up over a certain period, MSC-FAL. 1/Circ. 3/Rev. 2, guidance on the management of maritime "Cyber Risks", MSC 428(98), guidance on the management of maritime "Cyber Risks" in safety management systems, and A. 1072(28) Revised guidelines for the structure of an integrated system of emergency plans for ship-based emergencies.

[9] Chap. IX. Refer to MSC/Circ. 1059 - MEPC/Circ. 404 on procedures for observed significant ISM Code non-conformities, MSC-MEPC. 2/Circ. 2 on IMO requirements for publications on board ship, and MSC-MEPC. 7/Circ. 7 on guidance for near-miss reporting.

Annex 12

Chapter X - High-speed craft

Regulation 1	Definitions
Regulation 2	Application
Regulation 3	Requirements for high-speed craft

Regulation 1 Definitions

The following applies to this chapter:

1 High-Speed Craft Code, 1994 (1994 HSC Code) means the International Code for Safety of High-Speed Craft adopted by the Maritime Safety Committee of the Organisation by resolution MSC. 36(63), which may be amended by the Organisation provided that such amendments are adopted, brought into force and given effect in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to annexes other than chapter I.[1)]

2 High-Speed Craft Code, 2000 (2000 HSC Code) means the International Code for Safety of High-Speed Craft adopted by the Maritime Safety Committee of the Organisation by resolution MSC. 97(73), which may be amended by the Organisation provided that such amendments are adopted, brought into force and given effect in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to annexes other than chapter I.[2)]

3 "High-speed craft" are vessels with a maximum speed in metres per second (m/s) equal to or greater than:

$3.73\Delta^{0.1667}$

Where: Δ = volume of displacement corresponding to the design waterline (m^3)

with the exception of vessels that are in a state where the hull is not submerged (non-displacement mode) but is fully supported clear of the water surface by aerodynamic forces generated by the air cushion effect.

4 "Vessel under construction" means a vessel whose keel is laid or which is at a similar stage of construction.

5 "An equivalent construction stage" means a stage where:

5.1 a construction project identifiable with a specific vessel is started, and

5.2 assembly of this vessel has commenced and involves at least 50 tonnes or 3% of the estimated total hull mass, whichever is less.

Regulation 2 Application

1 This chapter shall apply to high-speed craft built on or after 1 January 1996 on the following basis:

1.1 passenger vessels that do not continue on their voyage for more than 4 hours at the operating speed from a place of refuge when fully loaded; and

1.2 cargo ships of 500 gross tonnage or more that do not continue their voyage for more than 8 hours at operational speed from a place of refuge when fully loaded.

1.3 *cargo ships of less than 500 gross tonnage laid down on or after 1 January 2002 that do not continue their voyage for more than 8 hours at operational speed from a place of refuge when fully loaded.*

2 Any vessel, regardless of its date of construction, which undergoes repairs, alterations, and modifications, and related fitting out, must continue to fulfil at least the requirements previously applicable to the vessel. Such a vessel, if built before 1 July 2002, shall, as a general rule, comply with the requirements for a vessel built on or after that date to at least the same extent as it did before it underwent such repairs, alterations or modifications or was fitted with such equipment. Repairs, amendments of and modifications of a major character and outfitting related thereto shall comply with the requirements for vessels built on or after 1 July 2002 to the extent that the Administration considers reasonable and practicable.

Regulation 3 Requirements for high-speed craft[3)4)]

1 Regardless of the provisions of chapters I-IV and regulations V/18, 19 and 20:

1.1 a high-speed craft constructed on or after 1 January 1996 but before 1 July 2002 which complies with the requirements of the High-Speed Craft Code, 1994 in its entirety and which has been surveyed and certified as required by that Code shall be deemed to comply with the requirements of chapters I to IV and regulations V/18, 19 and 20, *cf. subject to subsection 3*. For the purposes of this regulation, the requirements of that code should be considered mandatory;

1.2 a high-speed craft constructed on or after 1 July 2002 which complies with the requirements of the High-Speed Craft Code, 2000 in its entirety and which has been surveyed and certified as required by that Code shall be deemed to comply with the requirements of chapters I to IV and regulations V/18, 19 and 20,*cf. however, point 3*.

2 *The certificates and authorisations issued under the High-Speed Craft Code shall have the same binding effect and the same recognition as certificates issued under chapter I.*

3 *Regardless of the provisions of 1.1 and 1.2, a high-speed craft shall comply with the provisions of chapter II-1, regulations 3-9 and 3-13.*

4 *High-speed passenger craft shall also be issued with a passenger-carrying authorisation as specified in regulation I/12.*

Cargo high-speed craft shall also be issued with a trade permit as specified in regulation I/12.

The validity and period of validity of the passenger and trade permit for cargo vessels shall be as specified in regulation I/14.

[1] Chap. X. *The 1994 HSC Code was last amended by resolution* MSC. 498(105).
[2] Chap. X. *The 2000 HSC Code was last amended by resolution* MSC. 499(105).
[3] Chap. X. *Reference is made to MSC/Circ. 911 and MSC/Circ. 911/Add. 1, which contains interpretations of the fire safety provisions of the International Code of Safety for High-Speed Craft (HSC Code). The interpretations are to be used as guidance in complying with the HSC Code in respect of structural fire protection and installations, arrangements and equipment installed after 21 May 1999.*
[4] Chap. X. *Also refer to: MSC/Circ. 1001 Interim Guidelines for a simplified evacuation analysis of high-speed passenger craft.*

Annex 13

Chapter XI-1 - Special measures to enhance maritime safety

Section A	General provisions
Regulation 1	Authorisation of recognised organisations
Regulation 2	Enhanced inspection
Regulation 3	Ship identification number
Regulation 3-1	Shipping company and owner identification number
Regulation 4	Port state control of operational requirements
Regulation 5	Ship history (Continuous Synopsis Record)
Regulation 6	Additional requirements for investigating maritime casualties and incidents
Regulation 7	Device for measuring the atmosphere in enclosed spaces

Section A General provisions

Regulation 1 Authorisation of recognised organisations

The Administration[1)] shall authorise the organisations referred to in regulation I/6, including classification societies, in accordance with the provisions of the SOLAS Convention and with the Code for Recognised Organisations (RO Code), consisting of Part 1 and Part 2 (whose provisions shall be regarded as mandatory) and Part 3 (whose provisions shall be regarded as advisory), as adopted by the Organisation by resolution MSC.349(92), as may be amended by the Organisation, provided that:

a) the amendments to parts 1 and 2 of the RO Code have been adopted, entered into force and given effect in accordance with the provisions of article VIII of the SOLAS Convention;

b) amendments to Part 3 of the RO Code have been adopted by the Maritime Safety Committee (MSC) in accordance with its rules of procedure; and

c) any amendments adopted by the Maritime Safety Committee (MSC) and the Environment Committee (MEPC) are identical and enter into force or take effect at the same time, as appropriate.

Regulation 2 Enhanced survey[2)]

This regulation does not apply to ships with a gross tonnage below 500.

Bulk carriers as defined in regulation IX/1.6 and oil tankers as defined in regulation II-1/2.22 shall be subject to an enhanced inspection programme in accordance with the International Code on the Enhanced Programme of Inspections during Surveys of Bulk Carriers and Oil Tankers, 2011 (2011 ESP Code), adopted by the General Assembly of the Organisation by resolution A. 1049(27), which may be amended by the Organisation, provided that such amendments have been adopted, entered into force and given effect in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to annexes other than chapter I.

Regulation 2-1 - Harmonisation of survey periods for cargo ships not covered by the ESP Code

In the case of cargo ships not subject to more stringent surveys in accordance with regulation XI-1/2, the intermediate and renewal surveys referred to in regulation I/10 may, regardless of any other provisions, be carried out and completed during the corresponding periods as further specified in the 2011 ESP Code, as may be amended from time to time, and the guidelines developed by the Organisation[3] as appropriate.

Regulation 3 Ship identification number

(Subsections 4 and 5 apply to all ships covered by this regulation. Ships constructed before 1 July 2004 shall comply with the requirements of subsections 4 and 5 not later than the date of the next dry-docking after 1 July 2004).

1 This regulation applies to all passenger ships with a gross tonnage of 100 tonnes and above, and to all cargo ships with a gross tonnage of 300 tonnes and above.

2 Every ship shall bear an identification number in accordance with the IMO ship identification number system as adopted by the Organisation.[4)]

3 The ship identification number shall be entered in the certificates and in certified copies thereof as issued under regulation I/12 or I/13.[5)]

4 The ship identification number must be permanently affixed in the following locations:

4.1 In a conspicuous place either at the stern or amidships on both port and starboard sides of the ship, above the deepest assigned load line; or on both port and starboard sides of the superstructure; or on the front of the superstructure; or, on passenger ships, on a horizontal surface visible from the air; and

4.2 in an easily accessible position either on one of the transverse end bulkheads in the machinery space as defined in chapter II-2, regulation 3.30 or on one of the hatches; or - in tankers - in the pump-room; or - in ships with ro-ro spaces as defined in chapter II-2, regulation 3.41 - on one of the transverse end bulkheads in the ro-ro spaces.

5.1 The fixed mark must be completely clear, free of any other marks on the hull and painted in a contrasting colour.

5.2 The fixed mark referred to in subsection 4.1 must not be less than 200 mm tall. The fixed mark referred to in subsection 4.2 must not be less than 100 mm tall. The width of the markings should be proportional to their height.

5.3 The fixed mark can be made in relief, it can be engraved into the structure, or another similar way can be used to provide the ship with its identification number, ensuring that it is not easily removed.

5.4 For ships constructed in material other than steel or metal, the Administration must approve the method used to provide the ship with its identification number.

Regulation 3-1 Shipping company and owner identification number

1 This regulation applies to shipping companies and registered owners of passenger ships covered by chapter I of this Code and all cargo ships of 300 gross tonnage and above.

2 For the purposes of this regulation, the registered owner shall be interpreted as specified by the Administration and shipping company as defined in regulation IX/1.

3 Each company and registered owner shall be provided with an identification number corresponding to

the IMO Unique Company and Registered Owner Identification Number Scheme as adopted by the Organisation[6].

4 The ship identification number shall be inserted on certificates and certified copies of certificates issued in accordance with regulation IX/4 and sections A/19.2 or A/19.4 of the ISPS Code.

5 This regulation comes into force when the certificates referred to in subsection 4 are issued or renewed on or after 1 January 2009.

Regulation 4 Port State Control of operational requirements[7]

1 A ship in the port of another Contracting Government is subject to control of the operational requirements for the safety of the ship by inspectors authorised by that government when there are clear grounds for believing that the master and crew of the ship are not familiar with the essential shipboard procedures relating to ship safety.

2 In the circumstances defined in subsection 1 of this regulation, the Contracting Government carrying out the verification shall take measures to ensure that the ship does not proceed to sea until the situation is brought into conformity with the requirements of this Convention.

3 Procedures related to port State control prescribed in regulation I/19 apply to this regulation.

4 Nothing in this regulation shall be construed to limit the rights and obligations of the Contracting Government in carrying out the verification of operational requirements expressly provided for in the regulations.

Regulation 5 Ship history (Continuous Synopsis Record)[8]

1 A ship history record shall be issued for every ship to which chapter I applies. *However, the regulation does not apply to cargo ships with a gross tonnage of less than 500 and ships not in international trade.*

2.1 The purpose of ship history is to have an overview of relevant data about the ship history available on board.

2.2 For ships built before 1 July 2004, the ship history record shall at least contain information about the history of the ship from 1 July 2004.

3 A Ship History Record shall be issued by the Administration to every ship entitled to fly its flag and shall contain at least the following information (The Ship History Record shall contain the information specified in subsections 3.7 and 3.10 if issued or updated on or after 1 January 2009):

3.1 the name of the state whose flag the ship is authorised to fly;

3.2 the date on which the ship was registered in that State;

3.3 the ship identification number referred to in regulation 3;

3.4 the name of the ship;

3.5 the name of the port where the ship is registered;

3.6 name and main address of the registered owner(s);

3.7 registered owner identification number

3.8 name and main address of the registered bareboat charterer(s);

3.9 the name of the company as defined in chapter IX, regulation 1, its principal address and the address or addresses from which it conducts its safety management;

3.10 Company identification number

3.11 the name of all classification societies where the ship is classed;

3.12 The name of the Administration, Contracting State or recognised organisation which issued the Certificate of Compliance (or Interim Certificate of Compliance) referred to in the ISM Code, as defined in chapter IX, regulation 1, to the company operating the ship and the name of the body which carried out the audit under which the Certificate was issued, if different from the body which issued the Certificate;

3.13 The name of the Administration, Contracting State or recognised organisation which issued the Safety Certificate (or Interim Safety Certificate) referred to in the ISM Code as defined in chapter IX, regulation 1 to the ship and the name of the organisation which carried out the audit under which the certificate was issued, if different from the organisation which issued the certificate;

3.14 the name of the Administration, Contracting State or recognised safety organisation which issued the International Ship Safety Certificate (or Interim International Ship Safety Certificate specified in Part A of the ISPS Code, as defined in chapter XI-2, regulation 1, to the ship and the name of the organisation which carried out the verification under which the Certificate was issued, if different from the organisation which issued the Certificate; and

3.15 the date from which the ship ceased to be registered in that State.

4.1 Any change in the information referred to in subsections 3.4 to 3.12 shall be entered in the ship history record so that it contains updated and current data and the history of these changes.

4.2 In the case of amendments of records referred to in subsection 4.1, the Administration shall, as soon as practicable but not later than three months after the date of the amendment, issue either a revised and updated version of the history file or the relevant amendments thereto to the ship when entitled to fly its flag.

4.3 In the case of amendments of records referred to in subsection 4.1, pending the issuance of a revised and updated version of the history file, the Administration shall authorise and require either the Company, as defined in chapter IX, regulation 1, or the master to amend the history file to reflect the amendments. In such cases, the shipping company must inform the Administration immediately when the ship history has been changed.

5.1 A ship history must be in English, French or Spanish. In addition, the ship history can be translated into the official language(s) used by the Administration.

5.2 A ship history record shall be in the format established by the Organisation and shall be maintained in accordance with guidelines established by the Organisation. Previous entries in the ship history shall not be altered, deleted or in any way blurred or rendered illegible.

6 When a ship is transferred to the flag of another state, when it is sold to another shipping company (or taken over by another bareboat charterer), or when another shipping company assumes responsibility for the operation of the ship, the ship history must remain on board.

7 When a ship is to be transferred to the flag of another State, the shipping company shall notify the Administration of the name of that State so that the Administration can provide the State with a copy of the ship history file covering the period during which the ship has been under its jurisdiction.

8 When a ship is transferred to the flag of another State and the government of that State is a Contracting Government to the SOLAS Convention, the Contracting Government of the State whose flag the ship has previously flown shall, as soon as possible after the transfer, send a copy to the Administration of the relevant history file covering the period during which the ship has been under its jurisdiction together with any history file previously issued to the ship by other States.

9 When a ship is transferred to the flag of another State, the Administration should append the previous ship history records to the ship history record that the Administration will issue to the ship in order to provide the record of the ship's history, which is the intent of this regulation.

10 Ship history records must be kept on board the ship and must be available for inspection at all times.

Regulation 6 - Additional requirements for the investigation of marine casualties and incidents

Taking into account regulation I/21, each Administration shall conduct investigations into marine casualties and incidents in accordance with the provisions of the SOLAS Convention, supplemented by the provisions of the Code of International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident (Casualty Investigation Code) as adopted by resolution MSC. 255(84), and further:

6.1 the provisions of Parts I and II of the Casualty Investigation Code must be fully complied with;

6.2 related guidance and explanatory material contained in part III of the Casualty Investigation Code should be taken into account to the greatest extent possible in order to achieve a more uniform implementation of the Casualty Investigation Code;

6.3 amendments to parts I and II of the Casualty Investigation Code shall be adopted, enter into force and be given effect in accordance with the provisions of article VIII of the SOLAS Convention regarding amendment procedures for annexes other than chapter I; and

6.4 Part III of the Casualty Investigation Code shall be amended by the IMO Maritime Safety Committee MSC in accordance with its rules of procedure.

Regulation 7 Apparatus for measuring the atmosphere in enclosed spaces

Every ship to which Chapter I applies shall be fitted with an appropriate portable apparatus for measuring the atmosphere in enclosed spaces or with several such apparatus.[9)] These instruments shall be capable of measuring at least the concentration of oxygen, flammable gases or vapours, hydrogen sulphide and carbon monoxide before entering enclosed spaces.[10)] Instruments that the ship may be fitted with under other requirements may comply with the provisions of this regulation. Appropriate means must be available to calibrate all these devices.

[1] Chap. XI-1. The provision is included for practical reasons to ensure consistency in the reproduction of the international regulations. For the European Union, the relationship is governed by Directive 2009/15/EC of the European Parliament and of the Council on common regulations and standards for ship inspection and survey organisations and for the relevant activities of maritime administrations, as amended by Commission Implementing Directive 2014/111/EU, and by regulation (EC) No. 391/2009 of the European Parliament and of the Council on common regulations and standards for ship inspection and survey organisations, as amended by Commission Implementing regulation (EU) No. 1355/2014.

[2] Chap. XI-1. Refer to MSC/Circ. 655, guidance for planning the expanded inspection on bulk carriers and oil tankers, and MSC/Circ. 686, guidance on means of access to the hull for inspection and maintenance of oil tankers and bulk carriers.

[3] Refer to the "Survey Guidelines under the harmonised system of survey and certification (HSSC), 2015", as adopted by the Assembly of the Organisation by resolution A. 1104(29), as amended.

[4] Chap. XI-1. Refer to the IMO Ship Identification Numbering System - adopted by the Organisation by resolution A. 1117(30).

[5] Chap. XI-1. Refer to MSC/Circ. 1142 / MEPC/Circ. 425: Marking the Ships' Plans, Manuals and other documents with the IMO ship identification number.

[6] Chap. XI-1. Refer to resolution MSC. 160(78) entitled "Adoption of the IMO Unique Company and Registered Owner Identification Number Scheme".

[7] Chap. XI-1. Refer to Port State Control Procedures 2017 as adopted by the Organisation by resolution A. 1119(30).

[8] Chap. XI-1. Reference is also made to the Format and Guidelines for the Maintenance of the Continuous Synopsis Record as adopted by resolution A. 959(23), and amended by MSC 209(81).

[9] Chap. XI-1. Refer to "Guidelines to facilitate the selection of portable atmosphere testing instruments for enclosed spaces as required by SOLAS regulation XI-1/7" (MSC. 1/Circ. 1477).

[10] Chap. XI-1. Refer to "Revised recommendations for entering enclosed spaces aboard ships" (resolution A. 1050(27)).

Annex 14

Chapter XI-2 - Special measures to enhance maritime safety

Section A	Special measures to enhance maritime safety
	Introduction
Regulation 1	Definitions
Regulation 2	Application
Regulation 3	Contracting States' safety obligations
Regulation 4	Requirements for shipping companies and ships
Regulation 5	Special responsibilities of shipping companies
Regulation 6	Ship security alert system
Regulation 7	Threats to ships
Regulation 8	Master's discretion in relation to the safety and security of the ship
Regulation 9	Measures for control and compliance with the regulations
Regulation 10	Requirements for port facilities
Regulation 11	Alternative safety agreements
Regulation 12	Equivalent safety arrangements
Regulation 13	Dissemination of information

Section A Special measures to promote maritime

safety Introduction

Specific measures to promote maritime safety are regulated by regulation (EC) No 725/2004 of the European Parliament and of the Council of 31 March 2004 on enhancing ship and port facility safety. Chapter XI-2 is included for completeness, as these regulations also serve as a Danish translation of the International Convention for the Safety of Life at Sea.

The implementation, administration and enforcement of the regulations in chapter XI-2 are carried out by several different public authorities. The tasks affect the Ministry of Defence, including the Navy Command, the Ministry of Justice, including the Police, the Ministry of Transport, including the Danish Transport Authority, and the Ministry of Industry, including the Danish Maritime Authority.

The practical implementation, administration and enforcement of the regulations will be organised so that the tasks are handled by the authority that, taking into account the existing organisational structure, distribution of tasks and use of resources in the maritime and safety area, can most appropriately handle the individual task.

Chapter XI-2 is reproduced in full, although certain provisions are implemented by other authorities.

Regulation 1 Definitions

1 Unless expressly provided otherwise, the following definitions shall apply for the purposes of this chapter:

1.1 "Bulk carrier" means a bulk carrier as defined in chapter IX, regulation 1.6.

1.2 "Chemical tanker" means a chemical tanker as defined in chapter VII, regulation 8.2.

1.3 "Gas carrier" means a gas carrier as defined in chapter VII, regulation 11.2.

1.4 "High-speed craft" means a craft as defined in chapter X, regulation 1.2.

1.5 "Mobile offshore drilling unit (MODU)" means a mechanically propelled MODU as defined in chapter IX, regulation 1 that is not in place.

1.6 "Oil tanker" means an oil tanker as defined in chapter II-1, regulation 2.22.

1.7 "Shipping Company" means a shipping company as defined in chapter IX, regulation 1.

1.8 "Ship/port interface" means the interaction that occurs when a ship is directly and immediately involved in the transfer of persons or goods between ship and port or the provision of port services.

1.9 "Port facility" means an area defined by the Contracting State or by the designated authority where the ship/port interface exists. Depending on the circumstances, these can be anchorages, waiting areas and seaward entry areas.

1.10 "Ship-to-ship activities" refer to operations that occur outside of a port facility but involve the transfer of persons or goods from one vessel to another.

1.11 "Designated Authority means the organisation(s) or administration(s) designated within the Contracting State as being responsible for the implementation of the provisions of this chapter relating to port facility safety and the ship/port interface from the perspective of the port facility.

1.12 "The International Ship and Port Facility Security (ISPS) Code" means the international code for ship and port facility security. It contains a part A (mandatory provisions) and a part B (advisory provisions) adopted on 12 December 2002 by resolution 2 of the Conference of Contracting States to the International Convention on Safety of Life at Sea (SOLAS) of 1974, which may be amended by the Organisation on condition that:

1.12.1 the amendment to part A of the Code are adopted, brought into force and given legal effect in accordance with the provisions of article VIII of the SOLAS Convention on procedures for amending the annexes to the SOLAS Convention other than chapter I; and

1.12.2 Amendments to Part B of the Code are adopted by the IMO Maritime Safety Committee (MSC) in accordance with its rules of procedure.

1.13 "Safety Incident" means any suspicious act or circumstance that poses a threat to the safety of a ship, including a MODU and a high-speed craft, or to the safety of a port facility, ship/port interface or ship-to-ship activities.

1.14 "Security level" is an indication of the degree of risk that a security incident will be attempted or will occur.

1.15 'Declaration of Security' means an agreement between a ship and either a port facility or another ship with which it is in contact, detailing the security measures that each will implement.

1.16 "Recognised security organisation" means an organisation with appropriate expertise in security matters and with relevant knowledge of ship and port operations authorised to carry out an assessment, verification, approval or certification activity as required by this chapter or by part A of the ISPS Code.

2 When the term "ship" is used in regulations 3 to 13, it also includes MODUs and high-speed craft.

3 When the term 'all ships' is used in this chapter, it means all ships to which this chapter applies.

4 When the term "Contracting State" is used in regulations 3, 4, 7, 10, 11, 12 and 13, reference is also made to the
"designated authority".

Regulation 2 Application

1 This chapter applies to:

1.1 the following types of ships in international trade:

1.1.1 passenger ships, including high-speed passenger vessels;

1.1.2 cargo ships, including high-speed craft, of 500 gross tonnage or more; and

1.1.3 MODUs; and

1.2 port facilities serving such ships in international trade.

2 Regardless of the provisions of subsection 1.2, Contracting States shall determine the extent to which this chapter and the relevant parts of part A of the ISPS Code apply to those port facilities within their territory which are intended to serve ships arriving or departing from the port facilities occasionally engaged in international trade, even if these port facilities are primarily used by ships not engaged in international trade.

2.1 Contracting States shall, in accordance with subsection 2, base their decisions on a port facility safety assessment carried out in accordance with the provisions of part A of the ISPS Code.

2.2 A Contracting State shall not, by a decision it takes pursuant to subsection 2, jeopardise the level of safety sought to be achieved by this chapter or part A of the ISPS Code.

3 This chapter does not apply to warships, troopships or other ships owned or operated by a Contracting State and used only in its service for non-commercial purposes.

4 Nothing in this chapter shall prejudice the rights or obligations of States under international law.

Regulation 3 Contracting States' security obligations

1 Each Administration should establish security levels and ensure that ships entitled to fly its flag are provided with information on the security level. Whenever there are changes in the security level, this information shall be updated as circumstances may require.

2 Each Contracting State shall establish security levels and ensure that port facilities within its territory and ships prior to entering or while in port within its territory are notified thereof. Whenever there are changes in the security level, this information shall be updated as circumstances may require.

Regulation 4 Requirements for shipping companies and ships

1 Every company shall fulfil the relevant requirements of this chapter and part A of the ISPS Code, taking into account the guidance provided in part B of the ISPS Code.

2 Every ship shall comply with the relevant requirements of this chapter and part A of the ISPS Code, taking into account the guidance given in part B of the ISPS Code. In addition, it must be confirmed and certified that it fulfils the mentioned requirements as stated in part A of the ISPS Code.

3 Every ship shall, prior to entering or while in port within the territory of a Contracting State, fulfil the requirements of the security level set by that Contracting State if that security level is higher than that set by the Administration of the ship concerned.

4 Ships must respond without undue delay to any amendment to a higher security level.

5 When a ship fails to comply with the requirements of this chapter or part A of the ISPS Code or cannot comply with the security level set by the Administration or another Contracting State for that ship, the ship shall notify the relevant competent authority prior to any ship/port interface or prior to entry into port, whichever is earlier.

Regulation 5 Special responsibilities of shipping companies

The shipping company shall ensure that the master has information available on board at all times which can be used by the officers duly authorised by the Contracting State to determine:

1. who is responsible for the appointment of crew members or other persons employed or engaged on board the ship at that time in a capacity related to the commercial operation of the ship;

2. who has decision-making responsibility for the use of the ship; and

3. in the event that the ship is used under a charter party, who has entered into such charter party.

Regulation 6 Ship security alert system[1)]

1 A security alert system must be installed on all ships, specifically:

1.1 in ships built on or after 1 July 2004;

1.2 latest at the first radio survey after 1 July 2004 on passenger ships, including high-speed passenger craft, constructed before 1 July 2004;

1.3 not later than the first radio survey after 1 July 2004 on oil tankers, chemical tankers, gas carriers, bulk carriers and cargo high-speed craft of 500 gross tonnage and upwards, constructed before 1 July 2004; and

1.4 not later than the first radio survey after 1 July 2006 in other cargo ships of 500 gross tonnage and upwards and MODUs constructed before 1 July 2004.

2 When the ship security alert system is activated, it must:

2.1 initiate and transmit a ship safety alert from the ship to a competent authority ashore designated by the Administration, which in these circumstances may include the shipping company, indicating the ship and its position and that the safety of the ship is threatened or has been compromised;

2.2 do not send the security alert to other ships;

2.3 do not activate alarms on board the ship; and

2.4 continue the security alert until it is cancelled and/or reset.

3 The ship security alert system must:

3.1 be activated from the bridge and from at least one other location; and

3.2 comply with performance standards that are not inferior to those adopted by the Organisation.

4 The activation points for the ship security alert system must be designed so that the alarm cannot be triggered unintentionally.

5 The requirement for a ship security alert system may be fulfilled by using the radio system installed to fulfil the requirements of chapter IV provided that all the requirements of this regulation are met.

6 When an Administration receives notification of a security alert from a ship, it shall immediately inform the State or States in whose vicinity the ship is operating at the time.

7 When a Contracting State receives notification of a security alert from a ship not entitled to fly its flag, that Contracting State shall immediately inform the relevant Administration and, if appropriate, the State(s) in whose vicinity the ship is operating at the time.

Regulation 7 Threats to ships

1 Each Contracting State shall establish security levels and ensure that information thereon is provided to ships operating in, or having notified their intention to enter, its territorial sea.

2 Each Contracting State shall provide a contact point through which such ships can request advice or assistance and to which they can report any security-related concerns about other ships, movements or communications.

3 When an attack risk has been identified, the Contracting State concerned shall notify the ships concerned and their Administration of the following:

3.1 the security level at the time;

3.2 any security measures that the ships concerned should implement to protect themselves against attack, in accordance with the provisions of Part A of the ISPS Code; and

3.3 the necessary security measures that the coastal State may have decided to implement.

Regulation 8 Master's discretion in relation to the safety and security of the ship

1 The master shall not be restricted by the company, the charterer or any other person from taking or implementing decisions which, in their professional judgement, are necessary to maintain the safety and security of the ship. This includes denial of access to the ship to persons (except those identified as duly authorised by a Contracting State) or their effects and refusal to load cargoes, including containers or other closed cargo transport units.

2 If, in the master's professional judgement, a conflict arises during operation between the safety or security requirements applicable to the ship, they shall comply with the requirements necessary to maintain the safety of the ship. In such cases, the master may implement temporary security measures and shall immediately notify the Administration and, if appropriate, the Contracting State in whose port the ship is operating or whose port it intends to enter. Such interim security measures implemented under this regulation shall, as far as possible, be compatible with the applicable

security level. When such a case is detected, the Administration must ensure that the conflict is resolved and that the possibility of a recurrence is minimised.

Regulation 9 Control and compliance measures 1 Checking

ships in port

1.1 For the purposes of this chapter, all ships to which this chapter applies are subject to control by officers duly authorised by another Contracting State when in a port of that state; these officers may be the same as those performing the functions referred to in regulation 19 of chapter I. Such verification shall be limited to verifying the presence on board of a valid International Ship Safety Certificate or a valid Interim International Ship Safety Certificate issued in accordance with the provisions of Part A (Certificate) of the ISPS Code,[2]) which, if valid, shall be accepted unless there are clear grounds for believing that the ship does not fulfil the requirements of this chapter or of Part A of the ISPS Code.

1.2 When such clear grounds exist or when a valid certificate cannot be produced on request, the duly authorised officers of the Contracting State shall impose one or more of the control measures referred to in subsection 1.3 on the ship. Such measures imposed on the ship shall be proportionate to the negligence, taking into account the guidance given in Part B of the ISPS Code.

1.3 Such control measures include the following: inspection of the ship, delaying the ship, detention of the ship, restrictions on the operation of the ship, including its movements within the port, or expulsion of the ship from the port. They may additionally or alternatively include other minor, administrative or corrective measures.

2 Ships intending to enter a port of another Contracting State

2.1 In order to ensure that the ship complies with this chapter prior to entry into port so as to avoid the need to impose control measures or take other action, a Contracting State may, in applying this chapter, require ships intending to enter one of its ports to provide the following information to the officers duly authorised by that State:

2.1.1 that the ship holds a valid certificate and the name of the issuing authority;

2.1.2 What security level applies to the ship at that time;

2.1.3 the security level under which the ship operated in previous ports of call, where there has been an interface between the ship and the port within the timeframe specified in subsection 2.3;

2.1.4 Any special or additional security measures implemented by the ship in previous ports of call where there has been an interface between the ship and the port within the timeframe specified in subsection 2.3;

2.1.5 appropriate ship safety procedures were maintained during any ship-to-ship activities within the timeframe specified in subsection 2.3; or

2.1.6 other practical security-related information (but not details of the ship security plan), taking into account the guidance in Part B of the ISPS Code.

At the request of the Contracting State, the ship or shipping company shall provide confirmation acceptable to that Contracting State.

2.2 Every ship to which this chapter applies intending to enter a port of another Contracting State shall provide the information specified in subsection 2.1 upon request by the duly authorised officers of that government. The master may refuse to provide such information, but this may result in the ship being refused access to the port.

2.3 The ship shall keep records of the information specified in subsection 2.1 for the last ten calls at port facilities.

2.4 If, after receiving the information described in subsection 2.1, the duly authorised officers of the Contracting State of the port the ship intends to enter have clear grounds for believing that the ship does not comply with the requirements of this chapter or part A of the ISPS Code, such officers shall attempt to establish communication with and between the ship and the Administration in order to rectify the non-compliance. If such communication does not result in the ship rectifying the non-compliance or if these officers otherwise have clear grounds for believing that the ship is not in compliance with the requirements of this chapter or Part A of the ISPS Code, they may take action against the ship concerned as specified in subsection 2.5. Such action taken against the ship shall be proportionate to the negligence, taking into account the guidance given in Part B of the ISPS Code.

2.5 Such steps include the following:

2.5.1 A requirement to rectify the non-fulfilled requirements;

2.5.2 a requirement that the ship proceed to a specified place within the territorial sea or internal waters of the Contracting State;

2.5.3 an inspection of the ship if the ship intends to enter a port of the Contracting State and is already in the territorial waters of that State; or

2.5.4 Denial of access to the port.

Before taking such action, the ship shall be informed of the Contracting State's intentions. The master may then revoke the intention to enter the port in question. In such cases, this regulation does not apply.

3 Additional provisions

3.1 In case of:

3.1.1 the imposition of a control measure on a ship which is not a minor administrative or corrective measure referred to in subsection 1.3; or

3.1.2 that one of the steps mentioned in subsection 2.5 is taken,

an officer duly authorised by the Contracting State shall immediately inform the Administration in writing, indicating the control measures imposed on the ship, the action taken and the reasons for this. The Contracting State, which initiated the control measures or action, shall also inform the recognised safety organisation which issued the certificate to the ship concerned and the Organisation when such control measures or action have been initiated.

3.2 When the ship is refused entry or expelled from the port, the authorities of the port State should communicate the relevant facts to the authorities of the State where the ship subsequently intends to call, if it

it is known, and in any other relevant coastal State, taking into account guidelines to be developed by the Organisation. It must be ensured that such notification is confidential and secure.

3.3 A ship shall only be refused entry into port under subsections 2.4 and 2.5 or expelled from a port under subsections 1.1 to 1.3 if the officers duly authorised by the Contracting State have clear grounds to believe that the ship poses an immediate threat to the safety or security of persons, ships or other property and there is no other adequate means of removing that threat.

3.4 The control measures referred to in subsection 1.3 and the actions referred to in subsection 2.5 shall be carried out under this regulation only until the non-compliance giving rise to the control measures or actions has been rectified to the satisfaction of the Contracting State, taking into account any action proposed by the ship or the Administration.

3.5 When Contracting States exercise control according to subsection 1 or take action according to subsection 2:

3.5.1 every effort shall be made to avoid unnecessary detention or delay of a ship. If a ship is nevertheless subjected to undue detention or delay, it shall be entitled to compensation for any loss or damage suffered; and

3.5.2 access to the ship shall not be prevented if it is necessary for emergency, humanitarian or security purposes.

Regulation 10 Requirements for port facilities

1 Every port facility shall comply with the relevant requirements of this chapter and part A of the ISPS Code, taking into account the guidance given in part B of the ISPS Code.

2 Each Contracting State with one or more port facilities within its territory to which this regulation applies shall ensure that:

2.1 a port facility safety assessment is conducted, reviewed and approved in accordance with the provisions of Part A of the ISPS Code; and

2.2 a port facility security plan is prepared, reviewed, approved and implemented in accordance with the provisions of Part A of the ISPS Code.

3 Each Contracting State should identify and communicate the measures that need to be addressed in a security plan at the different security levels, including when a Declaration of Security is required to be submitted.

Regulation 11 Alternative safeguard agreements

1 When implementing this chapter and part A of the ISPS Code, a Contracting State may conclude bilateral or multilateral agreements in writing with other Contracting States on alternative safety arrangements covering international short sea shipping traffic on fixed routes between port facilities located within the respective territories.

2 Such agreements must not jeopardise the security level of other ships or port facilities not covered by the agreement.

3 Ships covered by such an agreement shall not engage in activities with ships not covered by the agreement.

4 Such agreements shall be reviewed regularly in the light of experience gained and any changes in the specific circumstances or assessed threats to the security of the ships, port facilities or routes covered by the agreement.

Regulation 12 Equivalent safeguard arrangements

1 An Administration may authorise a particular ship or a group of ships entitled to fly its flag to implement other security measures equivalent to those referred to in this chapter or in part A of the ISPS Code, provided that such security measures are at least as effective as those prescribed in this chapter or in part A of the ISPS Code. The Administration authorising such security measures shall communicate the details thereof to the Organisation.

2 When implementing this chapter and part A of the ISPS Code, a Contracting State may authorise a particular port facility or group of port facilities located within its territory which is not covered by an agreement entered into under regulation 11, to implement security measures equivalent to those prescribed in this chapter or in part A of the ISPS Code, provided that such security measures are at least as effective as those prescribed in this chapter or in part A of the ISPS Code. The Contracting State, which authorises such security measures, shall communicate the details of these to the Organisation.

Regulation 13 Dissemination of information

1 Not later than 1 July 2004, each Contracting State shall communicate the following information to the Organisation and make it available for the information of shipping companies and ships:

1.1 Name and contact address of its national authority(ies) responsible for ship and port facility security;

1.2 the areas within its territory covered by the approved port facility security plans;

1.3 the name and contact address of the persons designated to be available 24 hours a day to receive and respond to ship-to-shore security alerts referred to in regulation 6.2.1;

1.4 the name and contact address of the persons designated to be available 24 hours a day to receive and respond to any notification from a Contracting State carrying out the control and compliance measures referred to in regulation 9.3.1; and

1.5 the name and contact address of the persons designated to be available 24 hours a day to provide advice or assistance to ships and to whom ships may report any security-related concerns as referred to in regulation 7.2.

It shall thereafter update such information as soon as changes occur. The Organisation shall disseminate the information to other Contracting States for the information of their officials.

2 Not later than 1 July 2004, each Contracting State shall inform the Organisation of the name and contact details of any recognised safety organisation authorised to act on its behalf, together with details of the specific responsibilities and conditions of authorisation granted to such organisations. Such information shall be updated as soon as changes occur. The Organisation shall disseminate the information to other Contracting States for the information of these officials.

3 Not later than 1 July 2004, each Contracting State shall communicate to the Organisation a list of the approved port facility security plans for the port facilities located within its territory, together with

details of the area(s) covered by each approved port facility security plan and the associated approval date; and shall be communicated when:

3.1 changes to the area(s) covered by an approved port facility security plan are to be introduced or have been introduced. In such cases, the changes that have occurred in the area(s) covered by the plan must be communicated and the date from which these changes have come into force or will come into force;

3.2 an approved port facility security plan previously included in the list submitted to the Organisation is to be revoked or has been revoked. In such cases, the date from which the revocation was or becomes effective must be communicated. The Organisation shall be notified as soon as practicable.

3.3 additions need to be made to the list of approved port facility security plans. In such cases, the area(s) covered by the plan must be communicated and the approval date must be stated.

4 As from 1 July 2004, every five years, each Contracting State shall provide to the Organisation a revised and updated list of all the approved port facility security plans in force for the port facilities located within its territory and the area or areas covered by each of the approved port facility security plans and the associated approval dates (together with the approval dates of any amendments thereto). This list shall supersede and replace all information communicated to the Organisation under subsection 3 during the previous five years.

5 Any Contracting States shall notify the Organisation that an agreement has been entered into in accordance with regulation 11. The notification must contain the following:

5.1 the names of the Contracting States that have entered into the agreement;

5.2 the port facilities and fixed routes covered by the agreement;

5.3 the interval for reviewing the agreement;

5.4 the effective date of the agreement; and

5.5 information on any consultations with other Contracting States.

Thereafter, it shall, as soon as reasonably practicable, communicate such information to the Organisation when the agreement is amended or expires.

6 Any Contracting State which, in accordance with the provisions of regulation 12, allows equivalent safety arrangements for a ship entitled to fly its flag or for a port facility located within its territory shall notify the Organisation in detail.

7 The Organisation shall make information disseminated under subsection 3 available to other Contracting States upon request.

[1] Chap. XI-2. Refer to Performance Standards for a ship security alert system adopted by resolution MSC. 136(76) and to "revised performance standards for ship security alert systems adopted by resolution MSC. 147(77)" .

[2] Chap. XI-2. Refer to resolution MSC. 196(80): adoption of amendments to the International Code for the security of ships and of port facilities regarding changes to required certificates.

Annex 15

Chapter XII - Additional security measures for bulk carriers

Regulation 1	Definitions
Regulation 2	Scope of application
Regulation 3	Plan for implementation
Regulation 4	Bulk carrier leak stability
Regulation 5	Structural strength of bulk carriers
Regulation 6	Construction requirements and other requirements for bulk carriers
Regulation 7	Inspection and maintenance of bulk carriers
Regulation 8	Information on fulfilment of requirements for bulk carriers
Regulation 9	Requirements for bulk carriers unable to comply with regulation 4.3
Regulation 10	Information about the density of the cargo
Regulation 11	Cargo instruments
Regulation 12	Water level alarms in cargo holds, ballast tanks and voids
Regulation 13	Access to pumping systems
Regulation 14	Restriction when travelling with empty cargo holds

Regulation 1 Definitions

The following definitions apply to this chapter:

1. "Bulk carrier" means a ship whose primary purpose is to carry dry cargo in bulk and includes ship types such as ore carriers and combination carriers.[1)]

2. 'Single hull plating bulk carrier' means a bulk carrier as defined in subsection 1 in which

2.1 part of the cargo hold is limited by the side plating, or

2.2 one or more cargo holds are bounded by a double skin where the distance between them measured perpendicular to the side plating is less than 760 mm in bulk carriers built before 1 January 2000, or less than 1000 mm in bulk carriers built on or after 1 January 2000.

These ships include combination ships where a part of the cargo hold is limited by the side plating.

3. "Double-hull bulk carrier" means a bulk carrier as defined in subsection 1 in which all cargo holds are bounded by a double-hull with a spacing greater than that specified in subsection 2.2.

4. "Double skin": A construction in which the side of the ship consists of a side skin and a longitudinal bulkhead that extends from the double bottom to the deck. Hopper tanks and top wing tanks can form an integral part of the double skin.

5. "Length": The length of a bulk carrier is the length defined in the applicable International Convention on Load Lines.

6. "Bulk cargo" means any material, other than liquid or gas, consisting of a combination of particles, granules or larger pieces of material, generally of uniform composition and which is loaded directly into the cargo hold of the ship without further packaging.

7. "Standard for the strength of bulkheads and double bottoms in bulk carriers" means the "Standards for the evaluation of scantlings of the transverse watertight vertically corrugated bulkhead between the two foremost cargo holds and for the evaluation of allowable hold loading of the foremost cargo hold", adopted by resolution 4 of 27 November 1997 of the Conference of Contracting States to the International Convention on Safety of Life at Sea, 1974, which may be amended by the Organisation provided that such amendments have been adopted, entered into force and given effect in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to annexes other than chapter I.

8."Bulk carriers built" means bulk carriers where the keel has been laid or an equivalent stage of construction has been reached.

9."A corresponding construction stage" means the stage where

9.1 construction work identifiable with a specific ship is commenced; and

9.2 assembly of this ship has commenced and involves at least 50 tonnes or 1% of the estimated total hull weight, whichever is less.

10. "Breadth (B)": The width of a bulk carrier is the breadth defined in the applicable International Convention on Load Lines.

Regulation 2 Scope of application

Bulk carriers shall fulfil the requirements of this chapter together with the relevant requirements of other chapters.

Regulation 3 Implementation plan

Bulk carriers constructed before 1 July 1999 to which regulations 4 or 6 applies shall comply with the said regulations in accordance with the following schedule, with reference to the provisions on increased surveys in chapter XI-1, regulation 2:

1. Bulk carriers which on 1 July 1999 are 20 years old or more shall comply with the provisions as from the date of the first intermediate survey or the first renewal survey after 1 July 1999, whichever is the earlier;

2. Bulk carriers which on 1 July 1999 are 15 years old or more but less than 20 years old shall comply with the provisions from the date of the first renewal survey after 1 July 1999 but not later than 1 July 2002; and

3. Bulk carriers which on 1 July 1999 are less than 15 years old shall comply with the provisions from the date of the first renewal survey after the date on which the ship is 15 years old but not later than the date on which the ship is 17 years old.

Regulation 4 Leak stability of bulk carriers

1 Bulk carriers of 150 metres in length and above, constructed with single hull and designed to carry bulk cargoes of 1000 kg/m^3 and above, constructed on or after 1 July 1999 shall be capable of withstanding flooding of any cargo hold under all loading conditions and remain afloat in a satisfactory condition of equilibrium as specified in subsection 4 when loaded to the summer load line.

2 Bulk carriers of 150 metres in length and above, constructed with double hull, with the longitudinal bulkhead located at a distance from the ship's side measured perpendicular to the centreline at the assigned summer load line of less than B/5, or 11.5 m, whichever is less, intended to carry bulk cargoes of 1000 kg/m^3 and above, and constructed on or after 1 July 2006, shall be in capable of withstanding the flooding of any cargo hold under all loading conditions and remain afloat in a satisfactory condition of equilibrium as specified in subsection 4 when loaded to the summer load line.

3 Bulk carriers of 150 metres in length and above, constructed with a single shell and intended to carry bulk cargoes of a density of 1780 kg/m^3 and above, built before 1 July 1999, shall be capable of withstanding flooding of the forward cargo hold under all loading conditions and remain afloat in a satisfactory condition of equilibrium as specified in subsection 4 when loaded to the summer load line. This requirement shall be fulfilled in accordance with the implementation schedule in regulation 3.

4 Subject to the provisions of subsection 7, the equilibrium condition after water filling shall be in accordance with the equilibrium condition specified in the Annex to resolution A. 320(IX) - "Regulation equivalent to regulation 27 of the International Convention of Load Lines, 1966", as amended by resolution A. 514(13). The intended water filling need only be a filling of the cargo hold to the water level outside the ship in this condition. The fillability of a loaded cargo hold is set to 0.9 and the fillability of an empty cargo hold is set to 0.95, unless another relevant fillability for a particular load is assumed for the volume occupied by the load and a fillability of 0.95 is assumed for the remaining volume of the cargo hold.

5 Bulk carriers built before July 1999 which have been granted reduced freeboard in accordance with regulation 27(7) of the International Convention on Load Lines, 1966, adopted on 5 April 1966, may be deemed to comply with subsection 3 of this regulation.

6 Bulk carriers which have been granted reduced freeboard in accordance with subsection (8), regulation 27 of the International Convention on Load Lines, 1966, adopted by resolution A. 320(IX) and amended by resolution
A. 514(13), may be presumed to fulfil subsections 1 or 2, as applicable.

7 Bulk carriers which have been granted reduced freeboard in accordance with the provisions of regulation 27(8) set out in Annex B of the Protocol of 1988 to the International Convention on Load Lines, 1966, shall comply with the relevant provisions of the Protocol concerning the equilibrium condition after flooding.

Regulation 5 Structural strength of bulk carriers

1 Bulk carriers of 150 metres in length and above, constructed with single hull and intended to carry bulk cargoes of 1000 kg/m^3 and above, shall have sufficient strength to resist flooding of any cargo hold under all loading and ballast conditions, taking into account the dynamic effect of the presence of water in the cargo hold and recommendations adopted by the Organisation.[2)]

2 Bulk carriers of 150 metres in length and above, constructed with double hull, with the longitudinal bulkhead located at a distance from the ship's side measured perpendicular to the centreline at the assigned summer load line of less than B/5, or 11.5 m, whichever is less, intended to carry bulk cargoes of a density of 1000 kg/m^3 and above, and constructed on or after 1 July 2006. built on or after 1 July 2006 shall comply with the provisions of subsection 1 concerning the strength of the structure.

Regulation 6 Construction and other requirements for bulk carriers

1 Bulk carriers of 150 metres in length and above, constructed with a single hull, carrying bulk cargoes of 1780 kg/m^3 and above and constructed before 1 July 1999, shall comply with the requirements of this regulation in accordance with the implementation schedule of regulation 3.

1.1 The transverse watertight bulkhead between the two forward cargo holds and the double bottom in the forward cargo hold shall have sufficient strength to resist flooding of the forward cargo hold in accordance with the standard for the strength of bulkheads and double bottoms in bulk carriers, taking into account the dynamic effect from the presence of water in the cargo hold. With regard to this regulation, the standard for the strength of bulkheads and double bottoms in bulk carriers is mandatory.

1.2 When assessing the reinforcement of the double bottom and transverse watertight bulkhead against the requirements of subsection 1.1, the following limitations may be applied:

1.2.1 limiting the distribution of the weight of the load between the cargo holds; and

1.2.2 Limitation of the maximum deadweight.

1.2.3 Bulk carriers applying one or both of the limitations in subsections 1.2.1 and 1.2.2 to fulfil subsection 1.1 shall always comply with these limitations when carrying bulk cargoes with a density of 1780 kg/m^3 and above.

2 Bulk carriers of 150 metres in length and above built on or after 1 July 2006 shall, in all double hull areas, comply with the following requirements:

2.1 Primary stiffeners of the double skin must not be placed in the cargo hold.

2.2 Subject to the provisions below, the distance between the inner and outer shell plating must not be less than 1000 mm measured perpendicular to the plating. The double skin shall allow access for inspection as specified in chapter II-1, regulations 3-6 and in the technical provisions referring thereto.

2.2.1 The distances below are not required for cross connections or knees in transverse and longitudinal bracing.

2.2.2 The minimum distance for passing through the double skin at obstacles such as pipes or ladders must not be less than 600 mm.

2.2.3 When the inner and outer shell plating are cross-braced, the minimum distance between bracing must not be less than 600 mm.

2.2.4 When the inner and outer shell plating are longitudinally braced, the minimum distance between the bracing must not be less than 800 mm. Outside the parallel part of the cargo hold area, the distance may be reduced when necessary due to the design, but it must not be less than 600 mm.

2.2.5 The minimum distance mentioned above is the shortest distance measured between the bracing on the inner and outer shell plating.

3 Double skin compartments, except for top wing tanks, must not be used for cargo transport.

4 On bulk carriers with a length of 150 metres or more, carrying bulk cargo with a density of 1000 kg/m^3 or more and built on or after 1 July 2006

4.1 Cargo holds must be designed to allow loading and unloading with standard loading and unloading equipment without the risk of damage affecting the safety of the structure.

4.2 There must be an effective connection between the side plating structure and the rest of the hull.

4.3 The cargo area must be designed so that damage to a single brace does not lead to the collapse of the

entire braced plate.

Regulation 7 Survey and maintenance of bulk carriers

1 A bulk carrier of 150 metres or more in length, built with a single hull and constructed before 1 July 1999, which is 10 years old or more, shall not carry bulk cargoes with a density of 1780 kg/m^3 or more unless it has satisfactorily undergone either:

1.1 a periodical survey in accordance with the expanded inspection programme of chapter XI-1, regulation 2; or

1.2 a survey of all cargo holds to the same extent as the periodical survey in the expanded inspection programme of chapter XI-1, regulation 2.

2 Bulk carriers shall comply with the maintenance provisions of chapter II-1, regulation 3-1 and of the "Standards for owners' inspection and maintenance of bulk carrier hatch covers" adopted by the Organisation by resolution MSC. 169(79) and which may be amended by the Organisation when such amendments have been adopted and entered into force in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to chapters other than chapter I.

Regulation 8 Information on the fulfilment of requirements for bulk carriers

1 The booklet required by chapter VI, regulation 7.2 shall be endorsed by or on behalf of the Administration to indicate that regulations 4, 5, 6 and 7, as applicable, have been complied with.

2 Any restriction imposed on the carriage of bulk cargoes with a density of 1780 kg/m^3 and above in accordance with the requirements of regulations 6 and 14 shall be identified and entered in the booklet referred to in subsection 1.

3 A bulk carrier to which subsection 2 applies shall be permanently marked on the side, amidships port and starboard, with a filled equilateral triangle 500 mm square, with its apex 300 mm below the deck line and painted in a colour contrasting with the colour of the hull.

Regulation 9 Requirements for bulk carriers unable to comply with regulation 4.3

For bulk carriers constructed before 1 July 1999 to which regulation 4.3 applies and which are designed with an insufficient number of watertight transverse bulkheads to comply with the requirements of the regulation, the Administration may allow relaxation in the application of regulations 4.3 and 6, provided that they meet the following requirements:

1. For the forward cargo hold, inspections required by the annual survey in the expanded inspection programme of chapter XI-1, regulation 2 shall be replaced by the corresponding inspections from the intermediate cargo hold survey.

2. Ships shall be fitted with water level alarms in all cargo holds and in cargo conveyor tunnels which give an audible and visual alarm on the bridge and which are approved by the Administration or by an organisation recognised by it in accordance with the provisions of chapter XI-1, regulation 1.

3. Ships must have detailed information on cargo hold water-filling scenarios. The information must contain detailed instructions on evacuation preparedness in accordance with the provisions of section 8 of the International Safety Management (ISM) Code and be used as a basis for training and drills with the crew.

Regulation 10 Information on the density of the cargo

1 Before a bulk carrier is loaded, the shipper shall indicate the density of the cargo in addition to providing the cargo information required by chapter VI, regulation 2.

2 On bulk carriers subject to regulation 6, the density of the cargo shall be confirmed by an approved testing institute[3)] if it is declared to be between 1250 kg/m^3 and 1780 kg/m^3 unless the ship meets all the relevant requirements of this chapter for the carriage of bulk cargoes with a density of 1780 kg/m^3 and above.

Regulation 11 Loading instruments

This regulation applies to bulk carriers regardless of when the ship was built.

1 Bulk carriers of 150 metres in length and above shall be fitted with a loading instrument capable of indicating the shear forces and bending moments of the hull girder, taking into account the recommendation adopted by the Organisation.[4)]

2 Bulk carriers of 150 metres in length and above built before 1 July 1999 shall comply with subsection 1 not later than the first intermediate or periodical survey after 1 July 1999.

3 Bulk carriers less than 150 metres in length built on or after 1 July 2006 shall be fitted with a loading instrument capable of calculating the intact stability of the ship. Stability calculation programmes must be approved by the Administration and must be able to calculate standard conditions that can be used in connection with the approved stability information.

Regulation 12 Water level alarms in cargo holds, ballast tanks and

voids This regulation applies to bulk carriers regardless of when the ship

was built. **1** Bulk carriers shall be fitted with water level alarms

1.1 in each cargo hold, which give audible and visual alarms; one alarm when the water level reaches a height of 0.5 metres measured from the bottom of the cargo hold, and a second alarm when the water level exceeds 15% of the depth of the cargo hold, or 2.0 metres if lower. On bulk carriers to which regulation 9.2 applies, only the latter alarm need be installed. The water level alarm must be placed at the stern of the cargo hold. In cargo holds used for water ballast, a device can be installed to override the alarm. The visible alarms must clearly distinguish the location of the alarms in each cargo hold;

1.2 in each ballast tank in front of the collision bulkhead required by chapter II-1/12, there shall be a device that gives an audible and visible alarm when the water in the tank reaches a level not exceeding 10% of the tank capacity. A device can be installed to suppress the alarm when the tank is in use; and

1.3 in all empty spaces in front of the forward cargo hold, except for chain boxes, which give an audible and visible alarm at a water level of 0.1 m above the bottom. It is not necessary to install alarms in enclosed spaces where the volume does not exceed 0.1% of the ship's maximum displacement.

2 The audible and visual alarms referred to in subsection 1 shall be placed on the bridge.

3 Bulk carriers built before 1 July 2004 shall comply with this regulation not later than the date of the first annual, intermediate or renewal survey to be carried out on the ship after 1 July 2004, whichever is the earlier.

Regulation 13 Access to pump systems[5)]

This regulation applies to bulk carriers regardless of when the ship was built.

1 In bulk carriers, the means for draining and pumping ballast tanks forward of the collision bulkhead and empty spaces forward of the forward cargo holds shall be capable of being started from an immediately accessible enclosed space situated so as to be accessible from the bridge or from the engine control room without

the need to pass exposed freeboard decks or superstructure decks. Where pipes to these tanks or spaces are routed through the collision bulkhead, as an alternative to the provision of chapter II-1/12, it is acceptable that valves may be remotely controlled by means of a device located in accordance with this regulation.

2 Bulk carriers built before 1 July 2004 shall comply with the requirements of this regulation not later than the date of the first intermediate or renewal survey to be carried out on the ship after 1 July 2004, but not later than 1 July 2007.

Regulation 14 Restrictions when sailing with empty cargo holds

Bulk carriers of 150 metres in length and above, of single skin construction carrying bulk cargoes of a density of 1780 kg/m^3 and above, shall not operate with any cargo hold loaded with less than 10% of the maximum permissible load of that space when the ship has reached the age of 10 years unless they comply with the provisions of regulation 5.1 and in the "Standards and criteria for side structures of bulk carriers of single-side skin construction" adopted by the Organisation by resolution MSC. 168(79), which may be amended by the Organisation when such amendments have been adopted and entered into force in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to chapters other than chapter I.

[1] Chap. XII. For ships built before 2006, refer to resolution 6, "Interpretation of the definition of bulk carrier, as given in chapter IX of SOLAS 1974, as amended in 1994", adopted at the 1997 SOLAS conference. Refer to "Interpretation of the provisions of SOLAS chapter XII on additional security measures for bulk carriers", adopted by the MSC by resolution MSC. 79(70). Finally, refer to "The application provisions of Annex 1 to the Interpretation of the provisions of SOLAS chapter XII on additional security measures for bulk carriers", adopted by MSC resolution MSC. 89(71).

[2] Chap. XII. Refer to resolution 3 "Recommendation on compliance with SOLAS regulation XII/5" adopted at the SOLAS Conference, 1997.

[3] Chap. XII. For verification of the density of bulk cargoes, refer to MSC/Circ. 908, "Uniform method of measurement of the density of bulk cargoes".

[4] Chap. XII. Refer to resolution 5 "Recommendation on loading instruments", adopted at the 1997 SOLAS Conference.

[5] Chap. XII. Refer to "Interpretation of SOLAS regulation XII/13" (MSC/Circ. 1069).

Annex 16

Chapter XIII - Verification of compliance

Regulation 1	Definitions
Regulation 2	Application
Regulation 3	Verification of compliance

Regulation 1 Definitions

1 "Audit" refers to a systematic, independent, and documented process that involves obtaining evidence through audits and evaluating it objectively to determine the extent to which the audit criteria have been met.

2 "Audit Scheme" means the IMO Member State Audit Scheme as established by the Organisation and taking into account the guidelines developed by the Organisation.[1)]

3 "Implementation Code" means the IMO Instruments Implementation Code (III Code) as adopted by the Organisation by resolution A. 1070(28).

4 "Audit standard" means the implementation code.

Regulation 2 Application

Charter parties shall apply the provisions of the Implementation Code when performing their obligations and assuming their responsibilities under the SOLAS Convention.

Regulation 3 Verification of compliance

1 Each charter party shall be subject to periodic audits by the Organisation in accordance with the Audit Standard to verify compliance with and implementation of the SOLAS Convention.

2 The Secretary General of the Organisation shall be responsible for the administration of the audit scheme on the basis of the guidelines established by the Organisation.[2)]

3 Each charter party shall be responsible for facilitating the conduct of the audit and the implementation of an action programme to address observations based on the guidelines developed by the Organisation.[3)]

4 Audits of all charter parties shall:

4.1 be based on an overall timetable prepared by the Secretary General of the Organisation, taking into account the guidelines prepared by the Organisation;[4)] and

4.2 carried out at periodic intervals taking into account the guidelines established by the Organisation.[5)]

[1] Chap. XIII. Refer to the Framework and Procedures for the IMO Member State Audit Scheme as adopted by the Organisation by resolution A. 1067(28).

[2] Chap. XIII. Refer to the Framework and Procedures for the IMO Member State Audit Scheme as adopted by the Organisation by resolution A. 1067(28).

[3] Chap. XIII. Refer to the Framework and Procedures for the IMO Member State Audit Scheme as adopted by the Organisation by resolution A. 1067(28).

[4] Chap. XIII. Refer to the Framework and Procedures for the IMO Member State Audit Scheme as adopted by the Organisation by resolution A. 1067(28).

[5] Chap. XIII. Refer to the Framework and Procedures for the IMO Member State Audit Scheme as adopted by the Organisation by resolution A. 1067(28).

Annex 17

Chapter XIV - Secuirty measures for ships in polar waters

Regulation 1	Definitions
Regulation 2	Application
Regulation 3	Requirements for ships covered by this chapter
Regulation 4	Alternative design and alternative arrangements

Regulation 1 Definitions

For the purposes of this chapter, the following definitions apply:

1 "Polar Code" means the International Code for Ships in Polar Waters, consisting of an Introduction and Parts I-A and II-A and Parts I-B and II-B, as adopted by resolution MSC. 385(94) and the IMO's Environment Committee (MEPC),[1)] as amended, provided that:

1.1 amendments to the security-related provisions of the Introduction and part I-A of the Polar Code have been adopted, entered into force and given effect in accordance with the provisions of article VIII of the SOLAS Convention concerning the amendment procedures applicable to annexes other than chapter I; and

1.2 Amendments to Part I-B of the Polar Code shall be adopted by the IMO Maritime Safety Committee (MSC) in accordance with its rules of procedure.

2 "Antarctica" is the ocean area south of 60° south latitude.

3 "Arctic waters" are waters located north of a line from latitude 58°00’. 0 N and longitude 042°00’. 0 W to latitude 64°37’. 0 N, longitude 035°27’. 0 W and thence by compass line to latitude 67°03’. 9 N, longitude 026°33’. 4 W and thence by compass line to latitude 70°49’. 56 N and longitude 008°59’. 61 W (Sørkapp, Jan Mayen) and via the southern coast of Jan Mayen to 73°31’. 6 N and 019°01’. 0 E at Bjørnøya, and from there via a great circle line to latitude 68°38’. 29 N and longitude 043°23’08 E (Cap Kanin Nos) and thence via the northern coast of the Asian continent eastwards to the Bering Strait and thence from the Bering Strait westwards to latitude 60° N as far as Il’pyrskiy and along the 60. North latitude eastwards as far as and including the Strait of Etolin and thence through the northern coast of the North American continent as far south as latitude 60° N and thence eastwards along latitude 60° N to longitude 056°37’. 1 W and thence to latitude 58°00’. 0 N, longitude 042°00’. 0 W.

4 "Polar waters" are Arctic waters and/or the Antarctic region.

5 "Ship built" means a ship whose keel is laid or which is at a similar stage of construction.

6 "Equivalent construction stage" means the stage where:

6.1 a construction project that can be identified with a specific ship is started, and

6.2 assembly of this ship has commenced, comprising at least 50 tonnes or 1% of the estimated total hull weight, whichever is less.

Regulation 2 Application

1 This chapter applies to passenger ships of all sizes and cargo ships of 500 gross tonnage and upwards engaged in international trade when operating in polar waters.

2 Ships built before 1 January 2017 must comply with the relevant requirements of the Polar Code at the next intermediate or renewal survey after 1 January 2018, whichever comes first.

3 When applying part I-A of the Polar Code, the additional guidance contained in part I-B of the Polar Code should be taken into account.

4 This chapter does not apply to ships owned or operated by a Contracting Government and currently used only on official and non-commercial service. However, ships owned or operated by a Contracting Government and currently engaged only on official and non-commercial service are encouraged to act in a manner consistent, so far as is reasonable and practicable, with this chapter.

5 Nothing in this chapter shall prejudice the rights or obligations of States under international law.

Regulation 3 Requirements for ships covered by this chapter

1 Ships covered by this chapter shall fulfil the security-related requirements of the Preamble and part I-A of the Polar Code and, in addition to the requirements of regulations I/7, I/8, I/9 and I/10 of the Code, shall be surveyed and certified as specified in the Code.

2 Ships to which this chapter applies and to which a certificate has been issued under the provisions of subsection 1 shall be subject to the inspections laid down in regulations I/19 and XI-1/4. For this purpose, such certificates shall be treated as certificates issued under regulation I/12 or I/13.

Regulation 4 Alternative design and alternative arrangements

1 The purpose of this regulation is to provide a methodology for alternative design and arrangements for structural, machinery and electrical installations, fire safety and life-saving appliances and arrangements.

2 Structural arrangements, machinery and electrical installations, fire safety design and arrangement, and life-saving appliances and rescue arrangements may deviate from the prescriptive requirements of chapters 3, 6, 7 and 8 of the Polar Code, provided that the alternative design and arrangements fulfil the intent of the relevant objectives and functional requirements and provide a level of safety equivalent to that intended in those chapters.

3 When the alternative designs or arrangements deviate from the prescriptive requirements of chapters 3, 6, 7 and 8 of the Polar Code, a technical analysis, evaluation and approval of the design and arrangements shall be carried out based on the guidelines approved by the Organisation[2)].

4 Any alternative designs and arrangements that deviate from the prescriptive requirements shall be specified in the Polar Certificate and the ship's Polar Water Operational Manual as required by the Polar Code, also defining the technical and operational precautions and conditions for the authorised deviation.

[1] Chap. XIV. Refer to MEPC 264(68) by which the IMO's Environment Committee (MEPC) adopted the International Code for Ships in Polar Waters.

[2] Chap. XIV. Refer to "Guidelines for the approval of alternatives and equivalents as provided for in various IMO instruments" (MSC. 1/Circ. 1455), "Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III" (MSC. 1/Circ. 1212) and "Guidelines on alternative design and arrangements for fire safety" (MSC/Circ. 1002), as appropriate.

Annex 18

Chapter XV - Security measures for ships carrying industrial personnel

Regulation 1	*Definitions*
Regulation 2	*General*
Regulation 3	*Application*
Regulation 4	*Application of other chapters*
Regulation 5	*Requirements*

Regulation 1 *Definitions*

In this part:

1 *Industrial personnel (IP)*: all persons transported or accommodated on board for offshore industrial activities carried out on board other vessels and/or offshore installations.

2 *IP Code*: The International Code for the Safety of Ships Carrying Industrial Personnel, as adopted by the Maritime Safety Committee by resolution MSC. 527(106), as may be amended, provided that such amendments are adopted, enter into force and take effect in accordance with the provisions of article VIII of this Convention concerning amendment procedures for annexes other than chapter I.

3 *Offshore industrial activities* mean the construction, maintenance, decommissioning, operation or servicing of offshore facilities in connection with, but not limited to, the exploration and exploitation of resources in the renewable or hydrocarbon energy sector, aquaculture, marine mining or similar activities.

4 *HSC Code*: The International Code for Safety of High-Speed Craft, 2000, adopted by the Maritime Safety Committee by resolution MSC. 97(73), as may be amended, provided that such amendments are adopted, enter into force and take effect in accordance with the provisions of article VIII of this Convention concerning amendment procedures for annexes other than chapter I.

Regulation 2 *General*

1 Where the IP Code refers to requirements for passenger ships, the corresponding requirements for cargo ships must be met.

2 For the purposes of this chapter, industrial personnel are not considered passengers.

3 When the number of industrial personnel is specified as a parameter in this chapter or in the IP code, it shall be the total number of industrial personnel, specialised personnel[1] and passengers on board, with the number of passengers not exceeding 12.

4 Regardless of the provisions of regulation 2.1 above, for high-speed craft to which chapter X applies, a ship certified in accordance with the requirements of this chapter and the IP Code, and

Regardless of the provisions of chapters 2-12 and 18 of the HSC Code, shall be deemed to have complied with the requirements of chapters 2-12 and 18 of the HSC Code.

Regulation 3 Application

1 Unless expressly provided otherwise, this chapter shall apply to cargo ships and high-speed cargo ships of 500 gross tonnage and upwards, constructed on or after 1 July 2024, carrying industrial personnel of more than 12 persons.

2 Cargo ships constructed before 1 July 2024, which are approved by the Administration to carry industrial personnel in excess of 12 persons in accordance with the recommendations developed by the Organisation, shall comply with regulations III/1, III/2 (except subsection 2.1.7), IV/7 and IV/8 of the IP Code at the first intermediate or renewal survey, whichever is earlier, after 1 July 2024.

3 High-speed cargo ships constructed before 1 July 2024 and approved by the Administration to carry more than 12 persons as industrial personnel in accordance with the recommendations developed by the Organisation[1]) shall comply with regulations III/1, III/2 (except subsection 2.1.7), V/7 and V/8 of the IP Code at the third periodical survey or first renewal survey, whichever is earlier, after 1 July 2024.

4 Cargo ships and high-speed cargo ships, irrespective of the date of construction, which, before 1 July 2024, have not been authorised by the Administration to carry industrial personnel in excess of 12 persons on the basis of the recommendations developed by the Organisation[2)], shall comply and be certified in accordance with this chapter and the IP Code before carrying industrial personnel in excess of 12 persons on board.

5 In this chapter, the term "*constructed"* refers to the description given in the regulations:

. 1 II-2/1.1.1.2.1 as supplemented by regulation II-2/1.1.3 for cargo ships; and
. 2 X/1.4, supplemented by regulation X/1.5 for high-speed cargo vessels.

Regulation 4 ***Application of other chapters***

1 The regulations for cargo ships in the other chapters of this Convention apply to the ships described in regulation 3.1 above, except as amended by this chapter.

2 Regardless of the provisions of regulation 4.1 above, high-speed craft to which the HSC Code applies shall, unless modified by this chapter, be subject to the regulations for cargo ships of this Code.

Regulation 5 ***Requirements***

1 Ships and high-speed craft to which this chapter applies shall:

. 1 be certified as a cargo ship or high-speed cargo craft under either chapter I or chapter VIII or chapter X, as appropriate;
. 2 fulfil the requirements of the IP code and

. 3 in addition to the requirements of regulations I/8, I/9 and I/10 or sections 1.5 to 1.9 of the HSC Code, as applicable, shall be surveyed and certified as specified in the IP Code.

2 Ships and high-speed craft to which this chapter applies and which carry a certificate issued in accordance with the provisions of regulation 5.1 above shall be subject to the control prescribed in regulations I/19 or XI-1/4 and in 1.10 of the HSC Code, as applicable. For this purpose, such certificates shall be treated as a certificate issued under regulation I/12 or I/13.

[1] Refer to the Code of Safety for Special Purpose Ships, 2008.
[2] Refer to the *Interim recommendations on the safe carriage of more than 12 industrial personnel on board vessels engaged on international voyages* (resolution MSC. 418(97)).