No. S 57

MERCHANT SHIPPING ORDER, 2002
(S 27/02)

MERCHANT SHIPPING (SAFETY CONVENTION) REGULATIONS, 2003

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MERCHANT SHIPPING ORDER, 2002
(S 27/02)

MERCHANT SHIPPING (SAFETY CONVENTION) REGULATIONS, 2003

In exercise of the power conferred by section 109 of the Merchant Shipping Order, 2002, the Minister of Communications, with the approval of His Majesty the Sultan and Yang Di-Pertuan, hereby makes the following Regulations —

CHAPTER I

GENERAL PROVISIONS

PART A

PRELIMINARY

Citation.

1. These Regulations may be cited as the Merchant Shipping (Safety Convention) Regulations, 2003.

Application.

2. (1) Unless expressly provided otherwise, these Regulations shall apply only to ships engaged on international voyages.

(2) The classes of ships to which each Chapter applies are more precisely defined, and the extent of the application is shown, in each Chapter.

Interpretation.

3. In these Regulations, unless the context otherwise requires —

"age of ship" means the elapsed period of time determined from the year of build as indicated on the ship's registry papers;

"anniversary date" means the day and the month of each year which will correspond to the date of expiry of the relevant certificate;

"approved" means approved by the Director;

"authorised organisation" means an organisation authorised by the Minister in accordance with the regulations made under section 125;

"Contracting State" means the government of a country which is a party to the Convention;

"Convention" means the International Convention for the Safety of Life at Sea, 1974 and any amendment made thereto which has come into force and has been accepted by the Government;

"country" includes a territory;

"fishing vessel" means a vessel used for catching fish, whales, seals, walrus or other living resources of the sea;

"inflammable" has the same meaning as flammable;

"international voyage" means a voyage from Brunei Darussalam to a port or place outside Brunei Darussalam, or conversely, or a voyage between ports or places outside Brunei Darussalam;

"mile" means 1,852 metres;

"nuclear ship" means a ship provided with a nuclear power plant;

"Organisation" means the International Maritime Organisation;

"passenger" means every person other than —

(a) the master and the members of the crew or other persons employed or engaged in any capacity on board a ship on the business of that ship; and

(b) a child under one year of age;

"tanker" means a cargo ship constructed or adapted for the carriage in bulk of liquid cargoes of an inflammable nature.

Exceptions.

4. (1) These Regulations, unless expressly provided otherwise, do not apply to —

(a) ships of war and troopships;

(b) cargo ships of less than 500 tons;

(c) ships not propelled by mechanical means;

(d) wooden ships of primitive build;

(e) pleasure yachts not engaged in trade; and

(f) fishing vessels.

(2) Except as expressly provided in Chapter V, nothing herein shall apply to ships solely navigating the Great Lakes of North America and the River St. Lawrence as far east as a straight line drawn from Cap des Rosiers to West Point, Anticosti Island and, on the north side of Anticosti Island, the 63rd Meridian.

Exemptions.

5. (1) A ship which is not normally engaged on international voyages but which, in exceptional circumstances, is required to undertake a single international voyage may be exempted by the Director from any of the requirements of these Regulations, provided that it complies with safety requirements which are adequate in the opinion of the Director for the voyage which is to be undertaken by the ship.

(2) The Director may exempt any ship which embodies features of a novel kind from any of the provisions of Chapters II-1, II-2, III and IV, the application of which might seriously impede research into the development of such features and their incorporation in ships engaged on international voyages. Any such ship shall, however, comply with safety requirements which, in the opinion of the Director, are adequate for the service for which it is intended and are such as to ensure the overall safety of the ship.

(3) For the purpose of sub-regulation (2), the requirements of the following Codes, wherever applicable, shall be complied with to the satisfaction of the Director —

(a) dynamically supported craft with the Code of Safety for Dynamically Supported Craft adopted by the Organisation by resolution A.373(X) as amended from time to time;

(b) special purpose ships of not less than 500 tons carrying more than 12 special personnel with the Code of Safety for Special Purpose Ships adopted by the Organisation by resolution A.534(XIII) as amended from time to time; and

(c) mobile offshore drilling units with the Code for Mobile Offshore Drilling Units adopted by the Organisation by resolution A.649(16), as amended from time to time.

Equivalents.

6. Where these Regulations require that a particular fitting, material, appliance or apparatus, or type thereof, shall be fitted or carried in a ship, or that any particular provision shall be made, the Director may allow any other fitting, material, appliance or apparatus, or type thereof, to be fitted or carried, or any other provision to be made in that ship, if he is satisfied by trial thereof or otherwise that such fitting, material, appliance or apparatus, or type thereof, or provision, is at least as effective as that required by these Regulations.

PART B

SURVEYS AND CERTIFICATES

Inspection and survey.

7. (1) The inspection and survey of ships so far as regards the enforcement of these Regulations and the granting of exemptions therefrom, shall be carried out by surveyors of ships or authorised organisations, except that the granting of exemptions shall be with the approval of the Director.

(2) The surveyor of ships and authorised organisations may —

(a) require repairs to a ship; and

(b) carry out inspections and surveys if requested by the appropriate authorities of a Port State.

(3) When a surveyor of ships or authorised organisation determines that the condition of the ship or its equipment does not correspond substantially with the particulars of the certificate or is such that the ship is not fit to proceed to sea without danger to the ship, or persons on board, such surveyor or organisation shall immediately ensure that corrective action is taken.

(4) If such corrective action is not taken within the reasonable period specified by the surveyor of ships or authorised organisation, the validity of the relevant certificate is liable to be suspended by the surveyor of ships or authorised organisation until such time the corrective action has been taken to the satisfaction of the surveyor of ships or authorised organisation.

(5) The Director and the owner or master shall be notified immediately of any suspension or revalidation of a certificate; and, if the ship is in a foreign port, the appropriate authorities of the Port State shall also be notified immediately.

(6) When the validity of a certificate is to be suspended, the master or owner of the ship shall, on demand, deliver up the certificate to the surveyor of ships or authorised organisation.

(7) The owner of every ship in relation to which these Regulations apply shall apply for the surveys required under regulations 8, 9, 10 and 11 to be carried out by a surveyor of ships or an authorised organisation. Every such application may be made on behalf of the owner. Any application for survey shall be accompanied by such information relating to the ship as the surveyor of ships or authorised organisation may require for the purpose of the survey.

Surveys of passenger ships.

8. (1) A passenger ship shall be subjected to the following surveys —

(a) a survey before the ship is put in service;

(b) a renewal survey once every 12 months, except where sub-regulations (2), (5), (6) and (7) of regulation 15 is applicable; and

(c) additional surveys, as the occasion arises.

(2) The surveys referred to in sub-regulation (1) shall be carried out as follows —

(a) the initial survey shall include a complete inspection of the ship's structure, machinery and equipment, including the outside of the ship's bottom and the inside and outside of the boilers. This survey shall be such as to ensure that the arrangements, material, and scantlings of the structure, boilers and other pressure vessels and their appurtenances, main and auxiliary machinery, electrical installation, radio installations including those used in life-saving appliances, fire protection, fire safety systems and appliances, life-saving appliances and arrangements, shipborne navigational equipment, nautical publications, means of embarkation for pilots and other equipment, fully comply with the requirements of these Regulations, for ships of the service for which it is intended. The survey shall be such as to ensure that the workmanship of all parts of the ship and its equipment is in all respects satisfactory, and that the ship is provided with the lights, shapes, means of making sound signals and distress signals as required by these Regulations and of the collision regulations in force;

(b) the renewal survey shall include an inspection of the structure, boilers and other pressure vessels, machinery and equipment, including the outside of the ship's bottom. The survey shall be such as to ensure that the ship, as regards the structure, boilers and other pressure vessels and their appurtenances, main and auxiliary machinery, electrical installation, radio

installations including those used in life-saving appliances, fire protection, fire safety systems and appliances, life-saving appliances and arrangements, shipborne navigational equipment, nautical publications, means of embarkation for pilots and other equipment, is in satisfactory condition and fit for the service for which it is intended, and that it complies with the requirements of these Regulations. The lights, shapes and means of making sound signals and the distress signals carried by the ship shall also be subject to the survey for the purpose of ensuring that they comply with the requirements of these Regulations and of the collision regulations in force;

(c) an additional survey, either general or partial according to the circumstances, shall be made after a repair resulting from investigations prescribed in regulation 12, or whenever any important repairs or renewals are made. The survey shall be such as to ensure that the necessary repairs or renewals have been effectively made, that the material and workmanship of such repairs or renewals are in all respects satisfactory, and that the ship complies in all respects with these Regulations and of the collision regulations in force and such that the ship is fit for the service for which it is intended.

(3) For the purpose of sub-regulation (2), the rules for the construction and survey of a ship shall be the rules of the authorised organisation under which the ship is classed, in so far as such rules are not in conflict with the requirements of these Regulations or any rule or directive made by the Director.

Surveys of life-saving appliances and other equipment of cargo ships.

9. (1) The life-saving appliances and other equipment of cargo ships of 500 tons and upwards as referred to in paragraph *(a)* of sub-regulation (2) shall be subject to the following surveys —

(a) an initial survey before the ship is put in service;

(b) a renewal survey at intervals of 5 years, except where sub-regulations (2), (5), (6) and (7) of regulation 15 is applicable;

(c) a periodical survey within 3 months before or after the second anniversary date or within 3 months before or after the third anniversary date of the Cargo Ship Safety Equipment Certificate which shall take the place of one of the annual surveys specified in paragraph *(d)*;

(d) an annual survey within 3 months before or after each anniversary date of the Cargo Ship Safety Equipment Certificate;

(e) an additional survey as prescribed for passenger ships in paragraph *(c)* of sub-regulation (2) of regulation 8.

(2) The surveys referred to in sub-regulation (1) shall be carried out as follows —

(a) the initial survey shall include a complete inspection of the fire safety systems and appliances, life-saving appliances and arrangements except radio installations, the shipborne navigational equipment, means of embarking for pilots and other equipment to which Chapters II-1, II-2 and V apply to ensure that they comply with the requirements of these Regulations, are in satisfactory condition and are fit for the service for which the ship is intended. The fire control plans, nautical publications, lights, shapes, means of making sound signals and distress signals shall also be subject to the survey for the purpose of ensuring that they comply with the requirements of these Regulations and, where applicable, the collision regulations in force;

(b) the renewal and periodical surveys shall include an inspection of the equipment referred to in paragraph *(a)* to ensure that it complies with the relevant requirements of these Regulations and the collision regulations in force, is in satisfactory condition and is fit for the service for which the ship is intended;

(c) the annual survey shall include a general inspection of the equipment referred to in paragraph *(a)* to ensure that it has been maintained in accordance with paragraph *(a)* of regulation 12 and that it remains satisfactory for the service for which the ship is intended.

(3) The periodical and annual surveys referred to in paragraphs *(c)* and *(d)* of sub-regulation (1) shall be endorsed on the Cargo Ship Safety Equipment Certificate.

Surveys of radio installations of cargo ships.

10. (1) The radio installations, including those used in life-saving appliances, of cargo ships to which Chapters III and IV apply shall be subject to the following surveys —

(a) an initial survey before the ship is put in service;

(b) a renewal survey at intervals of 5 years, except where sub-regulations (2), (5), (6) and (7) of regulation 15 is applicable;

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

(d) an additional survey as prescribed for passenger ships in paragraph *(c)* of sub-regulation (2) of regulation 8.

(2) The surveys referred to in sub-regulation (1) shall be carried out as follows —

(a) the initial survey shall include a complete inspection of the radio installations of cargo ships, including those used in life-saving appliances, to ensure that they comply with the requirements of these Regulations;

(b) the renewal and periodical surveys shall include an inspection of the radio installations of cargo ships, including those used in life-saving appliances, to ensure that they comply with the requirements of these Regulations.

(3) The periodical surveys referred to in paragraph *(c)* of sub-regulation (1) shall be endorsed on the Cargo Ship Safety Radio Certificate.

Surveys of structure, machinery and equipment of cargo ships.

11. (1) The structure, machinery and equipment (other than items in respect of which Cargo Ship Safety Equipment Certificates and Cargo Ship Safety Radio Certificates are issued) of a cargo ship as referred to in paragraph *(a)* of sub-regulation (2) shall be subject to the following surveys and inspections —

(a) an initial survey including an inspection of the outside of the ship's bottom before the ship is put in service;

(b) a renewal survey at intervals of 5 years, except where sub-regulations (2), (5), (6) and (7) of regulation 15 is applicable;

(c) an intermediate survey within 3 months before or after the second anniversary date or within 3 months before or after the third anniversary date of the Cargo Ship Safety Construction Certificate, which shall take the place of one of the annual surveys specified in paragraph *(d)*;

(d) an annual survey within 3 months before or after each anniversary date of the Cargo Ship Safety Construction Certificate;

(e) a minimum of 2 inspections of the outside of the ship's bottom during any 5-year period, except where sub-regulation (5) or (6) of regulation 15 is applicable. Where sub-regulation (5) or (6) of regulation 15 is applicable, this 5-year period may be extended to coincide with the extended period of validity of the certificate. In all cases, the interval between any 2 such inspections shall not exceed 36 months;

(f) an additional survey as prescribed for passenger ships in paragraph *(c)* of sub-regulation (2) of regulation 8.

(2) The surveys and inspections referred to in sub-regulation (1) shall be carried out as follows —

(a) the initial survey shall include a complete inspection of the structure, machinery and equipment. This survey shall be such as to ensure that the arrangements, material, scantlings and workmanship of the structure, boilers and other pressure vessels, their appurtenances, main and auxiliary machinery including steering gear and associated control systems, electrical installation and other equipment comply with the requirements of these Regulations, are in satisfactory condition and are fit for the service for which the ship is intended and that the required stability information is provided. In the case of tankers, such a survey shall also include an inspection of the pump rooms, cargo, bunker and ventilation piping systems and associated safety devices;

(b) the renewal survey shall include an inspection of the structure, machinery and equipment as referred to in paragraph *(a)* to ensure that they comply with the requirements of these Regulations, are in satisfactory condition and are fit for the service for which the ship is intended;

(c) the intermediate survey shall include an inspection of the structure, boilers and other pressure vessels, machinery and equipment, the steering gear and the associated control systems and the electrical installations to ensure that they remain satisfactory for the service for which the ship is intended. In case of tankers, the survey shall also include an inspection of the pump rooms, cargo, bunker and ventilation piping systems and associated safety devices and the testing of insulation resistance of electrical installations in dangerous zones;

(d) the annual survey shall include a general inspection of the structure, machinery and equipment referred to in paragraph *(a)*, to ensure that they have been maintained in accordance with paragraph *(a)* of regulation 12 and that they remain satisfactory for the service for which the ship is intended;

(e) the inspection of the outside of the ship's bottom and the survey of related items inspected at the same time shall be such as to ensure that they remain satisfactory for the service for which the ship is intended.

(3) The intermediate and annual surveys and the inspections of the outside of the ship's bottom referred to in paragraphs *(c)*, *(d)* and *(e)* of sub-regulation (1) shall be endorsed on the Cargo Ship Safety Construction Certificate.

Maintenance of conditions after survey.

12. The owner or master of every ship in relation to which these Regulations apply shall ensure that —

(a) the condition of the ship and its equipment is maintained to conform with these Regulations to ensure that the ship in all respects will remain fit to proceed to sea without danger to the ship or persons on board;

(b) after any survey of the ship under regulation 8, 9, 10 or 11 has been completed, no change shall be made in the structural arrangements, machinery, equipment and other items covered by the survey, without the sanction of the Director; and

(c) whenever an accident occurs to a ship or a defect is discovered, either of which affects the safety of the ship or the efficiency or completeness of its life-saving appliances or other equipment, a request is made immediately to the Director and the authorised organisation responsible for issuing the relevant certificate for a survey as may be required by regulation 8, 9, 10 or 11, to be carried out as soon as practicable. The authorised organisation shall thereafter submit the survey report to the Director. If the ship is in a port of a Contracting State, the master or owner shall also report immediately to the appropriate authorities of that State and the authorised organisation shall ascertain that such a report has been made. If the ship is in Brunei Darussalam, the master or owner shall also report immediately to the Director.

Issue or endorsement of certificates.

13. (1) A Passenger Ship Safety Certificate shall be issued after an initial or renewal survey to a passenger ship which complies with the relevant requirements of Chapters II-1, II-2, III, IV and V and any other relevant requirements of these Regulations.

(2) A Cargo Ship Safety Construction Certificate shall be issued after an initial 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 and appliances and fire control plans) and any other relevant requirements of these Regulations.

(3) A Cargo Ship Safety Equipment Certificate shall be issued after an initial or renewal survey to a cargo ship which complies with the relevant requirements of Chapters II-1, II-2, III and IV and any other relevant requirements of these Regulations.

(4) A Cargo Ship Safety Radio Certificate shall be issued after an initial or renewal survey to a cargo ship which complies with the requirements of Chapter IV and any other relevant requirements of these Regulations.

(5) The Passenger Ship Safety Certificate, the Cargo Ship Safety Equipment Certificate and the Cargo Ship Safety Radio Certificate, referred to in sub-regulations (1), (3) and (4), shall be supplemented by a Record of Equipment in the forms set out in the Second Schedule.

(6) When an exemption is granted to a ship under and in accordance with these Regulations, a certificate referred to as an Exemption Certificate shall be issued in addition to the certificates prescribed in this regulation.

(7) The certificates referred to in this regulation shall be issued or endorsed either by the Director or an authorised organisation.

(8) Notwithstanding any other provisions of the present Convention, any certificate which is issued under, and in accordance with, the provisions of the Convention and which is current on the date of commencement of these Regulations shall remain valid until it expires.

Issue or endorsement of certificate by another Government.

14. The Director may, at the request of a Contracting State, cause a foreign ship in Brunei Darussalam to be surveyed and, if satisfied that the requirements of these Regulations are complied with, shall 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 contain a statement to the effect that it has been issued at the request of the Government of the State the flag of which the ship is entitled to fly, and it shall have the same force and receive the same recognition as a certificate issued under regulation 13.

Duration and validity of certificates.

15. (1) A Passenger Ship Safety Certificate shall be issued for a period not exceeding 12 months. A Cargo Ship Safety Construction Certificate, Cargo Ship Safety Equipment Certificate and Cargo Ship Safety Radio Certificate shall be issued for a period not exceeding 5 years. An Exemption Certificate shall not be valid for longer than the period of the certificate to which it refers.

(2) *(a)* Notwithstanding the requirements of sub-regulation (1), when the renewal survey is completed within 3 months before the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to —

(i) for a passenger ship, a date not exceeding 12 months from the date of expiry of the existing certificate;

(ii) for a cargo ship, a date not exceeding 5 years from the date of expiry of the existing certificate.

(b) When the renewal survey is completed after the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to —

(i) for a passenger ship, a date not exceeding 12 months from the date of expiry of the existing certificate;

(ii) for a cargo ship, a date not exceeding 5 years from the date of expiry of the existing certificate.

(c) When the renewal survey is completed more than 3 months before the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to —

(i) for a passenger ship, a date not exceeding 12 months from the date of completion of the renewal survey;

(ii) for a cargo ship, a date not exceeding 5 years from the date of completion of the renewal survey.

(3) If a certificate other than a Passenger Ship Safety Certificate is issued for a period of less than 5 years, the Director, or authorised organisation with the approval of the Director, may extend the validity of the certificate beyond the expiry date to the maximum period specified in sub-regulation (1), provided that the surveys referred to in regulations 9, 10 and 11 applicable when a certificate is issued for a period of 5 years are carried out as appropriate.

(4) If a renewal survey has been completed and a new certificate cannot be issued or placed on board the ship before the expiry date of the existing certificate, the surveyors of ships or authorised organisation may endorse the existing certificate and such a certificate shall be accepted as valid for a further period which shall not exceed 5 months from the expiry date.

(5) If a ship at a time when a certificate expires is not in a port in which it is to be surveyed, the Director, or authorised organisation with the approval of the Director, may extend the period of validity of the certificate but this extension shall be granted only for the purpose of allowing the ship to complete its voyage to the port in which it is to be surveyed, and then only in cases where it appears proper and reasonable to do so. No certificate shall be extended for a period longer than 3 months, and a ship to which an extension is granted shall not, on its arrival in the port in which it is to be surveyed, be entitled by virtue of such

extension to leave that port without having a new certificate. When the renewal survey is completed, the new certificate shall be valid to —

(a) for a passenger ship, a date not exceeding 12 months from the date of expiry of the existing certificate before the extension was granted;

(b) for a cargo ship, a date not exceeding 5 years from the date of expiry of the existing certificate before the extension was granted.

(6) A certificate issued to a ship engaged on short voyages which has not been extended under this regulation may be extended by the Director, or authorised organisation with the approval of the Director, for a period of grace of up to one month from the date of expiry stated on it. When the renewal survey is completed, the new certificate shall be valid to —

(a) for a passenger ship, a date not exceeding 12 months from the date of expiry of the existing certificate before the extension was granted;

(b) for a cargo ship, a date not exceeding 5 years from the date of expiry of the existing certificate before the extension was granted.

(7) In special circumstances, as determined by the Director, or authorised organisation with the approval of the Director, a new certificate need not be dated from the date of expiry of the existing certificate, as required by paragraph *(b)* of sub-regulation (2), sub-regulation (5) or (6). In this special circumstances, the new certificate shall be valid to —

(a) for a passenger ship, a date not exceeding 12 months from the date of completion of the renewal survey;

(b) for a cargo ship, a date not exceeding 5 years from the date of completion of the renewal survey.

(8) If an annual, intermediate or periodical survey is completed before the period specified in the relevant regulations, then —

(a) the anniversary date shown on the relevant certificate shall be amended by endorsement to a date which shall not be more than 3 months later than the date on which the survey was completed;

(b) the subsequent annual, intermediate and periodical survey required by the relevant regulations shall be completed at the intervals prescribed by these Regulations using the new anniversary date;

(c) the expiry date may remain unchanged, provided one or more annual, intermediate or periodical surveys, as appropriate, are carried out

so that the maximum intervals between the surveys prescribed by the relevant regulations are not exceeded.

(9) A certificate issued under regulation 13 or 14 shall cease to be valid in any of the following cases —

(a) if the relevant surveys and inspections are not completed within the periods specified under sub-regulation (1) of regulations 8, 9, 10 and 11;

(b) if the certificates are not endorsed in accordance with these Regulations;

(c) upon transfer of the ship to the flag of another country.

Form of certificates and records of equipment.

16. The certificates and records of equipment shall be in the forms set out in the First and Second Schedules respectively.

Availability of certificates.

17. The certificates issued under regulations 13 and 14 shall be readily available on board for examination at all times.

Acceptance of certificates.

18. Certificates and records of equipment issued in accordance with the Convention under the authority of a country to which the Convention applies shall be accepted by the Director for the purposes of these Regulations.

Qualification of certificates.

19. (1) If in the course of a particular voyage a ship has on board a number of persons less than the total number stated in the Passenger Ship Safety Certificate and is in consequence, in accordance with these Regulations, free to carry a smaller number of lifeboats and other life-saving appliances than that stated in the Certificate, an annex may be issued by the Director.

(2) This annex shall state that in the circumstances there is no infringement of these Regulations. It shall be annexed to the Certificate and shall be substituted for it in so far as the life-saving appliances are concerned. It shall be valid only for the particular voyage for which it is issued.

Control.*

20. (1) Every ship when in a port of another Contracting State is subject to control by officers duly authorised by such State in so far as this control is directed towards verifying that the certificates issued under regulation 13 or 14 are valid.

(2) Such certificates, if valid, shall be accepted unless there are clear grounds for believing that the condition of the ship or of its equipment does not correspond substantially with the particulars of any of the certificates or that the ship and its equipment are not in compliance with paragraphs *(a)* and *(b)* of regulation 12.

(3) In the circumstances specified in sub-regulation (2) or where a certificate has expired or ceased to be valid, the officer carrying out the control shall take steps to ensure that the ship shall not sail until it can proceed to sea or leave the port for the purpose of proceeding to the appropriate repair yard without danger to the ship or persons on board.

(4) In the event of this control giving rise to an intervention of any kind, the officer carrying out the control shall forthwith inform, in writing, the Consul or, in his absence, the nearest diplomatic representative of the State whose flag the ship is entitled to fly of all the circumstances in which intervention was deemed necessary. In addition, the authorities responsible for the issue of the certificates shall also be notified.

(5) The Port State authority of the Contracting State concerned shall notify all relevant information about the ship to the authorities of the next port of call, in addition to parties mentioned in sub-regulation (1), if it is unable to take action as specified in sub-regulations (3) and (4) or if the ship has been allowed to proceed to the next port of call.

(6) When exercising control under this regulation, all possible efforts shall be made to avoid a ship being unduly detained or delayed. If a ship is thereby unduly detained or delayed, it shall be entitled to compensation for any loss or damage suffered.

Privileges.

21. The privileges of the Convention may not be claimed in favour of any ship unless it holds an appropriate valid certificate.

* Refer to the Procedures for Port State Control adopted by the Organisation by resolution A.787(19), as amended by resolution A.882(21).

PART C

CASUALTIES

Casualties.

22. The master and owner of a Brunei Darussalam ship shall, in the event of accident to the ship resulting in loss of life or in the ship materially damaged, stranded, abandoned or lost, immediately inform the Director.

PART D

PENALTY

Penalty.

23. (1) The owner and the master of a ship to which these Regulations apply shall —

(a) comply with these Regulations in respect of any matter that is governed thereby; and

(b) ensure that the ship and its equipment comply with these Regulations.

(2) Any owner or master who fails to comply with sub-regulation (1) shall be guilty of an offence and liable on conviction to a fine not exceeding $10,000 and the ship may be detained.

CHAPTER II – 1

CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

PART A

GENERAL

Application.

24. (1) Unless expressly provided otherwise, this Chapter shall apply to ships the keels of which are laid or which are at a similar stage of construction on or after 1st. July, 1986.

(2) For the purpose of this Chapter —

"all ships" means ships constructed before, on or after 1st. July, 1986.

"ships constructed" means ships the keels of which are laid or which are at a similar stage of construction;

"similar stage of construction" means the stage at which —

(a) construction identifiable with a specific ship begins; and

(b) assembly of that ship has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less;

(3) For the purpose of this Chapter, a cargo ship, whenever built, which is converted to a passenger ship shall be treated as a passenger ship constructed on the date on which such a conversion commences.

(4) Unless expressly provided otherwise, ships constructed before 1st. July, 1986 shall comply with the requirements which are applicable under this Chapter.

(5) All ships which undergo repairs, alterations, modifications and outfitting related thereto shall continue to comply with at least the requirements previously applicable to these ships. Such ships if constructed before 1st. July, 1986 shall, as a rule, comply with the requirements for ships constructed on or after that date to at least the same extent as they did before undergoing such repairs, alterations, modifications or outfitting. Repairs, alterations and modifications of a major character and outfitting related thereto shall meet the requirements for ships constructed on or after that date in so far as the Director considers reasonable and practicable.

(6) Notwithstanding the provisions of sub-regulation (5), passenger ships which undergo repairs, alterations and modifications to meet the requirements of regulation 37 shall not be deemed to have undergone repairs, alterations and modifications of a major character.

(7) The Director may, if he considers that the sheltered nature and conditions of the voyage are such as to render the application of any specific requirements of this Chapter unreasonable or unnecessary, exempt from those requirements individual ships or classes of ships which, in the course of their voyage, do not proceed more than 20 miles from the nearest land.

(8) A passenger ship shall not be less than 24 metres in length unless specifically approved by the Director.

Interpretation.

25. (1) For the purpose of this Chapter, unless expressly provided otherwise —

"breadth of the ship" is the extreme width from outside of frame to outside of frame at or below the deepest subdivision load line;

"bulkhead deck" is the uppermost deck up to which the transverse watertight bulkheads are carried;

"deepest subdivision load line" is the water-line which corresponds to the greatest draught permitted by the subdivision requirements which are applicable;

"draught" is the vertical distance from the moulded base line amidships to the subdivision load line in question;

"length of the ship" is the length measured between perpendiculars taken at the extremities of the deepest subdivision load line;

"machinery space" is to be taken as extending from the moulded base line to the margin line and between the extreme main transverse watertight bulkheads, bounding the spaces containing the main and auxiliary propulsion machinery, boilers serving the needs of propulsion, and all permanent coal bunkers; and in the case of unusual arrangements, the Director may define the limits of the machinery spaces;

"margin line" is a line drawn at least 76 millimetres below the upper surface of the bulkhead deck at side;

"oil tanker" means the oil tanker as defined in Regulation 1 of Annex I of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973;

"passenger spaces" are those spaces which are provided for the accommodation and use of passengers, excluding baggage, store, provision and mail rooms; and for the purposes of regulations 33 and 34, spaces provided below the margin line for the accommodation and use of the crew shall be regarded as passenger spaces;

"permeability" of a space is the percentage of that space which can be occupied by water; the volume of a space which extends above the margin line shall be measured only to the height of that line;

"ro-ro passenger ship" means a passenger ship with ro-ro cargo spaces or special category spaces as defined in regulation 108;

"subdivision load line" is a water-line used in determining the subdivision of the ship;

"weathertight" means that in any sea conditions water will not penetrate into the ship.

(2) For the purpose of this Chapter, unless expressly provided otherwise, in all cases, volume and areas shall be calculated to moulded lines.

Interpretation relating to Parts C, D and E.

26. For the purposes of Parts C, D and E, unless expressly provided otherwise —

"auxiliary steering gear" is the equipment other than any part of the main steering gear necessary to steer the ship in the event of failure of the main steering gear but not including the tiller, quadrant or components serving the same purpose;

"chemical tanker" is a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product listed in either —

(a) Chapter 17 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk adopted by the Maritime Safety Committee by resolution MSC.4(48), hereinafter referred to as "the International Bulk Chemical Code", as may be amended by the Organisation; or

(b) 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 has been or may be amended by the Organisation,

whichever is applicable;

"control stations" are those spaces in which the ship's radio or main navigating equipment or the emergency source of power is located or where the fire recording or fire control equipment is centralised;

"dead ship condition" is the condition under which the main propulsion plant, boilers and auxiliaries are not in operation due to the absence of power;

"deadweight" is the difference in tonnes between the displacement of a ship in water of a specific gravity of 1.025 at the load water-line corresponding to the assigned summer freeboard and the lightweight of the ship;

"emergency condition" is a condition under which any services needed for normal operational and habitable conditions are not in working order due to failure of the main source of electric power;

"emergency source of electrical power" is a source of electrical power, intended to supply the emergency switchboard in the event of failure of the supply from the main source of electrical power;

"emergency switchboard" is a switchboard which in the event of failure of the main electrical power supply system is directly supplied by the emergency source of electrical power or the transitional source of emergency power and is intended to distribute electrical energy to the emergency services;

"gas carrier" is a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas or other products listed in either —

(a) Chapter 19 of the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk adopted by the Maritime Safety Committee by resolution MSC.5(48), hereinafter referred to as "the International Gas Carrier Code", as may be amended by the Organisation; or

(b) Chapter XIX of the Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk adopted by the Organisation by resolution A.328(IX), hereinafter referred to as "the Gas Carrier Code", as has been or may be amended by the Organisation,

whichever is applicable;

"lightweight" is the displacement of a ship in tonnes without cargo, fuel, lubricating oil, ballast water, fresh water and feedwater in tanks, consumable stores, and passengers and crew and their effects;

"machinery spaces" are all machinery spaces of category A and all other spaces containing propelling machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilising, ventilation and air-conditioning machinery, and similar spaces, and trunks to such spaces;

"machinery spaces of category A" are those spaces and trunks to such spaces which contain —

(a) internal combustion machinery used for main propulsion;

(b) internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375 kW; or

(c) any oil-fired boiler or oil fuel unit;

"main generating station" is the space in which the main source of electrical power is situated;

"main source of electrical power" is a source intended to supply electrical power to the main switchboard for distribution to all services necessary for maintaining the ship in normal operational and habitable conditions;

"main steering gear" is the machinery, rudder actuators, steering gear power units, if any, and ancillary equipment and the means of applying torque to the rudder stock (example, tiller or quadrant) necessary for effecting movement of the rudder for the purpose of steering the ship under normal service conditions;

"main switchboard" is a switchboard which is directly supplied by the main source of electrical power and is intended to distribute electrical energy to the ship's services;

"maximum ahead service speed" is the greatest speed which the ship is designed to maintain in service at sea at the deepest seagoing draught;

"maximum astern speed" is the speed which it is estimated the ship can attain at the designed maximum astern power at the deepest seagoing draught;

"normal operational and habitable condition" is a condition under which the ship as a whole, the machinery, services, means and aids ensuring propulsion, ability to steer, safe navigation, fire and flooding safety, internal and external communications and signals, means of escape, and emergency boat winches, as well as the designed comfortable conditions of habitability are in working order and functioning normally;

"power actuating system" is the hydraulic equipment provided for supplying power to turn the rudder stock, comprising a steering gear power unit or units, together with the associated pipes and fittings, and a rudder actuator; and the power actuating systems may share common mechanical components, that is, tiller, quadrant and rudder stock, or components serving the same purpose;

"steering gear control system" is the equipment by which orders are transmitted from the navigation bridge to the steering gear power units; steering

gear control systems comprise transmitters, receivers, hydraulic control pumps and their associated motors, motor controllers, piping and cables;

"steering gear power unit" is —

(a) in the case of electric steering gear, an electric motor and its associated electrical equipment;

(b) in the case of electrohydraulic steering gear, an electric motor and its associated electrical equipment and connected pump;

(c) in the case of other hydraulic steering gear, a driving engine and connected pump.

PART A — 1

STRUCTURE OF SHIPS

Structural, mechanical and electrical requirements for ships.

27. In addition to the requirements contained elsewhere in the present regulations, ships shall be designed, constructed and maintained in compliance with the structural, mechanical and electrical requirements of a classification society which is recognised by the Director in accordance with regulation 264, or with requirements determined by the Director which provide an equivalent level of safety.

Corrosion prevention of seawater ballast tanks.

28. (1) This regulation applies to oil tankers and bulk carriers constructed on or after 1st. July, 1998.

(2) All dedicated seawater ballast tanks shall have an efficient corrosion prevention system, such as hard protective coatings or equivalent. The coatings should preferably be of a light colour. The scheme for the selection, application and maintenance of the system shall be approved by the Director, based on the guidelines adopted by the Organisation. *Where appropriate, sacrificial anodes shall also be used.

* Refer to the Guidelines for the Selection, application and maintenance of corrosion prevention systems of dedicated seawater ballast tanks, adopted by the Organisation by resolution A.798(19).

Safe access to tanker bows.

29. (1) For the purpose of this regulation and regulation 30, "tankers" include oil tankers as defined in regulation 25, chemical tankers as defined in regulation 234 and gas carriers as defined in regulation 237.

(2) Every tanker constructed on or after 1st. July, 1998 shall be provided with the means to enable the crew to gain safe access to the bow even in severe weather conditions. For tankers constructed before 1st. July, 1998, such means of access shall be provided at the first scheduled dry-docking after 1st. July, 1998, but not later than 1st. July, 2001. Such means of access shall be approved by the Director based on the guidelines developed by the Organisation.*

Emergency towing arrangements on tankers.

30. (1) Emergency towing arrangements shall be fitted at both ends on board every tanker of not less than 20,000 tonnes deadweight.

(2) For tankers constructed on or after 1st. July, 2002 —

(a) the arrangements shall, at all times, be capable of rapid deployment in the absence of main power on the ship to be towed and easy connection to the towing ship. At least one of the emergency towing arrangements shall be pre-rigged ready for rapid deployment; and

(b) emergency towing arrangements at both ends shall be of adequate strength taking into account the size and deadweight of the ship, and the expected forces during bad weather conditions. The design and construction and prototype testing of emergency towing arrangements shall be approved by the Director, based on the guidelines developed by the Organisation.

(3) For tankers constructed before 1st. July, 2002, the design and construction of emergency towing arrangements shall be approved by the Director, based on the guidelines developed by the Organisation.†

* Refer to the Guidelines for Safe Access to Tanker Bows, adopted by the Maritime Safety Committee of the Organisation by resolution MSC.62(67).

† Refer to the Guidelines on Emergency Towing Arrangements for Tankers, adopted by the Maritime Safety Committee by resolution MSC.35(63), as may be amended.

New installation of materials containing asbestos.

31. (1) This regulation shall apply to materials used for the structure, machinery, electrical installations and equipment covered by the present Convention.

(2) For all ships, new installation of materials which contain asbestos shall be prohibited, except for —

(a) vanes used in rotary vane compressors and rotary vane vacuum pumps;

(b) watertight joints and linings used for the circulation of fluids when, at high temperature (in excess of 350°C) or pressure (in excess of 7×10^6 Pa), there is a risk of fire, corrosion or toxicity; and

(c) supple and flexible thermal insulation assemblies used for temperatures above 1,000°C.

PART B

SUBDIVISION AND STABILITY*

Floodable length in passenger ships.

32. (1) The floodable length at any point of the length of a ship shall be determined by a method of calculation which takes into consideration the form, draught and other characteristics of the ship in question.

(2) In a ship with a continuous bulkhead deck, the floodable length at a given point is the maximum portion of the length of the ship, having its centre at the point in question, which can be flooded under the definite assumptions set forth in regulation 33 without the ship being submerged beyond the margin line.

(3) In the case of a ship not having a continuous bulkhead deck, the floodable length at any point may be determined to an assumed continuous margin line which at no point is less than 76 millimetres below the top of the deck (at side) to which the bulkheads concerned and the shell are carried watertight.

* Instead of the requirements in this Part, the regulations on Subdivision and Stability of Passenger Ships as an equivalent to Part B of Chapter II of the International Convention for the Safety of Life at Sea, 1960, adopted by the Organisation by resolution A.265(VIII), may be used, if applied in their entirety.

(4) Where a portion of an assumed margin line is appreciably below the deck to which bulkheads are carried, the Director may permit a limited relaxation in the watertightness of those portions of the bulkheads which are above the margin line and immediately under the higher deck.

Permeability in passenger ships.

33. (1) *(a)* The definite assumptions referred to in regulation 32 relate to the permeabilities of the spaces below the margin line.

(b) In determining the floodable length, a uniform average permeability shall be used throughout the whole length of each of the following portions of the ship below the margin line —

(i) the machinery space as defined in regulation 25;

(ii) the portion forward of the machinery space; and

(iii) the portion abaft the machinery space.

(2) *(a)* The uniform average permeability throughout the machinery space shall be determined from the formula —

$$85 + 10\left(\frac{a - c}{v}\right)$$

where —

a = the volume of the passenger spaces, as defined in regulation 25, which are situated below the margin line within the limits of the machinery space;

c = the volume of between deck spaces below the margin line within the limits of the machinery space which are appropriated to cargo, coal or stores;

v = the whole volume of the machinery space below the margin line.

(b) Where it is shown to the satisfaction of the Director that the average permeability as determined by detailed calculation is less than that given by the formula, the detailed calculated value may be used. For the purpose of such calculation, the permeabilities of passenger spaces shall be taken as 95, that of all cargo, coal and store spaces as 60, and that of double

bottom, oil fuel and other tanks at such values as may be approved in each case.

(3) Except as provided in sub-regulation (4), the uniform average permeability throughout the portion of the ship forward of or abaft the machinery space shall be determined from the formula —

$$63 + 35\frac{a}{v}$$

where —

a = the volume of the passenger spaces, as defined in regulation 25, which are situated below the margin line, forward of or abaft the machinery space; and

v = the whole volume of the portion of the ship below the margin line, forward of or abaft the machinery space.

(4) *(a)* In the case of special subdivision required in sub-regulation (5) of regulation 34, the uniform average permeability throughout the portion of the ship forward of or abaft the machinery space shall be —

$$93 - 35\frac{b}{v}$$

where —

b = the volume of the spaces below the margin line and above the tops of floors, inner bottom, or peak tanks, as the case may be, which are appropriated to and used as cargo spaces, coal or oil fuel bunkers, store-rooms, baggage and mail rooms, chain lockers and fresh water tanks, forward of or abaft the machinery space; and

v = the whole volume of the portion of the ship below the margin line forward of or abaft the machinery space.

(b) In the case of ships engaged on services where the cargo holds are not generally occupied by any substantial quantities of cargo, no part of the cargo spaces is to be included in calculating "*b*".

(5) In the case of unusual arrangements, the Director may allow, or require, a detailed calculation of average permeability for the portions forward of or abaft the machinery space shall be required. For the purpose of such calculation, the permeability of passenger spaces shall be taken as 95, that of

spaces containing machinery as 85, that of all cargo, coal and store spaces as 60, and that of double bottom, oil fuel and other tanks at such value as may be approved in each case.

(6) Where a between-deck compartment between 2 watertight transverse bulkheads contains any passenger or crew space, the whole of that compartment, less any space completely enclosed within permanent steel bulkheads and appropriated to other purposes, shall be regarded as passenger space. Where the passenger or crew space in question is completely enclosed within permanent steel bulkheads, only the space so enclosed need be considered as passenger space.

Permissible length of compartments in passenger ships.

34. (1) Ships shall be as efficiently subdivided as is possible having regard to the nature of the service for which they are intended. The degree of subdivision shall vary with the length of the ship and with the service, in such manner that the highest degree of subdivision corresponds with the ships of greatest length, primarily engaged in the carriage of passengers.

Factor of subdivision.

(2) *(a)* The maximum permissible length of a compartment having its centre at any point in the ship's length is obtained from the floodable length by multiplying the latter by an appropriate factor called the factor of subdivision.

(b) The factor of subdivision shall depend on the length of the ship, and for a given length shall vary according to the nature of the service for which the ship is intended. It shall decrease in a regular and continuous manner —

(i) as the length of the ship increases; and

(ii) from a factor A, applicable to ships primarily engaged in the carriage of cargo, to a factor B, applicable to ships primarily engaged in the carriage of passengers.

(c) The variations of the factors A and B shall be expressed by the following formulae (I) and (II) where L is the length of the ship in metres —

$$A = \frac{58.2}{L - 60} + 0.18 \text{ (L = 131 and upwards)} \quad \text{(I)}$$

$$B = \frac{30.3}{L - 42} + 0.18 \text{ (L = 79 and upwards)} \quad \text{(II)}$$

Criterion of service.

(3) *(a)* For a ship of given length the appropriate factor of subdivision shall be determined by the criterion of service numeral (hereinafter referred to as the criterion numeral) as given by the following formulae (III) and (IV) where —

C_s = the Criterion Numeral;

L = the length of the ship in metres;

M = the volume of the machinery space in cubic metres, as defined in regulation 25; with the addition thereto of the volume of any permanent oil fuel bunkers which may be situated above the inner bottom and forward of or abaft the machinery space;

P = the whole volume of the passenger spaces below the margin line in cubic metres;

V = the whole volume of the ship below the margin line in cubic metres;

P_1 = KN where —

N = the number of passengers for which the ship is to be certified; and

K = 0.056L.

(b) Where the value of KN is greater than the sum of P and the whole volume of the actual passenger spaces above the margin line, the figure to be taken as P_1 is that sum or two-thirds KN, whichever is the greater.

When P_1 is greater than P —

$$C_s = 72 \frac{M + 2P_1}{V + P_1 - P} \quad \text{.....(III)}$$

and in other cases —

$$C_s = 72 \frac{M + 2P}{V} \quad \text{.....(IV)}$$

(c) For ships not having a continuous bulkhead deck, the volumes are to be taken up to the actual margin lines used in determining the floodable lengths.

Rules for subdivision of ships other than those covered by sub-regulation (5).

(4) *(a)* The subdivision abaft the forepeak of ships of 131 metres in length and upwards having a criterion numeral of 23 or less shall be governed by the factor A given by formula (I); of those having a criterion numeral of 123 or more by the factor B given by formula (II); and of those having a criterion numeral between 23 and 123 by the factor F obtained by linear interpolation between the factors A and B, using the formula —

$$F = A - \frac{(A - B)(C_s - 23)}{100} \quad \text{.....(V)}$$

Nevertheless, where the criterion numeral is equal to 45 or more and simultaneously the computed factor of subdivision as given by formula (V) is 0.65 or less, but more than 0.50, the subdivision abaft the forepeak shall be governed by the factor 0.50.

(b) Where the factor F is less than 0.40 and it is shown to the satisfaction of the Director to be impracticable to comply with the factor F in the machinery compartment of the ship, the subdivision of such compartment may be governed by an increased factor, which shall not exceed 0.40.

(c) The subdivision abaft the forepeak of ships of less than 131 metres but not less than 79 metres in length having a criterion numeral equal to S, where —

$$S = \frac{3,574 - 25L}{13}$$

shall be governed by the factor unity; of those having a criterion numeral of 123 or more by the factor B given by the formula (II); of those having a criterion numeral between S and 123 by the factor F obtained by linear interpolation between unity and the factor B using the formula —

$$F = 1 - \frac{(1 - B)(C_s - S)}{123 - S} \quad \text{.....(VI)}$$

(d) The subdivision abaft the forepeak of ships of less than 131 metres but not less than 79 metres in length and having a criterion numeral less than S, and of ships of less than 79 metres in length shall be governed by the factor unity, unless, in either case, it is shown to the satisfaction of the Director to be impracticable to comply with this factor in any part of the ship, in which case he may allow such relaxation as may appear to be justified having regard to all the circumstances.

(e) Paragraph *(d)* shall apply also to ships of whatever length, which are to be certified to carry a number of passengers exceeding 12 but not exceeding —

$\frac{L^2}{650}$, or 50, whichever is the less.

Special subdivision standards for ships complying with regulation 146(1)*(b)*.

(5) *(a)* In the case of ships primarily engaged in the carriage of passengers, the subdivision abaft the forepeak shall be governed by a factor of 0.50 or by the factor determined according to sub-regulations (3) and (4), if less than 0.50.

(b) In the case of such ships less than 91.5 metres in length, if the Director is satisfied that compliance with such factor would be impracticable in a compartment, he may allow the length of that compartment to be governed by a higher factor, provided the factor used is the lowest that is practicable and reasonable in the circumstances.

(c) Where, in the case of any ship whether less than 91.5 metres or not, the necessity of carrying appreciable quantities of cargo makes it impracticable to require the subdivision abaft the forepeak to be governed by a factor not exceeding 0.50, the standard of subdivision to be applied shall be determined in accordance with the following sub-paragraphs (i) to (v), subject to the condition that where the Director is satisfied that insistence on strict compliance in any respect would be unreasonable, he may allow such alternative arrangement of the watertight bulkheads as

appears to be justified on merits and will not diminish the general effectiveness of the subdivision —

(i) sub-regulation (3) relating to the criterion numeral shall apply with the exception that in calculating the value of P_1 for berthed passengers, K is to have the value defined in sub-regulation (3), or 3.5 m^3, whichever is the greater, and for unberthed passengers, K is to have the value 3.5 m^3;

(ii) the factor B in sub-regulation (2) shall be replaced by the factor BB determined by the following formula —

$$BB = \frac{17.6}{L - 33} + 0.20 \text{ (L = 55 metres and upwards)};$$

(iii) the subdivision abaft the forepeak of ships 131 metres in length and upwards having a criterion numeral of 23 or less shall be governed by the factor A given by formula (I) in sub-regulation (2); of those having a criterion numeral of 123 or more by the factor BB given by the formula in sub-paragraph (ii); and of those having a criterion numeral between 23 and 123 by the factor F obtained by linear interpolation between the factors A and BB, using the formula —

$$F = A - \frac{(A - BB)(C_s - 23)}{100}$$

except that if the factor F so obtained is less than 0.50, the factor to be used shall be either 0.50 or the factor calculated according to paragraph *(a)* of sub-regulation (4), whichever is the smaller;

(iv) the subdivision abaft the forepeak of ships less than 131 metres but not less than 55 metres in length having a criterion numeral equal to S_1 where —

$$S_1 = \frac{3,712 - 25L}{19}$$

shall be governed by the factor unity; of those having a criterion numeral of 123 or more by the factor BB given by the formula in sub-paragraph (ii); of those having a criterion numeral between S_1 and 123 by the factor F obtained by

linear interpolation between unity and the factor BB using the formula —

$$F = 1 - \frac{(1 - BB)(C_s - S_1)}{123 - S_1}$$

except that in either of the 2 latter cases, if the factor so obtained is less than 0.50, the subdivision may be governed by a factor not exceeding 0.50;

(v) the subdivision abaft the forepeak of ships less than 131 metres but not less than 55 metres in length and having a criterion numeral less than S_1 and of all ships less than 55 metres in length shall be governed by the factor unity, unless it is shown to the satisfaction of the Director to be impracticable to comply with this factor in particular compartments, in which event he may allow such relaxations in respect of those compartments as appear to be justified, having regard to all the circumstances, provided that the aftermost compartment and as many as possible of the forward compartments (between the forepeak and the after end of the machinery space) shall be kept within the floodable length.

(d) The special provisions regarding permeability given in sub-regulation (4) of regulation 33 shall be employed when calculating the floodable length curves.

(e) Where the Director or authorised organisation is satisfied that, having regard to the nature and conditions of the intended voyages compliance with the other provisions of this Chapter and of Chapter II-2 is sufficient, the requirements of this sub-regulation need not be complied with.

Special requirements concerning passenger ship subdivision.

35. (1) Where in a portion or portions of a ship the watertight bulkheads are carried to a higher deck than in the remainder of the ship and it is desired to take advantage of this higher extension of the bulkheads in calculating the floodable length, separate margin lines may be used for each such portion of the ship, provided that —

(a) the sides of the ship are extended throughout the ship's length to the deck corresponding to the upper margin line and all openings in the shell plating below this deck throughout the length of the ship are treated as being below a margin line, for the purpose of regulation 50; and

(b) the 2 compartments adjacent to the "step" in the bulkhead deck are each within the permissible length corresponding to their respective margin lines, and, in addition, their combined length does not exceed twice the permissible length based on the lower margin line.

(2) *(a)* A compartment may exceed the permissible length determined by the rules of regulation 34, provided the combined length of each pair of adjacent compartments to which the compartment in question is common does not exceed either the floodable length or twice the permissible length, whichever is the less.

(b) If one of the 2 adjacent compartments is situated inside the machinery space, and the second is situated outside the machinery space, and the average permeability of the portion of the ship in which the second is situated differs from that of the machinery space, the combined length of the 2 compartments shall be adjusted to the mean average permeability of the 2 portions of the ship in which the compartments are situated.

(c) Where the 2 adjacent compartments have different factors of subdivision, the combined length of the 2 compartments shall be determined proportionately.

(3) In ships of 100 metres in length and upwards, one of the main transverse bulkheads abaft the forepeak shall be fitted at a distance from the forward perpendicular which is not greater than the permissible length.

(4) A main transverse bulkhead may be recessed, provided that all parts of the recess lie inboard of vertical surfaces on both sides of the ship, situated at a distance from the shell plating equal to one-fifth the breadth of the ship, and measured at right angles to the centre line at the level of the deepest subdivision load line. Any part of a recess which lies outside these limits shall be dealt with as a step in accordance with sub-regulation (5).

(5) A main transverse bulkhead may be stepped, provided that it meets one of the following conditions —

(a) the combined length of the 2 compartments, separated by the bulkhead in question, does not exceed either 90% of the floodable length or twice the permissible length, except that, in ships having a factor of subdivision greater than 0.9, the combined length of the 2 compartments in question shall not exceed the permissible length;

(b) additional subdivision is provided in way of the step to maintain the same measure of safety as that secured by a plane bulkhead;

(c) the compartment over which the step extends does not exceed the permissible length corresponding to a margin line taken 76 millimetres below the step.

(6) Where a main transverse bulkhead is recessed or stepped, an equivalent plane bulkhead shall be used in determining the subdivision.

(7) If the distance between 2 adjacent main transverse bulkheads, or their equivalent plane bulkheads, or the distance between the transverse planes passing through the nearest stepped portions of the bulkheads, is less than 3 metres plus 3% of the length of the ship, or 11 metres, whichever is the less, only one of these bulkheads shall be regarded as forming part of the subdivision of the ship in accordance with regulation 34.

(8) Where a main transverse watertight compartment contains local subdivision and it can be shown to the satisfaction of the Director that, after any assumed side damage extending over a length of 3 metres plus 3% of the length of the ship, or 11 metres, whichever is the less, the whole volume of the main compartment will not be flooded, a proportionate allowance may be made in the permissible length otherwise required for such compartment. In such a case the volume of effective buoyancy assumed on the undamaged side shall not be greater than that assumed on the damaged side.

(9) Where the required factor of subdivision is 0.50 or less, the combined length of any 2 adjacent compartments shall not exceed the floodable length.

Stability of passenger ships in damaged condition.*

36. (1) Subject to regulation 37, paragraphs *(c)* and *(d)* of sub-regulation (3), sub-regulation (6) and paragraph *(b)* of sub-regulation (7) apply to passenger ships constructed on or after 29th. April, 1990.

(2) *(a)* Sufficient intact stability shall be provided in all service conditions so as to enable the ship to withstand the final stage of flooding of any one main compartment which is required to be within the floodable length.

(b) Where 2 adjacent main compartments are separated by a bulkhead which is stepped under the conditions of paragraph *(a)* of sub-regulation (5) of regulation 35, the intact stability shall be adequate to withstand the flooding of those 2 adjacent main compartments.

* Refer to MSC/Circ.541 (as may be revised): Guidance Notes on the Integrity of Flooding Boundaries above the Bulkhead Deck of Passenger Ships for proper application of regulations 36 and 54(1).

(c) Where the required factor of subdivision is 0.50 or less but more than 0.33, the intact stability shall be adequate to withstand the flooding of any 2 adjacent main compartments.

(d) Where the required factor of subdivision is 0.33 or less, the intact stability shall be adequate to withstand the flooding of any 3 adjacent main compartments.

(3) *(a)* The requirements of sub-regulation (2) shall be determined by calculations which are in accordance with sub-regulations (4), (5) and (7) and which take into consideration the proportions and design characteristics of the ship and the arrangement and configuration of the damaged compartments. In making these calculations the ship is to be assumed in the worst anticipated service condition as regards stability.

(b) Where it is proposed to fit decks, inner skins or longitudinal bulkheads of sufficient tightness to seriously restrict the flow of water, proper consideration shall be given to such restrictions in the calculations.

(c) The stability required in the final condition after damage, and after equalisation where provided, shall be determined as follows —

(i) the positive residual righting lever curve shall have a minimum range of 15° beyond the angle of equilibrium. This range may be reduced to a minimum of 10°, in the case where the area under the righting lever curve is that specified in sub-paragraph (ii), increased by the ratio —

$$\frac{15}{\text{Range}}$$

where the range is expressed in degrees;

(ii) the area under the righting lever curve shall be at least 0.015 metre-radians, measured from the angle of equilibrium to the lesser of —

(A) the angle at which progressive flooding occurs;

(B) 22° (measured from the upright) in the case of one-compartment flooding, or 27° (measured from the upright) in the case of the simultaneous flooding of 2 or more adjacent compartments;

(iii) a residual righting lever is to be obtained within the range of positive stability, taking into account the greatest of the following heeling moments —

(A) the crowding of all passengers towards one side;

(B) the launching of all fully loaded davit-launched survival craft on one side;

(C) due to wind pressure;

as calculated by the formula —

$$GZ \text{ (in metres)} = \frac{\text{heeling moment}}{\text{displacement}} + 0.04$$

However, in no case is this righting lever to be less than 0.1 metre;

(iv) for the purpose of calculating the heeling moments in sub-paragraph (iii), the following assumptions shall be made —

(A) moments due to crowding of passengers —

(I) 4 persons per square metre;

(II) a mass of 75 kg for each passenger;

(III) passengers shall be distributed on available deck areas towards one side of the ship on the decks where muster stations are located and in such a way that they produce the most adverse heeling moment;

(B) moments due to launching of all fully loaded davit-launched survival craft on one side —

(I) all lifeboats and rescue boats fitted on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out fully loaded and ready for lowering;

(II) for lifeboats which are arranged to be launched fully loaded from the stowed position, the maximum heeling moment during launching shall be taken;

(III) a fully loaded davit-launched liferaft attached to each davit on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out ready for lowering;

(IV) persons not in the life-saving appliances which are swung out shall not provide either additional heeling or righting moment;

(V) life-saving appliances on the side of the ship opposite to the side to which the ship has heeled shall be assumed to be in a stowed position;

(C) moments due to wind pressure —

(I) a wind pressure of 120 N/m^2 to be applied;

(II) the area applicable shall be the projected lateral area of the ship above the water-line corresponding to the intact condition;

(III) the moment arm shall be the vertical distance from a point at one-half of the mean draught corresponding to the intact condition to the centre of gravity of the lateral area.

(d) In intermediate stages of flooding, the maximum righting lever shall be at least 0.05 metres and the range of positive righting levers shall be at least 7°. In all cases, only one breach in the hull and only one free surface need be assumed.

(4) *(a)* For the purpose of making damage stability calculations, the volume and surface permeabilities shall be, in general, as follows —

Spaces	Permeability
Appropriated to cargo, coal or stores	60
Occupied by accommodation	95
Occupied by machinery	85
Intended for liquids	0 or 95*

* Whichever results in the more severe requirements.

(b) Higher surface permeabilities are to be assumed in respect of spaces which, in the vicinity of the damage waterplane, contain no substantial quantity of accommodation or machinery and spaces which are not generally occupied by any substantial quantity of cargo or stores.

(5) Assumed extent of damage shall be as follows —

(a) longitudinal extent: 3 metres plus 3% of the length of the ship, or 11 metres, whichever is the less; and where the required factor of subdivision is 0.33 or less, the assumed longitudinal extent of damage shall be increased as necessary so as to include any 2 consecutive main transverse watertight bulkheads;

(b) transverse extent (measured inboard from the ship's side, at right angles to the centreline at the level of the deepest subdivision load line): a distance of one-fifth of the breadth of the ship;

(c) vertical extent: from the base line upwards without limit; and

(d) if any damage of lesser extent than that indicated in paragraphs *(a)*, *(b)* and *(c)* would result in a more severe condition regarding heel or loss of metacentric height, such damage shall be assumed in the calculations.

(6) Unsymmetrical flooding is to be kept to a minimum consistent with efficient arrangements. Where it is necessary to correct large angles of heel, the means adopted shall, where practicable, be self-acting, but in any case where controls to cross-flooding fittings are provided they shall be operable from above the bulkhead deck. These fittings together with their controls shall be acceptable to the Director. The maximum angle of heel after flooding but before equalisation shall not exceed 15°. Where cross-flooding fittings are required, the time for equalisation shall not exceed 15 minutes. Suitable information concerning the use of cross-flooding fittings shall be supplied to the master of the ship.*

(7) The final conditions of the ship after damage and, in the case of unsymmetrical flooding, after equalisation measures have been taken shall be as follows —

(a) in the case of symmetrical flooding, there shall be a positive residual metacentric height of at least 50 millimetres as calculated by the constant displacement method;

* Reference is made to the Recommendation on a Standard Method for Establishing Compliance with the requirements for Cross-Flooding Arrangements in Passenger Ships, adopted by the Organisation by resolution A.226(VIII).

(b) in the case of unsymmetrical flooding, the angle of heel for one-compartment flooding shall not exceed 7°; for the simultaneous flooding of 2 or more adjacent compartments, a heel of 12° may be permitted by the Director;

(c) in no case shall the margin line be submerged in the final stage of flooding; if it is considered that the margin line may become submerged during an intermediate state of flooding, the Director may require such investigations and arrangements as he considers necessary for the safety of the ship.

(8) *(a)* The master of the ship shall be supplied with the data necessary to maintain sufficient intact stability under service conditions to enable the ship to withstand the critical damage. In the case of ships requiring cross-flooding, the master of the ship shall be informed of the conditions of stability on which the calculations of heel are based and be warned that excessive heeling might result should the ship sustain damage when in a less favourable condition.

(b) The data referred to in paragraph *(a)*, to enable the master to maintain sufficient intact stability, shall include information which indicates the maximum permissible height of the ship's centre of gravity above keel (KG), or alternatively the minimum permissible metacentric height (GM) for a range of draughts or displacements sufficient to include all service conditions. The information shall show the influence of various trims taking into account the operational limits.

(c) Each ship shall have scales of draughts marked clearly at the bow and stern. In the case where the draught marks are not located where they are easily readable, or operational constraints for a particular trade make it difficult to read the draught marks, then the ship shall also be fitted with a reliable draught indicating system by which the bow and stern draughts can be determined.

(d) On completion of loading of the ship and prior to its departure, the master shall determine the ship's trim and stability and also ascertain and record that the ship is in compliance with stability criteria in relevant regulations. The determination of the ship's stability shall always be made by calculation. The Director may accept the use of an electronic loading and stability computer or equivalent means for this purpose.

(e) Paragraphs *(b)*, *(c)* and *(d)* apply to all passenger ships.

(9) *(a)* No relaxation from the requirements for damage stability may be considered by the Director unless it is shown that the intact metacentric height in any service condition necessary to meet these requirements is excessive for the service intended.

(b) Relaxations from the requirements for damage stability shall be permitted only in exceptional cases and subject to the condition that the Director is satisfied that the proportions, arrangements and other characteristics of the ship are the most favourable to stability after damage which can practically and reasonably be adopted in the particular circumstances.

Stability of ro-ro passenger ships in damaged condition.*

37. Ro-ro passenger ships constructed before 1st. July, 1997 shall comply with regulation 36, which was in force prior 1st. October, 1994, not later than the date of the first periodical survey after the prescribed date of compliance, according to the value of A/A_{max} as defined in the annex of the Calculation Procedure to assess the survivability characteristics of existing ro-ro passenger ships when using a simplified method based upon resolution A.265(VIII), developed by the Maritime Safety Committee at its fifty-ninth session in June, 1991 (MSC/Circ.574)* —

Value of A/A_{max}	*Date of compliance*
less than 85%	1st. October, 1998
85% or more but less than 90%	1st. October, 2000
90% or more but less than 95%	1st. October, 2002
95% or more but less than 97.5%	1st. October, 2004
97.5% or more	1st. October, 2005.

Special requirements for ro-ro passenger ships carrying 400 persons or more.

38. Notwithstanding the provisions of regulations 36 and 37 —

(a) ro-ro passenger ships certified to carry 400 persons or more constructed on or after 1st. July, 1997 shall comply with paragraph *(c)* of sub-regulation (3) of regulation 36, assuming the damage applied anywhere within the ship's length L; and

* For the application of specific stability requirements to ro-ro passenger ships, refer to resolution 14 of the 1995 SOLAS Conference.

* Refer to MSC/Circ.649, Interpretation of provisions of resolution MSC.26(60) and MSC/Circ.574.

(b) ro-ro passenger ships certified to carry 400 persons or more constructed before 1st. July, 1997 shall comply with the requirements of paragraph *(a)* not later than the date of the first periodical survey after the following prescribed date of compliance which occurs the latest —

(i)	*Value of A/A_{max}*	*Date of compliance*
	less than 85%	1st. October, 1998
	85% or more but less than 90%	1st. October, 2000
	90% or more but less than 95%	1st. October, 2002
	95% or more but less than 97.5%	1st. October, 2004
	97.5% or more	1st. October, 2010;

(ii)	*Number of persons permitted to be carried*	
	1,500 or more	1st. October, 2002
	1,000 or more but less than 1,500	1st. October, 2006
	600 or more but less than 1,000	1st. October, 2008
	400 or more but less than 600	1st. October, 2010; or

(iii) age of the ship equal to or greater than 20 years, where the age of the ship means the time counted from the date on which the keel was laid or the date on which it was at a similar stage of construction or from the date on which the ship was converted to a ro-ro passenger ship.

Special requirements for passenger ships other than ro-ro passenger ships carrying 400 persons or more.

39. Notwithstanding the provisions of regulation 36, passenger ships, other than ro-ro passenger ships, certified to carry 400 persons or more constructed on or after 1st. July, 2002 shall comply with paragraphs *(c)* and *(d)* of sub-regulation (3) of regulation 36, assuming the damage applied anywhere within the ship's length L.

Ballasting of passenger ships.

40. (1) Water ballast should not in general be carried in tanks intended for oil fuel. In ships in which it is not practicable to avoid putting water in oil fuel tanks, oily-water separating equipment to the satisfaction of the Director shall be fitted, or other alternative means, such as discharge to shore facilities, acceptable to the Director shall be provided for disposing of the oily-water ballast.

(2) This regulation is without prejudice to the provisions of the International Convention for the Prevention of Pollution from Ships in force.

Peak and machinery space bulkheads, shaft tunnels etc. in passenger ships.

41. (1) A forepeak or collision bulkhead shall be fitted which shall be watertight up to the bulkhead deck. This bulkhead shall be located at a distance from the forward perpendicular of not less than 5% of the length of the ship and not more than 3 metres plus 5% of the length of the ship.

(2) Where any part of the ship below the water-line extends forward of the forward perpendicular, for example, a bulbous bow, the distances stipulated in sub-regulation (1) shall be measured from a point either —

(a) at the mid-length of such extension;

(b) at a distance 1.5% of the length of the ship forward of the forward perpendicular; or

(c) at a distance 3 metres forward of the forward perpendicular,

whichever gives the smallest measurement.

(3) Where a long forward superstructure is fitted, the forepeak or collision bulkhead on all passenger ships shall be extended weathertight to the next full deck above the bulkhead deck. The extension shall be so arranged as to preclude the possibility of the bow door causing damage to it in the case of damage to, or detachment of, a bow door.

(4) The extension required in sub-regulation (3) need not be fitted directly above the bulkhead below, provided that all parts of the extension are not located forward of the forward limit specified in sub-regulation (1) or (2). In ships constructed before 1st. July, 1997 —

(a) where a sloping ramp forms part of the extension, the part of the extension, which is more than 2.3 metres above the bulkhead deck, may extend no more than one metre forward of the forward limits specified in sub-regulation (1) or (2); and

(b) where the existing ramp does not comply with the requirements for acceptance as an extension to the collision bulkhead and the position of the ramp prevents the siting of such extension within the limits specified in sub-regulation (1) or (2), the extension may be sited within a limited distance aft of the aft limit specified in sub-regulation (1) or (2). The limited distance aft should be no more than is necessary to ensure non-interference with the ramp. The extension to the collision bulkhead shall open forward and comply with the requirements of sub-regulation (3) and shall be so arranged as to preclude the possibility of the ramp causing damage to it in the case of damage to, or detachment of, the ramp.

(5) Ramps not meeting the requirements mentioned in sub-regulation (4) shall be disregarded as an extension of the collision bulkhead.

(6) In ships constructed before 1st. July, 1997, the requirements of sub-regulations (3) and (4) shall apply not later than the date of the first periodical survey after 1st. July, 1997.

(7) An afterpeak bulkhead, and bulkheads dividing the machinery space, from the cargo and passenger spaces forward and aft, shall also be fitted and made watertight up to the bulkhead deck. The afterpeak bulkhead may be stepped below the bulkhead deck, provided the degree of safety of the ship as regards subdivision is not thereby diminished.

(8) In all cases, stern tubes shall be enclosed in watertight spaces of moderate volume. The stern gland shall be situated in a watertight shaft tunnel or other watertight space separate from the stern tube compartment and of such volume that, if flooded by leakage through the stern gland, the margin line will not be submerged.

Peak and machinery space bulkheads and stern tubes in cargo ships.

42. (1) For the purpose of this regulation, "freeboard deck", "length of ship" and "forward perpendicular" have the meanings as defined in the International Convention on Load Lines in force.

(2) A collision bulkhead shall be fitted which shall be watertight up to the freeboard deck. This bulkhead shall be located at a distance from the forward perpendicular of not less than 5% of the length of the ship or 10 metres, whichever is the less, and, except as may be permitted by the Director, not more than 8% of the length of the ship.

(3) Where any part of the ship below the water-line extends forward of the forward perpendicular, for example, a bulbous bow, the distances stipulated in sub-regulation (2) shall be measured from a point either —

(a) at the mid-length of such extension;

(b) at a distance 1.5% of the length of the ship forward of the forward perpendicular; or

(c) at a distance 3 metres forward of the forward perpendicular,

whichever gives the smallest measurement.

(4) The bulkhead may have steps or recesses, provided they are within the limits prescribed in sub-regulation (2) or (3). Pipes piercing the collision bulkhead shall be fitted with suitable valves operable from above the freeboard deck and the valve chest shall be secured at the bulkhead inside the forepeak. The valves may be fitted on the after side of the collision bulkhead, provided that the valves are readily accessible under all service conditions and the space in which they are located is not a cargo space. All valves shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable. No door, manhole, ventilation duct or any other opening shall be fitted in this bulkhead.

(5) Where a long forward superstructure is fitted, the collisions bulkhead shall be extended weathertight to the deck next above the freeboard deck. The extension need not be fitted directly above the bulkhead below, provided it is located within the limits prescribed in sub-regulation (2) or (3) with the exemption permitted by sub-regulation (6) and the part of the deck which forms the step is made effectively weathertight.

(6) Where bow doors are fitted and a sloping loading ramp forms part of the extension of the collision bulkhead above the freeboard deck, the part of the ramp which is more than 2.3 metres above the freeboard deck may extend forward of the limit specified in sub-regulation (2) or (3). The ramp shall be weathertight over its complete length.

(7) The number of openings in the extension of the collision bulkhead above the freeboard deck shall be restricted to the minimum compatible with the design and normal operation of the ship. All such openings shall be capable of being closed weathertight.

(8) Bulkheads shall be fitted separating the machinery space from cargo and passenger spaces forward and aft and made watertight up to the freeboard deck.

(9) Stern tubes shall be enclosed in a watertight space or spaces of moderate volume. Other measures to minimise the danger of water penetrating into the ship in case of damage to stern tube arrangements may be taken at the discretion of the Director.

(10) Sub-regulations (8) and (9) apply to ships constructed on or after 1st. February, 1992.

Double bottoms in passenger ships.

43. (1) A double bottom shall be fitted extending from the forepeak bulkhead to the afterpeak bulkhead as far as this is practicable and compatible with the design and proper working of the ship as follows —

(a) in ships of 50 metres and upwards but less than 61 metres in length, a double bottom shall be fitted at least from the machinery space to the forepeak bulkhead, or as near thereto as practicable;

(b) in ships of 61 metres and upwards but less than 76 metres in length, a double bottom shall be fitted at least outside the machinery space, and shall extend to the fore and afterpeak bulkheads, or as near thereto as practicable;

(c) in ships of 76 metres in length and upwards, a double bottom shall be fitted amidships, and shall extend to the fore and afterpeak bulkheads, or as near thereto as practicable.

(2) Where a double bottom is required to be fitted, its depth shall be to the satisfaction of the Director and the inner bottom shall be continued out to the ship's sides in such a manner as to protect the bottom to the turn of the bilge. Such protection shall be deemed satisfactory if the line of intersection of the outer edge of the margin plate with the bilge plating is not lower at any part than a horizontal plane passing through the point of intersection with the frame line amidships of a transverse diagonal line inclined at 25° to the base line and cutting it at a point one-half the ship's moulded breadth from the middle line.

(3) Small wells constructed in the double bottom in connection with drainage arrangements of holds etc. shall not extend downwards more than necessary. The depth of the well shall in no case be more than the depth less 460 millimetres of the double bottom at the centreline, nor shall the well extend below the horizontal plane referred to in sub-regulation (2). A well extending to the outer bottom is permitted at the after end of the shaft tunnel. Other wells (for example, for lubricating oil under main engines) may be permitted by the Director if he is satisfied that the arrangements give protection equivalent to that afforded by a double bottom complying with this regulation.

(4) A double bottom need not be fitted in way of watertight compartments of moderate size used exclusively for the carriage of liquids, provided the safety of the ship, in the event of bottom or side damage, is not, in the opinion of the Director, thereby impaired.

(5) In the case of ships to which sub-regulation (8) of regulation 24 applies and which are engaged on regular service within the limits of a short international voyage as defined in regulation 128, the Director may permit a double bottom to be dispensed with in any part of the ship which is subdivided by a factor not exceeding 0.50, if he is satisfied that the fitting of a double bottom in that part would not be compatible with the design and proper working of the ship.

Double bottoms in cargo ships other than tankers.

44. (1) A double bottom shall be fitted extending from the collision bulkhead to the afterpeak bulkhead, as far as this is practicable and compatible with the design and proper working of the ship.

(2) Where a double bottom is required to be fitted, its depth shall be to the satisfaction of the Director and the inner bottom shall be continued out to the ship's side in such a manner as to protect the bottom to the turn of the bilge.

(3) Small wells constructed in the double bottom, in connection with the drainage arrangements of holds, shall not extend in depth more than necessary. A well extending to the outer bottom may be permitted at the after end of the shaft tunnel of the ship. Other wells may be permitted by the Director if he is satisfied that the arrangements give protection equivalent to that afforded by a double bottom complying with this regulation.

(4) A double bottom need not be fitted in way of watertight compartments used exclusively for the carriage of liquids, provided the safety of the ship in the event of bottom damage is not, in the opinion of the Director, thereby impaired.

(5) This regulation shall apply to ships constructed on or after 1st. February, 1992.

Access to spaces in cargo area of oil tankers.

45. (1) This regulation shall apply to oil tankers constructed on or after 1st. October, 1994.

(2) Access to cofferdams, ballast tanks, cargo tanks and other spaces in the cargo area shall be direct from the open deck and such as to ensure their complete inspection. Access to double bottom spaces may be through a cargo pump room, pump room, deep cofferdam, pipe tunnel or similar compartments, subject to consideration of ventilation aspects.

(3) For access through horizontal openings, hatches or manholes, the dimensions shall be sufficient to allow a person wearing a self-contained air-breathing apparatus and protective equipment to ascend or descend any

ladder without obstruction and also to provide a clear opening to facilitate the hoisting of an injured person from the bottom of the space. The minimum clear opening shall not be less than 600 millimetres by 600 millimetres.

(4) For access through vertical openings, or manholes providing passage through the length and breadth of the space, the minimum clear opening shall not be less than 600 millimetres by 800 millimetres at a height of not more than 600 millimetres from the bottom shell plating, unless gratings or other footholds are provided.

(5) For oil tankers of less than 5,000 tonnes deadweight, smaller dimensions may be approved by the Director in special circumstances, if the ability to traverse such openings or to remove an injured person can be proved to the satisfaction of the Director.

Assigning, marking and recording of subdivision load lines for passenger ships.

46. (1) In order that the required degree of subdivision shall be maintained, a load line corresponding to the approved subdivision draught shall be assigned and marked on the ship's sides. A ship having spaces which are specially adapted for the accommodation of passengers and the carriage of cargo alternatively may, if the owners desire, have one or more additional load lines assigned and marked to correspond with the subdivision draughts for the alternative service conditions.

(2) The subdivision load lines assigned and marked shall be recorded in the Passenger Ship Safety Certificate, and shall be distinguished by the notation C.1 for the principal passenger condition, and C.2, C.3 etc. for the alternative conditions.

(3) The freeboard corresponding to each of these load lines shall be measured at the same position and from the same deck line as the freeboards determined in accordance with the International Convention on Load Lines in force.

(4) The freeboard corresponding to each approved subdivision load line and the conditions of service for which it is approved, shall be clearly indicated on the Passenger Ship Safety Certificate.

(5) In no case shall any subdivision load line mark be placed above the deepest load line in salt water as determined by the strength of the ship or the International Convention on Load Lines in force.

(6) Whatever may be the position of the subdivision load line marks, a ship shall in no case be loaded so as to submerge the load line mark appropriate to the season and locality as determined in accordance with the International Convention on Load Lines in force.

(7) A ship shall in no case be so loaded that when it is in salt water the subdivision load line mark appropriate to the particular voyage and condition of service is submerged.

Construction and initial tests of watertight bulkheads etc. in passenger ships and cargo ships.

47. (1) Each watertight subdivision bulkhead, whether transverse or longitudinal, shall be constructed in such a manner that it shall be capable of supporting, with a proper margin of resistance, the pressure due to the maximum head of water which it might have to sustain in the event of damage to the ship but at least the pressure due to a head of water up to the margin line. The construction of these bulkheads shall be to the satisfaction of the Director.

(2) *(a)* Steps and recesses in bulkheads shall be watertight and as strong as the bulkhead at the place where each occurs.

(b) Where frames or beams pass through a watertight deck or bulkhead, such deck or bulkhead shall be made structurally watertight without the use of wood or cement.

(3) Testing main compartments by filling them with water is not compulsory. When testing by filling with water is not carried out, a hose test shall be carried out where practicable. This test shall be carried out in the most advanced stage of the fitting out of the ship. Where a hose test is not practicable because of possible damage to machinery, electrical equipment insulation or outfitting items, it may be replaced by a careful visual examination of welded connections, supported where deemed necessary by means such as a dye penetrant test or an ultrasonic leak test or an equivalent test. In any case, a thorough inspection of the watertight bulkheads shall be carried out.

(4) The forepeak, double bottoms (including duct keels) and inner skins shall be tested with water to a head corresponding to the requirements of sub-regulation (1).

(5) Tanks which are intended to hold liquids, and which form part of the subdivision of the ship, shall be tested for tightness with water to a head up to the deepest subdivision load line or to a head corresponding to two-thirds of the depth from the top of keel to the margin line in way of the tanks, whichever is the greater; provided that in no case shall the test head be less than 0.9 metres above the top of the tank.

(6) The tests referred to in sub-regulations (4) and (5) are for the purpose of ensuring that the subdivision structural arrangements are watertight and are not to be regarded as a test of the fitness of any compartment for the storage of oil fuel or for other special purposes for which a test of a superior character may be

required depending on the height to which the liquid has access in the tank or its connections.

Openings in watertight bulkheads in passenger ships.

48. (1) The number of openings in watertight bulkheads shall be reduced to the minimum compatible with the design and proper working of the ship. Satisfactory means shall be provided for closing these openings.

(2) *(a)* Where pipes, scuppers, electric cables etc. are carried through watertight subdivision bulkheads, arrangements shall be made to ensure the watertight integrity of the bulkheads.

(b) Valves not forming part of a piping system shall not be permitted in watertight subdivision bulkheads.

(c) Lead or other heat sensitive materials shall not be used in systems which penetrate watertight subdivision bulkheads, where deterioration of such systems in the event of fire would impair the watertight integrity of the bulkheads.

(3) *(a)* No doors, manholes, or access openings are permitted —

(i) in the collision bulkhead below the margin line;

(ii) in watertight transverse bulkheads dividing a cargo space from an adjoining cargo space or from a permanent or reserve bunker, except as provided in paragraph *(a)* of sub-regulation (10) and in regulation 49.

(b) Except as provided in paragraph *(c)*, the collision bulkhead may be pierced below the margin line by not more than one pipe for dealing with fluid in the forepeak tank, provided that the pipe is fitted with a screwdown valve capable of being operated from above the bulkhead deck, the valve chest being secured inside the forepeak to the collision bulkhead. The Director may authorise the fitting of this valve on the after side of the collision bulkhead, provided that the valve is readily accessible under all service conditions and the space in which it is located is not a cargo space.

(c) If the forepeak is divided to hold 2 different kinds of liquids, the Director may allow the collision bulkhead to be pierced below the margin line by 2 pipes, each of which is fitted as required by of paragraph *(b)*, provided the Director is satisfied that there is no practical alternative to the fitting of such a second pipe and that, having regard to the additional subdivision provided in the forepeak, the safety of the ship is maintained.

(4) *(a)* Watertight doors fitted in bulkheads between permanent and reserve bunkers shall always be accessible, except as provided in paragraph *(d)* of sub-regulation (9) for between-deck bunker doors.

(b) Satisfactory arrangements shall be made by means of screens or otherwise to prevent the coal from interfering with the closing of watertight bunker doors.

(5) Subject to sub-regulation (11), not more than one door, apart from the doors to bunkers and shaft tunnels, may be fitted in each main transverse bulkhead within spaces containing the main and auxiliary propulsion machinery including boilers serving the needs of propulsion and all permanent bunkers. Where 2 or more shafts are fitted, the tunnels shall be connected by an intercommunicating passage. There shall be only one door between the machinery space and the tunnel spaces where 2 shafts are fitted and only 2 doors where there are more than 2 shafts. All these doors shall be of the sliding type and shall be so located as to have their sills as high as practicable. The hand gear for operating these doors from above the bulkhead deck shall be situated outside the spaces containing the machinery.

(6) *(a)* Watertight doors, except as provided in paragraph *(a)* of sub-regulation (10) or regulation 49, shall be power-operated sliding doors complying with the requirements of sub-regulation (7) capable of being closed simultaneously from the central operating console at the navigation bridge in not more than 60 seconds with the ship in the upright position.

(b) The means of operation whether by power or by hand of any power-operated sliding watertight door shall be capable of closing the door with the ship listed to 15° either way. Consideration shall also be given to the forces which may act on either side of the door as may be experienced when water is flowing through the opening applying a static head equivalent to a water height of at least one metre above the sill on the centreline of the door.

(c) Watertight door controls, including hydraulic piping and electric cables, shall be kept as close as practicable to the bulkhead in which the doors are fitted, in order to minimise the likelihood of them being involved in any damage which the ship may sustain. The positioning of watertight doors and their controls shall be such that if the ship sustains damage within one-fifth of the breadth of the ship, such distance being measured at right angles to the centreline at the level of the deepest subdivision load line, the operation of the watertight doors clear of the damage portion of the ship is not impaired.

(d) All power-operated sliding watertight doors shall be provided with means of indication which will show at all remote operating positions whether the doors are open or closed. Remote operating positions shall only

be at the navigation bridge as required by paragraph *(a)*(v) of sub-regulation (7) and, at the location where hand operation above the bulkhead deck is required by paragraph *(a)*(iv) of sub-regulation (7).

(e) In ships constructed before 1st. February, 1992, doors which do not comply with paragraphs *(a)* to *(d)* shall be closed before the voyage commences, and shall be kept closed during navigation; the time of opening such doors in port and of closing them before the ship leaves port shall be entered in the official log-book.

(7) *(a)* Each power-operated sliding watertight door shall —

(i) have a vertical or horizontal motion;

(ii) subject to sub-regulation (11), be normally limited to a maximum clear opening width of 1.2 metres. The Director may permit larger door only to the extent considered necessary for the effective operation of the ship, provided that other safety measures, including the following, are taken into consideration —

(A) special consideration shall be given to the strength of the door and its closing appliances in order to prevent leakages;

(B) the door shall be located outside the damage zone B/5;

(C) the door shall be kept closed when the ship is at sea, except for limited periods when absolutely necessary as determined by the Director;

(iii) be fitted with the necessary equipment to open and close the door using electric power, hydraulic power, or any other form of power that is acceptable to the Director;

(iv) be provided with an individual hand-operated mechanism. It shall be possible to open and close the door by hand at the door itself from either side, and in addition, close the door from an accessible position above the bulkhead deck with an all round crank motion or some other movement providing the same degree of safety acceptable to the Director. Direction of rotation or other movement is to be clearly indicated at all operating positions. The time necessary for the complete closure of the door, when operating by hand gear, shall not exceed 90 seconds with the ship in the upright position;

(v) be provided with controls for opening and closing the door by power from both sides of the door and also for closing the door by power from the central operating console at the navigation bridge;

(vi) be provided with an audible alarm, distinct from any other alarm in the area, which shall sound whenever the door is closed remotely by power and which shall sound for at least 5 seconds but no more than 10 seconds before the door begins to move and shall continue sounding until the door is completely closed. In the case of remote hand operation, it is sufficient for the audible alarm to sound only when the door is moving. Additionally, in passenger areas and areas of high ambient noise the Director may require the audible alarm to be supplemented by an intermittent visual signal at the door; and

(vii) have an approximately uniform rate of closure under power. The closure time, from the time the door begins to move to the time it reaches the completely closed position, shall in no case be less than 20 seconds or more than 40 seconds with the ship in the upright position.

(b) The electrical power required for power-operated sliding watertight doors shall be supplied from the emergency switchboard either directly or by a dedicated distribution board situated above the bulkhead deck. The associated control, indication and alarm circuits shall be supplied from the emergency switchboard either directly or by a dedicated distribution board situated above the bulkhead deck and be capable of being automatically supplied by the transitional source of emergency electrical power required by paragraph *(a)*(iii) of sub-regulation (3) of regulation 92 in the event of failure of either the main or emergency source of electrical power.

(c) Power-operated sliding watertight doors shall have —

(i) a centralised hydraulic system with 2 independent power sources each consisting of a motor and pump capable of simultaneously closing all doors. In addition, there shall be for the whole installation hydraulic accumulators of sufficient capacity to operate all the doors at least 3 times, that is, closed-open-closed, against an adverse list of 15°. This operating cycle shall be capable of being carried out when the accumulator is at the pump cut-in pressure. The fluid used shall be chosen considering the temperatures liable to be encountered by the installation during its service. The power operating system shall be designed to minimise the possibility of having a single failure in the hydraulic piping adversely

affect the operation of more than one door. The hydraulic system shall be provided with a low-level alarm for hydraulic fluid reservoirs serving the power-operated system and a low gas pressure alarm or other effective means of monitoring loss of stored energy in visual and shall be situated on the central operating console at the navigation bridge;

(ii) an independent hydraulic system for each door with each power source consisting of a motor and pump capable of opening and closing the door. In addition, there shall be a hydraulic accumulator of sufficient capacity to operate the door at least 3 times, that is, closed-open-closed, against an adverse list of 15°. This operating cycle shall be capable of being carried out when the accumulator is at the pump cut-in pressure. The fluid used shall be chosen considering the temperatures liable to be encountered by the installation during its service. A low gas pressure group alarm or other effective means of monitoring loss of stored energy in hydraulic accumulators shall be provided at the central operating console on the navigation bridge. Loss of stored energy indication at each local operating position shall also be provided; or

(iii) an independent electrical system and motor for each door with each power source consisting of a motor capable of opening and closing the door. The power source shall be capable of being automatically supplied by the transitional source of emergency electrical power as required by paragraph *(b)* of sub-regulation (4) of regulation 92 in the event of failure of either the main or emergency source of electrical power and with sufficient capacity to operate the door at least 3 times, that is, closed-open-closed, against an adverse list of 15°.

For the system specified in this paragraph, provision should be made as follows —

"Power systems for power-operated watertight sliding doors shall be separate from any other power system. A single failure in the electric or hydraulic power-operated systems excluding the hydraulic actuator shall not prevent the hand operation of any door.".

(d) Control handles shall be provided at each side of the bulkhead at a minimum height of 1.6 metres above the floor and shall be so arranged as to enable persons passing through the doorway to hold both handles in the open position without being able to set the power closing mechanism in

operation accidentally. The direction of movement of the handles in opening and closing the door shall be in the direction of door movement and shall be clearly indicated.

(e) As far as practicable, electrical equipment and components for watertight doors shall be situated above the bulkhead deck and outside hazardous areas and spaces.

(f) The enclosures of electrical components necessarily situated below the bulkhead deck shall provide suitable protection against the ingress of water.*

(g) Electric power, control, indication and alarm circuits shall be protected against fault in such a way that a failure in one door circuit will not cause a failure in any other door circuit. Short circuits or other faults in the alarm or indicator circuits of a door shall not result in a loss of power operation of that door. Arrangements shall be such that leakage of water into the electrical equipment located below the bulkhead deck will not cause the door to open.

(h) A single electrical failure in the power operating or control system of a power-operated sliding watertight door shall not result in a closed door opening. Availability of the power supply should be continuously monitored at a point in the electrical circuit as near as practicable to each of the motors required by paragraph *(c)*. Loss of any such power supply should activate an audible and visual alarm at the central operating console at the navigation bridge.

(8) *(a)* The central operating console at the navigation bridge shall have a "master mode" switch with 2 modes of control —

(i) a "local control" mode which shall allow any door to be locally opened and locally closed after use without automatic closure; and

(ii) a "doors closed" mode which shall automatically close any door that is open.

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* Reference is made to the following IEC publication 529:1976 —

1. electrical motors, associated circuits and control components; protected to IPx7 standard;
2. door position indicators and associated circuit components; protected to IPx8 standard; and
3. door movement warning signals; protected to IPx6 standard.

Other arrangements for the enclosures of electrical components may be fitted, provided the Director is satisfied that an equivalent protection is achieved. The water pressure testing of the enclosures protected to IPx8 shall be based on the pressure that may occur at the location of the component during flooding for a period of 36 hours.

The "doors closed" mode shall permit doors to be opened locally and shall automatically reclose the doors upon release of the local control mechanism. The "master mode" switch shall normally be in the "local control" mode. The "doors closed" mode shall only be used in an emergency or for testing purposes. Special consideration shall be given to the reliability of the "master mode" switch.

(b) The central operating console at the navigation bridge shall be provided with a diagram showing the location of each door, with visual indicators to show whether each door is open or closed. A red light shall indicate a door is fully open and a green light shall indicate a door is fully closed. When the door is closed remotely, the red light shall indicate the intermediate position by flashing. The indicating circuit shall be independent of the control circuit for each door.

(c) It shall not be possible to remotely open any door from the central operating console.

(9) *(a)* All watertight doors shall be kept closed during navigation except that they may be opened during navigation as specified in paragraphs *(b)*, *(c)* and *(d)*. Watertight doors of width of more than 1.2 metres permitted by sub-regulation (11) may only be opened in the circumstances detailed in that sub-regulation. Any door which is opened in accordance with this sub-regulation shall be ready to be immediately closed.

(b) A watertight door may be opened during navigation to permit the passage of passengers or crew, or when work in the immediate vicinity of the door necessitates it being opened. The door must be immediately closed when transit through the door is complete or when the task which necessitated it being open is finished.

(c) Certain watertight doors may be permitted to remain open during navigation only if considered absolutely necessary; that is, being open is determined essential to the safe and effective operation of the ship's machinery or to permit passengers normally unrestricted access throughout the passenger area. Such determination shall be made by the Director only after careful consideration of the impact on ship operations and survivability. A watertight door permitted to remain thus open shall be clearly indicated in the ship's stability information and shall always be ready to be immediately closed.

(d) Sliding watertight doors fitted between bunkers in the between-decks below the bulkhead deck may sometimes be open at sea for the purpose of trimming coal. The opening and closing of these doors shall be recorded in the official log-book.

(10) *(a)* If the Director is satisfied that such doors are essential, watertight doors of satisfactory construction may be fitted in watertight bulkheads dividing cargo between deck spaces. Such doors may be hinged, rolling or sliding doors but shall not be remotely controlled. They shall be fitted at the highest level and as far from the shell plating as practicable, but in no case shall the outboard vertical edges be situated at a distance from the shell plating which is less than one-fifth of the breadth of the ship, such distance being measured at right angles to the centreline at the level of the deepest subdivision load line.

(b) Such doors shall be closed before the voyage commences and shall be kept closed during navigation; the time of opening such doors in port and of closing them before the ship leaves port shall be entered in the official log-book. Should any of the doors be accessible during the voyage, they shall be fitted with a device which prevents unauthorised opening. When it is proposed to fit such doors, the number and arrangements shall receive the special consideration of the Director.

(11) Portable plates on bulkheads shall not be permitted, except in machinery spaces. Such plates shall always be in place before the ship leaves port, and shall not be removed during navigation, except in case of urgent necessity at the discretion of the master. The times of removal and replacement of any such portable plates shall be recorded in the official log-book, and the necessary precautions shall be taken in replacing them to ensure that the joints are watertight. The Director may permit not more than one power-operated sliding watertight door in each main transverse bulkhead larger than those specified in paragraph *(a)*(ii) of sub-regulation (7) to be substituted for these portable plates, provided these doors are closed before the ship leaves port and remain closed during navigation, except in case of urgent necessity at the discretion of the master. These doors need not meet the requirements of paragraph *(a)*(iv) of sub-regulation (7) regarding complete closure by hand-operated gear in 90 seconds. The time of opening and closing these doors, whether the ship is at sea or in port, shall be recorded in the log-book.

(12) *(a)* Where trunkways or tunnels for access from crew accommodation to the stokehold, for piping, or for any other purpose are carried through main transverse watertight bulkheads, they shall be watertight and in accordance with the requirements of regulation 53. The access to at least one end of each such tunnel or trunkway, if used as a passage at sea, shall be through a trunk extending watertight to a height sufficient to permit access above the margin line. The access to the other end of the trunkway or tunnel may be through a watertight door of the type required by its location in the ship. Such trunkways or tunnels shall not extend through the first subdivision bulkhead abaft the collision bulkhead.

(b) Where it is proposed to fit tunnel piercing main transverse watertight bulkheads, these shall receive the special consideration of the Director.

(c) Where trunkways in connection with refrigerated cargo and ventilation or forced draught trunks are carried through more than one watertight bulkhead, the means of closure at such openings shall be operated by power and be capable of being closed from a central position situated above the bulkhead deck.

(13) This regulation shall apply to ships constructed on or after 1st. February, 1992.

Passenger ships carrying goods vehicles and accompanying personnel.

49. (1) This regulation applies to passenger ships regardless of the date of construction designed or adapted for the carriage of goods vehicles and accompanying personnel where the total number of persons on board, other than those specified in regulation 3, exceeds 12.

(2) If in such a ship the total number of passengers which include personnel accompanying vehicles does not exceed N = 12 + A/25, where A = total deck area (square metres) of spaces available for the stowage of goods vehicles and where the clear height at the stowage position and at the entrance to such spaces is not less than 4 metres, sub-regulation (10) of regulation 48 in respect of watertight doors apply except that the doors may be fitted at any level in watertight bulkheads dividing cargo spaces. Additionally, indicators are required on the navigation bridge to show automatically when each door is closed and all door fastenings are secured.

(3) When applying the provisions of this Chapter to such a ship, N shall be taken as the maximum number of passengers for which the ship may be certified in accordance with this regulation.

(4) In applying regulation 36 for the worst operating conditions, the permeability for cargo spaces intended for the stowage of goods vehicles and containers shall be derived by calculation in which the goods vehicles and containers shall be assumed to be non-watertight and their permeability taken as 65. For ships engaged in dedicated services the actual value of permeability for goods vehicles or containers may be applied. In no case shall the permeability of the cargo spaces in which the goods vehicles and containers are carried be taken as less than 60.

Openings in shell plating of passenger ships below margin line.

50. (1) The number of openings in the shell plating shall be reduced to the minimum compatible with the design and proper working of the ship.

(2) The arrangement and efficiency of the means for closing any opening in the shell plating shall be consistent with its intended purpose and the position in which it is fitted and generally to the satisfaction of the Director.

(3) *(a)* Subject to the requirements of the International Convention on Load Lines in force, no sidescuttle shall be fitted in such a position that its sill is below a line drawn parallel to the bulkhead deck at side and having its lowest point 2.5% of the breadth of the ship above the deepest subdivision load line, or 500 millimetres, whichever is the greater.

(b) All sidescuttles the sills of which are below the margin line, as permitted by paragraph *(a)* shall be of such construction as will effectively prevent any person opening them without the consent of the master of the ship.

(c) (i) Where in a between-decks, the sills of any of the sidescuttles referred to in paragraph *(b)* are below a line drawn parallel to the bulkhead deck at side and having its lowest point 1.4 metres plus 2.5% of the breadth of the ship above the water when the ship departs from any port, all the sidescuttles in that between-decks shall be closed watertight and locked before the ship leaves port, and they shall not be opened before the ship arrives at the next port. In the application of this sub-paragraph, the appropriate allowance for fresh water may be made when applicable.

(ii) The time of opening such sidescuttles in port and of closing and locking them before the ship leaves port shall be entered in the official log-book.

(iii) For any ship that has one or more sidescuttles so placed that the requirements of sub-paragraph (i) would apply when it was floating at its deepest subdivision load line, the Director may indicate the limiting mean draught at which these sidescuttles will have their sills above the line drawn parallel to the bulkhead deck at side, and having its lowest point 1.4 metres plus 2.5% of the breadth of the ship above the water-line corresponding to the limiting mean draught, and at which it will therefore be permissible to depart from port without previously closing and locking them and to open them at sea on the responsibility of the master during the voyage to the next port. In tropical zones as defined in the International Convention on Load Lines in force, this limiting draught may be increased by 0.3 metre.

(4) Efficient hinged inside deadlights arranged so that they can be easily and effectively closed and secured watertight shall be fitted to all sidescuttles

except that abaft one-eighth of the ship's length from the forward perpendicular and above a line drawn parallel to the bulkhead deck at side and having its lowest point at a height of 3.7 metres plus 2.5% of the breadth of the ship above the deepest subdivision load line, the deadlights may be portable in passenger accommodation other than that for steerage passengers, unless the deadlights are required by the International Convention on Load Lines in force to be permanently attached in their proper positions. Such portable deadlights shall be stowed adjacent to the sidescuttles they serve.

(5) Sidescuttles and their deadlights which will not be accessible during navigation shall be closed and secured before the ship leaves port.

(6) *(a)* No sidescuttles shall be fitted in any spaces which are appropriated exclusively to the carriage of cargo or coal.

(b) Sidescuttles may be fitted in spaces appropriated alternatively to the carriage of cargo or passengers, but they shall be of such construction as will effectively prevent any person opening them or their deadlights without the consent of the master of the ship.

(c) If cargo is carried in such spaces, the sidescuttles and their deadlights shall be closed watertight and locked before the cargo is shipped and such closing and locking shall be recorded in the official log-book.

(7) Automatic ventilating sidescuttles shall not be fitted in the shell plating below the margin line without the special sanction of the Director.

(8) The number of scuppers, sanitary discharges and other similar openings in the shell plating shall be reduced to the minimum either by making each discharge serve for as many as possible of the sanitary and other pipes, or in any other satisfactory manner.

(9) *(a)* All inlets and discharges in the shell plating shall be fitted with efficient and accessible arrangements for preventing the accidental admission of water into the ship.

(b) (i) Subject to the requirements of the International Convention on Load Lines in force, and except as provided in paragraph *(c)*, each separate discharge led through the shell plating from spaces below the margin line shall be provided with either one automatic non-return valve fitted with a positive means of closing it from above the bulkhead deck or with 2 automatic non-return valves without positive means of closing, provided that the inboard valve is situated above the deepest subdivision load line and is always accessible for examination under service conditions. Where a valve with positive means of closing is fitted, the operating

position above the bulkhead deck shall always be readily accessible and means shall be provided for indicating whether the valve is open or closed.

(ii) The requirements of the International Convention on Load Lines in force shall apply to discharges led through the shell plating from spaces above the margin line.

(c) Machinery space main and auxiliary sea inlets and discharges in connection with the operation of machinery shall be fitted with readily accessible valves between the pipes and the shell plating or between the pipes and fabricated boxes attached to the shell plating. The valves may be controlled locally and shall be provided with indicators showing whether they are open or closed.

(d) All shell fittings and valves required by this regulation shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable. All pipes to which this regulation refers shall be of steel or other equivalent material to the satisfaction of the Director.

(10) *(a)* Gangway, cargo and coaling ports fitted below the margin line shall be of sufficient strength. They shall be effectively closed and secured watertight before the ship leaves port, and shall be kept closed during navigation.

(b) Such ports shall be in no case fitted so as to have their lowest point below the deepest subdivision load line.

(11) *(a)* The inboard opening of each ash-chute, rubbish-chute etc. shall be fitted with an efficient cover.

(b) If the inboard opening is situated below the margin line, the cover shall be watertight, and, in addition, an automatic non-return valve shall be fitted in the chute in an easily accessible position above the deepest subdivision load line. When the chute is not in use, both the cover and the valve shall be kept closed and secured.

Openings in shell plating below bulkhead deck of passenger ships and freeboard deck of cargo ships.

51. Notwithstanding the requirements of regulation 50, ships constructed on or after 1st. July, 1998 shall comply with the requirements of regulation 50 where a reference to "margin line" shall be deemed to mean a reference to the bulkhead deck of passenger ships and the freeboard deck of cargo ships.

Construction and initial tests of watertight doors, sidescuttles etc. in passenger ships and cargo ships.

52. (1) In passenger ships —

(a) the design, materials and construction of all watertight doors, sidescuttles, gangway, cargo and coaling ports, valves, pipes, ash-chutes and rubbish-chutes referred to in these Regulations shall be to the satisfaction of the Director; and

(b) the frames of vertical watertight doors shall have no groove at the bottom in which dirt might lodge and prevent the door closing properly.

(2) In passenger ships and cargo ships each watertight door shall be tested by water pressure to a head up to the bulkhead deck or freeboard deck respectively. The test shall be made before the ship is put into service, either before or after the door is fitted.

Construction and initial tests of watertight decks, trunks etc. in passenger ships and cargo ships.

53. (1) Watertight decks, trunks, tunnels, duct keels and ventilators shall be of the same strength as watertight bulkheads at corresponding levels. The means used for making them watertight, and the arrangements adopted for closing openings in them, shall be to the satisfaction of the Director. Watertight ventilators and trunks shall be carried at least up to the bulkhead deck in passenger ships and up to the freeboard deck in cargo ships.

(2) In ro-ro passenger ships, where a ventilation trunk passing through a structure penetrates the bulkhead deck, the trunk shall be capable of withstanding the water pressure that may be present within the trunk, after having taken into account the maximum heel angle allowable during intermediate stages of flooding, in accordance with sub-regulation (6) of regulation 36.

(3) In ro-ro passenger ships, where all or part of the penetration of the bulkhead deck is on the main ro-ro deck, the trunk shall be capable of withstanding impact pressure due to internal water motions (sloshing) of water trapped on the ro-ro deck.

(4) In ro-ro passenger ships, in ships constructed before 1st. July, 1997, the requirements of sub-regulations (2) and (3) shall apply not later than the date of the first periodical survey after 1st. July, 1997.

(5) After completion, a hose or flooding test shall be applied to watertight decks and a hose test to watertight trunks, tunnels and ventilators.

Watertight integrity of passenger ships above margin line.

54. (1) All reasonable and practicable measures shall be taken to limit the entry and spread of water above the bulkhead deck. Such measures may include partial bulkheads or webs. When partial watertight bulkheads and webs are fitted on the bulkhead deck, above or in the immediate vicinity of main subdivision bulkheads, they shall have watertight shell and bulkhead deck connections so as to restrict the flow of water along the deck when the ship is in a heeled damaged condition. Where the partial watertight bulkhead does not line up with the bulkhead below, the bulkhead deck between shall be made effectively watertight.*

(2) The bulkhead deck or a deck above it shall be weathertight. All openings in the exposed weather deck shall have coamings of ample height and strength and shall be provided with efficient means for expeditiously closing them weathertight. Freeing ports, open rails and scuppers shall be fitted as necessary for rapidly clearing the weather deck of water under all weather conditions.

(3) In passenger ships constructed on or after 1st. July, 1997, the open end of air pipes terminating within a superstructure shall be at least one metre above the water-line when the ship heels to an angle of 15°, or the maximum angle of heel during intermediate stages of flooding, as determined by direct calculation, whichever is the greater. Alternatively, air pipes from tanks other than oil tanks may discharge through the side of the superstructure. The provisions of this subregulation are without prejudice to the provisions of the International Convention on Load Lines in force.

(4) Sidescuttles, gangway, cargo and coaling ports and other means for closing openings in the shell plating above the margin line shall be of efficient design and construction and of sufficient strength having regard to the spaces in which they are fitted and their positions relative to the deepest subdivision load line.†

(5) Efficient inside deadlights, so arranged that they can be easily and effectively closed and secured watertight, shall be provided for all sidescuttles to spaces below the first deck above the bulkhead deck.

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* Refer to MSC/Circ.541 (as may be amended): Guidance Notes on the Integrity of Flooding boundaries above the Bulkhead Deck of Passenger Ships for proper application of regulations 36(2) and 54(1).

† Refer to the recommendation on strength and security and locking arrangements of shell doors on ro-ro passenger ships adopted by the Organisation by resolution A.793(19).

Closure of cargo loading doors.

55. (1) This regulation applies to all passenger ships.*

(2) The following doors, located above the margin line, shall be closed and locked before the ship proceeds on any voyage and shall remain closed and locked until the ship is at its next berth —

(a) cargo loading doors in the shell or the boundaries of enclosed superstructure;

(b) bow visors fitted in positions as indicated in paragraph *(a)*;

(c) cargo loading doors in the collision bulkhead;

(d) weathertight ramps forming an alternative closure to those defined in paragraphs *(a)*, *(b)* and *(c)*:

Provided that where a door cannot be opened or closed while the ship is at the berth, that door may be opened or left open while the ship approaches or draws away from the berth, but only so far as may be necessary to enable the door to be immediately operated; in any case, the inner bow door must be kept closed.

(3) Notwithstanding the requirements of paragraphs *(a)* and *(d)* of sub-regulation (2), the Director may authorise that particular doors can be opened at the discretion of the master, if necessary for the operation of the ship or the embarking and disembarking of passengers when the ship is at safe anchorage and provided that the safety of the ship is not impaired.

(4) The master shall ensure that an effective system of supervision and reporting of the closing and opening of the doors referred to in sub-regulation (2) is implemented.

(5) The master shall ensure, before the ship proceeds on any voyage, that an entry in the log-book, as required in regulation 65, is made of the time of the last closing of the doors specified in sub-regulation (2) and the time of any opening of particular doors in accordance with sub-regulation (3).

* Refer to MSC/Circ.541 (as may be amended): Guidance Notes on the Integrity of Flooding boundaries above the Bulkhead Deck of Passenger Ships for proper application of regulations 36(2) and 54(1).

Watertight integrity from ro-ro deck (bulkhead deck) to spaces below.

56. (1) In ro-ro passenger ships constructed on or after 1st. July, 1997 —

(a) subject to paragraphs *(b)* and *(c)*, all accesses that lead to spaces below the bulkhead deck shall have a lowest point which is not less than 2.5 metres above the bulkhead deck;

(b) where vehicle ramps are installed to give access to spaces below the bulkhead deck, their openings shall be able to be closed weathertight to prevent ingress of water below, alarmed and indicated to the navigation bridge;

(c) the Director may permit the fitting of particular accesses to spaces below the bulkhead deck, provided they are necessary for the essential working of the ship, for example, the movement of machinery and stores, subject to such accesses being made watertight, alarmed and indicated to the navigation bridge;

(d) the accesses referred to in paragraphs *(b)* and *(c)* shall be closed before the ship leaves the berth on any voyage and shall remain closed until the ship is at its next berth;

(e) the master shall ensure that an effective system of supervision and reporting of the closing and opening of such accesses referred to in paragraphs *(b)* and *(c)* is implemented; and

(f) the master shall ensure, before the ship leaves the berth on any voyage, that an entry in the official log-book, as required by regulation 65, is made of the time of the last closing of the accesses referred to in paragraphs *(b)* and *(c)*.

(2) In ro-ro passenger ships constructed before 1st. July, 1997 —

(a) all accesses from the ro-ro deck that lead to spaces below the bulkhead deck shall be made weathertight and means shall be provided on the navigation bridge, indicating whether the access is open or closed;

(b) all such accesses shall be closed before the ship leaves the berth on any voyage and shall remain closed until the ship is at its next berth;

(c) notwithstanding the requirements of paragraph *(b)*, the Director may permit some accesses to be opened during the voyage but only for a period sufficient to permit through passage and, if required, for the essential working of the ship; and

(d) the requirements of paragraph *(a)* shall apply not later than the date of the first periodical survey after 1st. July, 1997.

Access to ro-ro decks.

57. In all ro-ro passenger ships, the master or the designated officer shall ensure that, without the expressed consent of the master or the designated officer, no passengers are allowed access to an enclosed ro-ro deck when the ship is under-way.

Closure of bulkheads on ro-ro deck.

58. (1) All transverse or longitudinal bulkheads which are taken into account as effective to confine the seawater accumulated on the ro-ro deck shall be in place and secured before the ship leaves the berth and remain in place and secured until the ship is at its next berth.

(2) Notwithstanding the requirements of sub-regulation (1), the Director may permit some accesses within such bulkheads to be opened during the voyage but only for sufficient time to permit through passage and, if required, for the essential working of the ship.

Bilge pumping arrangements.

Passenger ships and cargo ships.

59. (1) *(a)* An efficient bilge pumping system shall be provided, capable of pumping from and draining any watertight compartment other than a space permanently appropriated for the carriage of fresh water, water ballast, oil fuel or liquid cargo and for which other efficient means of pumping are provided, under all practical conditions. Efficient means shall be provided for draining water from insulated holds.

(b) Sanitary, ballast and general service pumps may be accepted as independent power bilge pumps if fitted with the necessary connections to the bilge pumping system.

(c) All bilge pipes used in or under coal bunkers or fuel storage tanks or in boiler or machinery spaces, including spaces in which oil-settling tanks or oil fuel pumping units are situated, shall be of steel or other suitable material.

(d) The arrangement of the bilge and ballast pumping system shall be such as to prevent the possibility of water passing from the sea and from water ballast spaces into the cargo and machinery spaces, or from one

compartment to another. Provision shall be made to prevent any deep tank having bilge and ballast connections being inadvertently flooded from the sea when containing cargo, or being discharged through a bilge pipe when containing water ballast.

(e) All distribution boxes and manually operated valves in connection with the bilge pumping arrangements shall be in positions which are accessible under ordinary circumstances.

(f) Provisions shall be made for the drainage of enclosed cargo spaces situated on the bulkhead deck of a passenger ship and on the freeboard deck of a cargo ship, provided that the Director may permit the means of drainage to be dispensed with in any particular compartment of any ship or class of ship if he is satisfied that by reason of size or internal subdivision of those spaces the safety of the ship is not thereby impaired.

(g) (i) Where the freeboard to the bulkhead deck or the freeboard deck respectively is such that the deck edge is immersed when the ship heels more than 5°, the drainage shall be by means of a sufficient number of scuppers of suitable size discharging directly overboard, fitted in accordance with the requirements of regulation 50 in the case of a passenger ship and the requirements for scuppers, inlets and discharges of the International Convention on Load Lines in force in the case of a cargo ship.

(ii) Where the freeboard is such that the edge of the bulkhead deck or the edge of the freeboard deck respectively is immersed when the ship heels 5° or less, the drainage of the enclosed cargo spaces on the bulkhead deck or on the freeboard deck respectively shall be led to a suitable space, or spaces, of adequate capacity, having a high water level alarm and provided with suitable arrangements for discharge overboard. In addition, it shall be ensured that —

(A) the number, size and disposition of the scuppers are such as to prevent unreasonable accumulation of free water;

(B) the pumping arrangements required by this regulation for passenger ships or cargo ships, as applicable, take account of the requirements for any fixed pressure water-spraying fire-extinguishing system;

(C) water contaminated with petrol or other dangerous substances is not drained to machinery spaces or other spaces where sources of ignition may be present; and

(D) where the enclosed cargo space is protected by a carbon dioxide fire-extinguishing system, the deck scuppers are fitted with means to prevent the escape of the smothering gas.

Passenger ships.

(2) *(a)* The bilge pumping system required by paragraph *(a)* of sub-regulation (1) shall be capable of operation under all practicable conditions after a casualty whether the ship is upright or listed. For this purpose, wing suctions shall generally be fitted except in narrow compartments at the end of the ship where one suction may be sufficient. In compartments of unusual form, additional suctions may be required. Arrangements shall be made whereby water in the compartment may find its way to the suction pipes. Where, for particular compartments, the Director is satisfied that the provision of drainage may be undesirable, he may allow such provision to be dispensed with if calculations made in accordance with the conditions laid down in sub-regulation (3) of regulation 36 show that the survival capability of the ship will not be impaired.

(b) At least 3 power pumps shall be fitted connected to the bilge main, one of which may be driven by the propulsion machinery. Where the criterion numeral is 30 or more, one additional independent power pump shall be provided.

(c) Where practicable, the power bilge pumps shall be placed in separate watertight compartments and so arranged or situated that these compartments will not be flooded by the same damage. If the main propulsion machinery, auxiliary machinery and boilers are in 2 or more watertight compartments, the pumps available for bilge service shall be distributed as far as is possible throughout these compartments.

(d) On a ship of 91.5 metres in length and upwards or having a criterion numeral of 30 or more, the arrangements shall be such that at least one power bilge pump shall be available for use in all flooding conditions which the ship is required to withstand, as follows —

(i) one of the required bilge pumps shall be an emergency pump of a reliable submersible type having a source of power situated above the bulkhead deck; or

(ii) the bilge pumps and their sources of power shall be so distributed throughout the length of the ship that at least one pump in an undamaged compartment will be available.

(e) With the exception of additional pumps which may be provided for peak compartments only, each required bilge pump shall be so arranged as to draw water from any space required to be drained by paragraph *(a)* of sub-regulation (1).

(f) Each power bilge pump shall be capable of pumping water through the required main bilge pipe at a speed of not less than 2 metre/sec. Independent power bilge pumps situated in machinery spaces shall have direct suctions from these spaces, except that not more than 2 such suctions shall be required in any one space. Where 2 or more such suctions are provided, there shall be at least one on each side of the ship. The Director may require independent power bilge pumps situated in other spaces to have separate direct suctions. Direct suctions shall be suitably arranged and those in a machinery space shall be of a diameter not less than that required for the bilge main.

(g) (i) In addition to the direct bilge suction or suctions required by paragraph *(f)*, a direct suction from the main circulating pump leading to the drainage level of the machinery space and fitted with a non-return valve shall be provided in the machinery space. The diameter of this direct suction pipe shall be at least two-thirds of the diameter of the pump inlet in the case of steamships, and of the same diameter as the pump inlet in the case of motorships.

(ii) Where in the opinion of the Director the main circulating pump is not suitable for this purpose, a direct emergency bilge suction shall be led from the largest available independent power driven pump to the drainage level of the machinery space; the suction shall be of the same diameter as the main inlet of the pump used. The capacity of the pump so connected shall exceed that of a required bilge pump by an amount deemed satisfactory by the Director.

(iii) The spindles of the sea inlet and direct suction valves shall extend well above the engine room platform.

(h) All bilge suction piping up to the connection to the pumps shall be independent of other piping.

(i) The diameter "d" of the bilge main shall be calculated according to the following formula. The actual internal diameter of the bilge main may be rounded off to the nearest standard size acceptable to the Director —

$$d = 25 + 1.68\sqrt{L\,(B + D)}$$

where —

d is the internal diameter of the bilge main (millimeters);

L and B are the length and the breadth of the ship (metres); and

D is the moulded depth of the ship to the bulkhead deck (metres), provided that in a ship having an enclosed cargo space on the bulkhead deck which is internally drained in accordance with the requirements of paragraph *(g)*(ii) of sub-regulation (1) and which extends for the full length of the ship, D shall be measured to the next deck above the bulkhead deck. Where the enclosed cargo spaces cover a lesser length, D shall be taken as the moulded depth to the bulkhead deck plus lh/L where l and h are the aggregate length and height respectively of the enclosed cargo spaces (metres). The diameter of the bilge branch pipes shall meet the requirements of the Director.

(j) Provision shall be made to prevent the compartment served by any bilge suction pipe being flooded in the event of the pipe being severed or otherwise damaged by collision or grounding in any other compartment. For this purpose, where the pipe is at any part situated nearer the side of the ship than one-fifth of the breadth of the ship (as defined in regulation 25 and measured at right angles to the centreline at the level of the deepest subdivision load line), or is in a duct keel, a non-return valve shall be fitted to the pipe in the compartment containing the open end.

(k) Distribution boxes, cocks and valves in connection with the bilge pumping system shall be so arranged that, in the event of flooding, one of the bilge pumps may be operative on any compartment. In addition, damage to a pump or its pipe connecting to the bilge main outboard of a line drawn at one-fifth of the breadth of the ship shall not put the bilge system out of action. If there is only one system of pipes common to all the pumps, the necessary valves for controlling the bilge suctions must be capable of being operated from above the bulkhead deck. Where in addition to the main bilge pumping system an emergency bilge pumping system is provided, it shall be independent of the main system and so arranged that a pump is capable of operating on any compartment under flooding condition as specified in paragraph *(a)*. In that case, only the valves necessary for the operation of the emergency system need be capable of being operated from above the bulkhead deck.

(l) All cocks and valves referred to in paragraph *(k)* which can be operated from above the bulkhead deck shall have their controls at their

place of operation clearly marked and shall be provided with means to indicate whether they are open or closed.

Cargo ships.

(3) At least 2 power pumps connected to the main bilge system shall be provided, one of which may be driven by the propulsion machinery. If the Director is satisfied that the safety of the ship is not impaired, bilge pumping arrangements may be dispensed with in particular compartments.

(4) Paragraphs *(f)* and *(g)* of sub-regulation (1) and paragraph (i) of sub-regulation (2) apply to ships constructed on or after 1st. February, 1992.

Stability information for passenger ships and cargo ships.*

60. (1) Every passenger ship regardless of size and every cargo ship having a length, as defined in the International Convention on Load Lines for the time being in force, of 24 metres and upwards, shall be inclined upon its completion and the elements of its stability determined. The master of the ship shall be supplied with such information satisfactory to the Director as is necessary to enable him by rapid and simple processes to obtain accurate guidance as to the stability of the ship under varying conditions of service. A copy of the stability information shall be furnished to the Director.

(2) Where any alteration is made to a ship which materially affects the stability information supplied to the master, an amended stability information shall be provided. If necessary the ship shall be re-inclined.

(3) At periodical intervals, not exceeding 5 years, a lightweight survey shall be carried out on all passenger ships to verify any changes in lightship displacement and longitudinal centre of gravity. The ship shall be re-inclined whenever, in comparison with the approved stability information, a deviation from the lightship displacement exceeding 2% or a deviation of the longitudinal centre of gravity exceeding 1% of L is found, or anticipated.

* Refer to the Code of Intact Stability for all types of ships covered by IMO Instruments adopted by the Organisation by resolution A.749(18) as amended by resolution MSC.75(69).

Refer also to — MSC/Circ.456, Guidelines for the Preparation of Intact Stability Information; MSC/Circ.706, Guidelines in Intact Stability of Existing Tankers during Transfer Operations; MSC/Circ.707, Guidelines to the Master for Avoiding Dangerous Situations in Following and Quartering Seas.

(4) The Director may allow the inclining test of an individual ship as required by sub-regulation (1) to be dispensed with, provided that basic stability data are available from the inclining test of a sister ship and it is shown to the satisfaction of the Director that reliable stability information for the exempted ship can be obtained from such basic data.

(5) The Director may also allow the inclining test of an individual ship, or class of ships, especially designed for the carriage of liquids or ore in bulk, to be dispensed with when reference to existing data for similar ships clearly indicates that due to the ship's proportions and arrangements, more than sufficient metacentric height will be available in all probable loading conditions.

Damage control plans in passenger ships.*

61. There shall be permanently exhibited, for the guidance of the officer in charge of the ship, plans showing clearly for each deck and hold the boundaries of the watertight compartments, the openings therein with the means of closure and position of any controls thereof, and the arrangements for the correction of any list due to flooding. In addition, booklets containing the aforementioned information shall be made available to the officers of the ship.

Damage control in dry cargo ships.†

62. (1) There shall be permanently exhibited or readily available on the navigation bridge, for the guidance of the officer in charge of the ship, a plan showing clearly for each deck and hold the boundaries of the watertight compartments, the openings therein with the means of closure and position of any controls thereof, and the arrangements for the correction of any list due to flooding. In addition, booklets containing the aforementioned information shall be made available to the officers of the ship.‡

(2) Indicators shall be provided for all sliding doors and for hinged doors in watertight bulkheads. Indication showing whether the doors are open or closed shall be given on the navigation bridge. In addition, shell doors and other openings which, in the opinion of the Director, could lead to major flooding if left open or not properly secured shall be provided with such indicators.

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* Refer to MSC/Circ.919, Guidelines for Damage Control Plans.

† Refer to MSC/Circ.919, Guidelines for Damage Control Plans.

‡ Refer to MSC/Circ.434, Guidelines for the preparation of information on the effect of flooding to be provided to masters of dry cargo ships.

(3) *(a)* General precautions shall consist of a listing of equipment, conditions and operational procedures, considered by the Director to be necessary to maintain watertight integrity under normal ship operations.

(b) Specific precautions shall consist of a listing of elements (that is, closures, security of cargo, sounding of alarms etc.) considered by the Director to be vital to the survival of the ship and its crew.

(4) This regulation applies to ships constructed on or after 1st. February, 1992.

Integrity of hull and superstructure, damage prevention and control.

63. (1) Indicators shall be provided on the navigation bridge for all shell doors, loading doors and other closing appliances which, if left open or not properly secured, could, in the opinion of the Director, lead to flooding of a special category space or ro-ro cargo space. The indicator system shall be designed on the fail-safe principle and shall show by visual alarms if the door is not fully closed or if any of the securing arrangements are not in place and fully locked and by audible alarms if such door or closing appliances become open or the securing arrangements become unsecured. The indicator panel on the navigation bridge shall be equipped with a mode selection function "harbour/sea voyage" so arranged that an audible alarm is given on the navigation bridge if the ship leaves harbour with the bow doors, inner doors, stern ramp or any other side shell doors not closed or any closing device not in the correct position. The power supply for the indicator system shall be independent of the power supply for operating and securing the doors. The indicator systems, approved by the Director, which were installed on ships constructed before 1st. July, 1997 need not be changed.

(2) Television surveillance and a water leakage detection system shall be arranged to provide an indication to the navigation bridge and to the engine control station of any leakage through inner and outer bow doors, stern doors or any other shell doors which could lead to flooding of special category spaces or ro-ro cargo spaces.

(3) Special category spaces and ro-ro cargo spaces shall be continuously patrolled or monitored by effective means, such as television surveillance, so that any movement of vehicles in adverse weather conditions and unauthorised access by passengers thereto can be detected whilst the ship is underway.

(4) Documented operating procedures for closing and securing all shell doors, loading doors and other closing appliances which, if left open or not properly secured, could, in the opinion of the Director, lead to flooding of a special category space or ro-ro cargo space, shall be kept on board and posted at an appropriate place.

(5) This regulation applies to all ro-ro passenger ships, except that for ships constructed before 1st. July, 1997, sub-regulation (2) shall apply not later than the date of the first periodical survey after 1st. July, 1997.

Marking, periodical operation and inspection of watertight doors etc. in passenger ships.

64. (1) This regulation applies to all ships.

(2) *(a)* Drills for the operating of watertight doors, sidescuttles, valves and closing mechanisms of scuppers, ash-chutes and rubbish-chutes shall take place weekly. In ships in which the voyage exceeds one week in duration, a complete drill shall be held before leaving port, and others thereafter at least once a week during the voyage.

(b) All watertight doors, both hinged and power-operated, in main transverse bulkheads, in use at sea, shall be operated daily.

(3) *(a)* The watertight doors and all mechanisms and indicators connected therewith, all valves, the closing of which is necessary to make a compartment watertight, and all valves the operation of which is necessary for damage control cross connections shall be periodically inspected at sea at least once a week.

(b) Such valves, doors and mechanisms shall be suitably marked to ensure that they may be properly used to provide maximum safety.

Entries in log of passenger ships.

65. (1) This regulation applies to all ships.

(2) Hinged doors, portable plates, sidescuttles, gangway, cargo and coaling ports and other openings, which are required by these Regulations to be kept closed during navigation, shall be closed before the ship leaves port. The time of closing and the time of opening (if permissible under these Regulations) shall be recorded in the official log-book.

(3) A record of all drills and inspections required by regulation 59 shall be entered in the offical log-book with an explicit record of any defects which may be disclosed.

PART B – 1

SUBDIVISION AND DAMAGE STABILITY OF CARGO SHIPS*

Application.

66. (1) The requirements in this Part shall apply to cargo ships over 100 metres in length (L_s) but shall exclude those ships which are shown to comply with subdivision and damage stability regulations in other instruments* developed by the Organisation. The requirements in this Part shall also apply to cargo ships of 80 metres in L_s and upwards but not exceeding 100 metres in L_s constructed on or after 1st. July, 1998.

(2) Any reference hereinafter to regulations refers to the set of regulations contained in this Part.

(3) The Director may, for a particular ship or group of ships, accept alternative arrangements if he is satisfied that at least the same degree of safety as represented by these Regulations is achieved.

(4) This Part applies to cargo ships constructed on or after 1st. February, 1992.

Interpretation.

67. For the purpose of these Regulations, unless expressly provided otherwise —

"aft terminal" is the aft limit of the subdivision length;

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* The Maritime Safety Committee, in adopting the regulations contained in Part B-1, invited Administration to note that the regulations should be applied in conjunction with the Explanatory Notes to the SOLAS Regulations on Subdivision and Damage Stability of Cargo Ships of 100 metres in length and over, which were adopted by the Organisation by resolution A.684(17), in order to ensure their uniform application. Refer also to resolution MSC.76(69) on Extended Application of the Explanatory Notes to the SOLAS Regulations on Subdivision and Damages Stability of Cargo Ships of 100 metres in length and over (resolution A.684(17)).

* Ships shown to comply with the following regulations may be excluded from the application of Part B-1 —

1. Annex I to MARPOL 73/78;
2. International Bulk Chemical Code;
3. International Gas Carrier Code;
4. Guidelines for the Design and Construction of Offshore Supply Vessels (resolution A.469(XII));
5. Code of Safety for Special Purpose Ships (resolution A.534(13), as amended);
6. Damage stability requirements of regulation 27 of the 1966 Load Line Convention as applied in compliance with resolutions A.320(IX) and A.514(13), provided that in the case of ships to which regulation 27(9) applies, main transverse bulkheads, to be considered effective, are spaced according to paragraph 12(f) of resolution A.320(IX).

"breadth (B)" is the greatest moulded breadth of the ship at or below the deepest subdivision load line;

"deepest subdivision load line" is the subdivision load line which corresponds to the summer draught to be assigned to the ship;

"draught (d)" is the vertical distance from the moulded base line at mid-length to the water-line in question;

"forward terminal" is the forward limit of the subdivision length;

"mid-length" is the mid-point of the subdivision length of the ship;

"partial load line" is the light ship draught plus 60% of the difference between the light ship draught and deepest subdivision load line;

"permeability (μ)" of a space is the proportion of the immersed volume of that space which can be occupied by water;

"subdivision length of the ship (L_s)" is the greatest projected moulded length of that part of the ship at or below deck or decks limiting the vertical extent of flooding with the ship at the deepest subdivision load line;

"subdivision load line" is a water-line used in determining the subdivision of the ship.

Required subdivision index "R".

68. (1) These Regulations are intended to provide ships with a minimum standard of subdivision.

(2) The degree of subdivision to be provided shall be determined by the required subdivision index R as follows —

(a) for ships over 100 metres in L_s —

$$R = (0.002 + 0.0009L_s)^{1/3}$$

where L_s is in metres; and

(b) for ships of 80 metres in L_s and upwards but not exceeding 100 metres in L_s —

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

where R_o is the value R as calculated in accordance with the formula in paragraph *(a)*.

Attained subdivision index "A".

69. (1) The attained subdivision index A, calculated in accordance with this regulation, shall not be less than the required subdivision index R, calculated in accordance with sub-regulation (2) of regulation 68.

(2) The attained subdivision index A shall be calculated for the ship by the following formula —

$$A = \Sigma p_i s_i$$

where —

i represents each compartment or group of compartments under consideration;

p_i accounts for the probability that only the compartment or group of compartments under consideration may be flooded, disregarding any horizontal subdivision;

s_i accounts for the probability of survival after flooding the compartment or group of compartments under consideration, including the effects of any horizontal subdivision.

(3) In calculating A, level trim shall be used.

(4) This summation covers only those cases of flooding which contribute to the value of the attained subdivision index A.

(5) The summation indicated by the formula referred to in sub-regulation (2) shall be taken over the ship's length for all cases of flooding in which a single compartment or 2 or more adjacent compartments are involved.

(6) Wherever wing compartments are fitted, contribution to the summation indicated by the formula shall be taken for all cases of flooding in which wing

compartments are involved; and additionally, for all cases of simultaneous flooding of a wing compartment or compartments and the adjacent inboard compartment or compartments, assuming a rectangular penetration which extends to the ship's centreline, but excludes damage to any centreline bulkhead.

(7) The assumed vertical extent of damage is to extend from the base line upwards to any watertight horizontal subdivision above the water-line or higher. If a lesser extent will give a more severe result, such extent is to be assumed.

(8) If pipes, ducts or tunnels are situated within assumed flooded compartments, arrangements are to be made to ensure that progressive flooding cannot thereby extend to compartments other than those assumed flooded. The Director may permit minor progressive flooding if it is demonstrated that its effects can be easily controlled and the safety of the ship is not impaired.

(9) In the flooding calculations carried out according to the regulations, only one breach of the hull need be assumed.

Calculation of factor "p_i".

70. (1) The factor p_i shall be calculated according to paragraph *(a)* as appropriate, using the following notations —

x_1 = the distance from the aft terminal of L_s to the foremost portion of the aft end of the compartment being considered;

x_2 = the distance from the aft terminal of L_s to the aftermost portion of the forward end of the compartment being considered;

$E_1 = x_1/L_s$

$E_2 = x_2/L_s$

$E = E_1 + E_2 - 1$

$J = E_2 - E_1$

$J' = J - E$, if $E \geq 0$

$J' = J + E$, if $E < 0$

The maximum non-dimensional damage length

$J_{max} = 48/L_s$, but not more than 0.24.

The assumed distribution density of damage location along the ship's length

$a = 1.2 + 0.8E$, but not more than 1.2.

The assumed distribution function of damage location along the ship's length

$$F = 0.4 + 0.25E\,(1.2 + a)$$

$$y = J/J_{max}$$

$$p = F_1 J_{max}$$

$$q = 0.4F_2(J_{max})^2$$

$$F_1 = y^2 - \frac{y^3}{3} \qquad \text{if } y < 1,$$

$$F_1 = y - \frac{1}{3} \qquad \text{otherwise;}$$

$$F_2 = \frac{y^3}{3} - \frac{y^4}{12} \qquad \text{if } y < 1,$$

$$F_2 = \frac{y^2}{2} - \frac{y}{3} + \frac{1}{12} \qquad \text{otherwise.}$$

(a) The factor p_i is determined for each single compartment —

(i) where the compartment considered extends over the entire ship length L_s —

$$p_i = 1$$

(ii) where the aft limit of the compartment considered coincides with the aft terminal —

$$p_i = F + 0.5ap + q$$

(iii) where the forward limit of the compartment considered coincides with the forward terminal —

$$p_i = 1 - F + 0.5ap$$

(iv) when both ends of the compartment considered are inside the aft and forward terminals of the ship length L_s —

$$p_i = ap$$

(v) in applying the formulae of sub-paragraphs (ii), (iii) and (iv), where the compartment considered extends over the mid-length, these formulae values shall be reduced by an amount determined according to the formula for q, in which F_2 is calculated taking y to be J'/J_{max}.

(2) Wherever wing compartments are fitted, the p_i-value for a wing compartment shall be obtained by multiplying the value, as determined in sub-regulation (3), by the reduction factor r according to paragraph *(b)*, which represents the probability that the inboard spaces will not be flooded.

(a) The p_i-value for the case of simultaneous flooding of a wing and adjacent inboard compartment shall be obtained by using the formulae of sub-regulation (3), multiplied by the factor (1 - r).

(b) The reduction factor r shall be determined by the following formulae —

For $J \leq 0.2\ ^b/_B$ —

$$r = \frac{b}{B}\left(2.3 + \frac{0.08}{J + 0.02}\right) + 0.1, \qquad \text{if } ^b/_B \leq 0.2$$

$$r = \left(\frac{0.016}{J + 0.02} + \frac{b}{B} + 0.36\right), \qquad \text{if } ^b/_B > 0.2$$

For $J < 0.2\ ^b/_B$, the reduction factor r shall be determined by linear interpolation between —

$$r = 1, \qquad \text{for } J = 0$$

and

$$r = \text{as for the case where } J \geq 0.2\ ^b/_B, \qquad \text{for } J = 0.2\ ^b/_B$$

where —

b = the mean transverse distance in metres measured at right angles to the centreline at the deepest subdivision load line between the shell and a plane through the outermost portion of and parallel to that part of the longitudinal bulkhead which extends between the longitudinal limits used in calculating the factor p_i.

(3) To evaluate p_i for compartments taken singly, the formulae in sub-regulations (1) and (2) shall be applied directly.

(a) To evaluate the p_i-values attributable to groups of compartments, the following applies —

(i) for compartments taken by pairs —

$$p_i = p_{12} - p_1 - p_2$$

$$p_i = p_{23} - p_2 - p_3 \quad \text{etc.}$$

(ii) for compartments taken by groups of 3 —

$$p_i = p_{123} - p_{12} - p_{23} + p_2$$

$$p_i = p_{234} - p_{23} - p_{34} + p_3 \quad \text{etc.}$$

(iii) for compartments taken by groups of 4 —

$$p_i = p_{1234} - p_{123} - p_{234} + p_{23}$$

$$p_i = p_{2345} - p_{234} - p_{345} + p_{34} \quad \text{etc.}$$

where —

p_{12}, p_{23}, p_{34} etc.,

p_{123}, p_{234}, p_{345} etc., and

p_{1234}, p_{2345}, p_{3456} etc.

shall be calculated according to the formulae in sub-regulations (1) and (2) for a single compartment whose non-dimensional length J corresponds to that of a group consisting of the compartments indicated by the indices assigned to p.

(b) The factor p_i for a group of 3 or more adjacent compartments equals zero if the non-dimensional length of such a group minus the non-dimensional length of the aftermost and foremost compartments in the group is greater than J_{max}.

Calculation of factor "s_i".

71. (1) The factor s_i shall be determined for each compartment or group of compartments according to the following —

(a) in general for any condition of flooding from any initial loading condition s shall be —

$$s = C\sqrt{0.5\,(GZ_{max})\,(range)}$$

with —

$C = 1$, if $\theta_e \leq 25°$;

$C = 0$, if $\theta_e > 30°$;

$$C = \sqrt{\frac{30 - \theta_e}{5}} \quad \text{otherwise;}$$

GZ_{max} = maximum positive righting lever (in metres) within the range as given below but not more than 0.1 metre;

Range = range of positive righting levers beyond the angle of equilibrium (in degrees) but not more than 20°; however, the range shall be terminated at the angle where openings not capable of being closed weather-tight are immersed;

θ_e = final equilibrium angle of heel (in degrees);

(b) $_s = 0$ where the final water-line taking into account sinkage, heel and trim, immerses the lower edge of openings through which progressive flooding may take place. Such opening shall include air-pipes, ventilators and openings which are closed by means of weathertight doors or hatch covers, and may exclude those openings closed by means of watertight manhole covers and flush scuttles, small watertight hatch covers which maintain the high integrity of the deck, remotely operated sliding watertight doors, access doors and access hatch covers, of watertight integrity,

normally closed at sea and sidescuttles of the non-opening type. If the compartments so flooded are taken into account in the calculations, the requirements of this regulation shall be applied;

(c) for each compartment or group of compartments, s_i shall be weighted according to draught considerations as follows —

$$s_i = 0.5s_l + 0.5s_p$$

where —

s_l is the s-factor at the deepest subdivision load line;

s_p is the s-factor at the partial load line.

(2) For all compartments forward of the collision bulkhead, the s-value, calculated assuming the ship to be at its deepest subdivision load line and with assumed unlimited vertical extent of damage, is to be equal to one.

(3) Wherever a horizontal subdivision is fitted above the water-line in question, the following applies —

(a) the s-value for the lower compartment or group of compartments shall be obtained by multiplying the value as determined in paragraph *(a)* of sub-regulation (1) by the reduction factor v according to paragraph *(c)*, which represents the probability that the spaces above the horizontal subdivision will not be flooded;

(b) in cases of positive contribution to index A due to simultaneous flooding of the spaces above the horizontal subdivision, the resulting s-value for such a compartment or group of compartments shall be obtained by an increase of the value as determined by paragraph *(a)* by the s-value for simultaneous flooding according to paragraph *(a)* of sub-regulation (1), multiplied by the factor (1 - v);

(c) the probability factor v_i shall be calculated according to —

$v_i = \dfrac{H - d}{H_{max} - d}$, for the assumed flooding up to the horizontal subdivision above the subdivision load line, where H is to be restricted to a height of H_{max}.

$v_i = 1$, if the uppermost horizontal subdivision in way of the assumed damage region is below H_{max}.

where —

H is the height of the horizontal subdivision above the base line (in metres) which is assumed to limit the vertical extent of damage;

H_{max} is the maximum possible vertical extent of damage above the base line (in metres); or

$$H_{max} = d + 0.056L_s \left(1 - \frac{L_s}{500}\right), \text{ if } L_s \leq 250 \text{ metres}$$

$$H_{max} = d + 7, \quad \text{if } L_s > 250 \text{ metres},$$

whichever is less.

Permeability.*

72. For the purpose of the subdivision and damage stability calculations of the regulations, the permeability of each space or part of a space shall be as follows —

Spaces	Permeability
Appropriated to stores	0.60
Occupied by accommodation	0.95
Occupied by machinery	0.85
Void spaces	0.95
Dry cargo spaces	0.70
Intended for liquid	0 or 0.95†

* Refer to MSC/Circ.651, Interpretation of Regulations of Part B-1 of SOLAS Chaper II-1.

† Whichever results in the more severe requirements.

Stability information.

73. (1) The master of the ship shall be supplied with such reliable information as is necessary to enable him by rapid and simple means to obtain accurate guidance as to the stability of the ship under varying conditions of service. The information shall include —

(a) a curve of minimum operational metacentric height (GM) versus draught which assures compliance with the relevant intact stability requirements and the requirements of regulations 66 to 71, alternatively a corresponding curve of the maximum allowable vertical centre of gravity (KG) versus draught, or with the equivalents of either of these curves;

(b) instructions concerning the operation of cross-flooding arrangements; and

(c) all other data and aids which might be necessary to maintain stability after damage.

(2) There shall be permanently exhibited, or readily available on the navigation bridge, for the guidance of the officer in charge of the ship, plans showing clearly for each deck and hold the boundaries of the watertight compartments, the openings therein with the means of closure and position of any controls thereof, and the arrangements for the correction of any list due to flooding. In addition, booklets containing the aforementioned information shall be made available to the officers of the ship.*

(3) In order to provide the information referred to in paragraph *(a)* of sub-regulation (1), the limiting GM (or KG) values to be used, if they have been determined from considerations related to the subdivision index, the limiting GM shall be varied linearly between the deepest subdivision load line and the partial load line.† In such cases, for draughts below the partial load line if the minimum GM requirement at this draught results from the calculation of the subdivision index, then this GM value shall be assumed for lesser draughts, unless the intact stability requirements apply.

* Refer to MSC/Circ.919, Guidelines for Damage Control Plans.

† Refer to MSC/Circ.651, Interpretation of Regulations of Part B-1 of SOLAS Chapter II-1.

Openings in watertight bulkheads and internal decks in cargo ships.

74. (1) The number of openings in watertight subdivisions is to be kept to a minimum compatible with the design and proper working of the ship. Where penetrations of watertight bulkheads and internal decks are necessary for access, piping, ventilation, electrical cables etc., arrangements are to be made to maintain the watertight integrity. The Director may permit relaxation in the watertightness of openings above the freeboard deck, provided that it is demonstrated that any progressive flooding can be easily controlled and that the safety of the ship is not impaired.

(2) Doors provided to ensure the watertight integrity of internal openings which are used while at sea are to be sliding watertight doors capable of being remotely closed from the bridge and are also to be operable locally from each side of the bulkhead. Indicators are to be provided at the control position showing whether the doors are open or closed, and an audible alarm is to be provided at the door closure. The power, control and indicators are to be operable in the event of main power failure. Particular attention is to be paid to minimise the effect of control system failure. Each power-operated sliding watertight door shall be provided with an individual hand-operated mechanism. It shall be possible to open and close the door by hand at the door itself from both sides.

(3) Access doors and access hatch covers normally closed at sea, intended to ensure the watertight integrity of internal openings, shall be provided with means of indication locally and on the bridge showing whether these doors or hatch covers are open or closed. A notice is to be affixed to each such door or hatch cover to the effect that it is not to be left open. The use of such doors and hatch covers shall be authorised by the officer of the watch.

(4) Watertight doors or ramps of satisfactory construction may be fitted to internally subdivide large cargo spaces, provided that the Director is satisfied that such doors or ramps are essential. These doors or ramps may be hinged, rolling or sliding doors or ramps, but shall not be remotely controlled.* Such doors or ramps shall be closed before the voyage commences and shall be kept closed during navigation. The time of opening such doors or ramps in port and of closing them before the ship leaves port shall be entered in the official log-book. Should any of the doors or ramps be accessible during the voyage, they shall be fitted with a device which prevents unauthorised opening.

(5) Other closing appliances which are kept permanently closed at sea to ensure the watertight integrity of internal openings shall be provided with a notice which is to be affixed to each such closing appliance to the effect that it is to be kept closed. Manholes fitted with closely bolted covers need not be so marked.

* Refer to MSC/Circ.651, Interpretation of Regulations of Part B-1 of SOLAS Chaper II-1.

External openings in cargo ships.

75. (1) All external openings leading to compartments assumed intact in the damage analysis, which are below the final damage water-line, are required to be watertight.

(2) External openings required to be watertight in accordance with sub-regulation (1) shall be of sufficient strength and, except for cargo hatch covers, shall be fitted with indicators on the bridge.

(3) Openings in the shell plating below the deck limiting the vertical extent of damage shall be kept permanently closed while at sea. Should any of these openings be accessible during the voyage, they shall be fitted with a device which prevents unauthorised opening.

(4) Notwithstanding the requirements of sub-regulation (3), the Director may authorise that particular doors may be opened at the discretion of the master, if necessary for the operation of the ship and provided that the safety of the ship is not impaired.

(5) Other closing appliances which are kept permanently closed at sea to ensure the watertight integrity of external openings shall be provided with a notice affixed to each appliance to the effect that it is to be kept closed. Manholes fitted with closely bolted covers need not be so marked.

PART C*

MACHINERY INSTALLATIONS

General.

76. (1) The machinery, boilers and other pressure vessels, associated piping systems and fittings shall be of a design and construction adequate for the service for which they are intended and shall be so installed and protected as to reduce to a minimum any danger to persons on board, due regard being paid to moving parts, hot surfaces and other hazards. The design shall have regard to materials used in construction, the purpose for which the equipment is intended, the working conditions to which it will be subjected and the environmental conditions on board.†

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* Except where expressly provided otherwise, Part C applies to passenger ships and cargo ships.

† Refer to MSC/Circ.834, Guidelines for engine room layout, design and arrangement.

(2) The Director shall give special consideration to the reliability of single essential propulsion components and he may require a separate source of propulsion power sufficient to give the ship a navigable speed, especially in the case of unconventional arrangements.

(3) Means shall be provided whereby normal operation of propulsion machinery can be sustained or restored even though one of the essential auxiliaries becomes inoperative. Special consideration shall be given to the malfunctioning of —

(a) a generating set which serves as a main source of electrical power;

(b) the sources of steam supply;

(c) the boiler feed water systems;

(d) the fuel oil supply systems for boilers or engines* ;

(e) the sources of lubricating oil pressure;

(f) the sources of water pressure;

(g) a condensate pump and the arrangements to maintain vacuum in condensers;

(h) the mechanical air supply for boilers;

(i) an air compressor and receiver for starting or control purposes; and

(j) the hydraulic, pneumatic or electrical means for control in main propulsion machinery, including controllable pitch propellers,

but the Director, having regard to overall safety considerations, may accept a partial reduction in propulsion capability from normal operation.

(4) Means shall be provided to ensure that the machinery can be brought into operation from the dead ship condition without external aid.

(5) All boilers, parts of machinery, steam, hydraulic, pneumatic and other systems and their associated fittings which are under internal pressure shall be subjected to appropriate tests, including a pressure test before being put into service for the first time.

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* 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.

(6) Main propulsion machinery and all auxiliary machinery essential to the propulsion and the safety of the ship shall, as fitted in the ship, be designed to operate when the ship is upright and when inclined at any angle of list up to and including 15° either way under static conditions and 22.5° under dynamic conditions (rolling) either way and simultaneously inclined dynamically (pitching) 7.5° by bow or stern. The Director may permit deviation from these angles, taking into consideration the type, size and service conditions of the ship.

(7) Provision shall be made to facilitate cleaning, inspection and maintenance of main propulsion and auxiliary machinery, including boilers and pressure vessels.

(8) Special consideration shall be given to the design, construction and installation of propulsion machinery systems so that any mode of their vibrations shall not cause undue stresses in this machinery in the normal operating ranges.

(9) Non-metallic expansion joints in piping systems, if located in a system which penetrates the ship's side and both the penetration and the non-metallic expansion joint are located below the deepest load water-line, shall be inspected as part of the surveys prescribed in sub-regulation (1) of regulation 11 and replaced as necessary, or at an interval recommended by the manufacturer.

(10) Operating and maintenance instructions and engineering drawings for ships machinery and equipment essential to the safe operation of the ship shall be written in a language understandable by those officers and crew members who are required to understand such information in the performance of their duties.

(11) Location and arrangement of vent pipes for fuel oil service, settling and lubrication oil tanks shall be such that in the event of a broken vent pipe this shall not directly lead to the risk of ingress of seawater splashes or rainwater. 2 fuel oil service tanks for each type of fuel used on board necessary for propulsion and vital systems or equivalent arrangements shall be provided on each new ship, with a capacity of at least 8h at maximum continuous rating of the propulsion plant and normal operating load at sea of the generator plant.* This sub-regulation applies only to ships constructed on or after 1st. July, 1998.

* Refer to regulation 120 on arrangements for oil fuel, lubricating oil and other flammable oils.

Machinery.

77. (1) Where risk from overspeeding of machinery exists, means shall be provided to ensure that the safe speed is not exceeded.

(2) Where main or auxiliary machinery, including pressure vessels or any parts of such machinery, are subject to internal pressure and may be subject to dangerous overpressure, means shall be provided where practicable to protect against such excessive pressure.

(3) All gearing and every shaft and coupling used for transmission of power to machinery essential for the propulsion and safety of the ship or for the safety of persons on board shall be so designed and constructed that they will withstand the maximum working stresses to which they may be subjected in all service conditions, and due consideration shall be given to the type of engines by which they are driven or of which they form part.

(4) Internal combustion engines of a cylinder diameter of 200 millimetres or a crankcase volume of 0.6 m^3 and above shall be provided with crankcase explosion relief valves of a suitable type with sufficient relief area. The relief valves shall be arranged or provided with means to ensure that discharge from them is so directed as to minimise the possibility of injury to personnel.

(5) Main turbine propulsion machinery and, where applicable, main internal combustion propulsion machinery and auxiliary machinery shall be provided with automatic shut-off arrangements in the case of failures such as lubricating oil supply failure which could lead rapidly to complete breakdown, serious damage or explosion. The Director may permit provisions for overriding automatic shut-off devices.

Means of going astern.*

78. (1) Sufficient power for going astern shall be provided to secure proper control of the ship in all normal circumstances.

(2) The ability of the machinery to reverse the direction of thrust of the propeller in sufficient time, and so to bring the ship to rest within a reasonable distance from maximum ahead service speed, shall be demonstrated and recorded.

* Refer to Recommendation on the provisions and the display of manoeuvring information on board ships (resolution A.601(15)), the interim standards for ship manoeuvrability (resolution A.751(18)), and the explanatory notes to the interim standards for ship manoeuvrability (MSC/Circ.644).

(3) The stopping times, ship headings and distances recorded on trials, together with the results of trials to determine the ability of ships having multiple propellers to navigate and manoeuvre with one or more propellers inoperative, shall be available on board for the use of the master or designated personnel.

(4) Where the ship is provided with supplementary means for manoeuvring or stopping, the effectiveness of such means shall be demonstrated and recorded as referred to in sub-regulations (2) and (3).

Steering gear.*

79. (1) Unless expressly provided otherwise, every ship shall be provided with a main steering gear and an auxiliary steering gear to the satisfaction of the Director. The main steering gear and the auxiliary steering gear shall be so arranged that the failure of one of them shall not render the other one inoperative.

(2) *(a)* All the steering gear components and the rudder stock shall be of sound and reliable construction to the satisfaction of the Director. Special consideration shall be given to the suitability of any essential component which is not duplicated. Any such essential component shall, where appropriate, utilise anti-friction bearings such as ball bearings, roller bearings or sleeve bearings which shall be permanently lubricated or provided with lubrication fittings.

(b) The design pressure for calculations to determine the scantlings of piping and other steering gear components subjected to internal hydraulic pressure shall be at least 1.25 times the maximum working pressure to be expected under the operational conditions specified in paragraph *(b)* of sub-regulation (3), taking into account any pressure which may exist in the low pressure side of the system. At the discretion of the Director, fatigue criteria shall be applied for the design of piping and components, taking into account pulsating pressures due to dynamic loads.

(c) Relief valves shall be fitted to any part of the hydraulic system which can be isolated and in which pressure can be generated from the power source or from external forces. The setting of the relief valves shall not exceed the design pressure. The valves shall be of adequate size and so arranged as to avoid an undue rise in pressure above the design pressure.

* Refer 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.

(3) The main steering gear and rudder stock shall be —

(a) of adequate strength and capable of steering the ship at maximum ahead service speed which shall be demonstrated;

(b) capable of putting the rudder over from 35° on one side to 35° on the other side with the ship at its deepest seagoing draught and running ahead at maximum ahead service speed and, under the same conditions, from 35° on either side to 30° on the other side in not more than 28 seconds;

(c) operated by power where necessary to meet the requirement of paragraph *(b)* and in any case, when the Director requires a rudder stock of over 120 millimetres diameter in way of the tiller, excluding strengthening for navigation in ice; and

(d) so designed that they will not be damaged at maximum astern speed; however, this design requirement need not be proved by trials at maximum astern speed and maximum rudder angle.

(4) The auxiliary steering gear shall be —

(a) of adequate strength and capable of steering the ship at navigable speed and of being brought speedily into action in an emergency;

(b) capable of putting the rudder over from 15° on one side to 15° on the other side in not more than 60 seconds with the ship at its deepest seagoing draught and running ahead at one-half of the maximum ahead service speed or 7 knots, whichever is the greater; and

(c) operated by power where necessary to meet the requirements of paragraph *(b)* and in any case when the Director requires a rudder stock of over 230 millimetres diameter in way of the tiller, excluding strengthening for navigation in ice.

(5) Main and auxiliary steering gear power units shall be —

(a) arranged to re-start automatically when power is restored after a power failure; and

(b) capable of being brought into operation from a position on the navigation bridge. In the event of a power failure to any one of the steering gear power units, an audible and visual alarm shall be given on the navigation bridge.

(6) *(a)* Where the main steering gear comprises 2 or more identical power units, an auxiliary steering gear need not be fitted, provided that —

(i) in a passenger ship, the main steering gear is capable of operating the rudder as required by paragraph *(b)* of sub-regulation (3) while any one of the power units is out of operation;

(ii) in a cargo ship, the main steering gear is capable of operating the rudder as required by paragraph *(b)* of sub-regulation (3) while operating with all power units;

(iii) the main steering gear is so arranged that after a single failure in its piping system or in one of the power units, the defect can be isolated so that steering capability can be maintained or speedily regained.

(b) Steering gears, other than the hydraulic type, shall achieve standards equivalent to the requirements of this sub-regulation to the satisfaction of the Director.

(7) Steering gear control shall be provided —

(a) for the main steering gear, both on the navigation bridge and in the steering gear compartment;

(b) where the main steering gear is arranged in accordance with sub-regulation (6) by 2 independent control systems, both operable from the navigation bridge. This does not require duplication of the steering wheel or steering lever. Where the control system consists of an hydraulic telemotor, a second independent system need not be fitted, except in a tanker, chemical tanker or gas carrier of 10,000 tons and upwards;

(c) for the auxiliary steering gear, in the steering gear compartment and, if power-operated, it shall also be operable from the navigation bridge and shall be independent of the control system for the main steering gear.

(8) Any main and auxiliary steering gear control system operable from the navigation bridge shall comply with the following —

(a) if electric, it shall be served by its own separate circuit supplied from a steering gear power circuit from a point within the steering gear compartment, or directly from switchboard busbars supplying that steering gear power circuit at a point on the switchboard adjacent to the supply to the steering gear power circuit;

(b) means shall be provided in the steering gear compartment for disconnecting any control system operable from the navigation bridge from the steering gear it serves;

(c) the system shall be capable of being brought into operation from a position on the navigation bridge;

(d) in the event of a failure of electrical power supply to the control system, an audible and visual alarm shall be given on the navigation bridge; and

(e) short circuit protection only shall be provided for steering gear control supply circuits.

(9) The electrical power circuits and the steering gear control systems with their associated components, cables and pipes required by this regulation and regulation 80 shall be separated as far as is practicable throughout their length.

(10) A means of communication shall be provided between the navigation bridge and the steering gear compartment.

(11) The angular position of the rudder shall —

(a) if the main steering gear is power-operated, be indicated on the navigation bridge. The rudder angle indication shall be independent of the steering gear control system; and

(b) be recognisable in the steering gear compartment.

(12) Hydraulic power-operated steering gear shall be provided with the following —

(a) arrangements to maintain the cleanliness of the hydraulic fluid taking into consideration the type and design of the hydraulic system;

(b) a low level alarm for each hydraulic fluid reservoir to give the earliest practicable indication of hydraulic fluid leakage. Audible and visual alarms shall be given on the navigation bridge and in the machinery space where they can be readily observed; and

(c) a fixed storage tank having sufficient capacity to recharge at least one power actuating system including the reservoir, where the main steering gear is required to be power operated. The storage tank shall be permanently connected by piping in such a manner that the hydraulic systems can be readily recharged from a position within the steering gear compartment and shall be provided with a contents gauge.

(13) The steering gear compartments shall be —

(a) readily accessible and, as far as practicable, separated from machinery spaces; and

(b) provided with suitable arrangements to ensure working access to steering gear machinery and controls. These arrangements shall include handrails and gratings or other non-slip surfaces to ensure suitable working conditions in the event of hydraulic fluid leakage.

(14) Where the rudder stock is required to be over 230 millimetres diameter in way of the tiller, excluding strengthening for navigation in ice, an alternative power supply, sufficient at least to supply the steering gear power unit which complies with the requirements of paragraph *(b)* of sub-regulation (4) and also its associated control system and the rudder angle indicator, shall be provided automatically, within 45 seconds, either from the emergency source of electrical power or from an independent source of power located in the steering gear compartment. This independent source of power shall be used only for this purpose. In every ship of 10,000 tons and upwards, the alternative power 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 tons and upwards and in every other ship of 70,000 tons and upwards, the main steering gear shall comprise 2 or more identical power units complying with the provisions of sub-regulation (6).

(16) Every tanker, chemical tanker or gas carrier of 10,000 tons and upwards shall, subject to sub-regulation (17), comply with the following —

(a) the main steering shall be so arranged that in the event of loss of steering capability due to a single failure in any part of one of the power actuating systems of the main steering gear, excluding the tiller, quadrant or components serving the same purpose, or seizure of the rudder actuators, steering capability shall be regained in not more than 45 seconds after the loss of one power actuating system;

(b) the main steering gear shall comprise either —

(i) 2 independent and separate power actuating systems, each capable of meeting the requirements of paragraph *(b)* of sub-regulation (3); or

(ii) at least 2 identical power actuating systems which, acting simultaneously in normal operation, shall be capable of meeting the requirements of paragraph *(b)* of sub-regulation (3). Where necessary to comply with this requirement, interconnection of hydraulic power actuating systems shall be provided. Loss of hydraulic fluid from one system shall be capable of being detected and the defective system automatically isolated so that the other actuating system or systems shall remain fully operational;

(c) steering gears other than of the hydraulic type shall achieve equivalent standards.

(17) For tankers, chemical tankers or gas carriers of 10,000 tons and upwards, but of less than 100,000 tons deadweight, solutions other than those set out in sub-regulation (16), which need not apply the single failure criterion to the rudder actuator or actuators, may be permitted provided that an equivalent safety standard is achieved and that —

(a) following loss of steering capability due to a single failure of any part of the piping system or in one of the power units, steering capability shall be regained within 45 seconds; and

(b) where the steering gear includes only a single rudder actuator, special consideration is given to stress analysis for the design, including fatigue analysis and fracture mechanics analysis, as appropriate, to the material used, to the installation of sealing arrangements and to testing and inspection and to the provision of effective maintenance. The provisions of the Guidelines for Acceptance of Non-Duplicated Rudder Actuators for Tankers, Chemical Tankers and Gas Carriers of 10,000 tons and above but less than 100,000 tons deadweight, adopted by the Organisation shall also be applied.*

(18) Every tanker, chemical tanker or gas carrier of 10,000 tons and upwards, constructed before 1st. September, 1984, shall comply with the following —

(a) the requirements of paragraph *(a)* of sub-regulation (7), paragraphs *(b)* and *(d)* of sub-regulation (8), sub-regulations (10), (11), paragraphs *(b)* and *(c)* of sub-regulation (12) and paragraph *(b)* of sub-regulation (13);

(b) 2 independent steering gear control systems shall be provided, each of which can be operated from the navigation bridge. This does not require duplication of the steering wheel or steering lever;

(c) if the steering gear control system in operation fails, the second system shall be capable of being brought into immediate operation from the navigation bridge; and

(d) each steering gear control system, if electric, shall be served by its own separate circuit supplied from the steering gear power circuit or directly from switchboard busbars supplying that steering gear power circuit at a point on the switchboard adjacent to the supply to the steering gear power circuit.

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* Adopted by the Organisation by resolution A.467(XII).

(19) In addition to the requirements of sub-regulation (18), in every tanker, chemical tanker or gas carrier of 40,000 tons and upwards, constructed before 1st. September, 1984, the steering gear shall be so arranged that, in the event of a single failure of the piping or of one of the power units, steering capability can be maintained or the rudder movement can be limited so that steering capability can be speedily regained. This shall be achieved by —

(a) an independent means of restraining the rudder;

(b) fast acting valves which may be manually operated to isolate the actuator or actuators from the external hydraulic piping, together with a means of directly refilling the actuators by a fixed independent power-operated pump and piping system; or

(c) an arrangement such that, where hydraulic power systems are interconnected, loss of hydraulic fluid from one system shall be detected and the defective system isolated either automatically or from the navigation bridge so that the other system remains fully operational.

Additional requirements for electric and electrohydraulic steering gear.

80. (1) Means for indicating that the motors of electric and electrohydraulic steering gear are running shall be installed on the navigation bridge and at a suitable main machinery control position.

(2) Each electric or electrohydraulic steering gear comprising one or more power units shall be served by at least 2 exclusive circuits fed directly from the main switchboard. One of the circuits may be supplied through the emergency switchboard. An auxiliary electric or electrohydraulic steering gear associated with a main electric or electrohydraulic steering gear may be connected to one of the circuits supplying this main steering gear. The circuits supplying an electric or electrohydraulic steering gear shall have adequate rating for supplying all motors which can be simultaneously connected to them and may be required to operate simultaneously.

(3) Short circuit protection and an overload alarm shall be provided for such circuits and motors. Protection against excess current, including starting current, if provided, shall be for not less than twice the full load current of the motor or circuit so protected, and shall be arranged to permit the passage of the appropriate starting currents. Where a 3-phase supply is used, an alarm shall be provided that will indicate failure of any one of the supply phases. The alarms required in this sub-regulation shall be both audible and visual and shall be situated 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 102.

(4) When in a ship of less than 1,600 tons, an auxiliary steering gear which is required by paragraph *(c)* of sub-regulation (4) of regulation 79 to be operated by power is not electrically powered or is powered by an electric motor primarily intended for other services, the main steering gear may be fed by one circuit from the main switchboard. Where such an electric motor primarily intended for other services is arranged to power such an auxiliary steering gear, the requirement of sub-regulation (3) may be waived by the Director if he is satisfied with the protection arrangement together with the requirements of sub-regulation (5) and paragraph *(c)* of sub-regulation (7) of regulation 79 applicable to auxiliary steering gear.

Machinery controls.

81. (1) Main and auxiliary machinery essential for the propulsion and safety of the ship shall be provided with effective means for its operation and control.

(2) Where remote control of propulsion machinery from the navigation bridge is provided and the machinery spaces are intended to be manned, the following shall apply —

(a) the speed, direction of thrust and, if applicable, the pitch of the propeller shall be fully controllable from the navigation bridge under all sailing conditions, including manoeuvring;

(b) the remote control shall be performed, for each independent propeller, by a control device so designed and constructed that its operation does not require particular attention to the operational details of the machinery. Where multiple propellers are designed to operate simultaneously, they may be controlled by one control device;

(c) the main propulsion machinery shall be provided with an emergency stopping device on the navigation bridge which shall be independent of the navigation bridge control system;

(d) propulsion machinery orders from the navigation bridge shall be indicated in the main machinery control room or at the manoeuvring platform as appropriate;

(e) remote control of the propulsion machinery shall be possible only from one location at a time; at such locations interconnected control positions are permitted. At each location there shall be an indicator showing which location is in control of the propulsion machinery. The transfer of control between the navigation bridge and machinery spaces shall be possible only in the main machinery space or the main machinery control room. This system shall include means to prevent the propelling thrust

from altering significantly when transferring control from one location to another;

(f) it shall be possible to control the propulsion machinery locally, even in the case of failure in any part of the remote control system;

(g) the design of the remote control system shall be such that in case of its failure an alarm will be given. Unless the Director considers it impracticable, the preset speed and direction of thrust of the propeller shall be maintained until local control is in operation;

(h) indicators shall be fitted on the navigation bridge for —

(i) propeller speed and direction of rotation in the case of fixed pitch propellers; or

(ii) propeller speed and pitch position in the case of controllable pitch propellers;

(i) an alarm shall be provided on the navigation bridge and in the machinery space to indicate low starting air pressure which shall be set at a level to permit further main engine starting operations. If the remote control system of the propulsion machinery is designed for automatic starting, the number of automatic consecutive attempts which fail to produce a start shall be limited in order to safeguard sufficient starting air pressure for starting locally.

(3) Where the main propulsion and associated machinery, including sources of main electrical supply, are provided with various degrees of automatic or remote control and are under continuous manual supervision from a control room, the arrangements and controls shall be so designed, equipped and installed that the machinery operation will be as safe and effective as if it were under direct supervision; for this purpose regulations 97 to 101 shall apply as appropriate. Particular consideration shall be given to protect such spaces against fire and flooding.

(4) In general, automatic starting, operational and control systems shall include provisions for manually overriding the automatic controls. Failure of any part of such systems shall not prevent the use of the manual override.

(5) Ships constructed on or after 1st. July, 1998 shall, in lieu of sub-regulations (1) to (4), comply with the following —

(a) main and auxiliary machinery essential for the propulsion, control and safety of the ship shall be provided with effective means for its operation and control. All control systems essential for the propulsion, control

and safety of the ship shall be independent or designed such that failure of one system does not degrade the performance of another system;

(b) where remote control of propulsion machinery from the navigation bridge is provided, the following shall apply —

(i) the speed, direction of thrust and, if applicable, the pitch of the propeller shall be fully controllable from the navigation bridge under all sailing conditions, including manoeuvring;

(ii) the control shall be performed by a single control device for each independent propeller, with automatic performance of all associated services, including, where necessary, means of preventing overload of the propulsion machinery. Where multiple propellers are designed to operate simultaneously, they may be controlled by one control device;

(iii) the main propulsion machinery shall be provided with an emergency stopping device on the navigation bridge which shall be independent of the navigation bridge control system;

(iv) propulsion machinery orders from the navigation bridge shall be indicated in the main machinery control room and at the manoeuvring platform;

(v) remote control of the propulsion machinery shall be possible only from one location at a time; at such locations interconnected control positions are permitted. At each location there shall be an indicator showing which location is in control of the propulsion machinery. The transfer of control between the navigation bridge and machinery spaces shall be possible only in the main machinery space or the main machinery control room. This system shall include means to prevent the propelling thrust from altering significantly when transferring control from one location to another;

(vi) it shall be possible to control the propulsion machinery locally, even in the case of failure in any part of the remote control system. It shall also be possible to control the auxiliary machinery, essential for the propulsion and safety of the ship, at or near the machinery concerned;

(vii) the design of the remote control system shall be such that in case of its failure an alarm will be given. Unless the Director considers it impracticable, the preset speed and direction of thrust of the propellers shall be maintained until local control is in operation;

(viii) indicators shall be fitted on the navigation bridge, the main machinery control room and at the manoeuvring platform for —

(A) propeller speed and direction of rotation in the case of fixed pitch propellers; and

(B) propeller speed and pitch position in the case of controllable pitch propellers;

(ix) an alarm shall be provided on the navigation bridge and in the machinery space to indicate low starting air pressure which shall be set at a level to permit further main engine starting operations. If the remote control system of the propulsion machinery is designed for automatic starting, the number of automatic consecutive attempts which fail to produce a start shall be limited in order to safeguard sufficient starting air pressure for starting locally;

(c) where the main propulsion and associated machinery, including sources of main electrical supply, are provided with various degrees of automatic or remote control and are under continuous manual supervision from a control room, the arrangements and controls shall be so designed, equipped and installed that the machinery operation will be as safe and effective as if it were under direct supervision. For this purpose, regulations 97 to 101 shall apply as appropriate. Particular consideration shall be given to protect such spaces against fire and flooding;

(d) in general, automatic starting, operational and control systems shall include provisions for manually overriding the automatic controls. Failure of any part of such systems shall not prevent the use of the manual override.

Steam boilers and boiler feed systems.

82. (1) Every steam boiler and every unfired steam generator shall be provided with not less than 2 safety valves of adequate capacity. Having regard to the output or any other features of any boiler or unfired steam generator, the Director may permit only one safety valve to be fitted if he is satisfied that adequate protection against overpressure is thereby provided.

(2) Each oil-fired boiler which is intended to operate without manual supervision shall have safety arrangements which shut off the fuel supply and give an alarm in the case of low water level, air supply failure or flame failure.

(3) Water tube boilers serving turbine propulsion machinery shall be fitted with a high-water-level alarm.

(4) Every steam generating system which provides services essential for the safety of the ship, or which could be rendered dangerous by the failure of its feed water supply, shall be provided with not less than 2 separate feed water systems from and including the feed pumps, noting that a single penetration of the steam drum is acceptable. Unless overpressure is prevented by the pump characteristics, means shall be provided which will prevent overpressure in any part of the systems.

(5) Boilers shall be provided with means to supervise and control the quality of the feed water. Suitable arrangements shall be provided to preclude, as far as practicable, the entry of oil or other contaminants which may adversely affect the boiler.

(6) Every boiler essential for the safety of the ship and designed to contain water at a specified level shall be provided with at least 2 means for indicating its water level, at least one of which shall be a direct reading gauge glass.

Steam pipe systems.

83. (1) Every steam pipe and every fitting connected thereto through which steam may pass shall be so designed, constructed and installed as to withstand the maximum working stresses to which it may be subjected.

(2) Means shall be provided for draining every steam pipe in which dangerous water hammer action might otherwise occur.

(3) If a steam pipe or fitting may receive steam from any source at a higher pressure than that for which it is designed, a suitable reducing valve, relief valve and pressure gauge shall be fitted.

Air pressure systems.

84. (1) In every ship, means shall be provided to prevent overpressure in any part of compressed air systems and wherever water jackets or casings of air compressors and coolers might be subjected to dangerous overpressure due to leakage into them from air pressure parts. Suitable pressure relief arrangements shall be provided for all systems.

(2) The main starting air arrangements for main propulsion internal combustion engines shall be adequately protected against the effects of backfiring and internal explosion in the starting air pipes.

(3) All discharge pipes from starting air compressors shall lead directly to the starting air receivers, and all starting pipes from the air receivers to main or auxiliary engines shall be entirely separate from the compressor discharge pipe system.

(4) Provision shall be made to reduce to a minimum the entry of oil into the air pressure system and to drain these systems.

Ventilating systems in machinery spaces.

85. Machinery spaces of category A shall be adequately ventilated so as to ensure that when machinery or boilers therein are operating at full power in all weather conditions, including heavy weather, an adequate supply of air is maintained to the space for the safety and comfort of personnel and the operation of the machinery. Any other machinery space shall be adequately ventilated appropriate for the purpose of that machinery space.

Protection against noise.*

86. Measures shall be taken to reduce machinery noise in machinery spaces to acceptable levels as determined by the Director. If this noise cannot be sufficiently reduced, the source of excessive noise shall be suitably insulated or isolated or a refuge from noise shall be provided if the space is required to be manned. Ear protectors shall be provided for personnel required to enter such spaces, if necessary.

Communication between navigation bridge and machinery space.

87. (1) At least 2 independent means shall be provided for communicating orders from the navigation bridge to the position in the machinery space or in the control room from which the engines are normally controlled; one of these shall be an engine room telegraph which provides visual indication of the orders and responses both in the machinery space and on the navigation bridge. Appropriate means of communication shall be provided to any other positions from which the engines may be controlled.

* Refer to the Code on Noise Levels on Board Ships, adopted by the Organisation by resolution A.468(XII).

(2) For ships constructed on or after 1st. October, 1994, in lieu of the requirements of sub-regulation (1), there shall be provided at least 2 independent means for communicating orders from the navigation bridge to the position in the machinery space or in the control room from which the speed and direction of thrust of the propellers are normally controlled; one of these shall be an engine room telegraph which provides visual indication of the orders and responses both in the machinery spaces and on the navigation bridge. Appropriate means of communication shall be provided from the navigation bridge and the engine room to any other position from which the speed or direction of thrust of the propellers may be controlled.

Engineers' alarm.

88. An engineers' alarm shall be provided to be operated from the engine control room or at the manoeuvring platform as appropriate, and shall be clearly audible in the engineers' accommodation.

Location of emergency installations in passenger ships.

89. Emergency sources of electrical power, fire pumps, bilge pumps, except those specifically serving the spaces forward of the collision bulkhead, any fixed fire-extinguishing system required by Chapter II-2 and other emergency installations which are essential for the safety of the ship, except anchor windlasses, shall not be installed forward of the collision bulkhead.

PART D*

ELECTRICAL INSTALLATIONS

General.

90. (1) Electrical installations shall be such that —

(a) all electrical auxiliary services necessary for maintaining the ship in normal operational and habitable conditions shall be ensured without recourse to the emergency source of electrical power;

(b) electrical services essential for safety shall be ensured under various emergency conditions; and

(c) the safety of passengers, crew and ship from electrical hazards shall be ensured.

* Except where expressly provided otherwise, Part D applies to passenger ships and cargo ships.

(2) The Director shall take appropriate steps to ensure uniformity in the implementation and application of this Part in respect of electrical installations.*

Main source of electrical power and lighting systems.

91. (1) *(a)* A main source of electrical power of sufficient capacity to supply all those services mentioned in paragraph *(a)* of sub-regulation (1) of regulation 90 shall be provided. This main source of electrical power shall consist of at least 2 generating sets.

(b) The capacity of these generating sets shall be such that in the event of any one generating set being stopped it will still be possible to supply those services necessary to provide normal operational conditions of propulsion and safety. Minimum comfortable conditions of habitability shall also be ensured which include at least adequate services for cooking, heating, domestic refrigeration, mechanical ventilation, sanitary and fresh water.

(c) The arrangements of the ship's main source of electrical power shall be such that the services referred to in paragraph *(a)* of sub-regulation (1) of regulation 90 can be maintained regardless of the speed and direction of rotation of the propulsion machinery or shafting.

(d) In addition, the generating sets shall be such as to ensure that with any one generator or its primary source of power out of operation, the remaining generating sets shall be capable of providing the electrical services necessary to start the main propulsion plant from a dead ship condition. The emergency source of electrical power may be used for the purpose of starting from a dead ship condition if its capability either alone or combined with that of any other source of electrical power is sufficient to provide at the same time those services required to be supplied by paragraphs *(a)*, *(b)* and *(c)* of sub-regulation (2) of regulation 92 or paragraphs *(a)*, *(b)*, *(c)* and *(d)* of sub-regulation (2) of regulation 94.

(e) Where transformers constitute an essential part of the electrical supply system required by this sub-regulation, the system shall be so arranged as to ensure the same continuity of the supply as is stated in this sub-regulation.

(2) *(a)* A main electric lighting system which shall provide illumination throughout those parts of the ship normally accessible to and used by passengers or crew shall be supplied from the main source of electrical power.

* Refer to the recommendations published by the International Electrotechnical Commission and, in particular, Publication 92 - Electrical Installations in Ships.

(b) The arrangement of the main electric lighting system shall be such that a fire or other casualty in spaces containing the main source of electrical power, associated transforming equipment, if any, the main switchboard and the main lighting switchboard, will not render the emergency electric lighting system required by paragraphs *(a)* and *(b)* of sub-regulation (2) of regulation 92 or paragraphs *(a)*, *(b)* and *(c)* of sub-regulation (2) of regulation 94 inoperative.

(c) The arrangement of the emergency electric lighting system shall be such that a fire or other casualty in spaces containing the emergency source of electrical power, associated transforming equipment, if any, 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 so placed relative to one main generating station that, as far as practicable, the integrity of the normal electrical supply may be affected only by a fire or other casualty in one space. An environmental enclosure for the main switchboard, such as may be provided by a machinery control room situated within the main boundaries of the space, is not to be considered as separating the switchboards from the generators.

(4) Where the total installed electrical power of the main generating sets is in excess of 3 MW, the main busbars shall be subdivided into at least 2 parts which shall normally be connected by removable links or other approved means. So far as is practicable, the connection of generating sets and any other duplicated equipment shall be equally divided between the parts. Equivalent arrangements may be permitted to the satisfaction of the Director.

(5) Ships constructed on or after 1st. July, 1998 —

(a) in addition to sub-regulations (1), (2) and (3), shall comply with the following —

(i) where the main source of electrical power is necessary for 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 safety of the ship will be maintained or immediately restored in the case of loss of any one of the generators in service;

(ii) load shedding or other equivalent arrangements shall be provided to protect the generators required by this regulation against sustained overload;

(iii) where the main source of electrical power is necessary for propulsion of the ship, the main busbar shall be subdivided

into at least 2 parts which shall normally be connected by circuit breakers or other approved means. So far as is practicable, the connection of generating sets and other duplicated equipment shall be equally divided between the parts; and

(b) need not comply with sub-regulation (4).

Emergency source of electrical power in passenger ships.

92. (1) *(a)* A self-contained emergency source of electrical power shal be provided.

(b) The emergency source of electrical power, associated transforming equipment, if any, transitional source of emergency power, emergency switchboard and emergency lighting switchboard shall be located above the uppermost continuous deck and shall be readily accessible from the open deck. They shall not be located forward of the collision bulkhead.

(c) The location of the emergency source of electrical power and associated transforming equipment, if any, the transitional source of emergency power, the emergency switchboard and the emergency electric lighting switchboards in relation to the main source of electrical power, associated transforming equipment, if any, and the main switchboard shall be such as to ensure to the satisfaction of the Director that a fire or other casualty in spaces containing the main source of electrical power, associated transforming equipment, if any, and the main switchboard or in any machinery space of category A will not interfere with the supply, control and distribution of emergency electrical power. As far as practicable, the space containing the emergency source of electrical power, associated transforming equipment, if any, the transitional source of emergency electrical power and the emergency switchboard shall not be contiguous to the boundaries of machinery spaces of category A or those spaces containing the main source of electrical power, associated transforming equipment, if any, or the main switchboard.

(d) Provided that suitable measures are taken for safeguarding independent emergency operation under all circumstances, the emergency generator may be used exceptionally, and for short periods, to supply non-emergency circuits.

(2) The electrical power available shall be sufficient to supply all those services that are essential for safety in an emergency, due regard being paid to such services as may have to be operated simultaneously. The emergency source of electrical power shall be capable, having regard to starting currents and the transitory nature of certain loads, of supplying simultaneously at least the

following services for the periods specified in this sub-regulation, if they depend upon an electrical source for their operation —

(a) for a period of 36 hours, emergency lighting —

(i) at every muster and embarkation station and over the sides as required by sub-regulation (4) of regulation 136 and sub-regulation (7) of regulation 141;

(ii) in alleyways, stairways and exits giving access to the muster and embarkation stations, as required by sub-regulation (5) of regulation 136;

(iii) in all service and accommodation alleyways, stairways and exits, personnel lift cars;

(iv) in the machinery spaces and main generating stations including their control positions;

(v) in all control stations, machinery control rooms, and at each main and emergency switchboard;

(vi) at all stowage positions for firemen's outfits;

(vii) at the steering gear; and

(viii) at the fire pump, the sprinkler pump and the emergency bilge pump referred to in paragraph *(d)* and at the starting position of their motors;

(b) for a period of 36 hours —

(i) the navigation lights and other lights required by the International Regulations for Preventing Collisions at Sea in force; and

(ii) on ships constructed on or after 1st. February, 1995, the VHF radio installation required by paragraphs *(a)* and *(b)* of sub-regulation (1) of regulation 170; and, if applicable —

(A) the MF radio installation required by paragraphs *(a)* and *(b)* of sub-regulation (1) of regulation 172 and paragraphs *(b)* and *(c)* of sub-regulation (1) of regulation 173;

(B) the ship earth station required by paragraph *(a)* of sub-regulation (1) of regulation 173; and

(C) the MF/HF radio installation required by paragraphs *(a)* and *(b)* of sub-regulation (2) of regulation 173 and sub-regulation (1) of regulation 174;

(c) for a period of 36 hours—

(i) all internal communication equipment required in an emergency;

(ii) the shipborne navigational equipment as required by regulation 193; where such provision is unreasonable or impracticable, the Director may waive this requirement for ships of less than 5,000 tons;

(iii) the fire detection and fire alarm system, and the fire door holding and release system; and

(iv) for intermittent operation of the daylight signaling lamp, the ship's whistle, the manually operated call points and all internal signals that are required in an emergency,

unless such services have an independent supply for the period of 36 hours from an accumulator battery suitably located for use in an emergency;

(d) for a period of 36 hours —

(i) one of the fire pumps required by paragraphs *(a)* and *(c)* of sub-regulation (3) of regulation 109;

(ii) the automatic sprinkler pump, if any; and

(iii) the emergency bilge pump and all the equipment essential for the operation of electrically powered remote controlled bilge valves;

(e) for the period of time required by sub-regulation (14) of regulation 79 the steering gear if required to be so supplied by that regulation;

(f) for a period of half an hour —

(i) any watertight doors required by regulation 48 to be power-operated, together with their indicators and warning signals; and

(ii) the emergency arrangements to bring the lift cars to deck level for the escape of persons. The passenger lift cars may be brought to deck level sequentially in an emergency;

(g) in a ship engaged regularly on voyages of short duration, the Director, if satisfied that an adequate standard of safety would be attained, may accept a lesser period than the 36 hour period specified in paragraphs *(a)* to *(e)* but not less than 12 hours.

(3) The emergency source of electrical power may be either a generator or an accumulator battery, which shall comply with the following —

(a) where the emergency source of electrical power is a generator, it shall be —

(i) driven by a suitable prime-mover with an independent supply of fuel having a flashpoint (closed cup test) of not less than 43°C;

(ii) started automatically upon failure of the electrical supply from the main source of electrical power and shall be automatically connected to the emergency switchboard; those services referred to in sub-regulation (4) shall then be transferred automatically to the emergency generating set. The automatic starting system and the characteristic of the prime-mover shall be such as to permit the emergency generator to carry its full rated load as quickly as is safe and practicable, subject to a maximum of 45 seconds. Unless a second independent means of starting the emergency generating set is provided, the single source of stored energy shall be protected to preclude its complete depletion by the automatic starting system; and

(iii) provided with a transitional source of emergency electrical power according to sub-regulation (4);

(b) where the emergency source of electrical power is an accumulator battery, it shall be capable of —

(i) carrying the emergency electrical load without recharging while maintaining the voltage of the battery throughout the discharge period within 12% above or below its nominal voltage;

(ii) automatically connecting to the emergency switchboard in the event of failure of the main source of electrical power; and

(iii) immediately supplying at least those services specified in sub-regulation (4);

(c) the following provision in paragraph *(a)*(ii) shall not apply to ships constructed on or after 1st. October, 1994 —

"unless a second independent means of starting the emergency generating set is provided, the single source of stored energy shall be protected to preclude its complete depletion by the automatic starting system";

(d) for ships constructed on or after 1st. July, 1998, where electrical power is necessary to restore propulsion, the capacity shall be sufficient to restore propulsion to the ship in conjunction with other machinery, as appropriate, from a dead ship condition within 30 minutes after blackout.

(4) The transitional source of emergency electrical power required by paragraph *(a)*(iii) of sub-regulation (3) shall consist of an accumulator battery suitably located for use in an emergency which shall operate without recharging while maintaining the voltage of the battery throughout the discharge period within 12% above or below its nominal voltage and be of sufficient capacity and so arranged as to supply automatically in the event of failure of either the main or emergency source of electrical power at least the following services, if they depend upon an electrical source for their operations —

(a) for half an hour —

(i) the lighting required by paragraphs *(a)* and *(b)* of sub-regulation (2); and

(ii) all services required by sub-paragraphs (i), (iii) and (iv) of paragraph *(c)* of sub-regulation (2), unless such services have an independent supply for the period specified from an accumulator battery suitably located for use in an emergency;

(b) power to operate the watertight doors, as required by paragraph *(c)*(iii) of sub-regulation (7) of regulation 48, but not necessarily all of them simultaneously, unless an independent temporary source of stored energy is provided. Power to the control, indication and alarm circuits as required by paragraph *(b)* of sub-regulation (7) of regulation 48 for half an hour.

(5) *(a)* The emergency switchboard shall be installed as near as is practicable to the emergency source of electrical power.

(b) Where the emergency source of electrical power is a generator, the emergency switchboard shall be located in the same space unless the operation of the emergency switchboard would thereby be impaired.

(c) No accumulator battery fitted in accordance with this regulation shall be installed in the same space as the emergency switchboard. An indicator shall be mounted in a suitable place on the main switchboard or in the machinery control room to indicate when the batteries constituting either the emergency source of electrical power or the transitional source of emergency electrical power referred to in paragraph *(a)*(iii) of sub-regulation (3) or sub-regulation (4) are being discharged.

(d) The emergency switchboard shall be supplied during normal operation from the main switchboard by an interconnector feeder which is to be adequately protected at the main switchboard against overload and short circuit and which is to be disconnected automatically at the emergency switchboard upon failure of the main source of electrical power. Where the system is arranged for feedback operation, the interconnector feeder is also to be protected at the emergency switchboard at least against short circuit.

(e) In order to ensure ready availability of the emergency source of electrical power, arrangements shall be made where necessary to disconnect automatically non-emergency circuits from the emergency switchboard to ensure that power shall be available to the emergency circuits.

(6) The emergency generator and its prime-mover and any emergency accumulator battery shall be so designed and arranged as to ensure that they will function at full rated power when the ship is upright and when inclined at any angle of list up to 22.5° or when inclined up to 10° either in the fore or aft direction, or is in any combination of angles within those limits.

(7) Provision shall be made for the periodic testing of the complete emergency system and shall include the testing of automatic starting arrangements.

(8) Paragraph *(d)*(i) of sub-regulation (2) and paragraph *(b)* of sub-regulation (4) apply to ships constructed on or after 1st. February, 1992.

Supplementary emergency lighting for ro-ro passenger ships.

93. (1) This regulation applies to all passenger ships with ro-ro cargo spaces or special category spaces as defined in regulation 108.

(2) In addition to the emergency lighting required by sub-regulation (2) of regulation 92, on every passenger ship with ro-ro cargo spaces or special category spaces —

(a) all passenger public spaces and alleyways shall be provided with supplementary electric lighting that can operate for at least 3 hours when all other sources of electric power have failed and under any condition of heel. The illumination provided shall be such that the approach to the means of escape can be readily seen. The source of power for the supplementary lighting shall consist of accumulator batteries located within the lighting units that are continuously charged, where practicable, from the emergency switchboard. Alternatively, any other means of lighting which is at least as effective may be accepted by the Director. The supplementary lighting shall be such that any failure of the lamp will be immediately apparent. Any accumulator battery provided shall be replaced at intervals having regard to the specified service life in the ambient conditions that they are subject to in service; and

(b) a portable rechargeable battery operated lamp shall be provided in every crew space alleyway, recreational space and every working space which is normally occupied unless supplementary emergency lighting, as required by paragraph *(a)*, is provided.

Emergency source of electrical power in cargo ships.

94. (1) *(a)* A self-contained emergency source of electrical power shall be provided.

(b) The emergency source of electrical power, associated transforming equipment, if any, transitional source of emergency power, emergency switchboard and emergency lighting switchboard shall be located above the uppermost continuous deck and shall be readily accessible from the open deck. They shall not be located forward of the collision bulkhead, except where permitted by the Director in exceptional circumstances.

(c) The location of the emergency source of electrical power, associated transforming equipment, if any, the transitional source of emergency power, the emergency switchboard and the emergency lighting switchboard in relation to the main source of electrical power, associated transforming equipment, if any, and the main switchboard shall be such as to ensure to the satisfaction of the Director that a fire or other casualty in the space containing the main source of electrical power, associated transforming equipment, if any, and the main switchboard, or in any machinery space of category A will not interfere with the supply, control and distribution of emergency electrical power. As far as practicable the space containing the emergency source of electrical power, associated transforming equipment, if any, the transitional source of emergency electrical power and the emergency switchboard shall not be contiguous to the boundaries of machinery spaces of category A or those spaces

containing the main source of electrical power, associated transforming equipment, if any, and the main switchboard.

(d) Provided that suitable measures are taken for safeguarding independent emergency operation under all circumstances, the emergency generator may be used, exceptionally, and for short periods, to supply non-emergency circuits.

(2) The electrical power available shall be sufficient to supply all those services that are essential for safety in an emergency, due regard being paid to such services as may have to be operated simultaneously. The emergency source of electrical power shall be capable, having regard to starting currents and the transitory nature of certain loads, of supplying simultaneously at least the following services for the periods specified in this sub-regulation, if they depend upon an electrical source for their operation —

(a) for a period of 3 hours, emergency lighting at every muster and embarkation station and over the sides as required by sub-regulation (4) of regulation 136 and sub-regulation (7) of regulation 141;

(b) for a period of 18 hours, emergency lighting —

(i) in all service and accommodation alleyways, stairways and exits, personnel lift cars and personnel lift trunks;

(ii) in the machinery spaces and main generating stations including their control positions;

(iii) in all control stations, machinery control rooms and at each main and emergency switchboard;

(iv) at all stowage positions for firemen's outfits;

(v) at the steering gear;

(vi) at the fire pump referred to in paragraph *(e)*, at the sprinkler pump, if any, and at the emergency bilge pump, if any, and at the starting positions of their motors; and

(vii) in all cargo pump rooms of tankers constructed on or after 1st. July, 2002;

(c) for a period of 18 hours —

(i) the navigation lights and other lights required by the International Regulations for Preventing Collisions at Sea in force; and

(ii) on ships constructed on or after 1st February, 1995, the VHF radio installation required by paragraphs *(a)* and *(b)* of sub-regulation (1) of regulation 170; and, if applicable —

(A) the MF radio installation required by paragraphs *(a)* and *(b)* of sub-regulation (1) of regulation 172 and paragraphs *(b)* and *(c)* of sub-regulation (1) of regulation 173;

(B) the ship earth station required by paragraph *(a)* of sub-regulation (1) of regulation 173; and

(C) the MF/HF radio installation required by paragraphs *(a)* and *(b)* of sub-regulation (2) of regulation 173 and sub-regulation (1) of regulation 174;

(d) for a period of 18 hours —

(i) all internal communication equipment as required in an emergency;

(ii) the shipborne navigational equipment as required by regulation 193; where such provision is unreasonable or impracticable, the Director may waive this requirement for ships of less than 5,000 tons;

(iii) the fire detection and fire alarm system; and

(iv) intermittent operation of the daylight signaling lamp, the ship's whistle, the manually operated call points and all internal signals that are required in an emergency,

unless such services have an independent supply for the period of 18 hours from an accumulator battery suitably located for use in an emergency;

(e) for a period of 18 hours one of the fire pumps required by paragraphs *(a)* and *(c)* of sub-regulation (3) of regulation 109 if dependent upon the emergency generator for its source of power;

(f) (i) for the period of time required by sub-regulation (14) of regulation 79 the steering gear where it is required to be so supplied by that regulation;

(ii) in a ship engaged regularly in voyages of short duration, the Director, if satisfied that an adequate standard of safety would be attained, may accept a lesser period than the 18 hour

period specified in paragraphs *(b)* to *(e)* but not less than 12 hours.

(3) The emergency source of electrical power may be either a generator or an accumulator battery, which shall comply with the following —

(a) where the emergency source of electrical power is a generator, it shall be —

(i) driven by a suitable prime-mover with an independent supply of fuel having a flashpoint (closed cup test) of not less than 43°C;

(ii) started automatically upon failure of the main source of electrical power supply unless a transitional source of emergency electrical power in accordance with sub-paragraph (iii) is provided. Where the emergency generator is automatically started, it shall be automatically connected to the emergency switchboard; those services referred to in sub-regulation (4) shall then be connected automatically to the emergency generator; and unless a second independent means of starting the emergency generator is provided, the single source of stored energy shall be protected to preclude its complete depletion by the automatic starting system; and

(iii) provided with a transitional source of emergency electrical power as specified in sub-regulation (4), unless an emergency generator is provided capable both of supplying the services mentioned in sub-regulation (4) and of being automatically started and supplying the required load as quickly as is safe and practicable subject to a maximum of 45 seconds;

(b) where the emergency source of electrical power is an accumulator battery, it shall be capable of —

(i) carrying the emergency electrical load without recharging while maintaining the voltage of the battery throughout the discharge period within 12% above or below its nominal voltage;

(ii) automatically connecting to the emergency switchboard in the event of failure of the main source of electrical power; and

(iii) immediately supplying at least those services specified in sub-regulation (4);

(c) the following provision in paragraph *(a)*(ii) shall not apply to ships constructed on or after 1st. October, 1994 —

"unless a second independent means of starting the emergency generator is provided, the single source of stored energy shall be protected to preclude its complete depletion by the automatic starting system";

(d) for ships constructed on or after 1st July, 1998, where electrical power is necessary to restore propulsion, the capacity shall be sufficient to restore propulsion to the ship in conjunction with other machinery, as appropriate, from a dead ship condition within 30 minutes after blackout.

(4) The transitional source of emergency electrical power where required by paragraph *(a)*(iii) of sub-regulation (3) shall consist of an accumulator battery suitably located for use in an emergency which shall operate without recharging while maintaining the voltage of the battery throughout the discharge period within 12% above or below its nominal voltage and be of sufficient capacity and shall be so arranged as to supply automatically in the event of failure of either the main or the emergency source of electrical power for half an hour at least the following services if they depend upon an electrical source for their operation —

(a) the lighting required by paragraphs *(a)*, *(b)* and *(c)*(i) of sub-regulation (2). For this transitional phase, the required emergency electric lighting, in respect of the machinery space and accommodation and service spaces, may be provided by permanently fixed, individual, automatically charged, relay operated accumulator lamps; and

(b) all services required by sub-paragraphs (i), (iii) and (iv) of paragraph *(d)* of sub-regulation (2), unless such services have an independent supply for the period specified from an accumulator battery suitably located for use in an emergency.

(5) *(a)* The emergency switchboard shall be installed as near as is practicable to the emergency source of electrical power.

(b) Where the emergency source of electrical power is a generator, the emergency switchboard shall be located in the same space unless the operation of the emergency switchboard would thereby be impaired.

(c) No accumulator battery fitted in accordance with this regulation shall be installed in the same space as the emergency switchboard. An indicator shall be mounted in a suitable place on the main switchboard or in the machinery control room to indicate when the batteries constituting either the emergency source of electrical power or the transitional source of electrical power referred to in paragraph *(b)* of sub-regulation (3) or sub-regulation (4) are being discharged.

(d) The emergency switchboard shall be supplied during normal operation from the main switchboard by an interconnector feeder which is to be adequately protected at the main switchboard against overload and short circuit and which is to be disconnected automatically at the emergency switchboard upon failure of the main source of electrical power. Where the system is arranged for feedback operation, the interconnector feeder is also to be protected at the emergency switchboard at least against short circuit.

(e) In order to ensure ready availability of the emergency source of electrical power, arrangements shall be made where necessary to disconnect automatically non-emergency circuits from the emergency switchboard to ensure that electrical power shall be available automatically to the emergency circuits.

(6) The emergency generator and its prime-mover and any emergency accumulator battery shall be so designed and arranged as to ensure that they will function at full rated power when the ship is upright and when inclined at any angle of list up to 22.5° or when inclined up to 10° either in the fore or aft direction, or is in any combination of angles within those limits.

(7) Provision shall be made for the periodic testing of the complete emergency system and shall include the testing of automatic starting arrangements.

Starting arrangements for emergency generating sets.

95. (1) Emergency generating sets shall be capable of being readily started in their cold condition at a temperature of 0°C. If this is impracticable, or if lower temperatures are likely to be encountered, provision acceptable to the Director shall be made for the maintenance of heating arrangements, to ensure ready starting of the generating sets.

(2) Each emergency generating set arranged to be automatically started shall be equipped with starting devices approved by the Director with a stored energy capability of at least 3 consecutive starts. A second source of energy shall be provided for an additional 3 starts within 30 minutes, unless manual starting can be demonstrated to be effective.

(3) Ships constructed on or after 1st. October, 1994 shall, in lieu of the second sentence of sub-regulation (2), comply with the following requirements —

"The source of stored energy shall be protected to preclude critical depletion by the automatic starting system, unless a second independent means of starting is provided. In addition, a second source of

energy shall be provided for an additional 3 starts within 30 minutes, unless manual starting can be demonstrated to be effective.".

(4) The stored energy shall be maintained at all times, as follows —

(a) electrical and hydraulic starting systems shall be maintained from the emergency switchboard;

(b) compressed air starting systems may be maintained by the main or auxiliary compressed air receivers through a suitable non-return valve or by an emergency air compressor which, if electrically driven, is supplied from the emergency switchboard;

(c) all of these starting, charging and energy storing devices shall be located in the emergency generator space. These devices are not to be used for any purpose other than the operation of the emergency generating set. This does not preclude the supply to the air receiver of the emergency generating set from the main or auxiliary compressed air system through the non-return valve fitted in the emergency generator space.

(5) *(a)* Where automatic starting is not required, manual starting is permissible such as manual cranking, inertia starters, manually charged hydraulic accumulators, or powder charge cartridges, where they can be demonstrated as being effective.

(b) When manual starting is not practicable, the requirements of sub-regulations (2) and (4) shall be complied with, except that starting may be manually initiated.

Precautions against shock, fire and other hazards of electrical origin.

96. (1) *(a)* Exposed metal parts of electrical machines or equipment which are not intended to be live but which are liable under fault conditions to become live shall be earthed unless the machines or equipments are —

(i) supplied at a voltage not exceeding 50V direct current or 50V root mean square between conductors; auto-transformers shall not be used for the purpose of achieving this voltage; or

(ii) supplied at a voltage not exceeding 250V by safety isolating transformers supplying only one consuming device; or

(iii) constructed in accordance with the principle of double insulation.

(b) The Director may require additional precautions for portable electrical equipment for use in confined or exceptionally damp spaces where particular risks due to conductivity may exist.

(c) All electrical apparatus shall be so constructed and so installed as not to cause injury when handled or touched in the normal manner.

(2) Main and emergency switchboards shall be so arranged as to give easy access as may be needed to apparatus and equipment, without danger to personnel. The sides and the rear and, where necessary, the front of switchboards shall be suitably guarded. Exposed live parts having voltages to earth exceeding a voltage to be specified by the Director shall not be installed on the front of such switchboards. Where necessary, non-conducting mats or gratings shall be provided at the front and rear of the switchboard.

(3) *(a)* The hull return system of distribution shall not be used for any purpose in a tanker, or for power, heating or lighting in any other ship of 1,600 tons and upwards.

(b) The requirement of paragraph *(a)* does not preclude under conditions approved by the Director the use of —

(i) impressed current cathodic protective systems;

(ii) limited and locally earthed systems; or

(iii) insulation level monitoring devices, provided the circulation current does not exceed 30 mA under the most unfavourable conditions.

(c) For ships constructed on or after 1st. October, 1994, the requirement of paragraph *(a)* does not preclude the use of limited and locally earthed systems, provided that any possible resulting current does not flow directly through any dangerous spaces.

(d) Where the hull return system is used, all final subcircuits, that is, all circuits fitted after the last protective device, shall be 2-wire and special precautions shall be taken to the satisfaction of the Director.

(4) *(a)* Earthed distribution systems shall not be used in a tanker. The Director may exceptionally permit in a tanker the earthing of the neutral for alternating current power networks of 3,000V (line to line) and over, provided that any possible resulting current does not flow directly through any of the dangerous spaces.

(b) When a distribution system, whether primary or secondary, for power, heating or lighting, with no connection to earth is used, a device capable of continuously monitoring the insulation level to earth and of giving an audible or visual indication of abnormally low insulation values shall be provided.

(c) Ships constructed on or after 1st. October, 1994 shall, in lieu of paragraph *(a)*, comply with the following requirements —

(i) except as permitted by sub-paragraph (ii), earthed distribution systems shall not be used in a tanker;

(ii) the requirement of sub-paragraph (i) does not preclude the use of earthed intrinsically safe circuits and, in addition, under conditions approved by the Director, the use of the following earthed systems —

(A) power supplied control circuits and instrumentation circuits where technical or safety reasons preclude the use of a system with no connection to earth, provided the current in the hull is limited to not more than 5 amperes in both normal and fault conditions;

(B) limited and locally earthed systems, provided that any possible resulting current does not flow directly through any of the dangerous spaces; or

(C) alternating current power networks of 1,000V root mean square (line to line) and over, provided that any possible resulting current does not flow directly through any of the dangerous spaces.

(5) *(a)* Except as permitted by the Director in exceptional circumstances, all metal sheaths and armour of cables shall be electrically continuous and shall be earthed.

(b) All electric cables and wiring external to equipment shall be at least of a flame-retardant type and shall be so installed as not to impair their original flame-retarding properties. Where necessary for particular applications, the Director may permit the use of special types of cables such as radio frequency cables, which do not comply with the foregoing.

(c) Cables and wiring serving essential or emergency power, lighting, internal communications or signals shall, so far as practicable, be routed clear of galleys, laundries, machinery spaces of category A and their casings and other high fire risk areas. In ro-ro passenger ships, cabling for emergency alarms and public address systems installed on or after 1st. July, 1998 shall be approved by the Director, having regard to the recommendations developed by the Organisation.* Cables connecting fire pumps to the emergency switchboard shall be of a fire-resistant type where they pass through high fire risk areas. Where practicable all such cables should be run in such a manner as to preclude their being rendered unserviceable by heating of the bulkheads that may be caused by a fire in an adjacent space.

(d) Where cables which are installed in hazardous areas introduce the risk of fire or explosion in the event of an electrical fault in such areas, special precautions against such risks shall be taken to the satisfaction of the Director.

(e) Cables and wiring shall be installed and supported in such a manner as to avoid chafing or other damage.

(f) Terminations and joints in all conductors shall be so made as to retain the original electrical, mechanical, flame-retarding and, where necessary, fire-resisting properties of the cable.

(6) *(a)* Each separate circuit shall be protected against short circuit and overload, except as permitted in regulations 79 and 80 or where the Director may exceptionally otherwise permit.

(b) The rating or appropriate setting of the overload protective device for each circuit shall be permanently indicated at the location of the protective device.

(7) Lighting fittings shall be so arranged as to prevent temperature rises which could damage the cables and wiring, and to prevent surrounding material from becoming excessively hot.

(8) All lighting and power circuits terminating in a bunker or cargo space shall be provided with a multiple pole switch outside the space for disconnecting such circuits.

(9) *(a)* Accumulator batteries shall be suitably housed, and compartments used primarily for their accommodation shall be properly constructed and efficiently ventilated.

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* Refer to MSC/Circ.808, Recommendation on performance standards for public address systems on passenger ships, including cabling.

(b) Electrical or other equipment which may constitute a source of ignition of flammable vapours shall not be permitted in these compartments except as permitted in sub-regulation (10).

(c) Accumulator batteries shall not be located in sleeping quarters except where hermetically sealed to the satisfaction of the Director.

(10) No electrical equipment shall be installed in any space where flammable mixtures are liable to collect, including those on board tankers or in compartments assigned principally to accumulator batteries, in paint lockers, acetylene stores or similar spaces, unless the Director is satisfied that such equipment is —

(a) essential for operational purposes;

(b) of a type which will not ignite the mixture concerned;

(c) appropriate to the space concerned; and

(d) appropriately certified for safe usage in the dusts, vapours or gases likely to be encountered.

(11) In a passenger ship, distribution systems shall be so arranged that fire in any main vertical zone as is defined in regulation 108 will not interfere with services essential for safety in any other such zone. This requirement shall be met if main and emergency feeders passing through any such zone are separated both vertically and horizontally as widely as is practicable.

PART E*

ADDITIONAL REQUIREMENTS FOR PERIODICALLY UNATTENDED MACHINERY SPACES

General.

97. (1) The arrangements provided shall be such as to ensure that the safety of the ship in all sailing conditions, including manoeuvring, is equivalent to that of a ship having the machinery spaces manned.

(2) Measures shall be taken to the satisfaction of the Director to ensure that the equipment is functioning in a reliable manner and that satisfactory arrangements are made for regular inspections and routine tests to ensure continuous reliable operation.

* Part E, except regulation 105, applies to cargo ships.

(3) Every ship shall be provided with documentary evidence, to the satisfaction of the Director, of its fitness to operate with periodically unattended machinery spaces.

Fire precautions.

98. (1) Means shall be provided to detect and give alarms at an early stage in case of fires —

(a) in boiler air supply casings and exhausts (uptakes); and

(b) in scavenging air belts of propulsion machinery,

unless the Director considers this to be unnecessary in a particular case.

(2) Internal combustion engines of 2,250 kW and above or having cylinders of more than 300 millimetres bore shall be provided with crankcase oil mist detectors or engine bearing temperature monitors or equivalent devices.

Protection against flooding.

99. (1) Bilge wells in periodically unattended machinery spaces shall be located and monitored in such a way that the accumulation of liquids is detected at normal angles of trim and heel, and shall be large enough to accommodate easily the normal drainage during the unattended period.

(2) Where the bilge pumps are capable of being started automatically, means shall be provided to indicate when the influx of liquid is greater than the pump capacity of when the pump is operating more frequently than would normally be expected. In these cases, smaller bilge wells to cover a reasonable period of time may be permitted. Where automatically controlled bilge pumps are provided, special attention shall be given to oil pollution prevention requirements.

(3) The location of the controls of any valve serving a sea inlet, a discharge below the water-line or a bilge injection system shall be so sited as to allow adequate time for operation in case of influx of water to the space, having regard to the time likely to be required in order to reach and operate such controls. If the level to which the space could become flooded with the ship in the fully loaded condition so requires, arrangements shall be made to operate the controls from a position above such level.

Control of propulsion machinery from navigation bridge.

100. (1) Under all sailing conditions, including manoeuvring, the speed, direction of thrust and, if applicable, the pitch of the propeller shall be fully controllable from the navigation bridge.

(2) Such remote control shall be performed by a single control device for each independent propeller, with automatic performance of all associated services, including, where necessary, means of preventing overload of the propulsion machinery.

(3) The main propulsion machinery shall be provided with an emergency stopping device on the navigation bridge which shall be independent of the navigation bridge control system.

(4) Propulsion machinery orders from the navigation bridge shall be indicated in the main machinery control room or at the propulsion machinery control position as appropriate.

(5) Remote control of the propulsion machinery shall be possible only from one location at a time; at such locations interconnected control positions are permitted. At each location there shall be an indicator showing which location is in control of the propulsion machinery. The transfer of control between the navigation bridge and machinery spaces shall be possible only in the main machinery space or in the main machinery control room. The system shall include means to prevent the propelling thrust from altering significantly when transferring control from one location to another.

(6) It shall be possible for all machinery essential for the safe operation of the ship to be controlled from a local position, even in the case of failure in any part of the automatic or remote control systems.

(7) The design of the remote automatic control system shall be such that in case of its failure an alarm will be given. Unless the Director considers it impracticable, the preset speed and direction of thrust of the propeller shall be maintained until local control is in operation.

(8) Indicators shall be fitted on the navigation bridge for —

(a) propeller speed and direction of rotation in the case of fixed pitch propellers; or

(b) propeller speed and pitch position in the case of controllable pitch propellers.

(9) The number of consecutive automatic attempts which fail to produce a start shall be limited to safeguard sufficient starting air pressure. An alarm shall

be provided to indicate low starting air pressure set at a level which still permits starting operations of the propulsion machinery.

Communication.

101. A reliable means of vocal communication shall be provided between the main machinery control room or the propulsion machinery control position as appropriate, the navigation bridge and the engineer officers' accommodation.

Alarm systems.

102. (1) An alarm system shall be provided indicating any fault requiring attention and shall —

(a) be capable of sounding an audible alarm in the main machinery control room or at the propulsion machinery control position, and indicate visually each separate alarm function at a suitable position;

(b) have a connection to the engineers' public rooms and to each of the engineers' cabins through a selector switch, to ensure connection to at least one of those cabins. The Director may permit equivalent arrangements;

(c) activate an audible and visual alarm on the navigation bridge for any situation which requires action by or attention of the officer on watch;

(d) as far as is practicable be designed on the fail-to-safety principle; and

(e) activate the engineers' alarm required by regulation 88 if an alarm function has not received attention locally within a limited time.

(2) *(a)* The alarm system shall be continuously powered and shall have an automatic change-over to a stand-by power supply in case of loss of normal power supply.

(b) Failure of the normal power supply of the alarm system shall be indicated by an alarm.

(3) *(a)* The alarm system shall be able to indicate at the same time more than one fault and the acceptance of any alarm shall not inhibit another alarm.

(b) Acceptance at the position referred to in sub-regulation (1) of any alarm condition shall be indicated at the positions where it was shown. Alarms shall be maintained until they are accepted and the visual indica-

tions of individual alarms shall remain until the fault has been corrected, when the alarm system shall automatically reset to the normal operating condition.

Safety systems.

103. A safety system shall be provided to ensure that serious malfunction in machinery or boiler operations, which presents an immediate danger, shall initiate the automatic shutdown of that part of the plant and that an alarm shall be given. Shutdown of the propulsion system shall not be automatically activated except in cases which could lead to serious damage, complete breakdown, or explosion. Where arrangements for overriding the shutdown of the main propelling machinery are fitted, these shall be such as to preclude inadvertent operation. Visual means shall be provided to indicate when the override has been activated.

Special requirements for machinery, boiler and electrical installations.

104. (1) The special requirements for the machinery, boiler and electrical installations shall be to the satisfaction of the Director and shall include at least the requirements of this regulation.

(2) The main source of electrical power shall comply with the following —

(a) where the electrical power can normally be supplied by one generator, suitable load shedding arrangements shall be provided to ensure the integrity of supplies to services required for propulsion and steering as well as the safety of the ship. In the case of loss of the generator in operation, adequate provision shall be made for automatic starting and connecting to the main switchboard of a stand-by generator of sufficient capacity to permit propulsion and steering and to ensure the safety of the ship with automatic re-starting of the essential auxiliaries including, where necessary, sequential operations. The Director may dispense with this requirement for a ship of less than 1,600 tons, if it is considered impracticable;

(b) if the electrical power is normally supplied by more than one generator simultaneously in parallel operation, provision shall be made, for instance by load shedding, to ensure that, in case of loss of one of these generating sets, the remaining ones are kept in operation without overload to permit propulsion and steering and to ensure the safety of the ship.

(3) Where stand-by machines are required for other auxiliary machinery essential to propulsion, automatic change-over devices shall be provided.

Automatic control and alarm system.

(4) *(a)* The control system shall be such that the services needed for the operation of the main propulsion machinery and its auxiliaries are ensured through the necessary automatic arrangements.

(b) An alarm shall be given on the automatic change-over.

(c) An alarm system complying with regulation 102 shall be provided for all important pressures, temperatures and fluid levels and other essential parameters.

(d) A centralised control position shall be arranged with the necessary alarm panels and instrumentation indicating any alarm.

(5) Means shall be provided to keep the starting air pressure at the required level where internal combustion engines are used for main propulsion.

Special consideration in respect of passenger ships.

105. Passenger ships shall be specially considered by the Director as to whether or not their machinery spaces may be periodically unattended and, if so, whether additional requirements to those stipulated in these Regulations are necessary to achieve equivalent safety to that of normally attended machinery spaces.

CHAPTER II – 2

CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

PART A

GENERAL

Application.

106. (1) *(a)* Unless expressly provided otherwise, this Chapter shall apply to ships constructed on or after 1st. July, 2002.

(b) For the purpose of this Chapter –

"all ships" means ships, irrespective of type, constructed before, on or after 1st. July, 2002;

"ships constructed" means ships the keels of which are laid or which are at a similar stage of construction;

"similar stage of construction" means the stage at which —

(i) construction identifiable with a specific ship begins; and

(ii) assembly of that ship has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less.

(c) For the purpose of this Chapter, a cargo ship, whenever built, which is converted to a passenger ship shall be treated as a passenger ship constructed on the date on which such a conversion commences.

Applicable requirements to existing ships.

(2) *(a)* Unless expressly provided otherwise, for ships constructed before 1st. July, 2002 shall ensure that the requirements which are applicable under Chapter II-2 of SOLAS 1974, as amended by resolutions MSC.1(XLV), MSC.6(48), MSC.13(57), MSC.22(59), MSC.24(60), MSC.27(61), MSC.31(63) and MSC.57(67), are complied with.

(b) Ships constructed before 1st. July, 2002 shall also comply with —

(i) sub-regulation (3), paragraphs *(g)* and (i) of sub-regulation (6) as appropriate;

(ii) sub-paragraphs (ii), (iii), (iv) and (v) of paragraph *(d)* of sub-regulation (3) and paragraph *(c)* of sub-regulation (4) of regulation 118 and Part E, except sub-paragraphs (ii) and (iii) of paragraph *(b)* of sub-regulation (3) of regulation 121 thereof, as appropriate, not later than the date of the first survey after 1st. July, 2002;

(iii) paragraph *(a)*(iii) of sub-regulation (4) and paragraph *(d)* of sub-regulation (6) of regulation 115 for new installations only; and

(iv) paragraph *(f)* of sub-regulation (5) of regulation 115 not later than 1st. October, 2005 for passenger ships of 2,000 tons and above.

Repairs, alterations, modifications and outfitting.

(3) *(a)* All ships which undergo repairs, alterations, modifications and outfitting related thereto shall continue to comply with at least the requirements previously applicable to these ships. Such ships, if constructed before 1st. July, 2002 shall, as a rule, comply with the require-

ments for ships constructed on or after that date to at least the same extent as they did before undergoing such repairs, alterations, modifications or outfitting.

(b) Repairs, alterations and modifications which substantially alter the dimensions of a ship or the passenger accommodation spaces, or substantially increase a ship's service life and outfitting related thereto, shall meet the requirements for ships constructed on or after 1st. July, 2002 in so far as the Director deems reasonable and practicable.

Exemptions.

(4) *(a)* The Director may, if he considers that the sheltered nature and conditions of the voyage are such as to render the application of any specific requirements of this Chapter unreasonable or unnecessary, exempt* from those requirements individual ships or classes of ships entitled to fly the flag of its State, provided that such ships, in the course of their voyage, do not sail at distances of more than 20 miles from the nearest land.

(b) In the case of passenger ships which are employed in special trades for the carriage of large numbers of special trade passengers, such as the pilgrim trade, the Director, if satisfied that it is impracticable to enforce compliance with the requirements of this Chapter, may exempt such ships from those requirements, provided that they comply fully with the provisions of —

(i) the rules annexed to the Special Trade Passenger Ships Agreement, 1971; and

(ii) the rules annexed to the Protocol on Space Requirements for Special Trade Passenger Ships, 1973.

Applicable requirements depending on ship type.

(5) Unless expressly provided otherwise —

(a) requirements not referring to a specific ship type shall apply to ships of all types; and

(b) requirements referring to "tankers" shall apply to tankers subject to the requirements specified in sub-regulation (6).

* Refer to Port State concurrence with SOLAS exemptions (MSC/Circ.606).

Application of requirements for tankers.

(6) *(a)* Requirements for tankers in this Chapter shall apply to tankers carrying crude oil or petroleum products having a flashpoint not exceeding 60°C (closed cup test), as determined by an approved flashpoint apparatus, and a Reid vapour pressure which is below the atmospheric pressure or other liquid products having a similar fire hazard.

(b) Where liquid cargoes other than those referred to in paragraph *(a)* or liquefied gases which introduce additional fire hazards are intended to be carried, additional safety measures shall be required, having due regard to the provisions of the International Bulk Chemical Code, as defined in regulation 234, the Bulk Chemical Code, the International Gas Carrier Code, as defined in regulation 237, and the Gas Carrier Code, as appropriate.

(c) A liquid cargo with a flashpoint of less than 60°C for which a regular foam fire-fighting system complying with the Fire Safety Systems Code is not effective, is considered to be a cargo introducing additional fire hazards in this context. The following additional measures are required —

(i) the foam shall be of alcohol-resistant type;

(ii) the type of foam concentrates for use in chemical tankers shall be to the satisfaction of the Director, taking into account the guidelines developed by the Organisation*; and

(iii) the capacity and application rates of the foam extinguishing system shall comply with Chapter 11 of the International Bulk Chemical Code, except that lower application rates may be accepted based on performance tests. For tankers fitted with inert gas systems, a quantity of foam concentrate sufficient for 20 minutes of foam generation may be accepted.†

* Refer to the Guidelines for performance and testing criteria and surveys of expansion foam concentrates for fire-extinguishing systems for chemical tankers (MSC/Circ.799).

† Refer to the Information on flashpoint and recommended fire-fighting media for chemicals to which neither the IBC nor BCH Codes apply (MSC/Circ.533).

(d) For the purpose of this regulation, a liquid cargo with a vapour pressure greater than 1.013 bar absolute at 37.8°C is considered to be a cargo introducing additional fire hazards. Ships carrying such substances shall comply with paragraph 15.14 of the International Bulk Chemical Code. When ships operate in restricted areas and at restricted times, the Director may agree to waive the requirements for refrigeration systems in accordance with paragraph 15.14.3 of the International Bulk Chemical Code.

(e) Liquid cargoes with a flashpoint exceeding 60°C other than oil products or liquid cargoes subject to the requirements of the International Bulk Chemical Code are considered to constitute a low fire risk, not requiring the protection of a fixed foam extinguishing system.

(f) Tankers carrying petroleum products with a flashpoint exceeding 60°C (closed cup test), as determined by an approved flashpoint apparatus, shall comply with the requirements provided in sub-paragraph (iv)(D) of paragraph *(a)* of sub-regulation (2) and paragraph *(b)*(iii) of sub-regulation (10) of regulation 115 and the requirements for cargo ships other than tankers, except that, in lieu of the fixed fire-extinguishing system required in sub-regulation (7) of regulation 115, they shall be fitted with a fixed deck foam system which shall comply with the provisions of the Fire Safety Systems Code.

(g) Combination carriers constructed before, on or after 1st. July, 2002 shall not carry cargoes other than oil unless all cargo spaces are empty of oil and gas-freed or unless the arrangements provided in each case have been approved by the Director taking into account the guidelines developed by the Organisation.*

(h) Chemical tankers and gas carriers shall comply with the requirements for tankers, except where alternative and supplementary arrangements are provided to the satisfaction of the Director, having due regard to the provisions of the International Bulk Chemical Code and the International Gas Carrier Code, as appropriate.

* Refer to the Guidelines for inert gas system (MSC/Circ.353), as amended by MSC/Circ.387.

(i) The requirements of sub-subparagraphs (A) and (D) of paragraph *(j)(i)* of sub-regulation (5) of regulation 109 and a system for continuous monitoring of the concentration of hydrocarbon gases shall be fitted on all tankers constructed before 1st. July, 2002 by the date of the first scheduled dry-docking after 1st. July, 2002, but not later than 1st. July, 2005. Sampling points or detector heads shall be located in suitable positions in order that potentially dangerous leakages are readily detected. When the hydrocarbon gas concentration reaches a pre-set level which shall not be higher than 10% of the lower flammable limit, a continuous audible and visual alarm signal shall be automatically effected in the pump room and cargo control room to alert personnel to the potential hazard. Existing monitoring systems already fitted having a pre-set level not greater than 30% of the lower flammable limit may be accepted.

Fire safety objectives and functional requirements.

107. (1) The fire safety objectives of this Chapter are to —

(a) prevent the occurrence of fire and explosion;

(b) reduce the risk to life caused by fire;

(c) reduce the risk of damage caused by fire to the ship, its cargo and the environment;

(d) contain, control and suppress fire and explosion in the compartment of origin; and

(e) provide adequate and readily accessible means of escape for passengers and crew.

(2) In order to achieve the fire safety objectives set out in sub-regulation (1), the following functional requirements are embodied in this Chapter as appropriate —

(a) division of the ship into main vertical and horizontal zones by thermal and structural boundaries;

(b) separation of accommodation spaces from the remainder of the ship by thermal and structural boundaries;

(c) restricted use of combustible materials;

(d) detection of any fire in the zone of origin;

(e) containment and extinction of any fire in the space of origin;

(f) protection of means of escape and access for fire-fighting;

(g) ready availability of fire-extinguishing appliances; and

(h) minimisation of possibility of ignition of flammable cargo vapour.

(3) The fire safety objectives set out in sub-regulation (1) shall be achieved by ensuring compliance with the prescriptive requirements specified in Part B, C, D, E or G, or by alternative design and arrangements which comply with Part F. A ship shall be considered to meet the functional requirements set out in sub-regulation (2) and to achieve the fire safety objectives set out in sub-regulation (1) when either —

(a) the ship's design and arrangements, as a whole, comply with the relevant prescriptive requirements in Part B, C, D, E or G;

(b) the ship's design and arrangements, as a whole, have been reviewed and approved in accordance with Part F; or

(c) part of the ship's design and arrangements have been reviewed and approved in accordance with Part F and the remaining parts of the ship comply with the relevant prescriptive requirements in Part B, C, D, E or G.

Interpretation.

108. For the purpose of this Chapter, unless expressly provided otherwise —

"'A' class divisions" are those divisions formed by bulkheads and decks which comply with the following criteria —

(a) they are constructed of steel or other equivalent material;

(b) they are suitably stiffened;

(c) they are insulated with approved non-combustible materials such that the average temperature of the unexposed side will not rise more than 140°C above the original temperature, nor will the temperature, at any one point, including any joint, rise more than 180°C above the original temperature, within the time listed below —

class 'A-60'	60 minutes
class 'A-30'	30 minutes
class 'A-15'	15 minutes
class 'A-0'	0 minute;

(d) they are so constructed as to be capable of preventing the passage of smoke and flame to the end of the one-hour standard fire test; and

(e) the Director shall require a test of a prototype bulkhead or deck in accordance with the Fire Test Procedures Code to ensure that it meets the above requirements for integrity and temperature rise;

"accommodation spaces" are those spaces used for public spaces, corridors, lavatories, cabins, offices, hospitals, cinemas, game and hobby rooms, barber shops, pantries containing no cooking appliances and similar spaces;

"atriums" means public spaces within a single main vertical zone spanning 3 or more open decks;

"'B' class divisions" are those divisions formed by bulkheads, decks, ceilings or linings which comply with the following criteria —

(a) they are constructed of approved non-combustible materials and all materials used in the construction and erection of 'B' class divisions are non-combustible, with the exception that combustible veneers may be permitted, provided they meet other appropriate requirements of this Chapter;

(b) they have an insulation value such that the average temperature of the unexposed side will not rise more than 140°C above the original temperature, nor will the temperature at any one point, including any joint, rise more than 225°C above the original temperature, within the time listed below —

class 'B-15'	15 minutes
class 'B-0'	0 minute;

(c) they are so constructed as to be capable of preventing the passage of flame to the end of the first half hour of the standard fire test; and

(d) the Director shall require a test of a prototype division, in accordance with the Fire Test Procedures Code, to ensure that it meets the above requirements for integrity and temperature rise;

"bulkhead deck" is the uppermost deck up to which the transverse watertight bulkheads are carried;

"'C' class divisions" are divisions constructed of approved non-combustible materials. They need meet neither requirements relative to the passage of smoke and flame nor limitations relative to the temperature rise. Combustible veneers are permitted provided they meet the requirements of this Chapter;

"cargo area" is that part of the ship that contains cargo holds, cargo tanks, slop tanks and cargo pump rooms including pump rooms, cofferdams, ballast and void spaces adjacent to cargo tanks and also deck areas throughout the entire length and breadth of the part of the ship over the spaces mentioned in this regulation;

"cargo spaces" are spaces used for cargo, cargo oil tanks, tanks for other liquid cargo and trunks to such spaces;

"central control station" is a control station in which the following control and indicator functions are centralised —

(a) fixed fire detection and fire alarm systems;

(b) automatic sprinklers, fire detection and fire alarm systems;

(c) fire door indicator panels;

(d) fire door closures;

(e) watertight door indicator panels;

(f) watertight door closures;

(g) ventilation fans;

(h) general or fire alarms;

(i) communication systems including telephones; and

(j) microphones to public address systems;

"chemical tanker" is a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product of a flammable nature listed in Chapter 17 of the International Bulk Chemical Code, as defined in regulation 234;

"closed ro-ro spaces" are ro-ro spaces which are neither open ro-ro spaces nor weather decks;

"closed vehicle spaces" are vehicle spaces which are neither open vehicle spaces nor weather decks;

"combination carrier" is a cargo ship designed to carry both oil and solid cargoes in bulk;

"combustible material" is any material other than a non-combustible material;

"continuous 'B' class ceilings or linings" are those 'B' class ceilings or linings which terminate at an 'A' or 'B' class division;

"continuously manned central control station" is a central control station which is continuously manned by a responsible member of the crew;

"control stations" are those spaces in which the ship's radio or main navigating equipment or the emergency source of power is located or where the fire recording or fire control equipment is centralised. Spaces where the fire recording or fire control equipment is centralised are also considered to be a fire control station;

"crude oil" is any oil occurring naturally in the earth, whether or not treated to render it suitable for transportation, and includes crude oil where certain distillate fractions may have been removed from or added to;

"dangerous goods" are those goods referred to in regulation 227;

"deadweight" is the difference in tonnes between the displacement of a ship in water of a specific gravity of 1.025 at the load water-line corresponding to the assigned summer freeboard and the lightweight of the ship;

"Fire Safety Systems Code" means the International Code for Fire Safety Systems as adopted by the Maritime Safety Committee of the Organisation by resolution MSC.98(73), as may be amended by the Organisation, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of Article VIII of the present Convention concerning the amendment procedures applicable to the Annex other than Chapter I thereof;

"Fire Test Procedures Code" means the International Code for Application of Fire Test Procedures as adopted by the Maritime Safety Committee of the Organisation by resolution MSC.61(67), as may be amended by the Organisation, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of Article VIII of the present Convention concerning the amendment procedures applicable to the Annex other than Chapter I thereof;

"flashpoint" is the temperature in degrees Celsius (closed cup test) at which a product will give off enough flammable vapour to be ignited, as determined by an approved flashpoint apparatus;

"gas carrier" is a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas or other products of a flammable nature listed in Chapter 19 of the International Gas Carrier Code, as defined in regulation 237;

"helicopter facility" is a helideck including any refuelling and hangar facilities;

"helideck" is a purpose-built helicopter landing area located on a ship including all structure, fire-fighting appliances and other equipment necessary for the safe operation of helicopters;

"lightweight" is the displacement of a ship in tonnes without cargo, fuel, lubricating oil, ballast water, fresh water and feedwater in tanks, consumable stores, and passengers and crew and their effects;

"low flame spread" means that the surface thus described will adequately restrict the spread of flame, this being determined in accordance with the Fire Test Procedures Code;

"machinery spaces" are machinery spaces of category A and other spaces containing propulsion machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilising, ventilation and air-conditioning machinery, and similar spaces, and trunks to such spaces;

"machinery spaces of category A" are those spaces and trunks to such spaces which contain either —

(a) internal combustion machinery used for main propulsion;

(b) internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375 kW; or

(c) any oil-fired boiler or oil fuel unit, or any oil-fired equipment other than boilers, such as inert gas generators, incinerators etc.;

"main vertical zones" are those sections into which the hull, superstructure, and deckhouse are divided by 'A' class divisions, the mean length and width of which on any deck does not in general exceed 40 metres;

"non-combustible material" is a material which neither burns nor gives off flammable vapours in sufficient quantity for self-ignition when heated to approximately 750°C, this being determined in accordance with the Fire Test Procedures Code;

"oil fuel unit" is the equipment used for the preparation of oil fuel for delivery to an oil-fired boiler, or equipment used for the preparation for delivery of heated oil to an internal combustion engine, and includes any oil pressure pumps, filters and heaters dealing with oil at a pressure of more than 0.18 N/mm^2;

"open ro-ro spaces" are those ro-ro spaces which are either open at both ends or have an opening at one end, and are provided with adequate natural ventilation effective over their entire length through permanent openings distributed in the side plating or deckhead or from above, having a total area of at least 10% of the total area of the space sides;

"open vehicle spaces" are those vehicle spaces which are either open at both ends or have an opening at one end and are provided with adequate natural ventilation effective over their entire length through permanent openings distributed in the side plating or deckhead or from above, having a total area of at least 10% of the total area of the space sides;

"prescriptive requirements" means the construction characteristics, limiting dimensions, or fire safety systems specified in Part B, C, D, E or G;

"public spaces" are those portions of the accommodation which are used for halls, dining rooms, lounges and similar permanently enclosed spaces;

"rooms containing furniture and furnishings of restricted fire risk", for the purpose of regulation 114, are those rooms containing furniture and furnishings of restricted fire risk (whether cabins, public spaces, offices or other types of accommodation) in which —

(a) case furniture such as desks, wardrobes, dressing tables, bureaux, or dressers are constructed entirely of approved non-combustible materials, except that a combustible veneer not exceeding 2 millimetres may be used on the working surface of such articles;

(b) free-standing furniture such as chairs, sofas, or tables are constructed with frames of non-combustible materials;

(c) draperies, curtains and other suspended textile materials have qualities of resistance to the propagation of flame not inferior to those of wool having a mass of 0.8 kg/m^2, this being determined in accordance with the Fire Test Procedures Code;

(d) floor coverings have low flame spread characteristics;

(e) exposed surfaces of bulkheads, linings and ceilings have low flame spread characteristics;

(f) upholstered furniture has qualities of resistance to the ignition and propagation of flame, this being determined in accordance with the Fire Test Procedures Code; and

(g) bedding components have qualities of resistance to the ignition and propagation of flame, this being determined in accordance with the Fire Test Procedures Code;

"ro-ro passenger ship" means a passenger ship with ro-ro spaces or special category spaces;

"ro-ro spaces" are spaces not normally subdivided in any way and normally extending to either a substantial length or the entire length of the ship in which motor vehicles with fuel in their tanks for their own propulsion or goods (packaged or in bulk, in or on rail or road cars, vehicles (including road or rail tankers), trailers, containers, pallets, demountable tanks or in or on similar stowage units or other receptacles) can be loaded and unloaded normally in a horizontal direction;

"sauna" is a hot room with temperatures normally varying between 80°C and 120°C where the heat is provided by a hot surface (example, by an electrically heated oven). The hot room may also include the space where the oven is located and adjacent bathrooms;

"service spaces" are those spaces used for galleys, pantries containing cooking appliances, lockers, mail and specie rooms, store-rooms, workshops other than those forming part of the machinery spaces, and similar spaces and trunks to such spaces;

"special category spaces" are those enclosed vehicle spaces above and below the bulkhead deck, into and from which vehicles can be driven and to which passengers have access. Special category spaces may be accommodated on more than one deck, provided that the total overall clear height for vehicles does not exceed 10 metres;

"standard fire test" is a test in which specimens of the relevant bulkheads or decks are exposed in a test furnace to temperatures corresponding approximately to the standard time-temperature curve in accordance with the test method specified in the Fire Test Procedures Code;

"steel or other equivalent material" means any non-combustible material which, by itself or due to insulation provided, has structural and integrity

properties equivalent to steel at the end of the applicable exposure to the standard fire test (example, aluminium alloy with appropriate insulation);

"vehicle spaces" are cargo spaces intended for carriage of motor vehicles with fuel in their tanks for their own propulsion;

"weather deck" is a deck which is completely exposed to the weather from above and from at least 2 sides.

PART B

PREVENTION OF FIRE AND EXPLOSION

Probability of ignition.

Purpose.

109. (1) The purpose of this regulation is to prevent the ignition of combustible materials or flammable liquids. For this purpose, the following functional requirements shall be met —

(a) means shall be provided to control leaks of flammable liquids;

(b) means shall be provided to limit the accumulation of flammable vapours;

(c) the ignitability of combustible materials shall be restricted;

(d) ignition sources shall be restricted;

(e) ignition sources shall be separated from combustible materials and flammable liquids; and

(f) the atmosphere in cargo tanks shall be maintained out of the explosive range.

Arrangements for oil fuel, lubrication oil and other flammable oils.

Limitations in use of oils as fuel.

(2) *(a)* The following limitations shall apply to the use of oil as fuel —

(i) except as otherwise permitted by this regulation, no oil fuel with a flashpoint of less than 60°C shall be used*;

(ii) in emergency generators, oil fuel with a flashpoint of not less than 43°C may be used;

(iii) the use of oil fuel having a flashpoint of less than 60°C but not less than 43°C may be permitted (example, for feeding the emergency fire pump's engines and the auxiliary machines which are not located in the machinery spaces of category A) subject to the following —

(A) fuel oil tanks except those arranged in double bottom compartments shall be located outside of machinery spaces of category A;

(B) provisions for the measurement of oil temperature are provided on the suction pipe of the oil fuel pump;

(C) stop valves and cocks are provided on the inlet side and outlet side of the oil fuel strainers; and

(D) pipe joints of welded construction or of circular cone type or spherical type union joint are applied as much as possible; and

(iv) in cargo ships, the use of fuel having a lower flashpoint than otherwise specified in this paragraph, for example crude oil, may be permitted, provided that such fuel is not stored in any machinery space and subject to the approval by the Director of the complete installation.

* Refer to the recommended procedures to prevent the illegal or accidental use of low flashpoint cargo oil as fuel adopted by the Organisation by resolution A.565(14).

Arrangements for oil fuel.

(b) In a ship in which oil fuel is used, the arrangements for the storage, distribution and utilisation of the oil fuel shall be such as to ensure the safety of the ship and persons on board and shall at least comply with the following provisions —

Location of oil fuel systems.

(i) as far as practicable, parts of the oil fuel system containing heated oil under pressure exceeding 0.18 N/mm^2 shall not be placed in a concealed position such that defects and leakage cannot readily be observed. The machinery spaces in way of such parts of the oil fuel system shall be adequately illuminated;

Ventilation of machinery spaces.

(ii) the ventilation of machinery spaces shall be sufficient under normal conditions to prevent accumulation of oil vapour;

Oil fuel tanks.

(iii) (A) fuel oil, lubrication oil and other flammable oils shall not be carried in forepeak tanks;

(B) as far as practicable, oil fuel tanks shall be part of the ship's structure and shall be located outside machinery spaces of category A. Where oil fuel tanks, other than double bottom tanks, are necessarily located adjacent to or within machinery spaces of category A, at least one of their vertical sides shall be contiguous to the machinery space boundaries, and shall preferably have a common boundary with the double bottom tanks, and the area of the tank boundary common with the machinery spaces shall be kept to a minimum. Where such tanks are situated within the boundaries of machinery spaces of category A, they shall not contain oil fuel having a flashpoint of less than 60°C. In general, the use of free-standing oil fuel tanks shall be avoided. When such tanks are employed, their use shall be prohibited in category A machinery spaces on passenger ships. Where permitted, they shall be placed in an oil-tight spill tray of ample size having a suitable drain pipe leading to a suitably sized spill oil tank;

(C) no oil fuel tank shall be situated where spillage or leakage therefrom can constitute a fire or explosion hazard by falling on heated surfaces;

(D) oil fuel pipes which, if damaged, would allow oil to escape from a storage, settling or daily service tank having a capacity of 500 litres and above situated above the double bottom shall be fitted with a cock or valve directly on the tank capable of being closed from a safe position outside the space concerned in the event of a fire occurring in the space in which such tanks are situated. In the special case of deep tanks situated in any shaft or pipe tunnel or similar space, valves on the tank shall be fitted, but control in the event of fire may be effected by means of an additional valve on the pipe outside the tunnel or similar space. If such an additional valve is fitted in the machinery space, it shall be operated from a position outside this space. The controls for remote operation of the valve for the emergency generator fuel tank shall be in a separate location from the controls for remote operation of other valves for tanks located in machinery spaces;

(E) safe and efficient means of ascertaining the amount of oil fuel contained in any oil fuel tank shall be provided —

(I) where sounding pipes are used, they shall not terminate in any space where the risk of ignition of spillage from the sounding pipe might arise. In particular, they shall not terminate in passenger or crew spaces. As a general rule, they shall not terminate in machinery spaces. Where the Director considers that these latter requirements are impracticable, he may permit termination of sounding pipes in machinery spaces on condition that all of the following requirements are met —

(aa) an oil-level gauge is provided meeting the requirements of sub-subparagraph (II);

(bb) the sounding pipes terminate in locations remote from ignition hazards unless precautions are taken, such as the fitting of effective screens, to prevent the oil fuel in the case of spillage through the terminations

of the sounding pipes from coming into contact with a source of ignition; and

(cc) the terminations of sounding pipes are fitted with self-closing blanking devices and with a small-diameter self-closing control cock located below the blanking device for the purpose of ascertaining before the blanking device is opened that oil fuel is not present. Provisions shall be made so as to ensure that any spillage of oil fuel through the control cock involves no ignition hazard;

(II) other oil-level gauges may be used in place of sounding pipes subject to the following conditions —

(aa) in passenger ships, such gauges shall not require penetration below the top of the tank and their failure or overfilling of the tanks shall not permit release of fuel; and

(bb) in cargo ships, the failure of such gauges or overfilling of the tank shall not permit release of fuel into the space. The use of cylindrical gauge glasses is prohibited. The Director may permit the use of oil-level gauges with flat glasses and self-closing valves between the gauges and fuel tanks;

(III) the means prescribed in sub-subparagraph (II) which are acceptable to the Director shall be maintained in the proper condition to ensure their continued accurate functioning in service;

Prevention of overpressure.

(iv) provisions shall be made to prevent overpressure in any oil tanks or in any part of the oil fuel system, including the filling pipes served by pumps on board. Air and overflow pipes and relief valves shall discharge to a position where there is no risk of fire or explosion from the emergence of oils and vapour and shall not lead into crew spaces, passenger spaces nor into special category spaces, closed ro-ro cargo spaces, machinery spaces or similar spaces;

Oil fuel piping.

(v) (A) oil fuel pipes and their valves and fittings shall be of steel or other approved material, except that restricted use of flexible pipes shall be permissible in positions where the Director is satisfied that they are necessary.* Such flexible pipes and end attachments shall be of approved fire-resisting materials of adequate strength and shall be constructed to the satisfaction of the Director. For valves fitted to oil fuel tanks and under static pressure, steel or spheroidal-graphite cast iron may be accepted. Ordinary cast iron valves may be used in piping systems where the design pressure is lower than 7 bar and the design temperature is below 60°C;

(B) external high pressure fuel delivery lines between the high pressure fuel pumps and fuel injectors shall be protected with a jacketed piping system capable of containing fuel from a high pressure line failure. A jacketed pipe incorporates an outer pipe into which the high pressure fuel pipe is placed, forming a permanent assembly. The jacketed piping system shall include a means for collection of leakages and arrangements shall be provided with an alarm in case of a fuel line failure;

(C) oil fuel lines shall not be located immediately above or near units of high temperature, including boilers, steam pipelines, exhaust manifolds, silencers or other equipment required to be insulated by sub-paragraph (vi). As far as practicable, oil fuel lines shall be arranged far apart from hot surfaces, electrical installations or other sources of ignition and shall be screened or otherwise suitably protected to avoid oil spray or oil leakage onto the sources of ignition. The number of joints in such piping systems shall be kept to a minimum;

* Refer to recommendations published by the International Organisation for Standardisation, in particular publications 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.

(D) components of a diesel engine fuel system shall be designed considering the maximum peak pressure which will be experienced in service, including any high pressure pulses which are generated and transmitted back into the fuel supply and spill lines by the action of fuel injection pumps. Connections within the fuel supply and spill lines shall be constructed having regard to their ability to prevent pressurised oil fuel leaks while in service and after maintenance;

(E) in multi-engine installations which are supplied from the same fuel source, means of isolating the fuel supply and spill piping to individual engines shall be provided. The means of isolation shall not affect the operation of the other engines and shall be operable from a position not rendered inaccessible by a fire on any of the engines;

(F) where the Director may permit the conveying of oil and combustible liquids through accommodation and service spaces, the pipes conveying oil or combustible liquids shall be of a material approved by the Director having regard to the fire risk;

Protection of high temperature surfaces.

(vi) (A) surfaces with temperatures above 220°C which may be impinged as a result of a fuel system failure shall be properly insulated;

(B) precautions shall be taken to prevent any oil that may escape under pressure from any pump, filter or heater from coming into contact with heated surfaces.

Arrangements for lubricating oil.

(c) (i) The arrangements for the storage, distribution and utilisation of oil used in pressure lubrication systems shall be such as to ensure the safety of the ship and persons on board. The arrangements made in machinery spaces of category A and, whenever practicable, in other machinery spaces, shall at least comply with sub-paragraph (i), sub-subparagraphs (C), (D) and (E) of sub-paragraph (iii), sub-paragraph (iv), sub-subparagraphs (A) and (C) of sub-paragraph (v) and sub-paragraph (vi) of paragraph *(b)*, except that —

(A) this does not preclude the use of slight-flow glasses in lubricating systems, provided that they are shown by testing to have a suitable degree of fire resistance; and

(B) sounding pipes may be authorised in machinery spaces; however, the requirements of sub-subparagraphs (E)(I)(aa) and (E)(I)(cc) of sub-paragraph (iii) of paragraph *(b)* need not be applied on condition that the sounding pipes are fitted with appropriate means of closure.

(ii) Sub-paragraph (iii)(D) of paragraph *(b)* shall also apply to lubricating oil tanks except those having a capacity less than 500 litres, storage tanks on which valves are closed during the normal operation mode of the ship, or where it is determined that an unintended operation of a quick-closing valve on the oil lubricating tank would endanger the safe operation of the main propulsion and essential auxiliary machinery.

Arrangements for other flammable oils.

(d) The arrangements for the storage, distribution and utilisation of other flammable oils employed under pressure in power transmission systems, control and activating systems and heating systems shall be such as to ensure the safety of the ship and persons on board. Suitable oil collecting arrangements for leaks shall be fitted below hydraulic valves and cylinders. In locations where means of ignition are present, such arrangements shall at least comply with sub-subparagraphs (C) and (E) of sub-paragraph (iii), sub-paragraphs (v)(C) and (vi) of paragraph *(b)* and with sub-paragraphs (iv) and (v)(A) of paragraph *(b)* in respect of strength and construction.

Arrangements for oil fuel in periodically unattended machinery spaces.

(e) In addition to the requirements of paragraphs *(a)*, *(b)*, *(c)* and *(d)*, the oil fuel and lubricating oil systems in a periodically unattended machinery space shall comply with the following —

(i) where daily service oil fuel tanks are filled automatically, or by remote control, means shall be provided to prevent overflow spillages. Other equipment which treats flammable liquids automatically (example, oil fuel purifiers) which, whenever practicable, shall be installed in a special space reserved for purifiers and their heaters, shall have arrangements to prevent overflow spillages; and

(ii) where daily service oil fuel tanks or settling tanks are fitted with heating arrangements, a high temperature alarm shall be provided if the flashpoint of the oil fuel can be exceeded.

Arrangements for gaseous fuel for domestic purposes.

(3) Gaseous fuel systems used for domestic purposes shall be approved by the Director. Storage of gas bottles shall be located on the open deck or in a well-ventilated space which opens only to the open deck.

Miscellaneous items of ignition sources and ignitability.

Electric radiators.

(4) *(a)* Electric radiators, if used, shall be fixed in position and so constructed as to reduce fire risks to a minimum. No such radiators shall be fitted with an element so exposed that clothing, curtains, or other similar materials can be scorched or set on fire by heat from the element.

Waste receptacles.

(b) Waste receptacles shall be constructed of non-combustible materials with no openings in the sides or bottom.

Insulation surfaces protected against oil penetration.

(c) In spaces where penetration of oil products is possible, the surface of insulation shall be impervious to oil or oil vapours.

Primary deck coverings.

(d) Primary deck coverings, if applied within accommodation and service spaces and control stations, shall be of approved material which will not readily ignite, this being determined in accordance with the Fire Test Procedures Code.

Cargo areas of tankers.

Separation of cargo oil tanks.

(5) *(a)* (i) Cargo pump rooms, cargo tanks, slop tanks and cofferdams shall be positioned forward of machinery spaces. Oil fuel bunker tanks need not be forward of machinery

spaces. Cargo tanks and slop tanks shall be isolated from machinery spaces by cofferdams, cargo pump rooms, oil bunker tanks or ballast tanks. Pump rooms containing pumps and their accessories for ballasting those spaces situated adjacent to cargo tanks and slop tanks and pumps for oil fuel transfer shall be considered as equivalent to a cargo pump room within the context of this regulation, provided that such pump rooms have the same safety standard as that required for cargo pump rooms. Pump rooms intended solely for ballast or oil fuel transfer need not comply with the requirements of sub-regulation (9) of regulation 115. The lower portion of the pump room may be recessed into machinery spaces of category A to accommodate pumps, provided that the deck head of the recess is in general not more than one-third of the moulded depth above the keel, except that in the case of ships of not more than 25,000 tonnes deadweight, where it can be demonstrated that for reasons of access and satisfactory piping arrangements this is impracticable, the Director may permit a recess in excess of such height, but not exceeding one-half of the moulded depth above the keel.

(ii) Main cargo control stations, control stations, accommodation and service spaces (excluding isolated cargo handling gear lockers) shall be positioned aft of cargo tanks, slop tanks and spaces which isolate cargo or slop tanks from machinery spaces, but not necessarily aft of the oil fuel bunker tanks and ballast tanks, and shall be arranged in such a way that a single failure of a deck or bulkhead shall not permit the entry of gas or fumes from the cargo tanks into main cargo control stations, control stations, or accommodation and service spaces. A recess provided in accordance with sub-paragraph (i) need not be taken into account when the position of these spaces is being determined.

(iii) Where deemed necessary, the Director may permit main cargo control stations, control stations, accommodation and service spaces forward of the cargo tanks, slop tanks and spaces which isolate cargo and slop tanks from machinery spaces, but not necessarily forward of oil fuel bunker tanks or ballast tanks. Machinery spaces, other than those of category A, may be permitted forward of the cargo tanks and slop tanks provided they are isolated from the cargo tanks and slop tanks by cofferdams, cargo pump rooms, oil fuel bunker tanks or ballast tanks, and have at least one portable fire extinguisher. In cases where they contain internal combustion machinery, one approved foam-type extinguisher of at least 45 litres capacity or equivalent shall be arranged in addition to

portable fire extinguishers. If operation of a semi-portable fire extinguisher is impracticable, this fire extinguisher may be replaced by 2 additional portable fire extinguishers. Main cargo control stations, control stations and accommodation and service spaces shall be arranged in such a way that a single failure of a deck or bulkhead shall not permit the entry of gas or fumes from the cargo tanks into such spaces. In addition, where deemed necessary for the safety or navigation of the ship, the Director may permit machinery spaces containing internal combustion machinery not being main propulsion machinery having an output greater than 375 kW to be located forward of the cargo area, provided the arrangements are in accordance with this paragraph.

(iv) In combination carriers only —

(A) the slop tanks shall be surrounded by cofferdams, except where the boundaries of the slop tanks are part of the hull, main cargo deck, cargo pump room bulkhead or oil fuel bunker tank. These cofferdams shall not be open to a double bottom, pipe tunnel, pump room or other enclosed space, nor shall they be used for cargo or ballast and shall not be connected to piping systems serving oil cargo or ballast. Means shall be provided for filling the cofferdams with water and for draining them. Where the boundary of a slop tank is part of the cargo pump room bulkhead, the pump room shall not be open to the double bottom, pipe tunnel or other enclosed space; however, openings provided with gastight bolted covers may be permitted;

(B) means shall be provided for isolating the piping connecting the pump room with the slop tanks referred to in sub-subparagraph (A). The means of isolation shall consist of a valve followed by a spectacle flange or a spool piece with appropriate blank flanges. This arrangement shall be located adjacent to the slop tanks, but where this is unreasonable or impracticable, it may be located within the pump room directly after the piping penetrates the bulkhead. A separate permanently installed pumping and piping arrangement incorporating a manifold, provided with a shut-off valve and a blank flange, shall be provided for discharging the contents of the slop tanks directly to the open deck for disposal to shore reception facilities when the ship is in the dry cargo mode. When the transfer system is used for slop transfer in the dry cargo mode, it shall have no

connection to other systems. Separation from other systems by means of removal of spool pieces may be accepted;

(C) hatches and tank cleaning openings to slop tanks shall only be permitted on the open deck and shall be fitted with closing arrangements. Except where they consist of bolted plates with bolts at watertight spacing, these closing arrangements shall be provided with locking arrangements under the control of the responsible ship's officer; and

(D) where cargo wing tanks are provided, cargo oil lines below deck shall be installed inside these tanks. The Director may permit cargo oil lines to be placed in special ducts, provided these are capable of being adequately cleaned and ventilated to the satisfaction of the Director. Where cargo wing tanks are not provided, cargo oil lines below deck shall be placed in special ducts.

(v) Where the fitting of a navigation position above the cargo area is shown to be necessary, it shall be for navigation purposes only and it shall be separated from the cargo tank deck by means of an open space with a height of at least 2 metres. The fire protection requirements for such a navigation position shall be those required for control stations, as specified in paragraph *(d)*(ii) of sub-regulation (2) of regulation 114 and other provisions for tankers, as applicable.

(vi) Means shall be provided to keep deck spills away from the accommodation and service areas. This may be accomplished by provision of a permanent continuous coaming of a height of at least 300 millimetres, extending from side to side. Special consideration shall be given to the arrangements associated with stern loading.

Restriction on boundary openings.

(b) (i) Except as permitted in sub-paragraph (ii), access doors, air inlets and openings to accommodation spaces, service spaces, control stations and machinery spaces shall not face the cargo area. They shall be located on 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 not less than 3 metres from the end of

the superstructure or deckhouse facing the cargo area. This distance need not exceed 5 metres.

(ii) The Director may permit access doors in boundary bulkheads facing the cargo area or within the 5 metres limits specified in sub-paragraph (i), to main cargo control stations and to such service spaces used as provision rooms, store-rooms and lockers, provided they do not give access directly or indirectly to any other space containing or providing for accommodation, control stations or service spaces such as galleys, pantries or workshops, or similar space containing sources of vapour ignition. The boundary of such a space shall be insulated to 'A-60' class standard, with the exception of the boundary facing the cargo area. Bolted plates for the removal of machinery may be fitted within the limits specified in sub-paragraph (i). Wheelhouse doors and windows may be located within the limits specified in sub-paragraph (i) so long as they are designed to ensure that the wheelhouse can be made rapidly and efficiently gastight and vapourtight.

(iii) Windows and sidescuttles facing the cargo area and on the sides of the superstructures and deckhouses within the limits specified in sub-paragraph (i) shall be of the fixed (non-opening) type. Such windows and sidescuttles, except wheelhouse windows, shall be constructed to 'A-60' class standard.

(iv) Where there is permanent access from a pipe tunnel to the main pump room, a watertight door shall be fitted complying with the requirements of sub-regulation (2) of regulation 74 and, in addition, with the following —

(A) in addition to the bridge operation, the watertight door shall be capable of being manually closed from outside the main pump room entrance; and

(B) the watertight door shall be kept closed during normal operations of the ship except when access to the pipe tunnel is required.

(v) Permanent approved gastight lighting enclosures for illuminating 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 gastightness of the bulkhead or deck is maintained.

(vi) The arrangement of ventilation inlets and outlets and other deckhouse and superstructure boundary space openings shall

be such as to complement paragraph *(c)* and sub-regulation (6) of regulation 116. Such vents, especially for machinery spaces, shall be situated as far aft as practicable. Due consideration in this regard shall be given when the ship is equipped to load or discharge at the stern. Sources of ignition such as electrical equipment shall be so arranged as to avoid an explosion hazard.

Cargo tank venting.

General requirements.

(c) (i) The venting systems of cargo tanks shall be entirely distinct from the air pipes of the other compartments of the ship. The arrangements and position of openings in the cargo tank deck from which emission of flammable vapours can occur shall be such as to minimise the possibility of flammable vapours being admitted to enclosed spaces containing a source of ignition, or collecting in the vicinity of deck machinery and equipment which may constitute an ignition hazard. In accordance with this general principle, the criteria in sub-paragraphs (ii), (iii), (iv) and (v) and sub-regulation (6) of regulation 116 shall apply.

Venting arrangements.

(ii) (A) The venting arrangements in each cargo tank may be independent or combined with other cargo tanks and may be incorporated into the inert gas piping.

(B) Where the arrangements are combined with other cargo tanks, either stop valves or other acceptable means shall be provided to isolate each cargo tank. Where stop valves are fitted, they shall be provided with locking arrangements which shall be under the control of the responsible ship's officer. There shall be a clear visual indication of the operational status of the valves or other acceptable means. Where tanks have been isolated, it shall be ensured that relevant isolating valves are opened before cargo loading or ballasting or discharging of those tanks is commenced. Any isolation must continue to permit the flow caused by thermal variations in a cargo tank in accordance with paragraph *(a)*(i) of sub-regulation (6) of regulation 116.

(C) If cargo loading and ballasting or discharging of a cargo tank or cargo tank group which is isolated from a common venting system is intended, that cargo tank or cargo tank group shall be fitted with a means for over-pressure or underpressure protection as required in paragraph *(c)*(ii) of sub-regulation (6) of regulation 116.

(D) The venting arrangements shall be connected to the top of each cargo tank and shall be self-draining to the cargo tanks under all normal conditions of trim and list of the ship. Where it may not be possible to provide self-draining lines, permanent arrangements shall be provided to drain the vent lines to a cargo tank.

Safety devices in venting systems.

(iii) The venting system shall be provided with devices to prevent the passage of flame into the cargo tanks. The design, testing and locating of these devices shall comply with the requirements established by the Director based on the guidelines developed by the Organisation.* Ullage openings shall not be used for pressure equalisation. They shall be provided with self-closing and tightly sealing covers. Flame arresters and screens are not permitted in these openings.

Vent outlets for cargo handling and ballasting.

(iv) (A) Vent outlets for cargo loading, discharging and ballasting required by paragraph *(a)*(ii) of sub-regulation (6) of regulation 116 shall —

(I) permit the free flow of vapour mixtures; or

(II) permit the throttling of the discharge of the vapour mixtures to achieve a velocity of not less than 30 m/s;

(III) be so arranged that the vapour mixture is discharged vertically upwards;

* Refer 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 and to MSC/Circ.450//Rev.1, Revised factors to be taken into consideration when designing cargo tank venting and gas-freeing arrangements.

(IV) where the method is by free flow of vapour mixtures, be such that the outlet shall be not less than 6 metres above the cargo tank deck or fore and aft gangway if situated within 4 metres of the gangway and located not less than 10 metres measured horizontally from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery, which may include anchor windlass and chain locker openings, and equipment which may constitute an ignition hazard; and

(V) where the method is by high velocity discharge, be located at a height not less than 2 metres above the cargo tank deck and not less than 10 metres measured horizontally from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery, which may include anchor windlass and chain locker openings, and equipment which may constitute an ignition hazard. These outlets shall be provided with high velocity devices of an approved type.

(B) The arrangements for the venting of vapours displaced from the cargo tanks during loading and ballasting shall comply with this paragraph and sub-regulation (6) of regulation 116 and shall consist of either one or more mast risers, or a number of high velocity vents. The inert gas supply main may be used for such venting.

Isolation of slop tanks in combination carriers.

(v) In combination carriers, the arrangements for isolating slop tanks containing oil or oil residues from other cargo tanks shall consist of blank flanges which will remain in position at all times when cargoes other than liquid cargoes referred to in paragraph *(a)* of sub-regulation (6) of regulation 106 are carried.

Ventilation.

Ventilation systems in cargo pump rooms.

(d) (i) Cargo pump rooms shall be mechanically ventilated and discharges from the exhaust fans shall be led to a safe

place on the open deck. The ventilation of these rooms shall have sufficient capacity to minimise the possibility of accumulation of flammable vapours. The number of air charges shall be at least 20 per hour, based upon the gross volume of the space. The air ducts shall be arranged so that all of the space is effectively ventilated. The ventilation shall be of the suction type using fans of the non-sparking type.

Ventilation systems in combination carriers.

(ii) In combination carriers, cargo spaces and any enclosed spaces adjacent to cargo spaces shall be capable of being mechanically ventilated. The mechanical ventilation may be provided by portable fans. An approved fixed gas warning system capable of monitoring flammable vapours shall be provided in cargo pump rooms, pipe ducts and cofferdams, as referred to in paragraph *(a)*(iv) of sub-regulation (5), adjacent to slop tanks. Suitable arrangements shall be made to facilitate measurement of flammable vapours in all other spaces within the cargo area. Such measurements shall be made possible from the open deck or easily accessible positions.

Inert gas systems.

Application.

(e) (i) (A) For tankers of 20,000 tonnes deadweight and upwards, the protection of the cargo tanks shall be achieved by a fixed inert gas system in accordance with the requirements of the Fire Safety Systems Code, except that, in lieu of the above, the Director, after having given consideration to the ship's arrangement and equipment may accept other fixed installations if they afford protection equivalent to the above, in accordance with regulation 6. The requirements for alternative fixed installations shall comply with the requirements in sub-paragraph (iv).

(B) Tankers operating with a cargo tank cleaning procedure using crude oil washing shall be fitted with an inert gas system complying with the Fire Safety Systems Code and with fixed tank washing machines.

(C) Tankers required to be fitted with inert gas systems shall comply with the following provisions —

(I) double hull spaces shall be fitted with suitable connections for the supply of inert gas;

(II) where hull spaces are connected to a permanently fitted 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

(III) where such spaces are not permanently connected to an inert gas distribution system, appropriate means shall be provided to allow connection to the inert gas main.

Inert gas systems of chemical tankers and gas carriers.

(ii) The requirements for inert gas systems contained in the Fire Safety Systems Code need not be applied to —

(A) chemical tankers and gas carriers when carrying cargoes described in paragraph *(a)* of sub-regulation (6) of regulation 106, provided that they comply with the requirements for inert gas systems on chemical tankers established by the Director, based on the guidelines developed by the Organisation*; or

(B) chemical tankers and gas carriers 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 tanks used for their carriage does not exceed 3,000 m^3 and the individual nozzle capacities of tank washing machines do not exceed 17.5 m^3/h and the total combined throughput from the number of machines in use in a cargo tank at any one time does not exceed 110 m^3/h.

General requirements for inert gas systems.

(iii) (A) The inert gas system shall be capable of inerting, purging and gas-freeing empty tanks and maintaining the atmosphere in cargo tanks with the required oxygen content.

* Refer to the Regulation for inert gas systems on chemical tankers adopted by the Organisation by resolution A.567(14).

(B) The inert gas system referred to in sub-subparagraph (A) shall be designed, constructed and tested in accordance with the Fire Safety Systems Code.

(C) Tankers fitted with a fixed inert gas system shall be provided with a closed ullage system.

Requirements for equivalent systems.

(iv) Where an installation equivalent to a fixed inert gas system is installed, it shall —

(A) be capable of preventing dangerous accumulations of explosive mixtures in intact cargo tanks during normal service throughout the ballast voyage and necessary in-tank operations; and

(B) be so designed as to minimise the risk of ignition from the generation of static electricity by the system itself.

Inerting, purging and gas-freeing.

(f) (i) Arrangements for purging and gas-freeing shall be such as to minimise the hazards due to dispersal of flammable vapours in the atmosphere and to flammable mixtures in a cargo tank.

(ii) The procedure for cargo tank purging and gas-freeing shall be carried out in accordance with paragraph *(b)* of sub-regulation (3) of regulation 121.

(iii) The arrangements for inerting, purging or gas-freeing of empty tanks as required in sub-paragraph (iii)(A) of paragraph *(e)* shall be to the satisfaction of the Director and shall be such that the accumulation of hydrocarbon vapours in pockets formed by the internal structural members in a tank is minimised and that —

(A) on individual cargo tanks, the gas outlet pipe, if fitted, shall be positioned as far as practicable from the inert gas or air inlet and in accordance with paragraph *(c)* and sub-regulation (6) of regulation 116. The inlet of such outlet pipes may be located either at deck level or at not more than one metre above the bottom of the tank;

(B) the cross-sectional area of such gas outlet pipe referred to in sub-subparagraph (A) shall be such that an exit

velocity of at least 20 m/s can be maintained when any 3 tanks are being simultaneously supplied with inert gas. Their outlets shall extend not less than 2 metres above deck level; and

(C) each gas outlet referred to in sub-subparagraph (B) shall be fitted with suitable blanking arrangements.

Gas measurement.

Portable instrument.

(g) (i) Tankers shall be equipped with at least one portable instrument for measuring flammable vapour concentrations, together with a sufficient set of spares. Suitable means shall be provided for the calibration of such instruments.

Arrangements for gas measurement in double hull spaces and double bottom spaces.

(ii) (A) Suitable portable instruments for measuring oxygen and flammable vapour concentrations shall be provided. In selecting these instruments, due attention shall be given to their use in combination with the fixed gas sampling line systems referred to in sub-subparagraph (B).

(B) Where the atmosphere in double hull spaces cannot be reliably measured using flexible gas sampling hoses, such spaces shall be fitted with permanent gas sampling lines. The configuration of gas sampling lines shall be adapted to the design of such spaces.

(C) The materials of construction and the dimensions of gas sampling lines shall be such as to prevent restriction. Where plastic materials are used, they shall be electrically conductive.

Air supply to double hull spaces and double bottom spaces.

(h) Double hull spaces and double bottom spaces shall be fitted with suitable connections for the supply of air.

Protection of cargo area.

(i) Drip pans for collecting cargo residues in cargo lines and hoses shall be provided in the area of pipe and hose connections under the manifold area. Cargo hoses and tank washing hoses shall have electrical continuity over their entire lengths, including couplings and flanges (except shore connections), and shall be earthed for removal of electrostatic charges.

Protection of cargo pump rooms.

(j) In tankers —

(i) cargo pumps, ballast pumps and stripping pumps installed in cargo pump rooms and driven by shafts passing through pump room bulkheads shall be fitted with temperature sensing devices for bulkhead shaft glands, bearings and pump casings. A continuous audible and visual alarm signal shall be automatically effected in the cargo control room or the pump control station;

(ii) lighting in cargo pump rooms, except emergency lighting, shall be interlocked with ventilation such that the ventilation shall be in operation when switching on the lighting. Failure of the ventilation system shall not cause the lighting to go out;

(iii) a system for continuous monitoring of the concentration of hydrocarbon gases shall be fitted. Sampling points or detector heads shall be located in suitable positions in order that potentially dangerous leakages are readily detected. When the hydrocarbon gas concentration reaches a pre-set level, which shall not be higher than 10% of the lower flammable limit, a continuous audible and visual alarm signal shall be automatically effected in the pump room, engine control room, cargo control room and navigation bridge to alert personnel to the potential hazard; and

(iv) all pump rooms shall be provided with bilge level monitoring devices together with appropriately located alarms.

Fire growth potential.

Purpose.

110. (1) The purpose of this regulation is to limit the fire growth potential in every space of the ship. For this purpose, the following functional requirements shall be met —

(a) means of control for the air supply to the space shall be provided;

(b) means of control for flammable liquids in the space shall be provided; and

(c) the use of combustible materials shall be restricted.

Control of air supply and flammable liquid to space.

Closing appliances and stopping devices of ventilation.

(2) *(a)* (i) The main inlets and outlets of all ventilation systems shall be capable of being closed from outside the spaces being ventilated. The means of closing shall be easily accessible as well as prominently and permanently marked and shall indicate whether the shut-off is open or closed.

(ii) Power ventilation of accommodation spaces, service spaces, cargo spaces, control stations and machinery spaces shall be capable of being stopped from an easily accessible position outside the space being served. This position shall not be readily cut off in the event of a fire in the spaces served.

(iii) In passenger ships carrying more than 36 passengers, power ventilation, except machinery space and cargo space ventilation and any alternative system which may be required under sub-regulation (2) of regulation 113, shall be fitted with controls so grouped that all fans may be stopped from either of 2 separate positions which shall be situated as far apart as practicable. Fans serving power ventilation systems to cargo spaces shall be capable of being stopped from a safe position outside such spaces.

Means of control in machinery spaces.

(b) (i) Means of control shall be provided for opening and closure of skylights, closure of openings in funnels which normally allow exhaust ventilation and closure of ventilator dampers.

(ii) Means of control shall be provided for stopping ventilating fans. Controls provided for the power ventilation serving machinery spaces shall be grouped so as to be operable from 2 positions, one of which shall be outside such spaces. The means provided for stopping the power ventilation of the machinery spaces shall be entirely separate from the means provided for stopping ventilation of other spaces.

(iii) Means of control shall be provided for stopping forced and induced draught fans, oil fuel transfer pumps, oil fuel unit pumps, lubricating oil service pumps, thermal oil circulating pumps and oil separators (purifiers). Sub-paragraphs (iv) and (v) need not apply to oily water separators.

(iv) The controls required in sub-paragraphs (i), (ii) and (iii) and in paragraph *(b)*(iii)(D) of sub-regulation (2) of regulation 109 shall be located outside the space concerned so they will not be cut off in the event of fire in the space they serve.

(v) In passenger ships, the controls required in sub-paragraphs (i), (ii), (iii) and (iv) and in paragraph *(c)* of sub-regulation (3) of regulation 113 and paragraph *(b)*(iii) of sub-regulation (5) of regulation 114 and the controls for any required fire-extinguishing system shall be situated at one control position or grouped in as few positions as possible to the satisfaction of the Director. Such positions shall have a safe access from the open deck.

Additional requirements for means of control in periodically unattended machinery spaces.

(c) (i) For periodically unattended machinery spaces, the Director shall give special consideration to maintaining the fire integrity of the machinery spaces, the location and centralisation of the fire-extinguishing system controls, the required shutdown arrangements (example, ventilation, fuel pumps etc.) and that additional fire-extinguishing appliances and other fire-fighting equipment and breathing apparatus may be required.

(ii) In passenger ships, these requirements shall be at least equivalent to those of machinery spaces normally attended.

Fire protection materials.

Use of non-combustible materials.

Insulating materials.

(3) *(a)* (i) Insulating materials shall be non-combustible, except in cargo spaces, mail rooms, baggage rooms and refrigerated compartments of service spaces. Vapour barriers and adhesives used in conjunction with insulation, as well as the insulation of pipe fittings for cold service systems, need not be of non-combustible materials, but they shall be kept to the minimum quantity practicable and their exposed surfaces shall have low flame spread characteristics.

Ceilings and linings.

(ii) (A) In passenger ships, except in cargo spaces, all linings, grounds, draught stops and ceilings shall be of non-combustible material except in mail rooms, baggage rooms, saunas or refrigerated compartments of service spaces. Partial bulkheads or decks used to subdivide a space for utility or artistic treatment shall also be of non-combustible materials.

(B) In cargo ships, all linings, ceilings, draught stops and their associated grounds shall be of non-combustible materials in the following spaces —

(I) in accommodation and service spaces and control stations for ships where method IC is specified as referred to in paragraph *(c)*(i) of sub-regulation (2) of regulation 114; and

(II) in corridors and stairway enclosures serving accommodation and service spaces and control stations for ships where methods IIC or IIIC are specified as referred to in paragraph *(c)*(i) of sub-regulation (2) of regulation 114.

Use of combustible materials.

General.

(b) (i) (A) In passenger ships, 'A', 'B' or 'C' class divisions in accommodation and service spaces which are faced with combustible materials, facings, mouldings, decorations and veneers shall comply with sub-paragraphs (ii), (iii) and (iv) and regulation 111. Traditional wooden benches and wooden linings on bulkheads and ceilings are permitted in saunas and such materials need not be subject to the calculations prescribed in sub-paragraphs (ii) and (iii).

(B) In cargo ships, non-combustible bulkheads, ceilings and linings fitted in accommodation and service spaces may be faced with combustible materials, facings, mouldings, decorations and veneers, provided such spaces are bounded by non-combustible bulkheads, ceilings and linings in accordance with sub-paragraphs (ii), (iii) and (iv) and regulation 111.

Maximum calorific value of combustible materials.

(ii) Combustible materials used on the surfaces and linings specified in sub-paragraph (i) shall have a calorific value* not exceeding 45 MJ/m^2 of the area for the thickness used. The requirements of this sub-paragraph are not applicable to the surfaces of furniture fixed to linings or bulkheads.

Total volume of combustible materials.

(iii) Where combustible materials are used in accordance with sub-paragraph (i), they shall comply with the following requirements —

(A) the total volume of combustible facings, mouldings, decorations and veneers in accommodation and service spaces shall not exceed a volume equivalent to 2.5 millimetres veneer on the combined area of the walls and ceiling linings. Furniture fixed to linings, bulkheads or decks need not be included in the calculation of the total volume of combustible materials; and

* Refer to the recommendations published by the International Organisation for Standardisation, in particular publication ISO 1716:1973, Determination of calorific potential.

(B) in the case of ships fitted with an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code, the volume referred to in sub-subparagraph (A) may include some combustible material used for erection of 'C' class divisions.

Low flame spread characteristics of exposed surfaces.

(iv) The following surfaces shall have low flame spread characteristics in accordance with the Fire Test Procedures Code —

(A) in passenger ships —

(I) exposed surfaces in corridors and stairway enclosures and of bulkhead and ceiling linings in accommodation and service spaces (except saunas) and control stations; and

(II) surfaces and grounds in concealed or inaccessible spaces in accommodation and service spaces and control stations;

(B) in cargo ships —

(I) exposed surfaces in corridors and stairway enclosures and of ceilings in accommodation and service spaces (except saunas) and control stations; and

(II) surfaces and grounds in concealed or inaccessible spaces in accommodation and service spaces and control stations.

Furniture in stairway enclosures of passenger ships.

(c) Furniture in stairway enclosures shall be limited to seating. It shall be fixed, limited to 6 seats on each deck in each stairway enclosure, be of restricted fire risk determined in accordance with the Fire Test Procedures Code, and shall not restrict the passenger escape route. The Director may permit additional seating in the main reception area within a stairway enclosure if it is fixed, non-combustible and does not restrict the passenger escape route. Furniture shall not be permitted in passenger and crew corridors forming escape routes in cabin areas. In addition, lockers of non-combustible material, providing storage for non-hazardous safety

equipment required by these Regulations, may be permitted. Drinking water dispensers and ice cube machines may be permitted in corridors, provided they are fixed and do not restrict the width of the escape routes. This applies as well to decorative flower or plant arrangements, statues or other objects of art such as paintings and tapestries in corridors and stairways.

Smoke generation potential and toxicity.

Purpose.

111. (1) The purpose of this regulation is to reduce the hazard to life from smoke and toxic products generated during a fire in spaces where persons normally work or live. For this purpose, the quantity of smoke and toxic products released from combustible materials, including surface finishes, during fire shall be limited.

Paints, varnishes and other finishes.

(2) Paints, varnishes and other finishes used on exposed interior surfaces shall not be capable of producing excessive quantities of smoke and toxic products, this being determined in accordance with the Fire Test Procedures Code.

Primary deck coverings.

(3) Primary deck coverings, if applied within accommodation and service spaces and control stations, shall be of approved material which will not give rise to smoke or toxic or explosive hazards at elevated temperatures, this being determined in accordance with the Fire Test Procedures Code.

PART C

SUPPRESSION OF FIRE

Detection and alarm.

Purpose.

112. (1) The purpose of this regulation is to detect a fire in the space of origin and to provide for alarm for safe escape and fire-fighting activity. For this purpose, the following functional requirements shall be met —

(a) fixed fire detection and fire alarm system installations shall be suitable for the nature of the space, fire growth potential and potential generation of smoke and gases;

(b) manually operated call points shall be placed effectively to ensure a readily accessible means of notification; and

(c) fire patrols shall provide an effective means of detecting and locating fires and alerting the navigation bridge and fire teams.

General requirements.

(2) *(a)* A fixed fire detection and fire alarm system shall be provided in accordance with this regulation.

(b) A fixed fire detection and fire alarm system and a sample extraction smoke detection system required in this Part shall be of an approved type and comply with the Fire Safety Systems Code.

(c) Where a fixed fire detection and fire alarm system is required for the protection of spaces other than those specified in paragraph *(a)* of sub-regulation (5), at least one detector complying with the Fire Safety Systems Code shall be installed in each such space.

Initial and periodical tests.

(3) *(a)* The function of fixed fire detection and fire alarm systems required by this Chapter shall be tested under varying conditions of ventilation after installation.

(b) The function of fixed fire detection and fire alarm systems shall be periodically tested to the satisfaction of the Director by means of equipment producing hot air at the appropriate temperature, or smoke or aerosol particles having the appropriate range of density of particle size, or other phenomena associated with incipient fires to which the detector is designed to respond.

Protection of machinery spaces.

Installation.

(4) *(a)* A fixed fire detection and fire alarm system shall be installed in —

(i) periodically unattended machinery spaces; and

(ii) machinery spaces where —

(A) the installation of automatic and remote control systems and equipment has been approved in lieu of continuous manning of the space; and

(B) the main propulsion and associated machinery, including the main sources of electrical power, are provided with various degrees of automatic or remote control and are under continuous manned supervision from a control room.

Design.

(b) The fixed fire detection and fire alarm system required in sub-paragraph *(i)* of paragraph *(a)* shall be so designed and the detectors so positioned as to detect rapidly the onset of fire in any part of those spaces and under any normal conditions of operation of the machinery and variations of ventilation as required by the possible range of ambient temperatures. Except in spaces of restricted height and where their use is specially appropriate, detection systems using only thermal detectors shall not be permitted. The detection system shall initiate audible and visual alarms distinct in both respects from the alarms of any other system not indicating fire, in sufficient places to ensure that the alarms are heard and observed on the navigation bridge and by a responsible engineer officer. When the navigation bridge is unmanned, the alarm shall sound in a place where a responsible member of the crew is on duty.

Protection of accommodation and service spaces and control stations.

Smoke detectors in accommodation spaces.

(5) *(a)* Smoke detectors shall be installed in all stairways, corridors and escape routes within accommodation spaces as provided in paragraphs *(b)*, *(c)* and *(d)*. Consideration shall be given to the installation of special purpose smoke detectors within ventilation ducting.

Requirements for passenger ships carrying more than 36 passengers.

(b) A fixed fire detection and fire alarm system shall be so installed and arranged as to provide smoke detection in service spaces, control stations and accommodation spaces, including corridors, stairways and escape routes within accommodation spaces. Smoke detectors need not be fitted in private bathrooms and galleys. Spaces having little or no fire risk

such as voids, public toilets, carbon dioxide rooms and similar spaces need not be fitted with a fixed fire detection and alarm system.

Requirements for passenger ships carrying not more than 36 passengers.

(c) There shall be installed throughout each separate zone, whether vertical or horizontal, in all accommodation and service spaces and, where it is considered necessary by the Director, in control stations, except spaces which afford no substantial fire risk such as void spaces, sanitary spaces etc. either —

(i) a fixed fire detection and fire alarm system so installed and arranged as to detect the presence of fire in such spaces and providing smoke detection in corridors, stairways and escape routes within accommodation spaces; or

(ii) an automatic sprinkler, fire detection and fire alarm system of an approved type complying with the relevant requirements of the Fire Safety Systems Code and so installed and arranged as to protect such spaces and, in addition, a fixed fire detection and fire alarm system and so installed and arranged as to provide smoke detection in corridors, stairways and escape routes within accommodation spaces.

Protection of atriums in passenger ships.

(d) The entire main vertical zone containing the atrium shall be protected throughout with a smoke detection system.

Cargo ships.

(e) Accommodation and service spaces and control stations of cargo ships shall be protected by a fixed fire detection and fire alarm system or an automatic sprinkler, fire detection and fire alarm system as follows, depending on a protection method adopted in accordance with paragraph *(c)*(i) of sub-regulation (2) of regulation 114 —

(i) method IC - a fixed fire detection and fire alarm system shall be so installed and arranged as to provide smoke detection in all corridors, stairways and escape routes within accommodation spaces;

(ii) 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 so installed and arranged as to protect accommodation spaces, galleys and other service spaces, except spaces which afford no substantial fire risk such as void spaces, sanitary spaces etc. In addition, a fixed fire detection and fire alarm system shall be so installed and arranged as to provide smoke detection in all corridors, stairways and escape routes within accommodation spaces;

(iii) method IIIC - a fixed fire detection and fire alarm system shall be so installed and arranged as to detect the presence of fire in all accommodation spaces and service spaces, providing smoke detection in corridors, stairways and escape routes within accommodation spaces, except spaces which afford no substantial fire risk such as void spaces, sanitary spaces etc. In addition, a fixed fire detection and fire alarm system shall be so installed and arranged as to provide smoke detection in all corridors, stairways and escape routes within accommodation spaces.

Protection of cargo spaces in passenger ships.

(6) A fixed fire detection and fire alarm system or a sample extraction smoke detection system shall be provided in any cargo space which, in the opinion of the Director, is not accessible, except where it is shown to the satisfaction of the Director that the ship is engaged on voyages of such short duration that it would be unreasonable to apply this requirement.

Manually operated call points.

(7) Manually operated call points complying with the Fire Safety Systems Code shall be installed throughout the accommodation spaces, service spaces and control stations. One manually operated call point shall be located at each exit. Manually operated call points shall be readily accessible in the corridors of each deck such that no part of the corridor is more than 20 metres from a manually operated call point.

Fire patrols in passenger ships.

Fire patrols.

(8) *(a)* For ships carrying more than 36 passengers, an efficient patrol system shall be maintained so that an outbreak of fire may be promptly detected. Each member of the fire patrol shall be trained to be familiar with

the arrangements of the ship as well as the location and operation of any equipment he may be called upon to use.

Inspection hatches.

(b) The construction of ceilings and bulkheads shall be such that it will be possible, without impairing the efficiency of the fire protection, for the fire patrols to detect any smoke originating in concealed and inaccessible places, except where in the opinion of the Director there is no risk of fire originating in such places.

Two-way portable radiotelephone apparatus.

(c) Each member of the fire patrol shall be provided with a two-way portable radiotelephone apparatus.

Fire alarm signalling systems in passenger ships.*

(9) *(a)* Passenger ships shall at all times when at sea, or in port (except when out of service), be so manned or equipped as to ensure that any initial fire alarm is immediately received by a responsible member of the crew.

(b) The control panel of fixed fire detection and fire alarm systems shall be designed on the fail-safe principle (example, an open detector circuit shall cause an alarm condition).

(c) Passenger ships carrying more than 36 passengers shall have the fire detection alarms for the systems required by paragraph *(b)* of sub-regulation (5) centralised in a continuously manned central control station. In addition, controls for remote closing of the fire doors and shutting down the ventilation fans shall be centralised in the same location. The ventilation fans shall be capable of reactivation by the crew at the continuously manned control station. The control panels in the central control station shall be capable of indicating open or closed positions of fire doors and closed or off status of the detectors, alarms and fans. The control panel shall be continuously powered and should have an automatic change-over to standby power supply in case of loss of normal power supply. The control panel shall be powered from the main source of electrical power and the emergency source of electrical power defined by regulation 92 unless other arrangements are permitted by the regulations, as applicable.

* Refer to the Code on Alarms and Indicators adopted by the Organisation by resolution A.830(19).

(d) A special alarm, operated from the navigation bridge or fire control station, shall be fitted to summon the crew. This alarm may be part of the ship's general alarm system and shall be capable of being sounded independently of the alarm to the passenger spaces.

Control of smoke spread.

Purpose.

113. (1) The purpose of this regulation is to control the spread of smoke in order to minimise the hazards from smoke. For this purpose, means for controlling smoke in atriums, control stations, machinery spaces and concealed spaces shall be provided.

Protection of control stations outside machinery spaces.

(2) Practicable measures shall be taken for control stations outside machinery spaces in order to ensure that ventilation, visibility and freedom from smoke are maintained so that, in the event of fire, the machinery and equipment contained therein may be supervised and continue to function effectively. Alternative and separate means of air supply shall be provided and air inlets of the 2 sources of supply shall be so disposed that the risk of both inlets drawing in smoke simultaneously is minimised. At the discretion of the Director, such requirements need not apply to control stations situated on, and opening onto, an open deck or where local closing arrangements would be equally effective.

Release of smoke from machinery spaces.

(3) *(a)* This sub-regulation shall apply to machinery spaces of category A and, where the Director considers desirable, to other machinery spaces.

(b) Suitable arrangements shall be made to permit the release of smoke, in the event of fire, from the space to be protected, subject to paragraph *(b)*(i) of sub-regulation (5) of regulation 114. The normal ventilation systems may be acceptable for this purpose.

(c) Means of control shall be provided for permitting the release of smoke and such controls shall be located outside the space concerned so that they will not be cut off in the event of fire in the space they serve.

(d) In passenger ships, the controls required by paragraph *(c)* shall be situated at one control position or grouped in as few positions as possible to the satisfaction of the Director. Such positions shall have a safe access from the open deck.

Draught stops.

(4) Air spaces enclosed behind ceilings, panellings or linings shall be divided by close-fitting draught stops spaced not more than 14 metres apart. In the vertical direction, such enclosed air spaces, including those behind linings of stairways, trunks etc. shall be closed at each deck.

Smoke extraction systems in atriums of passenger ships.

(5) Atriums shall be equipped with a smoke extraction system. The smoke extraction system shall be activated by the required smoke detection system and be capable of manual control. The fans shall be sized such that the entire volume within the space can be exhausted in 10 minutes or less.

Containment of fire.

Purpose.

114. (1) The purpose of this regulation is to contain a fire in the space of origin. For this purpose, the following functional requirements shall be met —

(a) the ship shall be subdivided by thermal and structural boundaries;

(b) thermal insulation of boundaries shall have due regard to the fire risk of the space and adjacent spaces; and

(c) the fire integrity of the divisions shall be maintained at openings and penetrations.

Thermal and structural boundaries.

Thermal and structural subdivision.

(2) *(a)* Ships of all types shall be subdivided into spaces by thermal and structural divisions having regard to the fire risks of the space.

Passenger ships.

Main vertical zones and horizontal zones.

(b) (i) (A) (I) In ships carrying more than 36 passengers, the hull, superstructure and deckhouses shall be subdivided into main vertical zones by 'A-60' class divisions. Steps and recesses shall be kept to a

minimum, but where they are necessary, they shall also be 'A-60' class divisions. Where a category (5), (9) or (10) space defined in sub-subparagraph (B)(II) of sub-paragraph (iii) is on one side or where fuel oil tanks are on both sides of the division, the standard may be reduced to 'A-0'.

(II) In ships carrying not more than 36 passengers, the hull, superstructure and deckhouses in way of accommodation and service spaces shall be subdivided into main vertical zones by 'A' class divisions. These divisions shall have insulation values in accordance with tables specified in subparagraph (iv).

(B) As far as practicable, the bulkheads forming the boundaries of the main vertical zones above the bulkhead deck shall be in line with watertight subdivision bulkheads situated immediately below the bulkhead deck. The length and width of main vertical zones may be extended to a maximum of 48 metres in order to bring the ends of main vertical zones to coincide with watertight subdivision bulkheads or in order to accommodate a large public space extending for the whole length of the main vertical zone, provided that the total area of the main vertical zone is not greater than 1,600 m^2 on any deck. The length or width of a main vertical zone is the maximum distance between the furthermost points of the bulkheads bounding it.

(C) Such bulkheads shall extend from deck to deck and to the shell or other boundaries.

(D) Where a main vertical zone is subdivided by horizontal 'A' class divisions into horizontal zones for the purpose of providing an appropriate barrier between a zone with sprinklers and a zone without sprinklers, the divisions shall extend between adjacent main vertical zone bulkheads and to the shell or exterior boundaries of the ship and shall be insulated in accordance with the fire insulation and integrity values given in Table 4 in the Third Schedule.

(E) (I) On ships designed for special purposes, such as automobile or railroad car ferries, where the provision of main vertical zone bulkheads would defeat the purpose for which the ship is intended, equivalent

means for controlling and limiting a fire shall be substituted and specifically approved by the Director. Service spaces and ship stores shall not be located on ro-ro decks unless protected in accordance with the applicable regulations.

(II) In a ship with special category spaces, such spaces shall comply with the applicable provisions of regulation 125 and, where such compliance would be inconsistent with other requirements for passenger ships specified in this Chapter, the requirements of regulation 125 shall prevail.

Bulkheads within main vertical zone.

(ii) (A) For ships carrying more than 36 passengers, bulkheads which are not required to be 'A' class divisions shall be at least 'B' class or 'C' class divisions as prescribed in the tables referred to in sub-paragraph (iii).

(B) For ships carrying not more than 36 passengers, bulkheads within 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 referred to in sub-paragraph (iv). In addition, corridor bulkheads, where not required to be 'A' class, shall be 'B' class divisions which shall extend from deck to deck except —

(I) when continuous 'B' class ceilings or linings are fitted on both sides of the bulkhead, the portion of the bulkhead behind the continuous ceiling or lining shall be of material which, in thickness and composition, is acceptable in the construction of 'B' class divisions, but which shall be required to meet 'B' class integrity standards only in so far as is reasonable and practicable in the opinion of the Director; and

(II) in the case of a ship protected by an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code, the corridor bulkheads may terminate at a ceiling in the corridor, provided such bulkheads and ceilings are of 'B' class standard in compliance with sub-paragraph (iv). All doors and frames in such bulkheads shall

be of non-combustible materials and shall have the same fire integrity as the bulkhead in which they are fitted.

(C) Bulkheads required to be 'B' class divisions, except corridor bulkheads as prescribed in sub-subparagraph (B), shall extend from deck to deck and to the shell or other boundaries. Where a continuous 'B' class ceiling or lining is fitted on both sides of a bulkhead which is at least of the same fire resistance as the adjoining bulkhead, the bulkhead may terminate at the continuous ceiling or lining.

Fire integrity of bulkheads and decks in ships carrying more than 36 passengers.

(iii) (A) In addition to complying with the specific provisions for fire integrity of bulkheads and decks of passenger ships, the minimum fire integrity of all bulkheads and decks shall be as prescribed in Tables 1 and 2 in the Third Schedule. Where, due to any particular structural arrangements in the ship, difficulty is experienced in determining from the tables the minimum fire integrity value of any division, such values shall be determined to the satisfaction of the Director.

(B) The following requirements shall govern application of the tables —

(I) Table 1 shall apply to bulkheads not bounding either main vertical zones or horizontal zones. Table 2 shall apply to decks not forming steps in main vertical zones nor bounding horizontal zones;

(II) for determining the appropriate fire integrity standards to be applied to boundaries between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (14) below. Where the contents and use of a space are such that there is a doubt as to its classification for the purpose of this regulation, or where it is possible to assign 2 or more classifications to a space, it shall be treated as a space within the relevant category having the most stringent boundary requirements. Smaller enclosed rooms within a space that have less than 30% communicating openings to that space are considered

separate spaces. The fire integrity of the boundary bulkheads and decks of such smaller rooms shall be as prescribed in Tables 1 and 2. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the tables —

(1) *control stations* —

spaces containing emergency sources of power and lighting; wheelhouse and chartroom;

spaces containing the ship's radio equipment;

fire control stations;

control room for propulsion machinery when located outside the propulsion machinery space;

spaces containing centralised fire alarm equipment;

spaces containing centralised emergency public address system stations and equipment;

(2) *stairways* —

interior stairways, lifts, totally enclosed emergency escape trunks, and escalators (other than those wholly contained within the machinery spaces) for passengers and crew and enclosures thereto;

in this connection, a stairway which is enclosed at only one level shall be regarded as part of the space from which it is not separated by a fire door;

(3) *corridors* —

passenger and crew corridors and lobbies;

(4) *evacuation stations and external escape routes* —

survival craft stowage area;

open deck spaces and enclosed promenades forming lifeboat and liferaft embarkation and lowering stations;

assembly stations, internal and external;

external stairs and open decks used for escape routes;

the ship's side to the water-line in the lightest seagoing condition, superstructure and deckhouse sides situated below and adjacent to the liferaft and evacuation slide embarkation areas;

(5) *open deck spaces* —

open deck spaces and enclosed promenades clear of lifeboat and liferaft embarkation and lowering stations. To be considered in this category, enclosed promenades shall have no significant fire risk, meaning that furnishings shall be restricted to deck furniture. In addition, such spaces shall be naturally ventilated by permanent openings.

Air spaces (the space outside superstructures and deckhouses);

(6) *accommodation spaces of minor fire risk* —

cabins containing furniture and furnishings of restricted fire risk;

offices and dispensaries containing furniture and furnishings of restricted fire risk;

public spaces containing furniture and furnishings of restricted fire risk and having a deck area of less than 50 m^2;

(7) *accommodation spaces of moderate fire risk* —

spaces in category (6) but containing furniture and furnishings of other than restricted fire risk;

public spaces containing furniture and furnishings of restricted fire risk and having a deck area of 50 m^2 or more;

isolated lockers and small store rooms in accommodation spaces having areas less than 4 m^2 (in which flammable liquids are not stowed);

sale shops. Motion picture projection and film stowage rooms. Diet kitchens (containing no open flame);

cleaning gear lockers (in which flammable liquids are not stowed);

laboratories (in which flammable liquids are not stowed);

pharmacies;

small drying rooms (having a deck area of 4 m^2 or less);

specie rooms;

operating rooms;

(8) *accommodation spaces of greater fire risk* —

public spaces containing furniture and furnishings of other than restricted fire risk and having a deck area of 50 m^2 or more;

barber shops and beauty parlours;

saunas;

(9) *sanitary and similar spaces* —

communal sanitary facilities, showers, baths, water closets etc.;

small laundry rooms;

indoor swimming pool area;

isolated pantries containing no cooking appliances in accommodation spaces;

private sanitary facilities shall be considered a portion of the space in which they are located;

(10) *tanks, voids and auxiliary machinery spaces having little or no fire risk* —

water tanks forming part of the ship's structure;

voids and cofferdams;

auxiliary machinery spaces which do not contain machinery having a pressure lubrication system and where storage of combustibles is prohibited, such as —

ventilation and air-conditioning rooms;

windlass room;

steering gear room;

stabiliser equipment room;

electrical propulsion motor room;

rooms containing section switchboards and purely electrical equipment other than oil-filled electrical transformers (above 10 kVA);

shaft alleys and pipe tunnels; and

spaces for pumps and refrigeration machinery (not handling or using flammable liquids);

closed trunks serving the spaces listed above;

other closed trunks such as pipe and cable trunks;

(11) *auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk* —

cargo oil tanks;

cargo holds, trunkways and hatchways;

refrigerated chambers;

oil fuel tanks (where installed in a separate space with no machinery);

shaft alleys and pipe tunnels allowing storage of combustibles;

auxiliary machinery spaces as in category (10) which contain machinery having a pressure lubrication system or where storage of combustibles is permitted;

oil fuel filling stations;

spaces containing oil-filled electrical transformers (above 10 kVA);

spaces containing turbine and reciprocating steam engine driven auxiliary generators and small internal combustion engines of power output up to 110 kW driving generators, sprinkler, drencher or fire pumps, bilge pumps etc.;

closed trunks serving the spaces listed above;

(12) *machinery spaces and main galleys* —

main propulsion machinery rooms (other than electric propulsion motor rooms) and boiler rooms;

auxiliary machinery spaces other than those in categories (10) and (11) which contain internal combustion machinery or other oil-burning, heating or pumping units;

main galleys and annexes;

trunks and casings to the spaces listed above;

(13) *store rooms, workshops, pantries etc.* —

main pantries not annexed to galleys;

main laundry;

large drying rooms (having a deck area of more than 4 m^2);

miscellaneous stores;

mail and baggage rooms;

garbage rooms;

workshops (not part of machinery spaces, galleys etc.);

lockers and store rooms having areas greater than 4 m^2, other than those spaces that have provisions for the storage of flammable liquids;

(14) *other spaces in which flammable liquids are stowed* —

paint lockers;

store rooms containing flammable liquids (including dyes, medicines etc.);

laboratories (in which flammable liquids are stowed);

(III) where a single value is shown for the fire integrity of a boundary between 2 spaces, that value shall apply in all cases;

(IV) notwithstanding the provisions of sub-paragraph (ii), there are no special requirements for material or integrity of boundaries where only a dash appears in the tables;

(V) the Director shall determine in respect of category (5) spaces whether the insulation values in Table 1 shall apply to ends of deckhouses and superstructures, and whether the insulation values in Table 2 shall apply to weather decks. In no case shall the requirements of category (5) of Table 1 or 2 necessitate enclosure of spaces which in the opinion of the Director need not be enclosed.

(C) Continuous 'B' class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division.

Construction and arrangement of saunas.

(D) (I) The perimeter of the sauna shall be of 'A' class boundaries and may include changing rooms, showers and toilets. The sauna shall be insulated to 'A-60' standard against other spaces except those inside of the perimeter and spaces of categories (5), (9) and (10).

(II) Bathrooms with direct access to saunas may be considered as part of them. In such cases, the door between sauna and the bathroom need not comply with fire safety requirements.

(III) The traditional wooden lining on the bulkheads and ceiling are permitted in the sauna. The ceiling above the oven shall be lined with a non-combustible plate with an air gap of at least 30 millimetres. The distance from the hot surfaces to combustible materials shall be at least 500 millimetres or the combustible materials shall be

protected (example, non-combustible plate with an air gap of at least 30 millimetres).

(IV) The traditional wooden benches are permitted to be used in the sauna.

(V) The sauna door shall open outwards by pushing.

(VI) Electrically heated ovens shall be provided with a timer.

Fire integrity of bulkheads and decks in ships carrying not more than 36 passengers.

(iv) (A) In addition to complying with the specific provisions for fire integrity of bulkheads and decks of passenger ships, the minimum fire integrity of bulkheads and decks shall be as prescribed in Tables 3 and 4 in the Third Schedule.

(B) The following requirements govern application of the tables —

(I) Tables 3 and 4 shall apply respectively to the bulkheads and decks separating adjacent spaces;

(II) for determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (11) below. Where the contents and use of a space are such that there is a doubt as to its classification for the purpose of this regulation, or where it is possible to assign 2 or more classifications to a space, it shall be treated as a space within the relevant category having the most stringent boundary requirements. Smaller enclosed rooms within a space that have less than 30% communicating openings to that space are considered separate spaces. The fire integrity of the boundary bulkheads and decks of such smaller rooms shall be as prescribed in Tables 3 and 4. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the tables —

(1) *control stations* —

spaces containing emergency sources of power and lighting;

wheelhouse and chartroom;

spaces containing the ship's radio equipment;

fire control stations;

control room for propulsion machinery when located outside the machinery space;

spaces containing centralised fire alarm equipment;

(2) *corridors* —

passenger and crew corridors and lobbies;

(3) *accommodation spaces* —

spaces as defined in regulation 108 excluding corridors;

(4) *stairways* —

interior stairways, lifts, totally enclosed emergency escape trunks, and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto;

in this connection, a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door;

(5) *service spaces (low risk)* —

lockers and store rooms not having provisions for the storage of flammable liquids and having areas less than 4 m^2 and drying rooms and laundries;

(6) *machinery spaces of category A* —

spaces as defined in regulation 108;

(7) *other machinery spaces* —

electrical equipment rooms (auto-telephone exchange, air-conditioning duct spaces);

spaces as defined in regulation 108 excluding machinery spaces of category A;

(8) *cargo spaces* —

all spaces used for cargo (including cargo oil tanks) and trunkways and hatchways to such spaces, other than special category spaces;

(9) *service spaces (high risk)* —

galleys, pantries containing cooking appliances, paint lockers, lockers and store rooms having areas of 4 m^2 or more, spaces for the storage of flammable liquids, saunas and workshops other than those forming part of the machinery spaces;

(10) *open decks* —

open deck spaces and enclosed promenades having little or no fire risk. Enclosed promenades shall have no significant fire risk, meaning that furnishing shall be restricted to deck furniture. In addition, such spaces shall be naturally ventilated by permanent openings;

air spaces (the space outside superstructures and deckhouses);

(11) *special category and ro-ro spaces* —

spaces as defined in regulation 108;

(III) in determining the applicable fire integrity standard of a boundary between 2 spaces within a main vertical zone or horizontal zone which is not

protected by an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code or between such zones neither of which is so protected, the higher of the 2 values given in the tables shall apply;

(IV) in determining the applicable fire integrity standard of a boundary between 2 spaces within a main vertical zone or horizontal zone which is protected by an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code or between such zones, both of which are so protected, the lesser of the 2 values given in the tables shall apply. Where a zone with sprinklers and a zone without sprinklers meet within accommodation and service spaces, the higher of the 2 values given in the tables shall apply to the division between the zones.

(C) Continuous 'B' class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division.

(D) External boundaries which are required in sub-regulation (2) of regulation 116 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles, provided that there is no requirement for such boundaries of passenger ships to have 'A' class integrity. Similarly, in such boundaries which are not required to have 'A' class integrity, doors may be constructed of materials which are to the satisfaction of the Director.

(E) Saunas shall comply with sub-subparagraph (D) of sub-paragraph (iii).

Protection of stairways and lifts in accommodation area.

(v) (A) Stairways shall be within enclosures formed of 'A' class divisions, with positive means of closure at all openings, except that —

(I) a stairway connecting only 2 decks need not be enclosed, provided the integrity of the deck is maintained by proper bulkheads or self-closing

doors in one between-deck space. When a stairway is closed in one between-deck space, the stairway enclosure shall be protected in accordance with the tables for decks in sub-paragraph (iii) or (iv); and

(II) stairways may be fitted in the open in a public space, provided they lie wholly within the public space.

(B) Lift trunks shall be so fitted as to prevent the passage of smoke and flame from one between-deck to another and shall be provided with means of closing so as to permit the control of draught and smoke. Machinery for lifts located within stairway enclosures shall be arranged in a separate room, surrounded by steel boundaries, except that small passages for lift cables are permitted. Lifts which open into spaces other than corridors, public spaces, special category spaces, stairways and external areas shall not open into stairways included in the means of escape.

Cargo ships except tankers.

Methods of protection in accommodation area.

(c) (i) (A) One of the following methods of protection shall be adopted in accommodation and service spaces and control stations —

(I) method IC - the construction of internal divisional bulkheads of non-combustible 'B' or 'C' class divisions generally without the installation of an automatic sprinkler, fire detection and fire alarm system in the accommodation and service spaces, except as required by paragraph *(e)*(i) of sub-regulation (5) of regulation 112;

(II) method IIC - the fitting of an automatic sprinkler, fire detection and fire alarm system as required by paragraph *(e)*(ii) of sub-regulation (5) of regulation 112 for the detection and extinction of fire in all spaces in which fire might be expected to originate, generally with no restriction on the type of internal divisional bulkheads; or

(III) method IIIC - the fitting of a fixed fire detection and fire alarm system as required by paragraph *(e)*(iii) of sub-regulation (5) of regulation 112 in spaces in which a fire might be expected to originate, generally with no restriction on the type of internal divisional bulkheads, except that in no case shall the area of any accommodation space bounded by an 'A' or 'B' class division exceed 50 m^2. Consideration may be given by the Director to increasing this area for public spaces.

(B) The requirements for the use of non-combustible materials in the construction and insulation of boundary bulkheads of machinery spaces, control stations, service spaces etc., and the protection of the above stairway enclosures and corridors will be common to all 3 methods outlined in sub-subparagraph (A).

Bulkheads within accommodation area.

(ii) (A) Bulkheads required to be 'B' class divisions shall extend from deck to deck and to the shell or other boundaries. Where a continuous 'B' class ceiling or lining is fitted on both sides of the bulkhead, the bulkhead may terminate at the continuous ceiling or lining.

(B) Method IC - bulkheads not required by this or other regulations for cargo ships to be 'A' or 'B' class divisions shall be of at least 'C' class construction.

(C) Method IIC - there shall be no restriction on the construction of bulkheads not required by this or other regulations for cargo ships to be 'A' or 'B' class division except in individual cases where 'C' class bulkheads are required in accordance with Table 5 in the Third Schedule.

(D) Method IIIC - there shall be no restriction on the construction of bulkheads not required for cargo ships to be 'A' or 'B' class divisions except that the area of any accommodation space bounded by a continuous 'A' or 'B' class division shall in no case exceed 50 m^2, except in individual cases where 'C' class bulkheads are required in accordance with Table 5 in the Third Schedule. Consideration may be given by the Director to increasing this area for public spaces.

Fire integrity of bulkheads and decks.

(iii) (A) In addition to complying with the specific provisions for fire integrity of bulkheads and decks of cargo ships, the minimum fire integrity of bulkheads and decks shall be as prescribed in Tables 5 and 6 in the Third Schedule.

(B) The following requirements shall govern application of the tables —

(I) Tables 5 and 6 shall apply respectively to the bulkheads and decks separating adjacent spaces;

(II) for determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (11) below. Where the contents and use of a space are such that there is a doubt as to its classification for the purpose of this regulation, or where it is possible to assign 2 or more classifications to a space, it shall be treated as a space within the relevant category having the most stringent boundary requirements. Smaller enclosed rooms within a space that have less than 30% communicating openings to that space are considered separate spaces. The fire integrity of the boundary bulkheads and decks of such smaller rooms shall be as prescribed in Tables 5 and 6. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the tables —

(1) *control stations* —

spaces containing emergency sources of power and lighting;

wheelhouse and chartroom;

spaces containing the ship's radio equipment;

fire control stations;

control room for propulsion machinery when located outside the machinery space;

spaces containing centralised fire alarm equipment;

(2) *corridors* —

corridors and lobbies;

(3) *accommodation spaces* —

spaces as defined in regulation 108, excluding corridors;

(4) *stairways* —

interior stairways, lifts, totally enclosed emergency escape trunks, and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto;

in this connection, a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door;

(5) *service spaces (low risk)* —

lockers and store rooms not having provisions for the storage of flammable liquids and having areas less than 4 m^2 and drying rooms and laundries;

(6) *machinery spaces of category A* —

spaces as defined in regulation 108;

(7) *other machinery spaces* —

electrical equipment rooms (auto-telephone exchange, air-conditioning duct spaces);

spaces as defined in regulation 108, excluding machinery spaces of category A;

(8) *cargo spaces* —

all spaces used for cargo (including cargo oil tanks) and trunkways and hatchways to such spaces;

(9) *service spaces (high risk)* —

galleys, pantries containing cooking appliances, saunas, paint lockers and store rooms having areas of 4 m^2 or more, spaces for the storage of flammable liquids, and workshops other than those forming part of the machinery spaces;

(10) *open decks* —

open deck spaces and enclosed promenades having little or no fire risk. To be considered in this category, enclosed promenades shall have no significant fire risk, meaning that furnishings shall be restricted to deck furniture. In addition, such spaces shall be naturally ventilated by permanent openings;

air spaces (the space outside superstructures and deckhouses);

(11) *ro-ro and vehicle spaces* —

ro-ro spaces as defined in regulation 108;

vehicle spaces as defined in regulation 108.

(C) Continuous 'B' class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division.

(D) External boundaries which are required in sub-regulation (2) of regulation 116 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles, provided that there is no requirement for such boundaries of cargo ships to have 'A' class integrity. Similarly, in such boundaries which are not required to have 'A' class integrity, doors may be constructed of materials which are to the satisfaction of the Director.

(E) Saunas shall comply with sub-paragraph (iii)(D) of paragraph *(b)*.

Protection of stairways and lift trunks in accommodation spaces, service spaces and control stations.

(iv) (A) Stairways which penetrate only a single deck shall be protected, at a minimum, at one level by at least 'B-0' class divisions and self-closing doors. Lifts which penetrate only a single deck shall be surrounded by 'A-0' class divisions with steel doors at both levels. Stairways and lift trunks which penetrate more than a single deck shall be surrounded by at least 'A-0' class divisions and be protected by self-closing doors at all levels.

(B) On ships having accommodation for 12 persons or less, where stairways penetrate more than a single deck and where there are at least 2 escape routes direct to the open deck at every accommodation level, the 'A-0' requirements of sub-subparagraph (A) may be reduced to 'B-0'.

Tankers.

Application.

(d) (i) For tankers, only method IC as defined in sub-paragraph *(i)*(A) of paragraph *(c)* shall be used.

Fire integrity of bulkheads and decks.

(ii) (A) In lieu of paragraph *(c)* and in addition to complying with the specific provisions for fire integrity of bulkheads and decks of tankers, the minimum fire integrity of bulkheads and decks shall be as prescribed in Tables 7 and 8 in the Third Schedule.

(B) The following requirements shall govern application of the tables —

(I) Tables 7 and 8 shall apply respectively to the bulkhead and decks separating adjacent spaces;

(II) for determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified

according to their fire risk as shown in categories (1) to (10) below. Where the contents and use of a space are such that there is a doubt as to its classification for the purpose of this regulation, or where it is possible to assign 2 or more classifications to a space, it shall be treated as a space within the relevant category having the most stringent boundary requirements. Smaller enclosed areas within a space that have less than 30% communicating openings to that space are considered separate areas. The fire integrity of the boundary bulkheads and decks of such smaller spaces shall be as prescribed in Tables 7 and 8. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the tables —

(1) *control stations* —

spaces containing emergency sources of power and lighting;

wheelhouse and chartroom;

spaces containing the ship's radio equipment;

fire control stations;

control room for propulsion machinery when located outside the machinery space;

spaces containing centralised fire alarm equipment;

(2) *corridors* —

corridors and lobbies;

(3) *accommodation spaces* —

spaces as defined in regulation 108, excluding corridors;

(4) *stairways* —

interior stairways, lifts, totally enclosed emergency escape trunks, and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto;

in this connection, a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door;

(5) *service spaces (low risk)* —

lockers and store rooms not having provisions for the storage of flammable liquids and having areas less than 4 m^2 and drying rooms and laundries;

(6) *machinery spaces of category A* —

spaces as defined in regulation 108;

(7) *other machinery spaces* —

electrical equipment rooms (auto-telephone exchange and air-conditioning duct spaces);

spaces as defined in regulation 108, excluding machinery spaces of category A;

(8) *cargo pump rooms* —

spaces containing cargo pumps and entrances and trunks to such spaces;

(9) *service spaces (high risk)* —

galleys, pantries containing cooking appliances, saunas, paint lockers and store rooms having areas of 4 m^2 or more, spaces for the storage of flammable liquids, and workshops other than those forming part of the machinery spaces;

(10) *open decks* —

open deck spaces and enclosed promenades having little or no fire risk. To be considered in this category, enclosed promenades shall have no significant fire risk, meaning that furnishings shall be restricted to deck furniture. In addition, such spaces shall be naturally ventilated by permanent openings;

air spaces (the space outside superstructures and deckhouses).

(C) Continuous 'B' class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division.

(D) External boundaries which are required in sub-regulation (2) of regulation 116 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles, provided that there is no requirement for such boundaries of tankers to have 'A' class integrity. Similarly, in such boundaries which are not required to have 'A' class integrity, doors may be constructed of materials which are to the satisfaction of the Director.

(E) Exterior boundaries of superstructures and deckhouses enclosing accommodation and including any over-hanging decks which support such accommodation shall be constructed of steel and insulated to 'A-60' standard for the whole of the portions which face the cargo area and on the outward sides for a distance of 3 metres from the end boundary facing the cargo area. The distance of 3 metres shall be measured horizontally and parallel to the middle line of the ship from the boundary which faces the cargo area at each deck level. In the case of the sides of those superstructures and deckhouses, such insulation shall be carried up to the underside of the deck of the navigation bridge.

(F) Skylights to cargo pump rooms shall be of steel, shall not contain any glass and shall be capable of being closed from outside the pump room.

(G) Construction and arrangement of saunas shall comply with sub-paragraph (iii)(D) of paragraph *(b)*.

Penetrations in fire-resisting divisions and prevention of heat transmission.

(3) *(a)* Where 'A' class divisions are penetrated, such penetrations shall be tested in accordance with the Fire Test Procedures Code, subject to sub-paragraph (i)(E) of paragraph *(a)* of sub-regulation (4). In the case of ventilation ducts, paragraphs *(a)*(ii) and *(c)*(i) of sub-regulation (7) apply. Where a pipe penetration is made of steel or equivalent material having a thickness of 3 millimetres or greater and a length of not less than 900 millimetres (preferably 450 millimetres on each side of the division), and there are no openings, testing is not required. Such penetrations shall be suitably insulated by extension of the insulation at the same level of the division.

(b) Where 'B' class divisions are penetrated for the passage of electric cables, pipes, trunks, ducts etc. or for the fitting of ventilation terminals, lighting fixtures and similar devices, arrangements shall be made to ensure that the fire resistance is not impaired, subject to paragraph *(c)*(ii) of sub-regulation (7). Pipes other than steel or copper that penetrate 'B' class divisions shall be protected by either —

(i) a fire-tested penetration device suitable for the fire resistance of the division pierced and the type of pipe used; or

(ii) a steel sleeve, having a thickness of not less than 1.8 millimetres and a length of not less than 900 millimetres for pipe diameters of 150 millimetres or more and not less than 600 millimetres for pipe diameters of less than 150 millimetres (preferably equally divided to each side of the division). The pipe shall be connected to the ends of the sleeve by flanges or couplings; or the clearance between the sleeve and the pipe shall not exceed 2.5 millimetres; or any clearance between pipe and sleeve shall be made tight by means of non-combustible or other suitable material.

(c) Uninsulated metallic pipes penetrating 'A' or 'B' class divisions shall be of materials having a melting temperature which exceeds 950°C for 'A-0' and 850°C for 'B-0' class divisions.

(d) In approving structural fire protection details, the Director shall have regard to the risk of heat transmission at intersections and terminal points of required thermal barriers. The insulation of a deck or bulkhead shall be carried past the penetration, intersection or terminal point for a distance of at least 450 millimetres in the case of steel and aluminium structures. If a space is divided with a deck or a bulkhead of 'A' class standard having insulation of different values, the insulation with the higher value shall continue on the deck or bulkhead with the insulation of the lesser value for a distance of at least 450 millimetres.

Protection of openings in fire-resisting divisions.

Openings in bulkheads and decks in passenger ships.

Openings in 'A' class divisions.

(4) *(a)* (i) (A) Except for hatches between cargo, special category, store and baggage spaces, and between such spaces and the weather decks, openings shall be provided with permanently attached means of closing which shall be at least as effective for resisting fires as the divisions in which they are fitted.

(B) The construction of doors and door frames in 'A' class divisions, with the means of securing them when closed, shall provide resistance to fire as well as to the passage of smoke and flame equivalent to that of the bulkheads in which the doors are situated, this being determined in accordance with the Fire Test Procedures Code. Such doors and door frames shall be constructed of steel or other equivalent material. Watertight doors need not be insulated.

(C) It shall be possible for each door to be opened and closed from each side of the bulkhead by one person only.

(D) Fire doors in main vertical zone bulkheads, galley boundaries and stairway enclosures other than power-operated watertight doors and those which are normally locked shall satisfy the following requirements —

(I) the doors shall be self-closing and be capable of closing with an angle of inclination of up to 3.5° opposing closure;

(II) the approximate time of closure for hinged fire doors shall be no more than 40 seconds and no less than 10 seconds from the beginning of their movement with the ship in upright position. The approximate uniform rate of closure for sliding doors shall be of no more than 0.2 m/s and no less than 0.1 m/s with the sip in upright position;

(III) the doors, except those for emergency escape trunks, shall be capable of remote-release from the continuously manned central control station, either simultaneously or in groups, and shall be

capable of release also individually from a position at both sides of the door. Release switches shall have an on-off function to prevent automatic resetting of the system;

(IV) hold-back hooks not subject to central control station release are prohibited;

(V) a door closed remotely from the central control station shall be capable of being re-opened from both sides of the door by local control. After such local opening, the door shall automatically close again;

(VI) indication shall be provided at the fire door indicator panel in the continuously manned central control station whether each door is closed;

(VII) the release mechanism shall be so designed that the door will automatically close in the event of disruption of the control system or central power supply;

(VIII) local power accumulators for power-operated doors shall be provided in the immediate vicinity of the doors to enable the doors to be operated at least 10 times (fully opened and closed) after disruption of the control system or central power supply using the local controls;

(IX) disruption of the control system or central power supply at one door shall not impair the safe functioning of the other doors;

(X) remote-released sliding or power-operated doors shall be equipped with an alarm that sounds at least 5 seconds but no more than 10 seconds, after the door is released from the central control station and before the door begins to move and continues sounding until the door is completely closed;

(XI) a door designed to re-open upon contacting an object in its path shall re-open not more than one metre from the point of contact;

(XII) double-leaf doors equipped with a latch necessary for their fire integrity shall have a latch that is automatically activated by the operation of the doors when released by the system;

(XIII) doors giving direct access to special category spaces which are power-operated and automatically closed need not be equipped with the alarms and remote-release mechanisms required in sub-subparagraphs (III) and (X);

(XIV) the components of the local control system shall be accessible for maintenance and adjusting;

(XV) power-operated doors shall be provided with a control system of an approved type which shall be able to operate in case of fire and be in accordance with the Fire Test Procedures Code. This system shall satisfy the following requirements —

(aa) the control system shall be able to operate the door at the temperature of at least 200°C for at least 60 minutes, served by the power supply;

(bb) the power supply for all other doors not subject to fire shall not be impaired; and

(cc) at temperatures exceeding 200°C, the control system shall be automatically isolated from the power supply and shall be capable of keeping the door closed up to at least 945°C.

(E) In ships carrying not more than 36 passengers, where a space is protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of the Fire Safety Systems Code or fitted with a continuous 'B' class ceiling, openings in decks not forming steps in main vertical zones nor bounding horizontal zones shall be closed reasonably tight and such decks shall meet the 'A' class integrity requirements in so far as is reasonable and practicable in the opinion of the Director.

(F) The requirements for 'A' class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles, provided that there is no requirement for such boundaries to have 'A' class integrity in sub-subparagraph (C) of sub-paragraph (iii). The requirements for 'A' class integrity of the outer boundaries of the ship shall not apply to exterior doors, except for those in superstructures and deckhouses facing life-saving appliances, embarkation and external assembly station areas, external stairs and open decks used for escape routes. Stairway enclosure doors need not meet this requirement.

(G) Except for watertight doors, weathertight doors (semi-watertight doors), doors leading to the open deck and doors which need to be reasonably gastight, all 'A' class doors located in stairways, public spaces and main vertical zone bulkheads in escape routes shall be equipped with a self-closing hose port. The material, construction and fire resistance of the hose port shall be equivalent to the door into which it is fitted, and shall be a 150 millimetres square clear opening with the door closed and shall be inset into the lower edge of the door, opposite the door hinges or, in the case of sliding doors, nearest the opening.

(H) Where it is necessary that a ventilation duct passes through a main vertical zone division, a fail-safe automatic closing fire damper shall be fitted adjacent to the division. The damper shall also be capable of being manually closed from each side of the division. The operating position shall be readily accessible and be marked in red light-reflecting colour. The duct between the division and the damper shall be of steel or other equivalent material and, if necessary, insulated to comply with the requirements of paragraph *(a)* of sub-regulation (3). The damper shall be fitted on at least one side of the division with a visible indicator showing whether the damper is in the open position.

Openings in 'B' class divisions.

(ii) (A) Doors and door frames in 'B' class divisions and means of securing them shall provide a method of closure which shall have resistance to fire equivalent to that of the divisions, this being determined in accordance with

the Fire Test Procedures Code except that ventilation openings may be permitted in the lower portion of such doors. Where such opening is in or under a door, the total net area of any such opening shall not exceed 0.05 m^2. Alternatively, a non-combustible air balance duct routed between the cabin and the corridor, and located below the sanitary unit, is permitted where the cross-sectional area of the duct does not exceed 0.05 m^2. All ventilation openings shall be fitted with a grill made of non-combustible material. Doors shall be non-combustible.

(B) Cabin doors in 'B' class divisions shall be of a self-closing type. Hold-back hooks are not permitted.

(C) The requirements for 'B' class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles. Similarly, the requirements for 'B' class integrity shall not apply to exterior doors in superstructures and deckhouses. For ships carrying not more than 36 passengers, the Director may permit the use of combustible materials in doors separating cabins from the individual interior sanitary spaces such as showers.

(D) In ships carrying not more than 36 passengers, where an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code is fitted —

(I) openings in decks not forming steps in main vertical zones nor bounding horizontal zones shall be closed reasonably tight and such decks shall meet the 'B' class integrity requirements in so far as is reasonable and practicable in the opinion of the Director; and

(II) openings in corridor bulkheads of 'B' class materials shall be protected in accordance with paragraph *(b)*(ii) of sub-regulation (2).

Windows and sidescuttles.

(iii) (A) Windows and sidescuttles in bulkheads within accommodation and service spaces and control stations other than those to which sub-paragraphs (i)(F) and (ii)(C) apply shall be so constructed as to preserve the

integrity requirements of the type of bulkheads in which they are fitted, this being determined in accordance with the Fire Test Procedures Code.

(B) Notwithstanding the requirements of Tables 1, 2, 3 and 4 in the Third Schedule, windows and sidescuttles in bulkheads separating accommodation and service spaces and control stations from weather shall be constructed with frames of steel or other suitable material. The glass shall be retained by a metal glazing bead or angle.

(C) Windows facing life-saving appliances, embarkation and assembly stations, external stairs and open decks used for escape routes, and windows situated below liferaft and escape slide embarkation areas shall have fire integrity as required in Table 1 in the Third Schedule. Where automatic dedicated sprinkler heads are provided for windows, 'A-0' windows may be accepted as equivalent. To be considered under this sub-subparagraph, the sprinkler heads shall either be —

(I) dedicated heads located above the windows, and installed in addition to the conventional ceiling sprinklers; or

(II) conventional ceiling sprinkler heads arranged such that the window is protected by an average application rate of at least 5 l/m^2 and the additional window area is included in the calculation of the area of coverage.

Windows located in the ship's side below the lifeboat embarkation area shall have fire integrity at least equal to 'A-0' class.

Doors in fire-resisting divisions in cargo ships.

(b) (i) The fire resistance of doors shall be equivalent to that of the division in which they are fitted, this being determined in accordance with the Fire Test Procedures Code. Doors and door frames in 'A' class divisions shall be constructed of steel. Doors in 'B' class divisions shall be non-combustible. Doors fitted in boundary bulkheads of machinery spaces of category A shall be reasonably gastight and self-closing. In ships constructed according to method IC, the Director may permit the use of combustible materials in doors separating cabins

from individual interior sanitary accommodation such as showers.

(ii) Doors required to be self-closing shall not be fitted with hold-back hooks. Hold-back arrangements fitted with remote-release devices of the fail-safe type may be utilised.

(iii) In corridor bulkheads, ventilation openings may be permitted in and under the doors of cabins and public spaces. Ventilation openings are also permitted in 'B' class doors leading to lavatories, offices, pantries, lockers and store rooms. Except as permitted below, the openings shall be provided only in the lower half of a door. Where such an opening is in or under a door, the total net area of any such opening shall not exceed 0.05 m^2. Alternatively, a non-combustible air balance duct routed between the cabin and the corridor, and located below the sanitary unit, is permitted where the cross-sectional area of the duct does not exceed 0.05 m^2. Ventilation openings, except those under the door, shall be fitted with a grill made of non-combustible material.

(iv) Watertight doors need not be insulated.

Protection of openings in machinery spaces boundaries.

Application.

(5) *(a)* This sub-regulation shall apply to machinery spaces of category A and, where the Director considers it desirable, to other machinery spaces.

Protection of openings in machinery space boundaries.

(b) (i) The number of skylights, doors, ventilators, openings in funnels to permit exhaust ventilation and other openings to machinery spaces shall be reduced to a minimum consistent with the needs of ventilation and the proper and safe working of the ship.

(ii) Skylights shall be of steel and shall not contain glass panels.

(iii) Means of control shall be provided for closing power-operated doors or actuating release mechanisms on doors other than power-operated watertight doors. The controls shall be located outside the space concerned, where they will not be cut off in the event of fire in the space it serves.

(iv) In passenger ships, the means of control required in sub-paragraph (iii) shall be situated at one control position or grouped in as few positions as possible, to the satisfaction of the Director. Such positions shall have safe access from the open deck.

(v) In passenger ships, doors, other than power-operated water-tight doors, shall be so arranged that positive closure is assured in case of fire in the space by power-operated closing arrangements or by the provision of self-closing doors capable of closing against an inclination of 3.5° opposing closure, and having a fail-safe hold-back arrangement, provided with a remotely-operated release device. Doors for emergency escape trunks need not be fitted with a fail-safe hold-back facility and a remotely-operated release device.

(vi) Windows shall not be fitted in machinery space boundaries. This does not preclude the use of glass in control rooms within the machinery spaces.

Protection of cargo space boundaries.

(6) *(a)* In passenger ships carrying more than 36 passengers, the boundary bulkheads and decks of special category and ro-ro spaces shall be insulated to 'A-60' class standard. Where a category (5), (9) or (10) space, as defined in paragraph *(b)*(iii) of sub-regulation (2), is on one side of the division, the standard may be reduced to 'A-0'. Where fuel oil tanks are below a special category space, the integrity of the deck between such spaces may be reduced to 'A-0' standard.

(b) In passenger ships carrying not more than 36 passengers, the boundary bulkheads of special category spaces shall be insulated as required for category (11) spaces in Table 3 in the Third Schedule and the horizontal boundaries as required for category (11) spaces in Table 4 in the Third Schedule.

(c) In passenger ships carrying not more than 36 passengers, the boundary bulkheads and decks of closed and open ro-ro spaces shall have a fire integrity as required for category (8) spaces in Table 3 and the horizontal boundaries as required for category (8) spaces in Table 4.

(d) In passenger ships, indicators shall be provided on the navigation bridge which shall indicate when any fire door leading to or from the special category spaces is closed.

(e) In tankers, for the protection of cargo tanks carrying crude oil and petroleum products having a flashpoint not exceeding 60°C, materials readily rendered ineffective by heat shall not be used for valves, fittings, tank opening covers, cargo vent piping, and cargo piping so as to prevent the spread of fire to the cargo.

Ventilation systems.

Duct and dampers.

(7) *(a)* (i) Ventilation ducts shall be of non-combustible material. Short ducts, not generally exceeding 2 metres in length and with a free cross-sectional area* not exceeding 0.02 m^2, need not be non-combustible, subject to the following conditions —

(A) the ducts are made of a material which has a low flame spread characteristics;

(B) the ducts are only used at the end of the ventilation device; and

(C) the ducts are not situated less than 600 millimetres, measured along the duct, from an opening in an 'A' or 'B' class division, including continuous 'B' class ceiling.

(ii) The following arrangements shall be tested in accordance with the Fire Test Procedures Code —

(A) fire dampers, including their relevant means of operation; and

(B) duct penetrations through 'A' class divisions. The test is not required where steel sleeves are directly joined to ventilation ducts by means of riveted or screwed flanges or by welding.

Arrangement of ducts.

(b) (i) The ventilation systems for machinery spaces of category A, vehicle spaces, ro-ro spaces, galleys, special category spaces and cargo spaces shall, in general, be separated from each other and from the ventilation systems serving other spaces,

* The term "free cross-sectional area" means, even in th case of a pre-insulated duct, the area calculated on the basis of the inner diameter of the duct.

except that the gallery ventilation system on cargo ships of less than 4,000 tons and in passenger ships carrying not more than 36 passengers need not be completely separated, but may be served by separate ducts from a ventilation unit serving other spaces. In any case, an automatic fire damper shall be fitted in the galley ventilation duct near the ventilation unit. Ducts provided for the ventilation of machinery spaces of category A, galleys, vehicle spaces, ro-ro spaces or special category spaces shall not pass through accommodation spaces, service spaces or control stations unless they comply with the conditions specified in sub-subparagraph (A) or (B) —

(A) (I) the ducts are constructed of steel having a thickness of at least 3 millimetres and 5 millimetres for ducts the widths or diameters of which are up to and including 300 millimetres and 760 millimetres and over respectively and, in the case of such ducts, the widths or diameters of which are between 300 millimetres and 760 millimetres, having a thickness obtained by interpolation;

(II) the ducts are suitably supported and stiffened;

(III) the ducts are fitted with automatic fire dampers close to the boundaries penetrated; and

(IV) the ducts are insulated to 'A-60' class standard from the machinery spaces, galleys, vehicle spaces, ro-ro spaces or special category spaces to a point at least 5 metres beyond each fire damper; or

(B) (I) the ducts are constructed of steel in accordance with sub-subparagraphs (I) and (II) of sub-sub-paragraph (A); and

(II) the ducts are insulated to 'A-60' class standard throughout the accommodation spaces, service spaces or control stations,

except that penetrations of main zone divisions shall also comply with the requirements of sub-paragraph (i)(H) of paragraph *(a)* of sub-regulation (4).

(ii) Ducts provided for ventilation to accommodation spaces, service spaces or control stations shall not pass through machinery spaces of category A, galleys, vehicle spaces, ro-ro

spaces or special category spaces unless they comply with the conditions specified in sub-subparagraph (A) or (B) —

(A) (I) the ducts, where they pass through a machinery space of category A, galley, vehicle space, ro-ro space or special category space, are constructed of steel in accordance with sub-subparagraphs (A)(I) and (II) of sub-paragraph (i);

(II) automatic fire dampers are fitted close to the boundaries penetrated; and

(III) the integrity of the machinery space, galley, vehicle space, ro-ro space or special category space boundaries is maintained at the penetrations; or

(B) (I) the ducts, where they pass through a machinery space of category A, galley, vehicle space, ro-ro space or special category space, are constructed of steel in accordance with sub-subparagraphs (A)(I) and (II) of sub-paragraph (i); and

(II) the ducts are insulated to 'A-60' standard within the machinery space, galley, vehicle space, ro-ro space or special category space,

except that penetrations of main zone divisions shall also comply with the requirements of sub-paragraph (i)(H) of paragraph *(a)* of sub-regulation (4).

Details of duct penetrations.

(c) (i) Where a thin plated duct with a free cross-sectional area equal to, or less than, 0.02 m^2 passes through 'A' class bulkheads or decks, the opening shall be lined with a steel sheet sleeve having a thickness of at least 3 millimetres and a length of at least 200 millimetres, divided preferably into 100 millimetres on each side of the bulkhead or, in the case of the deck, wholly laid on the lower side of the decks pierced. Where ventilation ducts with a free cross-sectional area exceeding 0.02 m^2 pass through 'A' class bulkheads or decks, the opening shall be lined with a steel sheet sleeve. Where such ducts are of steel construction and pass through a deck or bulkhead, the ducts and sleeves shall comply with the following —

(A) the sleeves shall have a thickness of at least 3 millimetres and a length of at least 900 millimetres. When passing through bulkheads, this length shall be divided preferably into 450 millimetres on each side of the bulkhead. These ducts, or sleeves lining such ducts, shall be provided with fire insulation. The insulation shall have at least the same fire integrity as the bulkhead or deck through which the duct passes; and

(B) ducts with a free cross-sectional area exceeding 0.075 m^2 shall be fitted with fire dampers in addition to the requirements of sub-subparagraph (A). The fire damper shall operate automatically, but shall also be capable of being closed manually from both sides of the bulkhead or deck. The damper shall be provided with an indicator which shows whether the damper is open or closed. Fire dampers are not required where ducts pass through spaces surrounded by 'A' class divisions, without serving those spaces, provided those ducts have the same fire integrity as the divisions which they pierce. Fire dampers shall be easily accessible. Where they are placed behind ceilings or linings, these ceilings or linings shall be provided with an inspection door on which a plate reporting the identification number of the fire damper is provided. The fire damper identification number shall also be placed on any remote controls required.

(ii) Ventilation ducts with a free cross-sectional area exceeding 0.02 m^2 passing through 'B' class bulkheads shall be lined with steel sheet sleeves of 900 millimetres in length, divided preferably into 450 millimetres on each side of the bulkheads unless the duct is of steel for this length.

Ventilation systems for passenger ships carrying more than 36 passengers.

(d) (i) The ventilation system of a passenger ship carrying more than 36 passengers shall be in compliance with the following additional requirements.

(ii) In general, the ventilation fans shall be so disposed that the ducts reaching the various spaces remain within the main vertical zone.

(iii) Where ventilation systems penetrate decks, precautions shall be taken, in addition to those relating to the fire integrity of

the deck required by paragraph *(a)* of sub-regulation (3) and sub-paragraph (i)(E) of paragraph *(a)* of sub-regulation (4), to reduce the likelihood of smoke and hot gases passing from one between-deck space to another through the system. In addition to insulation requirements contained in this paragraph, vertical ducts shall, if necessary, be insulated as required by the appropriate Tables 1 and 2 in the Third Schedule.

(iv) Except in cargo spaces, ventilation ducts shall be constructed of the following materials —

(A) ducts not less than 0.075 m^2 in free cross-sectional area and all vertical ducts serving more than a single between-deck space shall be constructed of steel or other equivalent material;

(B) ducts less than 0.075 m^2 in free cross-sectional area, other than the vertical ducts referred to in sub-sub-paragraph (A), shall be constructed of non-combustible materials. Where such ducts penetrate 'A' or 'B' class divisions, due regard shall be given to ensuring the fire integrity of the division; and

(C) short lengths of duct, not in general exceeding 0.02 m^2 in free cross-sectional area nor 2 metres in length, need not be non-combustible, provided that all of the following conditions are met —

(I) the duct is constructed of a material which has low flame spread characteristics;

(II) the duct is used only at the terminal end of the ventilation system; and

(III) the duct is not located closer than 600 millimetres measured along its length to a penetration of an 'A' or 'B' class division, including continuous 'B' class ceilings.

(v) Stairway enclosures shall be ventilated and served by an independent fan and duct system which shall not serve any other spaces in the ventilation systems.

(vi) Exhaust ducts shall be provided with hatches for inspection and cleaning. The hatches shall be located near the fire dampers.

Exhaust ducts from galley ranges.

Requirements for passenger ships carrying more than 36 passengers.

(e) (i) Exhaust ducts from galley ranges shall meet the requirements of sub-subparagraph (B) of paragraph *(b)*(i) and shall be fitted with —

(A) a grease trap readily removable for cleaning unless an alternative approved grease removal system is fitted;

(B) a fire damper located in the lower end of the duct which is automatically and remotely-operated and, in addition, a remotely-operated fire damper located in the upper end of the duct;

(C) a fixed means for extinguishing a fire within the duct;

(D) remote control arrangements for shutting off the exhaust fans and supply fans, for operating the fire dampers mentioned in sub-subparagraph (B) and for operating the fire-extinguishing system, which shall be placed in a position close to the entrance to the galley. Where a multi-branch system is installed, a remote means located with the above controls shall be provided to close all branches exhausting through the same main duct before an extinguishing medium is released into the system; and

(E) suitably located hatches for inspection and cleaning.

Requirements for cargo ships and passenger ships carrying not more than 36 passengers.

(ii) Where they pass through accommodation spaces or spaces containing combustible materials, the exhaust ducts from galley ranges shall be constructed of 'A' class divisions. Each exhaust duct shall be fitted with —

(A) a grease trap readily removable for cleaning;

(B) a fire damper located in the lower end of the duct;

(C) arrangements, operable from within the galley, for shutting off the exhaust fans; and

(D) fixed means for extinguishing a fire within the duct.

Fire-fighting.

Purpose.

115. (1) The purpose of this regulation is to suppress and swiftly extinguish a fire in the space of origin. For this purpose, the following functional requirements shall be met —

(a) fixed fire-extinguishing systems shall be installed, having due regard to the fire growth potential of the protected spaces; and

(b) fire-extinguishing appliances shall be readily available.

Water supply systems.

(2) Ships shall be provided with fire pumps, fire mains, hydrants and hoses complying with the applicable requirements of this regulation.

Fire mains and hydrants.

General.

(a) (i) Materials readily rendered ineffective by heat shall not be used for fire mains and hydrants unless adequately protected. The pipes and hydrants shall be so placed that the fire hoses may be easily coupled to them. The arrangement of pipes and hydrants shall be such as to avoid the possibility of freezing. Suitable drainage provisions shall be provided for fire main piping. Isolation valves shall be installed for all open deck fire main branches used for purposes other than fire-fighting. In ships where deck cargo may be carried, the positions of the hydrants shall be such that they are always readily accessible and the pipes shall be arranged as far as practicable to avoid risk of damage by such cargo.

Ready availability of water supply.

(ii) The arrangements for the ready availability of water supply shall be —

(A) in passenger ships —

(I) of 1,000 tons and upwards such that at least one effective jet of water is immediately available from any hydrant in an interior location and so as to ensure the continuation of the output of water by the automatic starting of one required fire pump;

(II) of less than 1,000 tons by automatic start of at least one fire pump or by remote starting from the navigation bridge of at least one fire pump. If the pump starts automatically or if the bottom valve cannot be opened from where the pump is remotely started, the bottom valve shall always be kept open; and

(III) if fitted with periodically unattended machinery spaces in accordance with regulation 105, the Director shall determine provisions for fixed water fire-extinguishing arrangements for such spaces equivalent to those required for normally attended machinery spaces;

(B) in cargo ships —

(I) to the satisfaction of the Director; and

(II) with a periodically unattended machinery space or when only one person is required on watch, there shall be immediate water delivery from the fire main system at a suitable pressure, either by remote starting of one of the main fire pumps with remote starting from the navigation bridge and fire control station, if any, or permanent pressurisation of the fire main system by one of the main fire pumps, except that the Director may waive this requirement for cargo ships of less than 1,600 tons if the fire pump starting arrangement in the machinery space is in an easily accessible position.

Diameter of fire mains.

(iii) The diameter of the fire main and water service pipes shall be sufficient for the effective distribution of the maximum required discharge from 2 fire pumps operating simultaneously, except that in the case of cargo ships, the diameter need only be sufficient for the discharge of 140 m^3/h.

Isolating valves and relief valves.

(iv) (A) Isolating valves to separate the section of the fire main within the machinery space containing the main fire pump from the rest of the fire main shall be fitted in an easily accessible and tenable position outside the machinery spaces. The fire main shall be so arranged that when the isolating valves are shut, all the hydrants on the ship, except those in the machinery space referred to above, can be supplied with water by another fire pump or an emergency fire pump. The emergency fire pump, its seawater inlet, and suction and delivery pipes and isolating valves shall be located outside the machinery space. If this arrangement cannot be made, the sea-chest may be fitted in the machinery space if the valve is remotely controlled from a position in the same compartment as the emergency fire pump and the suction pipe is as short as practicable. Short lengths of suction or discharge piping may penetrate the machinery space, provided they are enclosed in a substantial steel casing or are insulated to 'A-60' class standards. The pipes shall have substantial wall thickness, but in no case less than 11 millimetres, and shall be welded except for the flanged connection to the sea inlet valve.

(B) A valve shall be fitted to serve each fire hydrant so that any fire hose may be removed while the fire pumps are in operation.

(C) Relief valves shall be provided in conjunction with fire pumps if the pumps are capable of developing a pressure exceeding the design pressure of the water service pipes, hydrants and hoses. These valves shall be so placed and adjusted as to prevent excessive pressure in any part of the fire main system.

(D) In tankers, isolation valves shall be fitted in the fire main at the poop front in a protected position and on the tank deck at intervals of not more than 40 metres to preserve the integrity of the fire main system in case of fire or explosion.

Number and position of hydrants.

(v) (A) The number and position of hydrants shall be such that at least 2 jets of water not emanating from the same hydrant, one of which shall be from a single length of hose, may reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated and any part of any cargo space when empty, any ro-ro space or any vehicle space, in which latter case the 2 jets shall reach any part of the space, each from a single length of hose. Furthermore, such hydrants shall be positioned near the accesses to the protected spaces.

(B) In addition to the requirements in sub-subparagraph (A), passenger ships shall comply with the following —

(I) in the accommodation, service and machinery spaces, the number and position of hydrants shall be such that the requirements of sub-subparagraph (A) may be complied with when all watertight doors and all doors in main vertical zone bulkheads are closed; and

(II) where access is provided to a machinery space of category A at a low level from an adjacent shaft tunnel, 2 hydrants shall be provided external to, but near the entrance to, that machinery space. Where such access is provided from other spaces, in one of those spaces 2 hydrants shall be provided near the entrance to the machinery space of category A. Such provision need not be made where the tunnel or adjacent spaces are not part of the escape route.

Pressure at hydrants.

(vi) With the 2 pumps simultaneously delivering water through the nozzles specified in sub-paragraph (iii) of paragraph *(c)*, with the quantity of water as specified in sub-paragraph (iii), through any adjacent hydrants, the following minimum pressures shall be maintained at all hydrants —

(A) for passenger ships —

4,000 tons and upwards	0.40 N/mm^2;
less than 4,000 tons	0.30 N/mm^2;

(B) for cargo ships —

6,000 tons and upwards	0.27 N/mm^2;
less than 6,000 tons	0.25 N/mm^2; and

(C) the maximum pressure at any hydrant shall not exceed that at which the effective control of a fire hose can be demonstrated.

International shore connection.

(vii) (A) Ships of 500 tons and upwards shall be provided with at least one international shore connection complying with the Fire Safety Systems Code.

(B) Facilities shall be available enabling such a connection to be used on either side of the ship.

Fire pumps.

Pumps accepted as fire pumps.

(b) (i) Sanitary, ballast, bilge or general service pumps may be accepted as fire pumps, provided that they are not normally used for pumping oil and that if they are subject to occasional duty for the transfer or pumping of oil fuel, suitable change-over arrangements are fitted.

Number of fire pumps.

(ii) Ships shall be provided with independently driven fire pumps as follows —

(A) in passenger ships of —

4,000 tons and upwards	at least 3;
less than 4,000 tons	at least 2;

(B) in cargo ships of —

1,000 tons and upwards	at least 2;
less than 1,000 tons	at least 2 power-driven pumps, one of which shall be independently driven.

Arrangement of fire pumps and fire mains.

Fire pumps.

(iii) (A) The arrangement of sea connections, fire pumps and their sources of power shall be as to ensure that —

(I) in passenger ships of 1,000 tons and upwards, in the event of a fire in any one compartment, all the fire pumps will not be put out of action; and

(II) in passenger ships of less than 1,000 tons and in cargo ships, if a fire in any one compartment could put all the pumps out of action, there shall be an alternative means consisting of an emergency fire pump complying with the provisions of the Fire Safety Systems Code with its source of power and sea connection located outside the space where the main fire pumps or their sources of power are located.

Requirements for space containing emergency fire pump.

Location of space.

(B) (I) The space containing the fire pump shall not be contiguous to the boundaries of machinery spaces of category A or those spaces containing main fire pumps. Where this is not practicable, the common bulkhead between the 2 spaces shall be insulated to a standard of structural fire protection equivalent to that required for a control station.

Access to emergency fire pump.

(II) No direct access shall be permitted between the machinery space and the space containing the emergency fire pump and its source of power. When this is impracticable, the Director may accept an arrangement where the access is by means of an airlock with the door of the machinery space being of 'A-60' class standard and the other door being at least steel both reasonably gastight, self-closing and without any hold-back arrangements. Alternatively, the access may be through a

watertight door capable of being operated from a space remote from the machinery space and the space containing the emergency fire pump and unlikely to be cut off in the event of fire in those spaces. In such spaces, a second means of access to the space containing the emergency fire pump and its source of power shall be provided.

Ventilation of emergency fire pump space.

(III) Ventilation arrangements to the space containing the independent source of power for the emergency fire pump shall be such as to preclude, as far as practicable, the possibility of smoke from a machinery space fire entering or being drawn into that space.

Additional pumps for cargo ships.

(C) In addition, in cargo ships where other pumps, such as general service, bilge and ballast etc., are fitted in a machinery space, arrangements shall be made to ensure that at least one of these pumps, having the capacity and pressure required by sub-paragraph (vi)(B) of paragraph *(a)* and sub-subparagraph (B) of sub-paragraph (iv), is capable of providing water to the fire main.

Capacity of fire pumps.

Total capacity of required fire pumps.

(iv) (A) The required fire pumps shall be capable of delivering for fire-fighting purposes a quantity of water, at the pressure specified in sub-paragraph (vi) of paragraph *(a)*, as follows —

(I) pumps in passenger ships - the quantity of water is not less than two-thirds of the quantity required to be dealt with by the bilge pumps when employed for bilge pumping; and

(II) pumps in cargo ships, other than any emergency pump - the quantity of water is not less than four-thirds of the quantity required under regulation 59 to be dealt with by each of the independent bilge

pumps in a passenger ship of the same dimension when employed in bilge pumping, provided that in no cargo ship need the total required capacity of the fire pumps exceed 180 m^3/h.

Capacity of each fire pump.

(B) Each of the required fire pumps (other than any emergency pump required in sub-subparagraph (A)(II) of sub-paragraph (iii) for cargo ships) shall have a capacity not less than 80% of the total required capacity divided by the minimum number of required fire pumps, but in any case not less than 25 m^3/h, and each such pump shall in any event be capable of delivering at least the 2 required jets of water. These fire pumps shall be capable of supplying the fire main system under the required conditions. Where more pumps than the minimum of required pumps are installed, such additional pumps shall have a capacity of at least 25 m^3/h and shall be capable of delivering at least the 2 jets of water required in sub-paragraph (v)(A) of paragraph *(a)*.

Fire hoses and nozzles.

General specifications.

(c) (i) (A) Fire hoses shall be of non-perishable material approved by the Director and shall be sufficient in length to project a jet of water to any of the spaces in which they may be required to be used. Each hose shall be provided with a nozzle and the necessary couplings. Hoses specified in this Chapter as "fire hoses" shall, together with any necessary fittings and tools, be kept ready for use in conspicuous positions near the water service hydrants or connections. Additionally, in interior locations in passenger ships carrying more than 36 passengers, fire hoses shall be connected to the hydrants at all times. Fire hoses shall have a length of at least 10 metres, but not more than —

(I) 15 metres in machinery spaces;

(II) 20 metres in other spaces and open decks; and

(III) 25 metres for open decks on ships with a maximum breadth in excess of 30 metres.

(B) Unless one hose and nozzle is provided for each hydrant in the ship, there shall be complete interchangeability of hose couplings and nozzles.

Number and diameter of fire hoses.

(ii) (A) Ships shall be provided with fire hoses, the number and diameter of which shall be to the satisfaction of the Director.

(B) In passenger ships, there shall be at least one fire hose for each of the hydrants required by sub-paragraph (v) of paragraph *(a)* and these hoses shall be used only for the purposes of extinguishing fires or testing the fire-extinguishing apparatus at fire drills and surveys.

(C) In cargo ships —

(I) of 1,000 tons and upwards, the number of fire hoses to be provided shall be one for each 30 metres length of the ship and one spare, but in no case less than 5 in all. This number does not include any hoses required in any engine room or boiler room. The Director may increase the number of hoses required so as to ensure that hoses in sufficient number are available and accessible at all times, having regard to the type of ship and the nature of trade in which the ship is employed. Ships carrying dangerous goods in accordance with regulation 124 shall be provided with 3 hoses and nozzles, in addition to those required above; and

(II) of less than 1,000 tons, the number of fire hoses to be provided shall be calculated in accordance with sub-subparagraph (I). The number of hoses shall in no case be less than 3.

Size and types of nozzles.

(iii) (A) For the purposes of this Chapter, standard nozzle sizes shall be 12 millimetres, 16 millimetres and 19 millimetres or as near thereto as possible. Large diameter

nozzles may be permitted at the discretion of the Director.

(B) For accommodation and service spaces, a nozzle size greater than 12 millimetres need not be used.

(C) For machinery spaces and exterior locations, the nozzle size shall be such as to obtain the maximum discharge possible from 2 jets at the pressure mentioned in sub-paragraph (vi) of paragraph *(a)* from the smallest pump, provided that a nozzle size greater than 19 millimetres need not be used.

(D) Nozzles shall be of an approved dual-purpose type (that is, spray/jet type) incorporating a shut-off.

Portable fire extinguishers.

Type and design.

(3) *(a)* Portable fire extinguishers shall comply with the requirements of the Fire Safety Systems Code.

Arrangement of fire extinguishers.

(b) (i) Accommodation spaces, service spaces and control stations shall be provided with portable fire extinguishers of appropriate types and in sufficient number to the satisfaction of the Director. Ships of 1,000 tons and upwards shall carry at least 5 portable fire extinguishers.

(ii) One of the portable fire extinguishers intended for use in any space shall be stowed near the entrance to that space.

(iii) Carbon dioxide fire extinguishers shall not be placed in accommodation spaces. In control stations and other spaces containing electrical or electronic equipment or appliances necessary for the safety of the ship, fire extinguishers shall be provided whose extinguishing media are neither electrically conductive nor harmful to the equipment and appliances.

(iv) Fire extinguishers shall be situated ready for use at easily visible places, which can be reached quickly and easily at any time in the event of a fire, and in such a way that their

serviceability is not impaired by the weather, vibration or other external factors. Portable fire extinguishers shall be provided with devices which indicate whether they have been used.

Spare charges.

(c) (i) Spare charges shall be provided for 100% of the first 10 extinguishers and 50% of the remaining fire extinguishers capable of being recharged on board. Not more than 60 total spare charges are required. Instructions for recharging shall be carried on board.

(ii) For fire extinguishers which cannot be recharged on board, additional portable fire extinguishers of the same quantity, type, capacity and number as determined in sub-paragraph (i) shall be provided in lieu of spare charges.

Fixed fire-extinguishing systems.

Types of fixed fire-extinguishing systems.

(4) (a) (i) A fixed fire-extinguishing system required by sub-regulation (5) may be any of the following systems —

(A) a fixed gas fire-extinguishing system complying with the provisions of the Fire Safety Systems Code;

(B) a fixed high-expansion foam fire-extinguishing system complying with the provisions of the Fire Safety Systems Code; and

(C) a fixed pressure water-spraying fire-extinguishing system complying with the provisions of the Fire Safety Systems Code.

(ii) Where a fixed fire-extinguishing system not required by this Chapter is installed, it shall meet the requirements of the relevant regulations of this Chapter and the Fire Safety Systems Code.

(iii) Fire-extinguishing systems using Halon 1211, 1301 and 2402 and perfluorocarbons shall be prohibited.

(iv) In general, the Director shall not permit the use of steam as a fire-extinguishing medium in fixed fire-extinguishing systems. Where the use of steam is permitted by the Director, it shall be used only in restricted areas as an addition to the required fire-extinguishing system and shall comply with the requirements of the Fire Safety Systems Code.

Closing appliances for fixed gas fire-extinguishing systems.

(b) Where a fixed gas fire-extinguishing system is used, openings which may admit air to, or allow gas to escape from, a protected space shall be capable of being closed from outside the protected space.

Storage rooms of fire-extinguishing medium.

(c) When the fire-extinguishing medium is stored outside a protected space, it shall be stored in a room which is located behind the forward collision bulkhead, and is used for no other purposes. Any entrance to such a storage room shall preferably be from the open deck and shall be independent of the protected space. If the storage space is located below deck, it shall be located no more than one deck below the open deck and shall be directly accessible by a stairway or ladder from the open deck. Spaces which are located below deck or spaces where access from the open deck is not provided shall be fitted with a mechanical ventilation system designed to take exhaust air from the bottom of the space and shall be sized to provide at least 6 air changes per hour. Access doors shall open outwards, and bulkheads and decks, including doors and other means of closing any opening therein, which form the boundaries between such rooms and adjacent enclosed spaces shall be gastight. For the purpose of the application of Tables 1 to 8 in the Third Schedule, such storage rooms shall be treated as fire control stations.

Water pumps for other fire-extinguishing systems.

(d) Pumps, other than those serving the fire main, required for the provision of water for fire-extinguishing systems required by this Chapter, their sources of power and their controls shall be installed outside the space protected by such systems and shall be so arranged that a fire in the space protected will not put any such system out of action.

Fire-extinguishing arrangements in machinery spaces.

Machinery spaces containing oil-fired boilers or oil fuel units.

Fixed fire-extinguishing systems.

(5) *(a)* (i) Machinery spaces of category A containing oil-fired boilers or oil fuel units shall be provided with any one of the fixed fire-extinguishing systems in paragraph *(a)* of sub-regulation (4). In each case, if the engine room and boiler room are not entirely separate, or if fuel oil can drain from the boiler room into the engine room, the combined engine and boiler rooms shall be considered as one compartment.

Additional fire-extinguishing arrangements.

(ii) (A) There shall be in each boiler room or at an entrance outside of the boiler room at least one portable foam applicator unit complying with the provisions of the Fire Safety Systems Code.

(B) There shall be at least 2 portable foam extinguishers or equivalent in each firing space in each boiler room and in each space in which a part of the oil fuel installation is situated. There shall be not less than one approved foam-type extinguisher of at least 135 litres capacity or equivalent in each boiler room. These extinguishers shall be provided with hoses on reels suitable for reaching any part of the boiler room. In the case of domestic boilers of less than 175 kW, an approved foam-type extinguisher of at least 135 litres capacity is not required.

(C) In each firing space there shall be a receptacle containing at least 0.1 m^3 sand, sawdust impregnated with soda, or other approved dry material, along with a suitable shovel for spreading the material. An approved portable extinguisher may be substituted as an alternative.

Machinery spaces containing internal combustion machinery.

Fixed fire-extinguishing systems.

(b) (i) Machinery spaces of category A containing internal combustion machinery shall be provided with one of the fixed fire-extinguishing systems in paragraph *(a)* of sub-regulation (4).

Additional fire-extinguishing arrangements.

(ii) (A) There shall be at least one portable foam applicator unit complying with the provisions of the Fire Safety Systems Code.

(B) There shall be in each such space approved foam-type fire extinguishers, each of at least 45 litres capacity or equivalent, sufficient in number to enable foam or its equivalent to be directed onto any part of the fuel and lubricating oil pressure systems, gearing and other fire hazards. In addition, there shall be provided a sufficient number of portable foam extinguishers or equivalent which shall be so located that no point in the space is more than 10 metres walking distance from an extinguisher and that there are at least 2 such extinguishers in each such space. For smaller spaces of cargo ships, the Director may consider relaxing this requirement.

Machinery spaces containing steam turbines or enclosed steam engines.

Fixed fire-extinguishing systems.

(c) (i) In spaces containing steam turbines or enclosed steam engines used for main propulsion or other purposes having in the aggregate a total output of not less than 375 kW, one of the fire-extinguishing systems specified in paragraph *(a)* of sub-regulation (4) shall be provided if such spaces are periodically unattended.

Additional fire-extinguishing arrangements.

(ii) (A) There shall be approved foam fire extinguishers, each of at least 45 litres capacity or equivalent, sufficient in

number to enable foam or its equivalent to be directed on to any part of the pressure lubrication system, on to any part of the casings enclosing pressure-lubricated parts of the turbines, engines or associated gearing, and any other fire hazards. Such extinguishers shall not be required if protection, at least equivalent to that required by this sub-subparagraph, is provided in such spaces by a fixed fire-extinguishing system fitted in compliance with paragraph *(a)* of sub-regulation (4).

(B) There shall be a sufficient number of portable foam extinguishers or equivalent which shall be so located that no point in the space is more than 10 metres walking distance from an extinguisher and that there are at least 2 such extinguishers in each such space, except that such extinguishers shall not be required in addition to any provided in compliance with sub-paragraph (ii)(B) of paragraph *(a)*.

Other machinery spaces.

(d) Where, in the opinion of the Director, a fire hazard exists in any machinery space for which no specific provisions for fire-extinguishing appliances are prescribed in paragraphs *(a)*, *(b)* and *(c)*, there shall be provided in, or adjacent to, that space such a number of approved portable fire extinguishers or other means of fire extinction as the Director may deem sufficient.

Additional requirements for passenger ships.

(e) In passenger ships carrying more than 36 passengers, each machinery space of category A shall be provided with at least 2 suitable water fog applicators.*

Fixed local application fire-extinguishing systems.

(f) (i) This paragraph shall apply to passenger ships of 500 tons and above and cargo ships of 2,000 tons and above.

* A water fog applicator might consist of a metal L-shaped pipe, the long limb being about 2 metres in length, capable of being fitted to a fire hose, and the short limb being about 250 millimetres in length, fitted with a fixed water fog nozzle or capable of being fitted with a water spray nozzle.

(ii) Machinery spaces of category A above 500 m^3 in volume shall, in addition to the fixed fire-extinguishing system required in sub-paragraph (i) of paragraph *(a)*, be protected by an approved type of fixed water-based or equivalent local application fire-extinguishing system, based on the guidelines developed by the Organisation.* In the case of periodically unattended machinery spaces, the fire-extinguishing system shall have both automatic and manual release capabilities. In the case of continuously manned machinery spaces, the fire-extinguishing system is only required to have a manual release capability.

(iii) Fixed local application fire-extinguishing systems are to protect areas such as the following without the necessity of engine shutdown, personnel evacuation, or sealing of the spaces —

(A) the fire hazard portions of internal combustion machinery used for the ship's main propulsion and power generation;

(B) boiler fronts;

(C) the fire hazard portions of incinerators; and

(D) purifiers for heated fuel oil.

(iv) Activation of any local application system shall give a visual and distinct audible alarm in the protected space and at continuously manned stations. The alarm shall indicate the specific system activated. The system alarm requirements described within this paragraph are in addition to, and not a substitute for, the detection and fire alarm system required elsewhere in this Chapter.

* Refer to the Guidelines for the approval of fixed water-based local application fire-fighting systems for use in category A machinery spaces (MSC/Circ.913).

Fire-extinguishing arrangements in control stations, accommodation and service spaces.

Sprinkler systems in passenger ships.

(6) *(a)* (i) Passenger ships carrying more than 36 passengers shall be equipped with an automatic sprinkler, fire detection and fire alarm system of an approved type complying with the requirements of the Fire Safety Systems Code in all control stations, accommodation and service spaces, including corridors and stairways. Alternatively, control stations, where water may cause damage to essential equipment, may be fitted with an approved fixed fire-extinguishing system of another type. Spaces having little or no fire risk such as voids, public toilets, carbon dioxide rooms and similar spaces need not be fitted with an automatic sprinkler system.

(ii) In passenger ships carrying not more than 36 passengers, when a fixed smoke detection and fire alarm system complying with the provisions of the Fire Safety Systems Code is provided only in corridors, stairways and escape routes within accommodation spaces, an automatic sprinkler system shall be installed in accordance with paragraph *(c)*(ii) of sub-regulation (5) of regulation 112.

Sprinkler systems for cargo ships.

(b) In cargo ships in which method IIC specified in sub-paragraph (i)(A)(II) of paragraph *(c)* of sub-regulation (2) of regulation 114 is adopted, an automatic sprinkler, fire detection and fire alarm system shall be fitted in accordance with the requirements in paragraph *(e)*(ii) of sub-regulation (5) of regulation 112.

Spaces containing flammable liquid.

(c) (i) Paint lockers shall be protected by —

(A) a carbon dioxide system, designed to give a minimum volume of free gas equal to 40% of the gross volume of the protected space;

(B) a dry powder system, designed for at least 0.5 kg powder/m^3;

(C) a water-spraying or sprinkler system, designed for 5 l/m^2 min. Water-spraying systems may be connected to the fire main of the ship; or

(D) a system providing equivalent protection, as determined by the Director.

In all cases, the system shall be operable from outside the protected space.

(ii) Flammable liquid lockers shall be protected by an appropriate fire-extinguishing arrangements approved by the Director.

(iii) For lockers of a deck area of less than 4 m^2, which do not give access to accommodation spaces, a portable carbon dioxide fire extinguisher sized to provide a minimum volume of free gas equal to 40% of the gross volume of the space may be accepted in lieu of a fixed system. A discharge port shall be arranged in the locker to allow the discharge of the extinguisher without having to enter into the protected space. The required portable fire extinguisher shall be stowed adjacent to the port. Alternatively, a port or hose connection may be provided to facilitate the use of fire main water.

Deep-fat cooking equipment.

(d) Deep-fat cooking equipment shall be fitted with the following —

(i) an automatic or manual fire-extinguishing system tested to an international standard acceptable to the Organisation*;

(ii) a primary and back up thermostat with an alarm to alert the operator in the event of failure of either thermostat;

(iii) arrangements for automatically shutting off the electrical power upon activation of the fire-extinguishing system;

(iv) an alarm for indicating operation of the fire-extinguishing system in the galley where the equipment is installed; and

* Refer to the recommendations by the International Organisation for Standardisation, in particular publication ISO 15371:2000, Fire-extinguishing systems for protection of galley deef-fat cooking equipment.

(v) controls for manual operation of the fire-extinguishing system which are clearly labeled for ready use by the crew.

Fire-extinguishing arrangements in cargo spaces.

Fixed gas fire-extinguishing systems for general cargo.

(7) *(a)* (i) Except as provided for in paragraph *(b)*, the cargo spaces of passenger ships of 1,000 tons and upwards shall be protected by a fixed carbon dioxide or inert gas fire-extinguishing system complying with the provisions of the Fire Safety Systems Code or by a fixed high-expansion foam fire-extinguishing system which gives equivalent protection.

(ii) Where it is shown to the satisfaction of the Director that a passenger ship is engaged on voyages of such short duration that it would be unreasonable to apply the requirements of sub-paragraph (i) and also in ships of less than 1,000 tons, the arrangements in cargo spaces shall be to the satisfaction of the Director, provided that the ship is fitted with steel hatch covers and effective means of closing all ventilators and other openings leading to the cargo spaces.

(iii) Except for ro-ro and vehicle spaces, cargo spaces on cargo ships of 2,000 tons and upwards shall be protected by a fixed carbon dioxide or inert gas fire-extinguishing system complying with the provisions of the Fire Safety Systems Code, or by a fire-extinguishing system which gives equivalent protection.

(iv) The Director may exempt from the requirements of sub-paragraph (iii) and paragraph *(b)* cargo spaces of any cargo ship if constructed, and solely intended, for the carriage of ore, coal, grain, unseasoned timber, non-combustible cargoes or cargoes which, in the opinion of the Director, constitute a low fire risk.* Such exemptions may be granted only if the ship is fitted with steel hatch covers and effective means of closing all ventilators and other openings leading to the cargo spaces. When such exemptions are granted, the Director shall issue an Exemption Certificate as prescribed in the First Schedule, irrespective of the date of construction of the ship

* Refer to the Code of Safe Practice for Solid Bulk Cargoes, emergency schedule B14, entry for coal, and to the list of solid bulk cargoes which are non-combustible or constitute a low fire risk or for which a fixed gas fire-extinguishing system is ineffective (MSC/Circ.671).

concerned, in accordance with sub-regulation (6) of regulation 13, and shall ensure that the list of cargoes the ship is permitted to carry is attached to the Exemption Certificate.

Fixed gas fire-extinguishing systems for dangerous goods.

(b) A ship engaged in the carriage of dangerous goods in any cargo spaces shall be provided with a fixed carbon dioxide or inert gas fire-extinguishing system complying with the provisions of the Fire Safety Systems Code or with a fire-extinguishing system which, in the opinion of the Director, gives equivalent protection for the cargoes carried.

Cargo tank protection.

Fixed deck foam fire-extinguishing systems.

(8) *(a)* For tankers of 20,000 tonnes deadweight and upwards, a fixed deck foam fire-extinguishing system shall be provided complying with the provisions of the Fire Safety Systems Code, except that, in lieu thereof, the Director may, after having given consideration to the ship's arrangement and equipment, accept other fixed installations if they afford protection equivalent thereof, in accordance with regulation 6. The requirements for alternative fixed installations shall comply with the requirements in paragraph *(b)*.

(b) In accordance with paragraph *(a)*, where the Director accepts an equivalent fixed installation in lieu of the fixed deck foam fire-extinguishing system, the installation shall —

(i) be capable of extinguishing spill fires and also preclude ignition of spilled oil not yet ignited; and

(ii) be capable of combating fires in ruptured tanks.

(c) Tankers of less than 20,000 tonnes deadweight shall be provided with a deck foam fire-extinguishing system complying with the requirements of the Fire Safety Systems Code.

Protection of cargo pump rooms in tankers.

Fixed fire-extinguishing systems.

(9) *(a)* Each cargo pump room shall be provided with one of the following fixed fire-extinguishing systems operated from a readily accessible

position outside the pump room. Cargo pump rooms shall be provided with a system suitable for machinery spaces of category A —

(i) a carbon dioxide fire-extinguishing system complying with the provisions of the Fire Safety Systems Code and with the following —

(A) the alarms giving audible warning of the release of fire-extinguishing medium shall be safe for use in a flammable cargo vapour or air mixture; and

(B) a notice shall be exhibited at the controls stating that, due to the electrostatic ignition hazard, the system is to be used only for fire extinguishing and not for inerting purposes;

(ii) a high-expansion foam fire-extinguishing system complying with the provisions of the Fire Safety Systems Code, provided that the foam concentrate supply is suitable for extinguishing fires involving the cargoes carried;

(iii) a fixed pressure water-spraying fire-extinguishing system complying with the provisions of the Fire Safety Systems Code.

Quantity of fire-extinguishing medium.

(b) Where the fire-extinguishing medium used in the cargo pump room system is also used in systems serving other spaces, the quantity of medium provided or its delivery rate need not be more than the maximum required for the largest compartment.

Firefighter's outfits.

Types of firefighter's outfits.

(10) *(a)* Firefighter's outfits shall comply with the Fire Safety Systems Code.

Number of firefighter's outfits.

(b) (i) Ships shall carry at least 2 firefighter's outfits.

(ii) In addition, in passenger ships there shall be provided —

(A) for every 80 metres, or part thereof, of the aggregate of the lengths of all passenger spaces and service spaces on the deck which carries such spaces or, if there is more than one such deck, on the deck which has the largest aggregate of such lengths, 2 firefighter's outfits and, in addition, 2 sets of personal equipment, each set comprising the items stipulated in the Fire Safety Systems Code. In passenger ships carrying more than 36 passengers, 2 additional firefighter's outfits shall be provided for each main vertical zone. For stairway enclosures which constitute individual main vertical zones and for the main vertical zones in the fore or aft end of a ship which do not contain spaces of categories (6), (7), (8) or (12) defined in paragraph *(b)*(iii) of sub-regulation (2) of regulation 114, no additional firefighter's outfits are required; and

(B) on ships carrying more than 36 passengers, for each pair of breathing apparatus, one water fog applicator which shall be stored adjacent to such apparatus.

(iii) In addition, in tankers, 2 firefighter's outfits shall be provided.

(iv) The Director may require additional sets of personal equipment and breathing apparatus, having regard to the size and type of the ship.

(v) 2 spare charges shall be provided for each required breathing apparatus. Passenger ships carrying not more than 36 passengers and cargo ships that are equipped with suitably located means for fully recharging the air cylinders free from contamination need carry only one spare charge for each required apparatus. In passenger ships carrying more than 36 passengers, at least 2 spare charges for each breathing apparatus shall be provided.

Storage of firefighter's outfits.

(c) (i) The firefighter's outfits or sets of personal equipment shall be kept ready for use in an easily accessible location that is permanently and clearly marked and, where more than one firefighter's outfit or more than one set of personal equipment is carried, they shall be stored in widely separated positions.

(ii) In passenger ships, at least 2 firefighter's outfits and, in addition, one set of personal equipment shall be available at any one position. At least 2 firefighter's outfits shall be stored in each main vertical zone.

Structural integrity.

Purpose.

116. (1) The purpose of this regulation is to maintain structural integrity of the ship, preventing partial or whole collapse of the ship structures due to strength deterioration by heat. For this purpose, materials used in the ship's structure shall ensure that the structural integrity is not degraded due to fire.

Material of hull, superstructures, structural bulkheads, decks and deckhouses.

(2) The hull, superstructures, structural bulkheads, decks and deckhouses shall be constructed of steel or other equivalent material. For the purpose of applying the definition of steel or other equivalent material as given in regulation 108, the applicable fire exposure shall be according to the integrity and insulation standards given in Tables 1, 2, 3, and 4 in the Third Schedule. For example, where divisions such as decks or sides and ends of deckhouses are permitted to have 'B-0' fire integrity, the applicable fire exposure shall be half an hour.

Structure of aluminium alloy.

(3) Unless otherwise specified in sub-regulation (2), in cases where any part of the structure is of aluminium alloy, the following shall apply —

(a) the insulation of aluminium alloy components of 'A' or 'B' class divisions, except structure which, in the opinion of the Director, is non-load-bearing, shall be such that the temperature of the structural core does not rise more than 200°C above the ambient temperature at any time during the applicable fire exposure to the standard fire test; and

(b) special attention shall be given to the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas, and 'A' and 'B' class divisions to ensure —

(i) that for such members supporting lifeboat and liferaft areas and 'A' class divisions, the temperature rise limitation specified in paragraph *(a)* shall apply at the end of one hour; and

(ii) that for such members required to support 'B' class divisions, the temperature rise limitation specified in paragraph *(a)* shall apply at the end of half an hour.

Machinery spaces of category A.

Crowns and casings.

(4) *(a)* Crowns and casings of machinery spaces of category A shall be of steel construction and shall be insulated as required by Tables 5 and 7 in the Third Schedule, as appropriate.

Floor plating.

(b) The floor plating of normal passageways in machinery spaces of category A shall be made of steel.

Materials of overboard fittings.

(5) Materials readily rendered ineffective by heat shall not be used for overboard scuppers, sanitary discharges, and other outlets which are close to the water-line and where the failure of the material in the event of fire would give rise to danger of flooding.

Protection of cargo tank structure against pressure or vacuum in tankers.

General.

(6) *(a)* The venting arrangements shall be so designed and operated as to ensure that neither pressure nor vacuum in cargo tanks shall exceed design parameters and be such as to provide for —

(i) the flow of the small volumes of vapour, air or inert gas mixtures caused by thermal variations in a cargo tank in all cases through pressure or vacuum valves; and

(ii) the passage of large volumes of vapour, air or inert gas mixtures during cargo loading and ballasting, or during discharging.

Openings for small flow by thermal variations.

(b) Openings for pressure release required by sub-paragraph (i) of paragraph *(a)* shall —

(i) have as great a height as is practicable above the cargo tank deck to obtain maximum dispersal of flammable vapours, but in no case less than 2 metres above the cargo tank deck; and

(ii) be arranged at the furthest distance practicable, but not less than 5 metres, from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery and equipment which may constitute an ignition hazard. Anchor windlass and chain locker openings constitute an ignition hazard.

Safety measures in cargo tanks.

Preventive measures against liquid rising in venting system.

(c) (i) Provisions shall be made to guard against liquid rising in the venting system to a height which would exceed the design head of cargo tanks. This shall be accomplished by high level alarms or overflow control systems or other equivalent means, together with independent gauging devices and cargo tank filling procedures. For the purposes of this regulation, spill valves are not considered equivalent to an overflow system.

Secondary means for pressure or vacuum relief.

(ii) A secondary means of allowing full flow relief of vapour, air or inert gas mixtures shall be provided to prevent overpressure or underpressure in the event of failure of the arrangements in sub-paragraph (ii) of paragraph *(a)*. Alternatively, pressure sensors may be fitted in each tank protected by the arrangement required in sub-paragraph (ii) of paragraph *(a)*, with a monitoring system in the ship's cargo control room or the position from which cargo operations are normally carried out. Such monitoring equipment shall also provide an alarm facility which is activated by detection of overpressure or underpressure conditions within a tank.

Bypasses in vent mains.

(iii) Pressure or vacuum valves required by sub-paragraph (i) of paragraph *(a)* may be provided with a bypass arrangement when they are located in a vent main or masthead riser. Where such an arrangement is provided there shall be suitable indicators to show whether the bypass is open or closed.

Pressure or vacuum-breaking devices.

(iv) One or more pressure or vacuum-breaking devices shall be provided to prevent the cargo tanks from being subject to —

(A) a positive pressure, in excess of the test pressure of the cargo tank, if the cargo were to be loaded at the maximum rated capacity and all other outlets are left shut; and

(B) a negative pressure, in excess of 700 millimetres water gauge, if the cargo were to be discharged at the maximum rated capacity of the cargo pumps and the inert gas blowers were to fail.

Such devices shall be installed on the inert gas main unless they are installed in the venting system required by paragraph *(c)*(i) of sub-regulation (5) of regulation 109 or on individual cargo tanks. The location and design of the devices shall be in accordance with paragraph *(c)* of sub-regulation (5) of regulation 109 and this sub-regulation.

Size of vent outlets.

(d) Vent outlets for cargo loading, discharging and ballasting required by sub-paragraph (ii) of paragraph *(a)* shall be designed on the basis of the maximum designed loading rate multiplied by a factor of at least 1.25 to take account of gas evolution, in order to prevent the pressure in any cargo tank from exceeding the design pressure. The master shall be provided with information regarding the maximum permissible loading rate for each cargo tank and, in the case of combined venting systems, for each group of cargo tanks.

PART D

ESCAPE

Notification of crew and passengers.

Purpose.

117. (1) The purpose of this regulation is to notify crew and passengers of a fire for safe evacuation. For this purpose, a general emergency alarm system and a public address system shall be provided.

General emergency alarm system.

(2) A general emergency alarm system required by paragraph *(b)* of sub-regulation (4) of regulation 131 shall be used for notifying crew and passengers of a fire.

Public address systems in passenger ships.

(3) A public address system or other effective means of communication complying with the requirements of sub-regulation (5) of regulation 131 shall be available throughout the accommodation and service spaces and control stations and open decks.

Means of escape.

Purpose.

118. (1) The purpose of this regulation is to provide means of escape so that persons on board can safely and swiftly escape to the lifeboat and liferaft embarkation deck. For this purpose, the following functional requirements shall be met —

(a) safe escape routes shall be provided;

(b) escape routes shall be maintained in a safe condition, clear of obstacles; and

(c) additional aids for escape shall be provided as necessary to ensure accessibility, clear marking, and adequate design for emergency situations.

General requirements.

(2) *(a)* Unless expressly provided otherwise in this regulation, at least 2 widely separated and ready means of escape shall be provided from all spaces or groups of spaces.

(b) Lifts shall not be considered as forming one of the means of escape as required by this regulation.

Means of escape from control stations, accommodation spaces and service spaces.

General requirements.

(3) *(a)* (i) Stairways and ladders shall be so arranged as to provide ready means of escape to the lifeboat and liferaft embarkation deck from passenger and crew accommodation spaces and from spaces in which the crew is normally employed, other than machinery spaces.

(ii) Unless expressly provided otherwise in this regulation, a corridor, lobby, or part of a corridor from which there is only one route of escape shall be prohibited. Dead-end corridors used in service areas which are necessary for the practical utility of the ship, such as fuel oil stations and athwartship supply corridors, shall be permitted, provided such dead-end 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 its width is considered a recess or local extension and is permitted.

(iii) All stairways in accommodation and service spaces and control stations shall be of steel frame construction except where the Director sanctions the use of other equivalent material.

(iv) If a radiotelegraph station has no direct access to the open deck, 2 means of escape from, or access to, the station shall be provided, one of which may be a porthole or window of sufficient size or other means to the satisfaction of the Director.

(v) Doors in escape routes shall, in general, open in way of the direction of escape, except that —

(A) individual cabin doors may open into the cabins in order to avoid injury to persons in the corridor when the door is opened; and

(B) doors in vertical emergency escape trunks may open out of the trunk in order to permit the trunk to be used both for escape and for access.

Means of escape in passenger ships.

Escape from spaces below bulkhead deck.

(b) (i) (A) Below the bulkhead deck, 2 means of escape, at least one of which shall be independent of watertight doors, shall be provided from each watertight compartment or similarly restricted space or group of spaces. Exceptionally, the Director may dispense with one of the means of escape for crew spaces that are entered only occasionally, if the required escape route is independent of watertight doors.

(B) Where the Director has granted dispensation under sub-subparagraph (A), this sole means of escape shall provide safe escape. Stairways shall not be less than 800 millimetres in clear width with handrails on both sides.

Escape from spaces above bulkhead deck.

(ii) Above the bulkhead deck there shall be at least 2 means of escape from each main vertical zone or similarly restricted space or group of spaces, at least one of which shall give access to a stairway forming a vertical escape.

Direct access to stairway enclosures.

(iii) Stairway enclosures in accommodation and service spaces shall have direct access from the corridors and be of a sufficient area to prevent congestion, having in view the number of persons likely to use them in an emergency. Within the perimeter of such stairway enclosures, only public toilets, lockers of non-combustible material providing storage for non-hazardous safety equipment and open information counters are permitted. Only public spaces, corridors, lifts, public toilets, special category spaces and open ro-ro spaces to which any passengers carried can have access, other escape

stairways required by sub-subparagraph (A) of sub-paragraph (iv) and external areas are permitted to have direct access to these stairway enclosures. Small corridors or lobbies used to separate an enclosed stairway from galleys or main laundries may have direct access to the stairway, provided they have a minimum deck area of 4.5 m^2, a width of no less than 900 millimetres and contain a fire hose station.

Details of means of escape.

(iv) (A) At least one of the means of escape required by sub-paragraphs (i)(A) and (ii) shall consist of a readily accessible enclosed stairway, which shall provide continuous fire shelter from the level of its origin to the appropriate lifeboat and liferaft embarkation decks, or to the uppermost weather deck if the embarkation deck does not extend to the main vertical zone being considered. In the latter case, direct access to the embarkation deck by way of external open stairways and passageways shall be provided and shall have emergency lighting in accordance with sub-regulation (5) of regulation 136 and slip-free surfaces underfoot. Boundaries facing external open stairways and passageways forming part of an escape route and boundaries in such a position that their failure during a fire would impede escape to the embarkation deck shall have fire integrity, including insulation values, in accordance with Tables 1 to 4 in the Third Schedule, as appropriate.

(B) Protection of access from the stairway enclosures to the lifeboat and liferaft embarkation areas shall be provided either directly or through protected internal routes which have fire integrity and insulation values for stairway enclosures as determined by Tables 1 to 4 in the Third Schedule, as appropriate.

(C) Stairways serving only a space and a balcony in that space shall not be considered as forming one of the required means of escape.

(D) Each level within an atrium shall have 2 means of escape, one of which shall give direct access to an enclosed vertical means of escape meeting the requirements of sub-subparagraph (A).

(E) The widths, number and continuity of escapes shall be in accordance with the requirements in the Fire Safety Systems Code.

Marking of escape routes.

(v) (A) In addition to the emergency lighting required by regulation 92 and sub-regulation (5) of regulation 136, the means of escape, including stairways and exits, shall be marked by lighting or photoluminescent strip indicators placed not more than 300 millimetres above the deck at all points of the escape route, including angles and intersections. The marking must enable passengers to identify the routes of escape and readily identify the escape exits. If electric illumination is used, it shall be supplied by the emergency source of power and it shall be so arranged that the failure of any single light or cut in a lighting strip will not result in the marking being ineffective. Additionally, escape route signs and fire equipment location markings shall be of photoluminescent material or marked by lighting. The Director shall ensure that such lighting or photoluminescent equipment has been evaluated, tested and applied in accordance with the Fire Safety Systems Code.

(B) In passenger ships carrying more than 36 passengers, the requirements of sub-subparagraph (A) shall also apply to the crew accommodation areas.

Normally locked doors that form part of escape route.

(vi) (A) Cabin and stateroom doors shall not require keys to unlock them from inside the room. Neither shall there be any doors along any designated escape route which require keys to unlock them when moving in the direction of escape.

(B) Escape doors from public spaces that are normally latched shall be fitted with a means of quick release. Such means shall consist of a door-latching mechanism incorporating a device that releases the latch upon the application of a force in the direction of escape flow. Quick release mechanisms shall be designed and installed to the satisfaction of the Director and, in particular —

(I) consist of bars or panels, the actuating portion of which extends across at least one-half of the width of the door leaf, at least 760 millimetres and not more than 1,120 millimetres above the deck;

(II) cause the latch to release when a force not exceeding 67 N is applied; and

(III) not be equipped with any locking device, set screw or other arrangement that prevents the release of the latch when pressure is applied to the releasing device.

Means of escape in cargo ships.

General.

(c) (i) At all levels of accommodation there shall be provided at least 2 widely separated means of escape from each restricted space or group of spaces.

Escape from spaces below lowest open deck.

(ii) Below the lowest open deck the main means of escape shall be a stairway and the second escape may be a trunk or a stairway.

Escape from spaces above lowest open deck.

(iii) Above the lowest open deck the means of escape shall be stairways or doors to an open deck or a combination thereof.

Dead-end corridors.

(iv) No dead-end corridors having a length of more than 7 metres shall be accepted.

Width and continuity of escape routes.

(v) The width, number and continuity of escape routes shall be in accordance with the requirements in the Fire Safety Systems Code.

Dispensation from 2 means of escape.

(vi) Exceptionally, the Director may dispense with one of the means of escape, for crew spaces that are entered only occasionally, if the required escape route is independent of watertight doors.

Emergency escape breathing devices.*

(d) (i) Emergency escape breathing devices shall comply with the Fire Safety Systems Code. Spare emergency escape breathing devices shall be kept on board.

(ii) All ships shall carry at least 2 emergency escape breathing devices within accommodation spaces.

(iii) In all passenger ships, at least 2 emergency escape breathing devices shall be carried in each main vertical zone.

(iv) In all passenger ships carrying more than 36 passengers, 2 emergency escape breathing devices, in addition to those required in sub-paragraph (iii), shall be carried in each main vertical zone.

(v) Sub-paragraphs (iii) and (iv) do not apply to stairway enclosures which constitute individual main vertical zones and to the main vertical zones in the fore or aft end of a ship which do not contain spaces of categories (6), (7), (8) or (12) as defined in paragraph *(b)*(iii) of sub-regulation (2) of regulation 114.

Means of escape from machinery spaces.

Means of escape on passenger ships.

(4) *(a)* Means of escape from each machinery space in passenger ships shall comply with the following provisions —

Escape from spaces below bulkhead deck.

(i) where the space is below the bulkhead deck, the 2 means of escape shall consist of either —

* Refer to the Guidelines for the performance, location, use and care of emergency escape breathing devices (MSC/Circ.849).

(A) 2 sets of steel ladders, as widely separated as possible, leading to doors in the upper part of the space, similarly separated and from which access is provided to the appropriate lifeboat and liferaft embarkation decks. One of these ladders shall be located within a protected enclosure that satisfies category (2) as defined in paragraph *(b)*(iii) of sub-regulation (2) of regulation 114 or category (4) as defined in paragraph *(b)*(iv) of sub-regulation (2) of regulation 114, as appropriate, from the lower part of the space it serves to a safe position outside the space. Self-closing fire doors of the same fire integrity standards shall be fitted in the enclosure. The ladder shall be fixed in such a way that heat is not transferred into the enclosure through non-insulated fixing points. The protected enclosure shall have minimum internal dimensions of at least 800 millimetres x 800 millimetres, and shall have emergency lighting provisions; or

(B) one steel ladder leading to a door in the upper part of the space from which access is provided to the embarkation deck and additionally, in the lower part of the space and in a position well separated from the ladder referred to, a steel door capable of being operated from each side and which provides access to a safe escape route from the lower part of the space to the embarkation deck;

Escape from spaces above bulkhead deck.

(ii) where the space is above the bulkhead deck, the 2 means of escape shall be as widely separated as possible and the doors leading from such means of escape shall be in a position from which access is provided to the appropriate lifeboat and liferaft embarkation decks. Where such means of escape require the use of ladders, these shall be of steel;

Dispensation from 2 means of escape.

(iii) in a ship of less than 1,000 tons, the Director may dispense with one of the means of escape, due regard being paid to the width and disposition of the upper part of the space. In a ship of 1,000 tons and above, the Director may dispense with one means of escape from any such space, including a normally unattended auxiliary machinery space, so long as either a door or a steel ladder provides a safe escape route to the embarkation deck, due regard being paid to the nature

and location of the space and whether persons are normally employed in that space. In the steering gear space, a second means of escape shall be provided when the emergency steering position is located in that space unless there is direct access to the open deck;

Escape from machinery control rooms.

(iv) 2 means of escape shall be provided from a machinery control room located within a machinery space, at least one of which will provide continuous fire shelter to a safe position outside the machinery space.

Means of escape on cargo ships.

(b) Means of escape from each machinery space in cargo ships shall comply with the following provisions —

Escape from machinery spaces of category A.

(i) except as provided in sub-paragraph (ii), 2 means of escape shall be provided from each machinery space of category A. In particular, one of the following provisions shall be complied with —

(A) 2 sets of steel ladders, as widely separated as possible, leading to doors in the upper part of the space, similarly separated and from which access is provided to the open deck. One of these ladders shall be located within a protected enclosure that satisfies category (4), as defined in paragraph *(c)*(iii) of sub-regulation (2) of regulation 114, from the lower part of the space it serves to a safe position outside the space. Self-closing fire doors of the same fire integrity standards shall be fitted in the enclosure. The ladder shall be fixed in such a way that heat is not transferred into the enclosure through non-insulated fixing points. The enclosure shall have minimum internal dimensions of at least 800 millimetres x 800 millimetres, and shall have emergency lighting provisions; or

(B) one steel ladder leading to a door in the upper part of the space from which access is provided to the open deck and, additionally, in the lower part of the space and in a position well separated from the ladder referred to, a

steel door capable of being operated from each side and which provides access to a safe escape route from the lower part of the space to the open deck;

Dispensation from 2 means of escape.

(ii) in a ship of less than 1,000 tons, the Director may dispense with one of the means of escape required under sub-paragraph (i), due regard being paid to the dimension and disposition of the upper part of the space. In addition, the means of escape from machinery spaces of category A need not comply with the requirement for an enclosed fire shelter listed in sub-subparagraph (A) of sub-paragraph (i). In the steering gear space, a second means of escape shall be provided when the emergency steering position is located in that space unless there is direct access to the open deck;

Escape from machinery spaces other than those of category A.

(iii) from machinery spaces other than those of category A, 2 escape routes shall be provided, except that a single escape route may be accepted for spaces that are entered only occasionally and for spaces where the maximum travel distance to the door is 5 metres or less.

Emergency escape breathing devices.

(c) (i) On all ships, within the machinery spaces, emergency escape breathing devices shall be situated ready for use at easily visible places, which can be reached quickly and easily at any time in the event of fire. The location of emergency breathing devices shall take into account the layout of the machinery space and the number of persons normally working in the spaces.*

(ii) The number and location of these devices shall be indicated in the fire control plan required in paragraph *(d)* of sub-regulation (2) of regulation 120.

(iii) Emergency escape breathing devices shall comply with the Fire Safety Systems Code.

* Refer to the Guidelines for the performance, location, use and care of emergency escape breathing devices (MSC/Circ.849).

Means of escape on passenger ships from special category and open ro-ro spaces to which any passengers carried can have access.

(5) *(a)* In special category and open ro-ro spaces to which any passengers carried can have access, the number and locations of the means of escape both below and above the bulkhead deck shall be to the satisfaction of the Director and, in general, the safety of access to the embarkation deck shall be at least equivalent to that provided for under sub-paragraphs (i)(A), (ii), (iv)(A) and (iv)(B) of paragraph *(b)* of sub-regulation (3). Such spaces shall be provided with designated walkways to the means of escape with a breadth of at least 600 millimetres. The parking arrangements for the vehicles shall maintain the walkways clear at all times.

(b) One of the escape routes from the machinery spaces where the crew is normally employed shall avoid direct access to any special category space.

Means of escape from ro-ro spaces.

(6) At least 2 means of escape shall be provided in ro-ro spaces where the crew are normally employed. The escape routes shall provide a safe escape to the lifeboat and liferaft embarkation decks and shall be located at the fore and aft ends of the space.

Additional requirements for ro-ro passenger ships.

General.

(7) *(a)* (i) Escape routes shall be provided from every normally occupied space on the ship to an assembly station. These escape routes shall be arranged so as to provide the most direct route possible to the assembly station,* and shall be marked with symbols based on the guidelines developed by the Organisation.*

(ii) The escape route from cabins to stairway enclosures shall be as direct as possible, with a minimum number of changes in direction. It shall not be necessary to cross from one side of the ship to the other to reach an escape route. It shall not be necessary to climb more than 2 decks up or down in order to reach an assembly station or open deck from any passenger space.

* Refer to Indication of the assembly stations in passenger ships (MSC/Circ.777).

* Refer to Symbols related to life-saving appliances and arrangements adopted by the Organisation by resolution A.760(18).

(iii) External routes shall be provided from open decks, as referred to in sub-paragraph (ii), to the survival craft embarkation stations.

(iv) Where enclosed spaces adjoin an open deck, openings from the enclosed space to the open deck shall, where practicable, be capable of being used as an emergency exit.

(v) Escape routes shall not be obstructed by furniture and other obstructions. With the exception of tables and chairs which may be cleared to provide open space, cabinets and other heavy furnishings in public spaces and along escape routes shall be secured in place to prevent shifting if the ship rolls or lists. Floor coverings shall also be secured in place. When the ship is underway, escape routes shall be kept clear of obstructions such as cleaning carts, bedding, luggage and boxes of goods.

Instruction for safe escape.

(b) (i) Decks shall be sequentially numbered, starting with "1" at the tank top or lowest deck. The numbers shall be prominently displayed at stair landings and lift lobbies. Decks may also be named, but the deck number shall always be displayed with the name.

(ii) Simple "mimic" plans showing the "you are here" position and escape routes marked by arrows shall be prominently displayed on the inside of each cabin door and in public spaces. The plan shall show the directions of escape and shall be properly oriented in relation to its position on the ship.

Strength of handrails and corridors.

(c) (i) Handrails or other handholds shall be provided in corridors along the entire escape route so that a firm handhold is available at every step of the way, where possible, to the assembly stations and embarkation stations. Such handrails shall be provided on both sides of longitudinal corridors more than 1.8 metres in width and transverse corridors more than one metre in width. Particular attention shall be paid to the need to be able to cross lobbies, atriums and other large open spaces along escape routes. Handrails and other handholds shall be of such strength as to withstand a distributed horizontal load of 750 N/m applied in the direction of the centre of the corridor or space, and a distributed vertical load

of 750 N/m applied in the downward direction. The 2 loads need not be applied simultaneously.

(ii) The lowest 0.5 metre of bulkheads and other partitions forming vertical divisions along escape routes shall be able to sustain a load of 750 N/m to allow them to be used as walking surfaces from the side of the escape route with the ship at large angles of heel.

*Evacuation analysis.**

(d) Escape routes shall be evaluated by an evacuation analysis early in the design process. The analysis shall be used to identify and eliminate, as far as practicable, congestion which may develop during an abandonment, due to normal movement of passengers and crew along escape routes, including the possibility that crew may need to move along these routes in a direction opposite to the movement of passengers. In addition, the analysis shall be used to demonstrate that escape arrangements are sufficiently flexible to provide for the possibility that certain escape routes, assembly stations, embarkation stations or survival craft may not be available as a result of a casualty.

PART E

OPERATIONAL REQUIREMENTS

Operational readiness and maintenance.

Purpose.

119. (1) The purpose of this regulation is to maintain and monitor the effectiveness of the fire safety measures the ship is provided with. For this purpose, the following functional requirements shall be met —

(a) fire protection systems and fire-fighting systems and appliances shall be maintained ready for use; and

(b) fire protection systems and fire-fighting systems and appliances shall be properly tested and inspected.

* Refer to the Interim Guidelines for a simplified evacuation analysis of ro-ro passenger ships (MSC/Circ.909).

General requirements.

(2) At all times while the ship is in service, the requirements of paragraph *(a)* of sub-regulation (1) shall be complied with. A ship is not in service when —

(a) it is in for repairs or lay-up (either at anchor or in port) or in dry-dock;

(b) it is declared not in service by the owner or the owner's representative; and

(c) in the case of passenger ships, there are no passengers on board.

Operational readiness.

(3) *(a)* The following fire protection systems shall be kept in good order so as to ensure their required performance if a fire occurs —

(i) structural fire protection, including fire-resisting divisions, and protection of openings and penetrations in these divisions;

(ii) fire detection and fire alarm systems; and

(iii) means of escape systems and appliances.

(b) Fire-fighting systems and appliances shall be kept in good working order and readily available for immediate use. Portable extinguishers which have been discharged shall be immediately recharged or replaced with an equivalent unit.

Maintenance, testing and inspections.

(4) *(a)* Maintenance, testing and inspections shall be carried out based on the guidelines developed by the Organisation* and in a manner having due regard to ensuring the reliability of fire-fighting systems and appliances.

(b) The maintenance plan shall be kept on board the ship and shall be available for inspection whenever required by the Director.

(c) The maintenance plan shall include at least the following fire protection systems and fire-fighting systems and appliances, where installed —

* Refer to the Guidelines on maintenance and inspection of fire protection systems and appliances (MSC/Circ.850).

(i) fire mains, fire pumps and hydrants, including hoses, nozzles and international shore connections;

(ii) fixed fire detection and fire alarm systems;

(iii) fixed fire-extinguishing systems and other fire-extinguishing appliances;

(iv) automatic sprinkler, fire detection and fire alarm systems;

(v) ventilation systems, including fire and smoke dampers, fans and their controls;

(vi) emergency shutdown of fuel supply;

(vii) fire doors, including their controls;

(viii) general emergency alarm systems;

(ix) emergency escape breathing devices;

(x) portable fire extinguishers, including spare charges; and

(xi) firefighter's outfits.

(d) The maintenance programme may be computer-based.

Additional requirements for passenger ships.

(5) In addition to the fire protection systems and appliances listed in paragraph *(c)* of sub-regulation (4), ships carrying more than 36 passengers shall develop a maintenance plan for low-location lighting and public address systems.

Additional requirements for tankers.

(6) In addition to the fire protection systems and appliances listed in paragraph *(c)* of sub-regulation (4), tankers shall have a maintenance plan for —

(a) inert gas systems;

(b) deck foam systems;

(c) fire safety arrangements in cargo pump rooms; and

(d) flammable gas detectors.

Instructions, on-board training and drills.

Purpose.

120. (1) The purpose of this regulation is to mitigate the consequences of fire by means of proper instructions for training and drills of persons on board in correct procedures under emergency conditions. For this purpose, the crew shall have the necessary knowledge and skills to handle fire emergency cases, including passenger care.

General requirements.

Instructions, duties and organisation.

(2) *(a)* (i) Crew members shall receive instruction on fire safety on board the ship.

(ii) Crew members shall receive instructions on their assigned duties.

(iii) Parties responsible for fire extinguishing shall be organised. These parties shall have the capability to complete their duties at all times while the ship is in service.

On-board training and drills.

(b) (i) Crew members shall be trained to be familiar with the arrangements of the ship as well as the location and operation of any fire-fighting systems and appliances that they may be called upon to use.

(ii) Training in the use of the emergency escape breathing devices shall be considered as part of on-board training.

(iii) Performance of crew members assigned fire-fighting duties shall be periodically evaluated by conducting on-board training and drills to identify areas in need of improvement, to ensure competency in fire-fighting skills is maintained, and to ensure the operational readiness of the fire-fighting organisation.

(iv) On-board training in the use of the ship's fire-extinguishing systems and appliances shall be planned and conducted in accordance with paragraph *(a)* of sub-regulation (4) of regulation 144.

(v) Fire drills shall be conducted and recorded in accordance with sub-regulations (3) and (5) of regulation 144.

Training manuals.

(c) (i) A training manual shall be provided in each crew mess room and recreation room or in each crew cabin.

(ii) The training manual shall be written in the working language of the ship.

(iii) The training manual, which may comprise several volumes, shall contain the instructions and information required in sub-paragraph (iv) in easily understood terms and illustrated wherever possible. Any part of such information may be provided in the form of audio-visual aids in lieu of the manual.

(iv) The training manual shall explain the following in detail —

(A) general fire safety practice and precautions related to the dangers of smoking, electrical hazards, flammable liquids and similar common shipboard hazards;

(B) general instructions on fire-fighting activities and fire-fighting procedures, including procedures for notification of a fire and use of manually operated call points;

(C) meanings of the ship's alarms;

(D) operation and use of fire-fighting systems and appliances;

(E) operation and use of fire doors;

(F) operation and use of fire and smoke dampers; and

(G) escape systems and appliances.

*Fire control plans.**

(d) (i) General arrangement plans shall be permanently exhibited for the guidance of the ship's officers, showing clearly for each deck the control stations, the various fire sections enclosed by 'A' class divisions, the sections enclosed by 'B' class divisions together with particulars of the fire detection and fire alarm systems, the sprinkler installation, the fire-extinguishing appliances, means of access to different compartments, decks etc., and the ventilating system, including particulars of the fan control positions, the position of dampers and identification numbers of the ventilating fans serving each section. Alternatively, at the discretion of the Director, such details may be set out in a booklet, a copy of which shall be supplied to each officer, and one copy shall at all times be available on board in an accessible position. Plans and booklets shall be kept up to date and any alterations thereto shall be recorded as soon as practicable. Description in such plans and booklets shall be in the language required by the Director. If the language used is not English, a translation into that language shall be included.

(ii) A duplicate set of fire control plans or a booklet containing such plans shall be permanently stored in a prominently marked weathertight enclosure outside the deckhouse for the assistance of shore-side fire-fighting personnel.*

Additional requirements for passenger ships.

Fire drills.

(3) *(a)* In addition to the requirement of paragraph *(b)*(iii) of sub-regulation (2), fire drills shall be conducted in accordance with regulation 155, having due regard to notification of passengers and movement of passengers to assembly stations and embarkation decks.

* Refer to Graphical symbols for fire control plans, adopted by the Organisation by resolution A.654(16).

* Refer to the Guidance concerning the location of fire control plans for assistance of shore-side fire-fighting personnel (MSC/Circ.451).

Fire control plans.

(b) In ships carrying more than 36 passengers, plans and booklets required by this regulation shall provide information regarding fire protection, fire detection and fire extinction based on the guidelines developed by the Organisation.*

Operations.

Purpose.

121. (1) The purpose of this regulation is to provide information and instructions for proper ship and cargo handling operations in relation to fire safety. For this purpose, the following functional requirements shall be met —

(a) fire safety operational booklets shall be provided on board; and

(b) flammable vapour releases from cargo tank venting shall be controlled.

Fire safety operational booklets.

(2) *(a)* The required fire safety operational booklet shall contain the necessary information and instructions for the safe operation of the ship and cargo handling operations in relation to fire safety. The booklet shall include information concerning the crew's responsibilities for the general fire safety of the ship while loading and discharging cargo and while underway. Necessary fire safety precautions for handling general cargoes shall be explained. For ships carrying dangerous goods and flammable bulk cargoes, the fire safety operational booklet shall also provide reference to the pertinent fire-fighting and emergency cargo handling instructions contained in the Code of Safe Practice for Solid Bulk Cargoes, the International Bulk Chemical Code, the International Gas Carrier Code and the International Maritime Dangerous Goods Code, as appropriate.

(b) The fire safety operational booklet shall be provided in each crew mess room and recreation room or in each crew cabin.

(c) The fire safety operational booklet shall be written in the working language of the ship.

* Refer to the Guidelines on the information to be provided with fire control plans and booklets required by SOLAS regulations II-2/20 and 41-2, adopted by the Organisation by resolution A.756(18).

(d) The fire safety operational booklet may be combined with the training manuals required in paragraph *(c)* of sub-regulation (2) of regulation 120.

Additional requirements for tankers.

General.

(3) *(a)* The fire safety operational booklet referred to in sub-regulation (2) shall include provisions for preventing fire spread to the cargo area due to ignition of flammable vapours and include procedures of cargo tank gas-purging or gas-freeing, taking into account the provisions in paragraph *(b)*.

Procedures for cargo tank purging or gas-freeing.

(b) (i) When the ship is provided with an inert gas system, the cargo tanks shall first be purged in accordance with paragraph *(f)* of sub-regulation (5) of regulation 109 until the concentration of hydrocarbon vapours in the cargo tanks has been reduced to less than 2% by volume. Thereafter, gas-freeing may take place at the cargo tank deck level.

(ii) When the ship is not provided with an inert gas system, the operation shall be such that the flammable vapour is discharged initially through —

(A) the vent outlets as specified in paragraph *(c)*(iv) of sub-regulation (5) of regulation 109;

(B) outlets at least 2 metres above the cargo tank deck level with a vertical efflux velocity of at least 30 m/s maintained during the gas-freeing operation; or

(C) outlets at least 2 metres above the cargo tank deck level with a vertical efflux velocity of at least 20 m/s and which are protected by suitable devices to prevent the passage of flame.

(iii) The outlets as referred to in sub-paragraph (ii) shall be located not less than 10 metres, measured horizontally, from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery, which may include anchor windlass and chain locker

openings, and equipment which may constitute an ignition hazard.

(iv) When the flammable vapour concentration at the outlet has been reduced to 30% of the lower flammable limit, gas-freeing may be continued at cargo tank deck level.

PART F

ALTERNATIVE DESIGN AND ARRANGEMENTS

Alternative design and arrangements.

Purpose.

122. (1) The purpose of this regulation is to provide a methodology for alternative design and arrangements for fire safety.

General.

(2) *(a)* Fire safety design and arrangements may deviate from the prescriptive requirements set out in Parts B, C, D, E or G, provided that the design and arrangements meet the fire safety objectives and the functional requirements.

(b) When fire safety design and arrangements deviate from the prescriptive requirements of this Chapter, engineering analysis, evaluation and approval of the alternative design and arrangements shall be carried out in accordance with this regulation.

Engineering analysis.

(3) The engineering analysis shall be prepared and submitted to the Director, based on the guidelines developed by the Organisation,* and shall include, as a minimum, the following elements —

(a) determination of the ship type and spaces concerned;

(b) identification of prescriptive requirements with which the ship or the spaces will not comply;

* Refer to the guidelines to be developed by the Organisation.

(c) identification of the fire and explosion hazards of the ship or the spaces concerned, including —

(i) identification of the possible ignition sources;

(ii) identification of the fire growth potential of each space concerned;

(iii) identification of the smoke and toxic effluent generation potential for each space concerned;

(iv) identification of the potential for the spread of fire, smoke or of toxic effluents from the spaces concerned to other spaces;

(d) determination of the required fire safety performance criteria for the ships or the spaces concerned addressed by the prescriptive requirements, in particular —

(i) performance criteria shall be based on the fire safety objectives and on the functional requirements of this Chapter;

(ii) performance criteria shall provide a degree of safety not less than that achieved by using the prescriptive requirements; and

(iii) performance criteria shall be quantifiable and measurable;

(e) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions; and

(f) technical justification demonstrating that the alternative design and arrangements meet the required fire safety performance criteria.

Evaluation of alternative design and arrangements.

(4) *(a)* The engineering analysis require in sub-regulation (3) shall be evaluated and approved by the Director, taking into account the guidelines developed by the Organisation.*

(b) A copy of the documentation, as approved by the Director, indicating that the alternative design and arrangements comply with this regulation shall be carried on board the ship.

* Refer to the guidelines to be developed by the Organisation.

Exchange of information.

(5) The Director shall communicate to the Organisation pertinent information concerning alternative design and arrangements approved by them for circulation to all Contracting States.

Re-evaluation due to change of conditions.

(6) If the assumptions, and operational restrictions that were stipulated in the alternative design and arrangements are changed, the engineering analysis shall be carried out under the changed condition and shall be approved by the Director.

PART G

SPECIAL REQUIREMENTS

Helicopter facilities.

Purpose.

123. (1) The purpose of this regulation is to provide additional measures in order to address the fire safety objectives of this Chapter for ships fitted with special facilities for helicopters. For this purpose, the following functional requirements shall be met —

(a) helideck structure shall be adequate to protect the ship from the fire hazards associated with helicopter operations;

(b) fire-fighting appliances shall be provided to adequately protect the ship from the fire hazards associated with helicopter operations;

(c) refuelling and hangar facilities and operations shall provide the necessary measures to protect the ship from the fire hazards associated with helicopter operations; and

(d) operation manuals and training shall be provided.

Application.

(2) *(a)* In addition to complying with the requirements of regulations in Parts B, C, D and E, as appropriate, ships equipped with helidecks shall comply with the requirement of this regulation.

(b) Where helicopters land or conduct winching operations on an occasional or emergency basis on ships without helidecks, fire-fighting equipment fitted in accordance with the requirements in Part C may be used. This equipment shall be made readily available in close proximity to the landing or winching areas during helicopter operations.

(c) Notwithstanding the requirements of paragraph *(b)*, ro-ro passenger ships without helidecks shall comply with regulation 153.

Structure.

Construction of steel or other equivalent material.

(3) *(a)* In general, the construction of the helidecks shall be of steel or other equivalent materials. If the helideck forms the deckhead of a deckhouse or superstructure, it shall be insulated to 'A-60' class standard.

Construction of aluminium or other low melting point metals.

(b) If the Director permits aluminium or other low melting point metal construction that is not made equivalent to steel, the following provisions shall be satisfied —

(i) if the platform is cantilevered over the side of the ship, after each fire on the ship or on the platform, the platform shall undergo a structural analysis to determine its suitability for further use; and

(ii) if the platform is located above the ship's deckhouse or similar structure, the following conditions shall be satisfied —

(A) the deckhouse top and bulkheads under the platform shall have no openings;

(B) windows under the platform shall be provided with steel shutters; and

(C) after each fire on the platform or in close proximity, the platform shall undergo a structural analysis to determine its suitability for further use.

Means of escape.

(4) A helideck shall be provided with both a main and an emergency means of escape and access for fire-fighting and rescue personnel. These shall be

located as far apart from each other as is practicable and preferably on opposite sides of the helideck.

Fire-fighting appliances.

(5) In close proximity to the helideck, the following fire-fighting appliances shall be provided and stored near the means of access to that helideck —

(a) at least 2 dry powder extinguishers having a total capacity of not less than 45 kg;

(b) carbon dioxide extinguishers of a total capacity of not less than 18 kg or equivalent;

(c) a suitable foam application system consisting of monitors or foam-making branch pipes capable of delivering foam to all parts of the helideck in all weather conditions in which helicopters can operate. The system shall be capable of delivering a discharge rate as required in the following for at least 5 minutes —

Category	Helicopter overall length	Discharge rate foam solution (l/min)
H1	up to but not including 15 metres	250
H2	from 15 metres up to but not including 24 metres	500
H3	from 24 metres up to but not including 35 metres	800

(d) the principal agent shall be suitable for use with salt water and conform to performance standards not inferior to those acceptable to the Organisation*;

(e) at least 2 nozzles of an approved dual-purpose type (jet/spray) and hoses sufficient to reach any part of the helideck;

(f) in addition to the requirements of sub-regulation (10) of regulation 115, 2 sets of firefighter's outfits; and

* Refer to the International Civil Aviation Organisation Airport Services Manual, Part 1, Rescue and Fire-fighting, Chapter 8, Extinguishing Agent Characteristics, paragraph 8.1.5, Foam Specifications Table 8-1, level 'B'.

(g) at least the following equipment shall be stored in a manner that provides for immediate use and protection from the elements —

(i) adjustable wrench;

(ii) blanket, fire-resistant;

(iii) cutters, bolt, 60 centimetres;

(iv) hook, grab or salving;

(v) hacksaw, heavy duty complete with 6 spare blades;

(vi) ladder;

(vii) lift line 5 millimetres diameter and 15 metres in length;

(viii) pliers, side-cutting;

(ix) set of assorted screwdrivers; and

(x) harness knife complete with sheath.

Drainage facilities.

(6) Drainage facilities in way of helidecks shall be constructed of steel and shall lead directly overboard independent of any other system and shall be designed so that drainage does not fall onto any part of the ship.

Helicopter refuelling and hangar facilities.

(7) Where the ship has helicopter refuelling and hangar facilities, the following requirements shall be complied with —

(a) a designated area shall be provided for the storage of fuel tanks which shall be —

(i) as remote as is practicable from accommodation spaces, escape routes and embarkation stations; and

(ii) isolated from areas containing a source of vapour ignition;

(b) the fuel storage area shall be provided with arrangements whereby fuel spillage may be collected and drained to a safe location;

(c) tanks and associated equipment shall be protected against physical damage and from a fire in an adjacent space or area;

(d) where portable fuel storage tanks are used, special attention shall be given to —

(i) design of the tank for its intended purpose;

(ii) mounting and securing arrangements;

(iii) electric bonding; and

(iv) inspection procedures;

(e) storage tank fuel pumps shall be provided with means which permit shutdown from a safe remote location in the event of a fire. Where a gravity fuelling system is installed, equivalent closing arrangements shall be provided to isolate the fuel source;

(f) the fuel pumping unit shall be connected to one tank at a time. The piping between the tank and the pumping unit shall be of steel or equivalent material, as short as possible, and protected against damage;

(g) electrical fuel pumping units and associated control equipment shall be of a type suitable for the location and potential hazards;

(h) fuel pumping units shall incorporate a device which will prevent over-pressurisation of the delivery or filling hose;

(i) equipment used in refuelling operations shall be electrically bonded;

(j) "NO SMOKING" signs shall be displayed at appropriate locations;

(k) hangar, refuelling and maintenance facilities shall be treated as category A machinery spaces with regard to structural fire protection, fixed fire-extinguishing and detection system requirements;

(l) enclosed hangar facilities or enclosed spaces containing refuelling installations shall be provided with mechanical ventilation, as required by sub-regulation (3) of regulation 125 for closed ro-ro spaces of cargo ships. Ventilation fans shall be of non-sparking type; and

(m) electric equipment and wiring in enclosed hangars or enclosed spaces containing refuelling installations shall comply with paragraphs *(b)*, *(c)* and *(d)* of sub-regulation (3) of regulation 125.

Operations manual and fire-fighting arrangements.

(8) *(a)* Each helicopter facility shall have an operation manual, including a description and a checklist of safety precautions, procedures and equipment requirements. This manual may be part of the ship's emergency response procedures.

(b) The procedures and precautions to be followed during refuelling operations shall be in accordance with recognised safe practices and contained in the operations manual.

(c) Fire-fighting personnel, consisting of at least 2 persons trained for rescue and fire-fighting duties, and fire-fighting equipment shall be immediately available at all times when helicopter operations are expected.

(d) Fire-fighting personnel shall be present during refuelling operations. The fire-fighting personnel shall not be involved with refuelling activities.

(e) On-board refresher training shall be carried out and additional supplies of fire-fighting media shall be provided for training and testing of the equipment.

Carriage of dangerous goods.*

Purpose.

124. (1) The purpose of this regulation is to provide additional safety measures in order to address the fire safety objectives of this Chapter for ships carrying dangerous goods. For this purpose, the following functional requirements shall be met —

(a) fire protection systems shall be provided to protect the ship from the added fire hazards associated with carriage of dangerous goods;

(b) dangerous goods shall be adequately separated from ignition sources; and

(c) appropriate personnel protective equipment shall be provided for the hazards associated with the carriage of dangerous goods.

* Refer to the Interim guidelines for open-top containerships (MSC/Circ.608/Rev.1).

General requirements.

(2) *(a)* In addition to complying with the requirements of regulations in Parts B, C, D, E and regulations 123 and 125,† as appropriate, ship types and cargo spaces, referred to in paragraph *(b)*, intended for the carriage of dangerous goods shall comply with the requirements of this regulation, as appropriate, except when carrying dangerous goods in limited quantities‡ unless such requirements have already been met by compliance with the requirements elsewhere in this Chapter. The types of ships and modes of carriage of dangerous goods are referred to in paragraph *(b)* and in Table 9 in the Third Schedule. Cargo ships of less than 500 tons shall comply with this regulation, but the Director may reduce the requirements and such reduced requirements shall be recorded in the document of compliance referred to in sub-regulation (4).

(b) The following ship types and cargo spaces shall govern the application of Tables 9 and 10 in the Third Schedule —

(i) ships and cargo spaces not specifically designed for the carriage of freight containers, but intended for the carriage of dangerous goods in packaged form, including goods in freight containers and portable tanks;

(ii) purpose-built containerships and cargo spaces intended for the carriage of dangerous goods in freight containers and portable tanks;

(iii) ro-ro ships and ro-ro spaces intended for the carriage of dangerous goods;

(iv) ships and cargo spaces intended for the carriage of solid dangerous goods in bulk; and

(v) ships and cargo spaces intended for carriage of dangerous goods other than liquids and gases in bulk in shipborne barges.

Special requirements.

(3) Unless otherwise specified, the following requirements shall govern the application of Tables 9, 10 and 11 in the Third Schedule to both on-deck and under-deck stowage of dangerous goods where the numbers of the following paragraphs are indicated in the first column of the Tables —

† Refer to Part 7 of the International Maritime Dangerous Goods Code.

‡ Refer to Chapter 3.4 of the International Maritime Dangerous Goods Code.

Water supplies.

(a) (i) arrangements shall be made to ensure immediate availability of a supply of water from the fire main at the required pressure either by permanent pressurisation or by suitably placed remote arrangements for the fire pumps;

(ii) the quantity of water delivered shall be capable of supplying 4 nozzles of a size and at pressures as specified in sub-regulation (2) of regulation 115, capable of being trained on any part of the cargo space when empty. This amount of water may be applied by equivalent means to the satisfaction of the Director;

(iii) means shall be provided for effectively cooling the designated under-deck cargo space by at least 5 l/min per square metre of the horizontal area of cargo spaces, either by a fixed arrangement of spraying nozzles or by flooding the cargo space with water. Hoses may be used for this purpose in small cargo spaces and in small areas of larger cargo spaces at the discretion of the Director. The drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. The drainage system shall be sized to remove no less than 125% of the combined capacity of both the water-spraying system pumps and the required number of fire hose nozzles. The drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls. Bilge wells shall be of sufficient holding capacity and shall be arranged at the side shell of the ship at a distance from each other of not more than 40 metres in each watertight compartment. If this is not possible, the adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Director in its approval of the stability information*;

(iv) provision to flood a designated under-deck cargo space with suitable specified media may be substituted for the requirements in sub-paragraph (iii);

* Refer to the Recommendation on fixed fire-extinguishing systems for special cargo spaces adopted by the Organisation by resolution A.123 (V).

(v) the total required capacity of the water supply shall satisfy sub-paragraphs (ii) and (iii), if applicable, simultaneously calculated for the largest designated cargo space. The capacity requirements of sub-paragraph (ii) shall be met by the total capacity of the main fire pumps, not including the capacity of the emergency fire pump, if fitted. If a drencher system is used to satisfy sub-paragraph (iii), the drencher pump shall also be taken into account in this total capacity calculation;

Sources of ignition.

(b) electrical equipment and wiring shall not be fitted in enclosed cargo spaces or vehicle spaces unless it is essential for operational purposes in the opinion of the Director. If electrical equipment is fitted in such spaces, it shall be of a certified safe type† for use in the dangerous environments to which it may be exposed unless it is possible to completely isolate the electrical system (example, by removal of links in the system, other than fuses). Cable penetrations of the decks and bulkheads shall be sealed against the passage of gas or vapour. Through runs of cables and cables within the cargo spaces shall be protected against damage from impact. Any other equipment which may constitute a source of ignition of flammable vapour shall not be permitted;

Detection system.

(c) ro-ro spaces shall be fitted with a fixed fire detection and fire alarm system complying with the requirements of the Fire Safety Systems Code. All other types of cargo spaces shall be fitted with either a fixed fire detection and fire alarm system or a sample extraction smoke detection system complying with the requirements of the Fire Safety Systems Code. If a sample extraction smoke detection system is fitted, particular attention shall be given to paragraph 2.1.3 in Chapter 10 of the Fire Safety Systems Code in order to prevent the leakage of toxic fumes into occupied areas;

Ventilation.

(d) (i) adequate power ventilation shall be provided in enclosed cargo spaces. The arrangement shall be such as to provide for at least 6 air changes per hour in the cargo space, based on an empty cargo space, and for removal of vapours from the upper or lower parts of the cargo space, as appropriate;

† Refer to the recommendations of the International Electrotechnical Commission, in particular publication IEC 60092, Electrical installations in ships.

(ii) the fans shall be such as to avoid the possibility of ignition of flammable gas or air mixtures. Suitable wire mesh guards shall be fitted over inlet and outlet ventilation openings;

(iii) natural ventilation shall be provided in enclosed cargo spaces intended for the carriage of solid dangerous goods in bulk, where there is no provision for mechanical ventilation;

Bilge pumping.

(e) (i) where it is intended to carry flammable or toxic liquids in enclosed cargo spaces, the bilge pumping system shall be designed to protect against inadvertent pumping of such liquids through machinery space piping or pumps. Where large quantities of such liquids are carried, consideration shall be given to the provision of additional means of draining those cargo spaces;

(ii) if the bilge drainage system is additional to 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 space served. If the additional system is common, the capacity need not exceed 25 m^3/h. the additional bilge system need not be arranged with redundancy;

(iii) whenever flammable or toxic liquids are carried, the bilge line into the machinery space shall be isolated either by fitting a blank flange or by a closed lockable valve;

(iv) enclosed spaces outside machinery spaces containing bilge pumps serving cargo spaces intended for carriage of flammable or toxic liquids shall be fitted with separate mechanical ventilation giving at least 6 air changes per hour. If the space has access from another enclosed space, the door shall be self-closing;

(v) if bilge drainage of cargo spaces is arranged by gravity drainage, the drainage shall be either led directly overboard or to a closed drain tank located outside the machinery spaces. The tank shall be provided with a vent pipe to a safe location on the open deck. Drainage from a cargo space into bilge wells in a lower space is only permitted if that space satisfies the same requirements as the cargo space above;

Personnel protection.

(f) (i) 4 sets of full protective clothing, resistant to chemical attack, shall be provided in addition to the firefighter's outfits required by sub-regulation (10) of regulation 115. The protective clothing shall cover all skin, so that no part of the body is unprotected;

(ii) at least 2 self-contained breathing apparatuses additional to those required by regulation 115 shall be provided. 2 spare charges suitable for use with the breathing apparatus shall be provided for each required apparatus. Passenger ships carrying not more than 36 passengers and cargo ships that are equipped with suitably located means for fully recharging the air cylinders free from contamination need carry only one spare charge for each required apparatus;

Portable fire extinguishers.

(g) portable fire extinguishers with a total capacity of at least 12 kg of dry powder or equivalent shall be provided for the cargo spaces. These extinguishers shall be in addition to any portable fire extinguishers required elsewhere in this Chapter;

Insulation of machinery space boundaries.

(h) bulkheads forming boundaries between cargo spaces and machinery spaces of category A shall be insulated to 'A-60' class standard, unless the dangerous goods are stowed at least 3 metres horizontally away from such bulkheads. Other boundaries between such spaces shall be insulated to 'A-60' class standard;

Water-spray system.

(i) each open ro-ro space having a deck above it and each space deemed to be a closed ro-ro space not capable of being sealed shall be fitted with an approved fixed pressure water-spraying system for manual operation which shall protect all parts of any deck and vehicle platform in the space, except that the Director may permit the use of any other fixed fire-extinguishing system that has been shown by full-scale test to be no less effective. The drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. The drainage system shall be sized to remove no less than 125% of the combined capacity of both the water-

spraying system pumps and the required number of fire hose nozzles. The drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls. Bilge wells shall be of sufficient holding capacity and shall be arranged at the side shell of the ship at a distance from each other of not more than 40 metres in each watertight compartment. If this is not possible, the adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Director in its approval of the stability information*;

Separation of ro-ro spaces.

(j) (i) in ships having ro-ro spaces, a separation shall be provided between a closed ro-ro space and an adjacent open ro-ro space. The separation shall be such as to minimise the passage of dangerous vapours and liquids between such spaces. Alternatively, such separation need not be provided if the ro-ro space is considered to be a closed cargo space over its entire length and fully complies with the relevant special requirements of this regulation;

(ii) in ships having ro-ro spaces, a separation shall be provided between a closed ro-ro space and the adjacent weather deck. The separation shall be such as to minimise the passage of dangerous vapours and liquids between such spaces. Alternatively, a separation need not be provided if the arrangements of the closed ro-ro spaces are in accordance with those required for the dangerous goods carried on adjacent weather decks.

Document of compliance.*

(4) The Director shall provide the ship with an appropriate document as evidence of compliance of construction and equipment with the requirements of this regulation. Certification for dangerous goods, except solid dangerous goods in bulk, is not required for those cargoes specified as classes 6.2 and 7, as defined in regulation 227, and dangerous goods in limited quantities.

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* Refer to the Recommendations on fixed fire-extinguishing systems for special cargo spaces adopted by the Organisation by resolution A. 123(V).

* Refer to the document of compliance with the special requirements for ships carrying dangerous goods under the provisions of regulation II-2/54 of SOLAS 74, as amended (MSC/Circ.642).

Protection of vehicle, special category and ro-ro spaces.

Purpose.

125. (1) The purpose of this regulation is to provide additional safety measures in order to address the fire safety objectives of this Chapter for ships fitted with vehicle, special category and ro-ro spaces. For this purpose, the following functional requirements shall be met —

(a) fire protection systems shall be provided to adequately protect the ship from the fire hazards associated with vehicle, special category and ro-ro spaces;

(b) ignition sources shall be separated from vehicle, special category and ro-ro spaces; and

(c) vehicle, special category and ro-ro spaces shall be adequately ventilated.

General requirements.

Application.

(2) *(a)* In addition to complying with the requirements of regulations in Parts B, C, D and E, as appropriate, vehicle, special category and ro-ro spaces shall comply with the requirements of this regulation.

Basic principles for passenger ships.

(b) (i) The basic principle underlying this regulation is that the main vertical zoning required by sub-regulation (2) of regulation 114 may not be practicable in vehicle spaces of passenger ships and, therefore, equivalent protection must be obtained in such spaces on the basis of a horizontal zone concept and by the provision of an efficient fixed fire-extinguishing system. Based on this concept, a horizontal zone for the purpose of this regulation may include special category spaces on more than one deck, provided that the total overall clear height for vehicles does not exceed 10 metres.

(ii) The basic principle underlying the provisions of sub-paragraph (i) is also applicable to ro-ro spaces.

(iii) The requirements of ventilation systems, openings in 'A' class divisions and penetrations in 'A' class divisions for

maintaining the integrity of vertical zones in this Chapter shall be applied equally to decks and bulkheads forming the boundaries separating horizontal zones from each other and from the remainder of the ship.

Precaution against ignition of flammable vapours in closed vehicle spaces, closed ro-ro spaces and special category spaces.

Ventilation systems.

Capacity of ventilation systems.

(3) *(a)* (i) There shall be provided an effective power ventilation system sufficient to give at least the following air changes —

(A) passenger ships —

special category spaces	10 air changes per hour;
closed ro-ro and vehicle spaces other than special category spaces for ships carrying more than 36 passengers	10 air changes per hour;
closed ro-ro and vehicle spaces other than special category spaces for ships carrying not more than 36 passengers	6 air changes per hour;

(B) cargo ships — 6 air changes per hour.

The Director may require an increased number of air changes when vehicles are being loaded and unloaded.

Performance of ventilation systems.

(ii) (A) In passenger ships, the power ventilation system required in sub-paragraph (i) shall be separate from other ventilation systems and shall be in operation at all times when vehicles are in such spaces. Ventilation ducts serving such cargo spaces capable of being effectively sealed shall be separated for each such space.

The system shall be capable of being controlled from a position outside such spaces.

(B) In cargo ships, ventilation fans shall normally be run continuously whenever vehicles are on board. Where this is impracticable, they shall be operated for a limited period daily as weather permits and in any case for a reasonable period prior to discharge, after which period the ro-ro or vehicle space shall be proved gas-free. One or more portable combustible gas detecting instruments shall be carried for this purpose. The system shall be entirely separate from other ventilating systems. Ventilation ducts serving ro-ro or vehicle spaces shall be capable of being effectively sealed for each cargo space. The system shall be capable of being controlled from a position outside such spaces.

(C) The ventilation system shall be such as to prevent air stratification and the formation of air pockets.

Indication of ventilation systems.

(iii) Means shall be provided on the navigation bridge to indicate any loss of the required ventilating capacity.

Closing appliances and ducts.

(iv) (A) Arrangements shall be provided to permit a rapid shut-down and effective closure of the ventilation system from outside of the space in case of fire, taking into account the weather and sea conditions.

(B) Ventilation ducts, including dampers, within a common horizontal zone shall be made of steel. In passenger ships, ventilation ducts that pass through other horizontal zones or machinery spaces shall be 'A-60' class steel ducts constructed in accordance with sub-subparagraphs (A) and (B) of paragraph *(b)*(i) of sub-regulation (7) of regulation 114.

Permanent openings.

(v) Permanent openings in the side plating, the ends or deckhead of the space shall be so situated that a fire in the cargo space does not endanger stowage areas and embarkation stations

for survival craft and accommodation spaces, service spaces and control stations in superstructures and deckhouses above the cargo spaces.

Electrical equipment and wiring.

(b) (i) Except as provided in sub-paragraph (ii), electrical equipment and wiring shall be of a type suitable for use in an explosive petrol and air mixture.*

(ii) In case of other than special category spaces below the bulkhead deck, notwithstanding the provisions in sub-paragraph (i), above a height of 450 millimetres from the deck and from each platform for vehicles, if fitted, except platforms with openings of sufficient size permitting penetration of petrol gases downwards, electrical equipment of a type so enclosed and protected as to prevent the escape of sparks shall be permitted as an alternative, on condition that the ventilation system is so designed and operated as to provide continuous ventilation of the cargo spaces at the rate of at least 10 air changes per hour whenever vehicles are on board.

Electrical equipment and wiring in exhaust ventilation ducts.

(c) Electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

Other ignition sources.

(d) Other equipment which may constitute a source of ignition of flammable vapours shall not be permitted.

Scuppers and discharges.

(e) Scuppers shall not be led to machinery or other spaces where sources of ignition may be present.

* Refer to the recommendations of the International Electrotechnical Commission, in particular publication 60079.

Detection and alarm.

Fixed fire detection and fire alarm systems.

(4) *(a)* Except as provided in sub-paragraph (i) of paragraph *(c)*, there shall be provided a fixed fire detection and fire alarm system complying with the requirements of the Fire Safety Systems Code. The fixed fire detection system shall be capable of rapidly detecting the onset of fire. The type of detectors and their spacing and location shall be to the satisfaction of the Director, taking into account the effects of ventilation and other relevant factors. After being installed, the system shall be tested under normal ventilation conditions and shall give an overall response time to the satisfaction of the Director.

Sample extraction smoke detection systems.

(b) Except open ro-ro spaces, open vehicle spaces and special category spaces, a sample extraction smoke detection system complying with the requirements of the Fire Safety Systems Code may be used as an alternative for the fixed fire detection and fire alarm system required in paragraph *(a)*.

Special category spaces.

(c) (i) An efficient fire patrol system shall be maintained in special category spaces. If an efficient fire patrol system is maintained by a continuous fire watch at all times during the voyage, a fixed fire detection and fire alarm system is not required.

(ii) Manually operated call points shall be spaced so that no part of the space is more than 20 metres from a manually operated call point, and one shall be placed close to each exit from such spaces.

Structural protection.

(5) Notwithstanding the provisions of paragraph *(b)* of sub-regulation (2) of regulation 114, in passenger ships carrying more than 36 passengers, the boundary bulkheads and decks of special category spaces and ro-ro spaces shall be insulated to 'A-60' class standard. Where a category (5), (9) or (10) space, as defined in paragraph *(b)*(iii) of sub-regulation (2) of regulation 114, is on one side of the division, the standard may be reduced to 'A-0'. Where fuel oil tanks are below a special category space or a ro-ro space, the integrity of the deck between such spaces may be reduced to 'A-0' standard.

Fire extinction.

Fixed fire-extinguishing systems. *

(6) *(a)* (i) Vehicle spaces and ro-ro spaces which are not special category spaces and are capable of being sealed from a location outside of the cargo spaces shall be fitted with a fixed gas fire-extinguishing system which shall comply with the provisions of the Fire Safety Systems Code, except that —

(A) if a carbon dioxide fire-extinguishing system is fitted, the quantity of gas available shall be at least sufficient to give a minimum volume of free gas equal to 45% of the gross volume of the largest such cargo space which is capable of being sealed, and the arrangements shall be such as to ensure that at least two-thirds of the gas required for the relevant space shall be introduced within 10 minutes;

(B) any other fixed inert gas fire-extinguishing system or fixed high-expansion foam fire-extinguishing system may be fitted, provided the Director is satisfied that an equivalent protection is achieved; and

(C) as an alternative, a fire-extinguishing system meeting the requirements of sub-paragraph (ii) may be fitted.

(ii) Ro-ro and vehicle spaces not capable of being sealed and special category spaces shall be fitted with an approved fixed pressure water-spraying system† for manual operation which shall protect all parts of any deck and vehicle platform in such spaces. Such water-spray systems shall have —

(A) a pressure gauge on the valve manifold;

(B) clear marking on each manifold valve indicating the spaces served;

(C) instructions for maintenance and operation located in the valve room; and

* Refer to the guidelines when approving alternative fixed water-based fire-lighting systems for use in special category spaces (MSC/Circ.914).

† Refer to the Recommendation on fixed fire-extinguishing systems for special cargo spaces adopted by the Organisation by resolution A.123(V).

(D) a sufficient number of drainage valves.

(iii) The Director may permit the use of any other fixed fire-extinguishing system that has been shown, by a full-scale test in conditions simulating a flowing petrol fire in a vehicle space or a ro-ro space, to be not less effective in controlling fires likely to occur in such a space.

(iv) When fixed pressure water-spraying fire-extinguishing systems are provided, in view of the serious loss of stability which could arise due to large quantities of water accumulating on the deck or decks during the operation of the water-spraying system, the following arrangements shall be provided —

(A) in passenger ships —

(I) in the spaces above the bulkhead deck, scuppers shall be fitted so as to ensure that such water is rapidly discharged directly overboard;

(II) in ro-ro passenger ships, discharge valves for scuppers, fitted with positive means of closing operable from a position above the bulkhead deck in accordance with the requirements of the International Convention on Load Lines in force, shall be kept open while the ships are at sea;

(III) any operation of valves referred to in sub-subparagraph (II) shall be recorded in the log-book;

(IV) in the spaces below the bulkhead deck, the Director may require pumping and drainage facilities to be provided additional to the requirements of regulation 59. In such case, the drainage system shall be sized to remove no less than 125% of the combined capacity of both the water-spraying system pumps and the required number of fire hose nozzles. The drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls. Bilge wells shall be of sufficient holding capacity and shall be arranged at the side shell of the ship at a distance from each other of not more than 40 metres in each watertight compartment;

(B) in cargo ships, the drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. In such case, the drainage system shall be sized to remove no less than 125% of the combined capacity of both the water-spraying system pumps and the required number of fire hose nozzles. The drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls. Bilge wells shall be of sufficient holding capacity and shall be arranged at the side shell of the ship at a distance from each other of not more than 40 metres in each watertight compartment. If this is not possible, the adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Director in its approval of the stability information.* Such information shall be included in the stability information supplied to the master as required by regulation 60.

Portable fire extinguishers.

(b) (i) Portable fire extinguishers shall be provided at each deck level in each hold or compartment where vehicles are carried, spaced not more than 20 metres apart on both sides of the space. At least one portable fire extinguisher shall be located at each access to such a cargo space.

(ii) In addition to sub-paragraph (i), the following fire-extinguishing appliances shall be provided in vehicle, ro-ro and special category spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion —

(A) at least 3 water fog applicators; and

(B) one portable foam applicator unit complying with the provisions of the Fire Safety Systems Code, provided that at least 2 such units are available in the ship for use in such spaces.

* Refer to the recommendation on fixed fire-extinguishing systems for special cargo spaces adopted by the Organisation by resolution A.123(V).

CHAPTER III

LIFE-SAVING APPLIANCES AND ARRANGEMENTS

PART A

GENERAL

Application.

126. (1) Unless expressly provided otherwise, this Chapter shall apply to ships the keels of which are laid or which are at a similar stage of construction on or after 1st. July, 1998.

(2) For the purpose of this Chapter —

"all ships" means ships constructed before, on or after 1st. July, 1998; and "all cargo ships" and "all passenger ships" shall be construed accordingly;

"ships constructed" means ships the keels of which are laid or which are at a similar stage of construction;

"similar stage of construction" means the stage at which —

(a) construction identifiable with a specific ship begins; and

(b) assembly of that ship has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less.

(3) For the purpose of this Chapter, a cargo ship, whenever built, which is converted to a passenger ship shall be treated as a passenger ship constructed on the date on which such a conversion commences.

(4) Ships constructed before 1st. July, 1998 shall —

(a) subject to paragraph *(b)*, comply with the requirements which are applicable under Chapter III of the Convention in force prior to 1st. July, 1998 to new or existing ships as prescribed by that Chapter; and

(b) when the life-saving appliances or arrangements on such ships are replaced or when such ships undergo repairs, alterations or modifications of a major character which involve replacement of, or any addition to, their existing life-saving appliances or arrangements,

such life-saving appliances or arrangements, in so far as is reasonable and practicable, comply with the requirements of this Chapter. If a survival craft other than an inflatable liferaft is replaced without replacing its launching appliance, or vice versa, the survival craft or launching appliance may be of the same type as that replaced.

Exemptions.

127. The Director may, if he considers that the sheltered nature and conditions of the voyage are such as to render the application of any specific requirements of this Chapter unreasonable or unnecessary, exempt from those requirements individual ships or classes of ships which, in the course of their voyage, do not proceed more than 20 miles from the nearest land.

Interpretation.

128. For the purpose of this Chapter, unless expressly provided otherwise —

"anti-exposure suit" means a protective suit designed for use by rescue boat crews and marine evacuation system parties;

"certificated person" means a person who holds a certificate of proficiency in survival craft issued under the authority of, or recognised as valid by, the Director in accordance with the requirements of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, in force; or a person who holds a certificate issued or recognised by the Administration of a State not a Party to that Convention for the same purpose as the convention certificate;

"detection" means the determination of the location of survivors or survival craft;

"embarkation ladder" means the ladder provided at survival craft embarkation stations to permit safe access to survival craft after launching;

"float-free launching" means a method of launching a survival craft whereby the craft is automatically released from a sinking ship and is ready for use;

"free-fall launching" means a method of launching a survival craft whereby the craft with its complement of persons and equipment on board is released and allowed to fall into the sea without any restraining apparatus;

"immersion suit" means a protective suit which reduces the body heat loss of a person wearing it in cold water;

"inflatable appliance" means an appliance which depends upon non-rigid, gas-filled chambers for buoyancy and which is normally kept uninflated until ready for use;

"inflated appliance" means an appliance which depends upon non-rigid, gas-filled chambers for buoyancy and which is kept inflated and ready for use at all times;

"International Life-Saving Appliance (LSA) Code", referred to in this Chapter as the Code, means the International Life-Saving Appliance (LSA) Code adopted by the Maritime Safety Committee of the Organisation by resolution MSC.48(66), as it may be amended by the Organisation, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of Article VIII of the present Convention concerning the amendment procedures applicable to the Annex other than Chapter I;

"launching appliance or arrangement" is a means of transferring a survival craft or rescue boat from its stowed position safely to the water;

"length" means 96% of the total length on a water-line at 85% of the least moulded depth measured from the top of the keel, or the length from the fore-side of the stem to the axis of the rudder stock on that water-line, if that be greater. In ships designed with a rake of keel the water-line on which this is measured shall be parallel to the designed water-line;

"lightest seagoing condition" means the loading condition with the ship on even keel, without cargo, with 10% stores and fuel remaining and in the case of a passenger ship, with the full number of passengers and crew and their luggage;

"marine evacuation system" means an appliance for the rapid transfer of persons from the embarkation deck of a ship to a floating survival craft;

"moulded depth" means the vertical distance measured from the top of the keel to the top of the freeboard deck beam at side —

(a) in wood and composite ships, the distance is measured from the lower edge of the keel rabbet. Where the form at the lower part of the midship section is of a hollow character, or where thick garboards are fitted, the distance is measured from the point where the line of the flat of the bottom continued inwards cuts the side of the keel;

(b) in ships having rounded gunwales, the moulded depth shall be measured to the point of intersection of the moulded lines of the deck and side shall plating, the lines extending as though the gunwale were of angular design;

(c) where the freeboard deck is stepped and the raised part of the deck extends over the point at which the moulded depth is to be determined, the moulded depth shall be measured to a line of reference extending from the lower part of the deck along a line parallel with the raised part;

"novel life-saving appliance or arrangement" means a life-saving appliance or arrangement which embodies new features not fully covered by the provisions of this Chapter or the Code but which provides an equal or higher standard of safety;

"positive stability" means the ability of a craft to return to its original position after the removal of a heeling moment;

"recovery time", for a rescue boat, means the time required to raise the boat to a position where persons on board can disembark to the deck of the ship, and includes the time required to make preparations for recovery on board the rescue boat such as passing and securing a painter, connecting the rescue boat to the launching appliance, and the time to raise the rescue boat. Recovery time does not include the time needed to lower the launching appliance into position to recover the rescue boat;

"rescue boat" means a boat designed to rescue persons in distress and to marshal survival craft;

"retrieval" means the safe recovery of survivors;

"ro-ro passenger ship" means a passenger ship with ro-ro cargo spaces or special category spaces as defined in regulation 108;

"short international voyage" means an international voyage in the course of which a ship is not more than 200 miles from a port or place in which the passengers and crew could be placed in safety. Neither the distance between the last port of call in the country in which the voyage begins and the final port of destination nor the return voyage shall exceed 600 miles. The final port of destination is the last port of call in the scheduled voyage at which the ship commences its return voyage to the country in which the voyage began;

"survival craft" means a craft capable of sustaining the lives of persons in distress from the time of abandoning the ship;

"thermal protective aid" means a bag or suit made of waterproof material with low thermal conductance.

Evaluation, testing and approval of life-saving appliances and arrangements.

129. (1) Except as provided in sub-regulations (5) and (6), life-saving appliances and arrangements required by this Chapter shall be approved by the Director.

(2) Before giving approval to life-saving appliances and arrangements, the Director shall require that such life-saving appliances and arrangements —

(a) are tested, to confirm that they comply with the requirements of this Chapter and the Code, in accordance with the recommendations of the Organisation*; or

(b) have successfully undergone, to the satisfaction of the Director, tests which are substantially equivalent to those specified in the recommendations.

(3) Before giving approval to novel life-saving appliances or arrangements, the Director shall require that such appliances or arrangements —

(a) provide safety standards at least equivalent to the requirements of this Chapter and the Code and have been evaluated and tested in accordance with the recommendations of the Organisation*; or

(b) have successfully undergone, to the satisfaction of the Director, evaluation and tests which are substantially equivalent to the recommendations.

(4) An approval granted by the Director may be subjected to any condition as determined by the Director, the contravention of which would result in the withdrawal of such approval.

(5) Before life-saving appliances and arrangements that have not been previously approved by the Director are accepted, such life-saving appliances and arrangements shall comply with the requirements of this Chapter and the Code to the satisfaction of the Director.

(6) Life-saving appliances required by this Chapter for which detailed specifications are not included in the Code shall be to the satisfaction of the Director.

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* Refer to the recommendations on testing of life-saving appliances adopted by the Organisation by resolution A.689(17). For life-saving appliances installed on board on or after 1st. July, 1999, refer to the revised recommendations on testing of life-saving appliances adopted by the Maritime Safety Committee of the Organisation by resolution MSC.81(70).

* Refer to the Code of Practice for the Evaluation, Testing and Acceptance of Prototype Novel Life-Saving Appliances and Arrangements adopted by the Organisation by resolution A.520(13).

Production tests.

130. Life-saving appliances are to be subjected to such production tests as considered necessary by the Director to ensure that the life-saving appliances are manufactured to the same standard as the approved prototype.

PART B

REQUIREMENTS FOR SHIPS AND LIFE-SAVING APPLIANCES

SECTION I

PASSENGER SHIPS AND CARGO SHIPS

Communications.

131. (1) Sub-regulation (2) applies to all passenger ships and to all cargo ships of 300 tons and upwards.

Radio life-saving appliances.

Two-way VHF radiotelephone apparatus.

(2) *(a)* (i) At least 3 two-way VHF radiotelephone apparatus shall be provided on every passenger ship and on every cargo ship of 500 tons and upwards. At least 2 two-way VHF radiotelephone apparatus shall be provided on every cargo ship of 300 tons and upwards but less than 500 tons. Such apparatus shall conform to performance standards not inferior to those adopted by the Organisation.* If a fixed two-way VHF radiotelephone apparatus is fitted in a survival craft, it shall conform to performance standards not inferior to those adopted by the Organisation.†

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* Refer to the Performance Standards for Survival Craft Two-Way VHF Radiotelephone Apparatus, adopted by the Organisation by resolution A.809(19), as it may be amended, Annex 1 or Annex 2 as applicable.

† Refer to the Performance Standards for Survival Craft Two-Way VHF Radiotelephone Apparatus, adopted by the Organisation by resolution A.809(19), as it may be amended, Annex 1 or Annex 2 as applicable.

(ii) Two-way VHF radiotelephone apparatus provided on board ships prior to 1st. February, 1992 and not complying fully with the performance standards adopted by the Organisation may be accepted by the Director until 1st. February, 1999, provided the Director is satisfied that they are compatible with approved two-way VHF radiotelephone apparatus.

Radar transponders.

(b) At least one radar transponder shall be carried on each side of every passenger ship and of every cargo ship of 500 tons and upwards. At least one radar transponder shall be carried on every cargo ship of 300 tons and upwards but less than 500 tons. Such radar transponder shall conform to performance standards not inferior to those adopted by the Organisation.* The radar transponders† shall be stowed in such locations that they can be rapidly placed in any survival craft other than the liferaft required by paragraph *(d)* of sub-regulation (1) of regulation 156. Alternatively, one radar transponder shall be stowed in each survival craft other than those required by paragraph *(d)* of sub-regulation (1) of regulation 156. On ships carrying at least 2 radar transponders and equipped with free-fall lifeboats, one of the radar transponders shall be stowed in a free-fall lifeboat and the other located in the immediate vicinity of the navigation bridge so that it can be utilised on board and ready for transfer to any of the other survival craft.

Distress flares.

(3) Not less than 12 rocket parachute flares, complying with the requirements of section 3.1 of the Code, shall be carried and be stowed on or near the navigation bridge.

On-board communications and alarm systems.

(4) *(a)* An emergency means comprised of either fixed or portable equipment or both shall be provided for two-way communications between emergency control stations, muster and embarkation stations and strategic positions on board.

* Refer to the Performance Standards for Survival Craft Radar Transponders for Use in Search and Rescue Operations, adopted by the Organisation by resolution A.802(19), as it may be amended.

† One of these radar transponders may be the radar transponder required by regulation 170(1)*(c)*.

(b) A general emergency alarm system complying with the requirements of paragraph 7.2.1 of the Code shall be provided and shall be used for summoning passengers and crew to muster stations and to initiate the actions included in the muster list. The system shall be supplemented by either a public address system complying with the requirements of paragraph 7.2.2 of the Code or other suitable means of communication. Entertainment sound systems shall automatically be turned off when the general emergency alarm system is activated.

(c) On passenger ships, the general emergency alarm system shall be audible on all open decks.

(d) On ships fitted with a marine evacuation system, communication between the embarkation station and the platform or the survival craft shall be ensured.

Public address systems on passenger ships.

(5) *(a)* In addition to the requirements of sub-regulation (3) of regulation 117 and of paragraph *(b)* of sub-regulation (4), all passenger ships shall be fitted with a public address system. With respect to passenger ships constructed before 1st. July, 1997, the requirements of paragraphs *(b)* and *(d)*, subject to paragraph *(e)*, shall apply not later than the date of the first periodical survey after 1st. July, 1997.

(b) The public address system shall be clearly audible above the ambient noise in all spaces, prescribed by paragraph 7.2.2.1 of the Code, and shall be provided with an override function controlled from one location on the navigation bridge and such other places on board as the Director deems necessary, so that all emergency messages will be broadcast if any loudspeaker in the spaces concerned has been switched off, its volume has been turned down or the public address system is used for other purposes.

(c) On passenger ships constructed on or after 1st. July, 1997 —

(i) the public address system shall have at least 2 loops which shall be sufficiently separated throughout their length and have 2 separate and independent amplifiers; and

(ii) the public address system and its performance standards shall be approved by the Director, having regard to the recommendations adopted by the Organisation.*

* Refer to MSC/Circ.808, Recommendation on Performance Standards for Public Address Systems on Passenger Ships, including cabling.

(d) The public address system shall be connected to the emergency source of electrical power required by paragraph *(b)* of sub-regulation (2) of regulation 92.

(e) Ships constructed before 1st. July, 1997 which are already fitted with the public address system approved by the Director which complies substantially with those required by paragraphs *(b)* and *(d)* and paragraph 7.2.2.1 of the Code are not required to change their system.

Personal life-saving appliances.

Lifebuoys.

132. (1) *(a)* Lifebuoys complying with the requirements of paragraph 2.1.1 of the Code shall be —

(i) so distributed as to be readily available on both sides of the ship and as far as practicable on all open decks extending to the ship's side; at least one shall be placed in the vicinity of the stern; and

(ii) so stowed as to be capable of being rapidly cast loose, and not permanently secured in any way.

(b) At least one lifebuoy on each side of the ship shall be fitted with a buoyant life line complying with the requirements of paragraph 2.1.4 of the Code equal in length to not less than twice the height at which it is stowed above the water-line in the lightest seagoing condition, or 30 metres, whichever is the greater.

(c) Not less than one-half of the total number of lifebuoys shall be provided with lifebuoy self-igniting lights complying with the requirements of paragraph 2.1.2 of the Code; not less than 2 of these shall also be provided with lifebuoy self-activating smoke signals complying with the requirements of paragraph 2.1.3 of the Code and be capable of quick release from the navigation bridge. Lifebuoys with lights and those with lights and smoke signals shall be equally distributed on both sides of the ship and shall not be the lifebuoys provided with life lines in compliance with the requirements of paragraph *(b)*.

(d) Each lifebuoy shall be marked in block capitals of the Roman alphabet with the name and port of registry of the ship on which it is carried.

Life jackets.

(2) *(a)* A life jacket complying with the requirements of paragraph 2.2.1 or 2.2.2 of the Code shall be provided for every person on board the ship and, in addition —

(i) a number of life jackets suitable for children equal to at least 10% of the number of passengers on board shall be provided or such greater number as may be required to provide a life jacket for each child; and

(ii) life jackets shall be carried for persons on watch and for use at remotely located survival craft stations in unlocked and clearly marked dry stowage positions in accordance with the following table —

Number of crew members	Minimum number of additional life jackets
More than 16 crew members	Not less than 25% of crew members
Up to 16 crew members	Not less than 4

These life jackets should be stowed on the bridge, in the engine control room and at any other manned watch station.

(b) Life jackets shall be so placed as to be readily accessible and their position shall be plainly indicated. Where, due to the particular arrangements of the ship, the life jackets provided in compliance with the requirements of paragraph *(a)* may become inaccessible, alternative provisions shall be made to the satisfaction of the Director which may include an increase in the number of life jackets to be carried.

(c) The life jackets used in totally enclosed lifeboats, except free-fall lifeboats, shall not impede entry into the lifeboat or seating, including operation of the seat-belts in the lifeboat.

(d) Life jackets selected for free-fall lifeboats, and the manner in which they are carried or worn, shall not interfere with entry into the lifeboat, occupant safety or operation of the lifeboat.

Immersion suits and anti-exposure suits.

(3) An immersion suit, complying with the requirements of section 2.3 of the Code or an anti-exposure suit complying with section 2.4 of the Code, of an

appropriate size, shall be provided for every person assigned to crew the rescue boat or assigned to the marine evacuation system party. If the ship is constantly engaged on voyages in warm climates where, in the opinion of the Director, thermal protection is unnecessary, this protective clothing need not be carried.

Muster list and emergency instructions.

133. (1) This regulation applies to all ships.

(2) Clear instructions to be followed in the event of an emergency shall be provided for every person on board. In the case of passenger ships, these instructions shall be drawn up in the English language.

(3) Muster lists and emergency instructions complying with the requirements of regulation 162 shall be exhibited in conspicuous places throughout the ship including the navigation bridge, engine room and crew accommodation spaces.

(4) Illustrations and instructions in the English language shall be posted in passenger cabins and be conspicuously displayed at muster stations and other passenger spaces to inform passengers of —

(a) their muster station;

(b) the essential actions they must take in an emergency; and

(c) the method of donning life jackets.

Operating instructions.

134. (1) This regulation applies to all ships.

(2) Posters or signs shall be provided on or in the vicinity of survival craft and their launching controls and shall —

(a) illustrate the purpose of controls and the procedures for operating the appliance and give relevant instructions or warnings;

(b) be easily seen under emergency lighting conditions; and

(c) use symbols in accordance with the recommendations of the Organisation.*

* Refer to the Symbols related to Life-Saving Appliances and Arrangements, adopted by the Organisation by resolution A.760(18), as amended by resolution MSC.82(70).

Manning of survival craft and supervision.

135. (1) This regulation applies to all ships.

(2) There shall be a sufficient number of trained persons on board for mustering and assisting untrained persons.

(3) There shall be a sufficient number of crew members, who may be deck officers or certificated persons, on board for operating the survival craft and launching arrangements required for abandonment by the total number of persons on board.

(4) A deck officer or certificated person shall be placed in charge of each survival craft to be used. The Director, having due regard to the nature of the voyage, the number of persons on board and the characteristics of the ship, may permit persons practised in the handling and operation of liferafts to be placed in charge of liferafts in lieu of persons qualified as above. A second-in-command shall also be nominated in the case of lifeboats.

(5) The person in charge of the survival craft shall have a list of the survival craft crew and shall see that the crew under his command are acquainted with their duties. In lifeboats, the second-in-command shall also have a list of the lifeboat crew.

(6) Every motorised survival craft shall have a person assigned who is capable of operating the engine and carrying out minor adjustments.

(7) The master shall ensure the equitable distribution of person referred to in sub-regulations (2), (3) and (4) among the ship's survival craft.

Survival craft muster and embarkation arrangements.

136. (1) Lifeboats and liferafts for which approved launching appliances are required shall be stowed as close to accommodation and service spaces as possible.

(2) Muster stations shall be provided close to the embarkation stations. Each muster station shall have sufficient clear deck space to accommodate all persons assigned to muster at that station, but at least 0.35 m^2 per person.

(3) Muster and embarkation stations shall be readily accessible from accommodation and work areas.

(4) Muster and embarkation stations shall be adequately illuminated by lighting supplied from the emergency source of electrical power required by regulation 92 or 94, as appropriate.

(5) Alleyways, stairways and exits giving access to the muster and embarkation stations shall be lighted. Such lighting shall be capable of being supplied by the emergency source of electrical power required by regulation 92 or 94, as appropriate. In addition to and as part of the markings required under paragraph *(b)*(v) of sub-regulation (2) of regulation 118, routes to muster stations shall be indicated with the muster station symbol, intended for that purpose, in accordance with the recommendations of the Organisation.*

(6) Davit-launched and free-fall launched survival craft muster and embarkation stations shall be so arranged as to enable stretcher cases to be placed in survival craft.

(7) An embarkation ladder complying with the requirements of paragraph 6.1.6 of the Code extending, in a single length, from the deck to the water-line in the lightest seagoing condition under unfavourable conditions of trim of up to 10° and a list of up to 20° either way shall be provided at each embarkation station or at every 2 adjacent embarkation stations for survival craft launched down the side of the ship. The Director may permit such ladders to be replaced by approved devices to afford access to the survival craft when waterborne, provided that there shall be at least one embarkation ladder on each side of the ship. Other means of embarkation enabling descent to the water in a controlled manner may be permitted for the liferafts required by paragraph *(d)* of sub-regulation (1) of regulation 156.

(8) Where necessary, means shall be provided for bringing the davit-launched survival craft against the ship's side and holding them alongside so that persons can be safely embarked.

Launching stations.

137. Launching stations shall be in such positions as to ensure safe launching having particular regard to clearance from the propeller and steeply overhanging portions of the hull and so that, as far as possible, survival craft, except survival craft specially designed for free-fall launching, can be launched down the straight side of the ship. If positioned forward, they shall be located abaft the collision bulkhead in a sheltered position and, in this respect, the strength of the launching appliance shall be to the satisfaction of the Director or authorised organisation.

* Refer to the Symbols related to Life-Saving Appliances and Arrangements adopted by the Organisation by resolution A.760(18), as amended by resolution MSC.82(70), and to the Guidelines for the Evaluation, Testing and Application of Low-Location Lighting on Passenger Ships, adopted by the Organisation by resolutions A.760(18) and A.752(18), respectively.

Stowage of survival craft.

138. (1) Each survival craft shall be stowed —

(a) so that neither the survival craft nor its stowage arrangements will interfere with the operation of any other survival craft or rescue boat at any other launching station;

(b) as near the water surface as is safe and practicable and, in the case of a survival craft other than a liferaft intended for throw-overboard launching, in such a position that the survival craft in the embarkation position is not less than 2 metres above the water-line with the ship in the fully loaded condition under unfavourable conditions of trim of up to 10° and listed up to 20° either way, or to the angle at which the ship's weather deck edge becomes submerged, whichever is less;

(c) in a state of continuous readiness so that 2 crew members can carry out preparations for embarkation and launching in less than 5 minutes;

(d) fully equipped as required by this Chapter and the Code; and

(e) as far as practicable, in a secure and sheltered position and protected from damage by fire and explosion. In particular, survival craft on tankers, other than the liferafts required by paragraph *(d)* of sub-regulation (1) of regulation 156, shall not be stowed on or above a cargo tank, slop tank, or other tank containing explosive or hazardous cargoes.

(2) Lifeboats for lowering down the ship's side shall be stowed as far forward of the propeller as practicable. On cargo ships of 80 metres in length and upwards but less than 120 metres in length, each lifeboat shall be so stowed that the after end of the lifeboat is not less than the length of the lifeboat forward of the propeller. On cargo ships of 120 metres in length and upwards and passenger ships of 80 metres in length and upwards, each lifeboat shall be so stowed that the after end of the lifeboat is not less than 1.5 times the length of the lifeboat forward of the propeller. Where appropriate, the ship shall be so arranged that lifeboats, in their stowed positions, are protected from damage by heavy seas.

(3) Lifeboats shall be stowed attached to launching appliances.

(4) *(a)* Every liferaft shall be stowed with its painter permanently attached to the ship.

(b) Each liferaft or group of liferafts shall be stowed with a float-free arrangement complying with the requirements of paragraph 4.1.6 of the Code so that each floats free and, if inflatable, inflates automatically when the ship sinks.

(c) Liferafts shall be stowed as to permit manual release of one raft or container at a time from their securing arrangements.

(d) Paragraphs *(a)* and *(b)* do not apply to liferafts required by paragraph *(d)* of sub-regulation (1) of regulation 156.

(5) Davit-launched liferafts shall be stowed within reach of the lifting hooks, unless some means of transfer is provided which is not rendered inoperable within the limits of trim and list prescribed in paragraph *(b)* of sub-regulation (1) or by ship motion or power failure.

(6) Liferafts intended for throw-overboard launching shall be so stowed as to be readily transferable for launching on either side of the ship unless liferafts, of the aggregate capacity required by sub-regulation (1) of regulation 156 to be capable of being launched on either side, are stowed on each side of the ship.

Stowage of rescue boats.

139. Rescue boats shall be stowed —

(a) in a state of continuous readiness for launching in not more than 5 minutes;

(b) in a position suitable for launching and recovery;

(c) so that neither the rescue boat nor its stowage arrangements will interfere with the operation of any survival craft at any other launching station; and

(d) if it is also a lifeboat, in compliance with the requirements of regulation 138.

Stowage of marine evacuation systems.

140. (1) The ship's side shall not have any openings between the embarkation station of the marine evacuation system and the water-line in the lightest seagoing condition and means shall be provided to protect the system from any projections.

(2) Marine evacuation systems shall be in such positions as to ensure safe launching having particular regard to clearance from the propeller and steeply overhanging positions of the hull and so that, as practicable, the system can be launched down the straight side of the ship.

(3) Each marine evacuation system shall be stowed so that neither the passage nor platform nor its stowage or operational arrangements will interfere

with the operation of any other life-saving appliance at any other launching station.

(4) Where appropriate, the ship shall be so arranged that the marine evacuation systems in their stowed positions are protected from damage by heavy seas.

Survival craft launching and recovery arrangements.

141. (1) Unless expressly provided otherwise, launching and embarkation appliances complying with the requirements of section 6.1 of the Code shall be provided for all survival craft except those which are —

(a) boarded from a position on deck less than 4.5 metres above the water-line in the lightest seagoing condition and which have a mass of not more than 185 kg;

(b) boarded from a position on deck less than 4.5 metres above the water-line in the lightest seagoing condition and which are stowed for launching directly from the stowed position under unfavourable conditions of trim of up to 10° and list of up to 20° either way;

(c) carried in excess of the survival craft for 200% of the total number of persons on board the ship and which have a mass of not more than 185 kg;

(d) carried in excess of the survival craft for 200% of the total number of persons on board the ship, are stowed for launching directly from the stowed position under unfavourable conditions of trim of up to 10° and list of up to 20° either way; or

(e) provided for use in conjunction with a marine evacuation system, complying with the requirements of section 6.2 of the Code and stowed for launching directly from the stowed position under unfavourable conditions of trim of up to 10° and list of up to 20° either way.

(2) Each lifeboat shall be provided with an appliance which is capable of launching and recovering the lifeboat. In addition there shall be provision for hanging-off the lifeboat to free the release gear for maintenance.

(3) Launching and recovery arrangements shall be such that the appliance operator on the ship is able to observe the survival craft at all times during launching and for lifeboats during recovery.

(4) Only one type of release mechanism shall be used for similar survival craft carried on board the ship.

(5) Preparation and handling of survival craft at any one launching station shall not interfere with the prompt preparation and handling of any other survival craft or rescue boat at any other station.

(6) Falls, where used, shall be long enough for the survival craft to reach the water with the ship in its lightest seagoing condition, under unfavourable conditions of trim of up to 10° and list of up to 20° either way.

(7) During preparation and launching, the survival craft, its launching appliance, and the area of water into which it is to be launched shall be adequately illuminated by lighting supplied from the emergency source of electrical power required by regulation 92 or 94, as appropriate.

(8) Means shall be available to prevent any discharge of water onto survival craft during abandonment.

(9) If there is a danger of the survival craft being damaged by the ship's stabiliser wings, means shall be available, powered by an emergency source of energy, to bring the stabiliser wings inboard; indicators operated by an emergency source of energy shall be available on the navigation bridge to show the position of the stabiliser wings.

(10) If partially enclosed lifeboats complying with the requirements of section 4.5 of the Code are carried, a davit span shall be provided, fitted with not less than 2 life lines of sufficient length to reach the water with the ship in its lightest seagoing condition, under unfavourable conditions of trim of up to 10° and list of up to 20° either way.

Rescue boat embarkation, launching and recovery arrangements.

142. (1) The rescue boat embarkation and launching arrangements shall be such that the rescue boat can be boarded and launched in the shortest possible time.

(2) If the rescue boat is one of the ship's survival craft, the embarkation arrangements and launching station shall comply with the requirements of regulations 136 and 137.

(3) Launching arrangements shall comply with the requirements of regulation 141. All rescue boats shall be capable of being launched, where necessary utilising painters, with the ship making headway at speeds up to 5 knots in calm water.

(4) Recovery time of the rescue boat shall be not more than 5 minutes in moderate sea conditions when loaded with its full complement of persons and equipment. If the rescue boat is also a lifeboat, this recovery time shall be

possible when loaded with its lifeboat equipment and the approved rescue boat complement of at least 6 persons.

(5) Rescue boat embarkation and recovery arrangements shall allow for safe and efficient handling of a stretcher case. Foul weather recovery strops shall be provided for safety if heavy fall blocks constitute a danger.

Line-throwing appliances.

143. A line-throwing appliance complying with the requirements of section 7.1 of the Code shall be provided.

Emergency training and drills.

144. (1) This regulation applies to all ships.

Familiarity with safety installations and practice musters.

(2) *(a)* Every crew member with assigned emergency duties shall be familiar with these duties before the voyage begins.

(b) On a ship engaged on a voyage where passengers are scheduled to be on board for more than 24 hours, musters of the passengers shall take place within 24 hours after their embarkation. Passengers shall be instructed in the use of the life jackets and the action to take in an emergency.

(c) Whenever new passengers embark, a passenger safety briefing shall be given immediately before sailing, or immediately after sailing. The briefing shall include the instructions required by sub-regulations (2) and (4) of regulation 133, and shall be made by means of an announcement, in one or more languages likely to be understood by the passengers. The announcement shall be made on the ship's public address system, or by other equivalent means likely to be heard at least by the passengers who have not yet heard it during the voyage. The briefing may be included in the muster required by paragraph *(b)* if the muster is held immediately upon departure. Information cards or posters or video programmes displayed on ships video displays may be used to supplement the briefing, but may not be used to replace the announcement.

Drills.

(3) *(a)* Drills shall, as far as practicable, be conducted as if there were an actual emergency.

(b) Every crew member shall participate in at least one abandon ship drill and one fire drill every month. The drills of the crew shall take place within 24 hours of the ship leaving a port if more than 25% of the crew have not participated in abandon ship and fire drills on board that particular ship in the previous month. When a ship enters service for the first time, after modification of a major character or when a new crew is engaged, these drills shall be held before sailing. The Director may accept other arrangements that are at least equivalent for those classes of ships for which this is impracticable.

Abandon ship drill.

(c) (i) Each abandon ship drill shall include —

(A) summoning of passengers and crew to muster stations with the alarm required by paragraph *(b)* of sub-regulation (4) of regulation 131 followed by drill announcement on the public address or other communication system and ensuring that they are made aware of the order to abandon ship;

(B) reporting to stations and preparing for the duties described in the muster list;

(C) checking that passengers and crew are suitably dressed;

(D) checking that life jackets are correctly donned;

(E) lowering of at least one lifeboat after any necessary preparation for launching;

(F) starting and operating the lifeboat engine;

(G) operation of davits used for launching liferafts;

(H) a mock search and rescue of passengers trapped in their staterooms; and

(I) instruction in the use of radio life-saving appliances.

(ii) Different lifeboats shall, as far as practicable, be lowered in compliance with the requirements of sub-paragraph (i)(F) at successive drills.

(iii) Except as provided in sub-paragraphs (iv) and (v), each lifeboat shall be launched with its assigned operating crew aboard and manoeuvred in the water at least once every 3 months during an abandon ship drill.

(iv) Lowering into the water, rather than launching of a lifeboat arranged for free-fall launching, is acceptable where free-fall launching is impracticable, provided the lifeboat is free-fall launched with its assigned operating crew aboard and manoeuvred in the water at least once every 6 months. In cases where it is impracticable, the Director may extend this period to 12 months, provided that arrangements are made for simulated launching which will take place at intervals of not more than 6 months.

(v) The Director may allow ships operating on short international voyages not to launch the lifeboats on one side if their berthing arrangements in port and their trading patterns do not permit launching of lifeboats on that side. All such lifeboats shall be lowered at least once every 3 months and launched at least annually.

(vi) As far as is reasonable and practicable, rescue boats other than lifeboats which are also rescue boats, shall be launched each month with their assigned crew aboard and manoeuvred in the water. In all cases, this requirement shall be complied with at least once every 3 months.

(vii) If lifeboat and rescue boat launching drills are carried out with the ship making headway, such drills shall, because of the dangers involved, be practised in sheltered waters only and under the supervision of an officer experienced in such drills.*

(viii) If a ship is fitted with marine evacuation systems, drills shall include exercising of the procedures required for the deployment of such a system up to the point immediately preceding actual deployment of the system. This aspect of drills should be augmented by regular instruction using the on-board training aids required by sub-regulation (4) of regulation 160. Additionally, every system party member shall, as far as practicable, be further trained by participation in a full deployment of a similar system into

* 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 Organisation by resolution A.624(15).

water, either on board a ship or ashore, at intervals of not longer than 2 years, but in no case longer than 3 years. This training can be associated with the deployments required by paragraph *(b)* of sub-regulation (8) of regulation 145.

(ix) Emergency lighting for mustering and abandonment shall be tested at each abandon ship drill.

Fire drills.

(d) (i) Fire drills should be planned in such a way that due consideration is given to regular practice in the various emergencies that may occur depending on the type of ships and the cargo.

(ii) Each fire drill shall include —

(A) reporting to stations and preparing for the duties described in the muster list required by regulation 133;

(B) starting of a fire pump, using at least the 2 required jets of water to show that the system is in proper working order;

(C) checking of fireman's outfit and other personal rescue equipment;

(D) checking of relevant communication equipment;

(E) checking the operation of watertight doors, fire doors, fire dampers and main inlets and outlets of ventilation systems in the drill area; and

(F) checking the necessary arrangements for subsequent abandoning of the ship.

(iii) The equipment used during drills shall immediately be brought back to its fully operational condition and any faults and defects discovered during the drills shall be remedied as soon as possible.

On-board training and instructions.

(4) *(a)* On-board training in the use of the ship's life-saving appliances, including survival craft equipment, and in the use of the ship's fire-extinguishing appliances shall be given as soon as possible but not later

than 2 weeks after a crew member joins the ship. If the crew member is on a regularly scheduled rotating assignment to the ship, such training shall be given not later than 2 weeks after the time of first joining the ship. Instructions in the use of the ship's fire-extinguishing appliances, life-saving appliances, and in survival at sea shall be given at the same interval as the drills. Individual instruction may cover different parts of the ship's life-saving and fire-extinguishing appliances, but all the ship's life-saving and fire-extinguishing appliances shall be covered within any period of 2 months.

(b) Every crew member shall be given instructions which shall include but not necessarily be limited to —

(i) operation and use of the ship's inflatable liferafts;

(ii) problems of hypothermia, first aid treatment for hypothermia and other appropriate first aid procedures;

(iii) special instructions necessary for use of the ship's life-saving appliances in severe weather and severe sea conditions; and

(iv) operation and use of fire-extinguishing appliances.

(c) On-board training in the use of davit-launched liferafts shall take place at intervals of not more than 4 months on every ship fitted with such appliances. Whenever practicable, this shall include the inflation and lowering of a liferaft. This liferaft may be a special liferaft intended for training purposes only, which is not part of the ship's life-saving equipment; such a special liferaft shall be conspicuously marked.

Records.

(5) The date when musters are held, details of abandon ship drills and fire drills, drills of other life-saving appliances and on-board training shall be recorded in the official log-book. If a full muster, drill or training session is not held at the appointed time, an entry shall be made in the official log-book stating the circumstances and the extent of the muster, drill or training session held.

Operational readiness, maintenance and inspections.

145. (1) This regulation applies to all ships. The requirements of sub-regulation (3) and paragraph *(b)* of sub-regulation (6) shall be complied with, as far as is practicable, on ships constructed before 1st. July, 1986.

Operational readiness.

(2) Before the ship leaves port and at all times during the voyages, all life-saving appliances shall be in working order and ready for immediate use.

Maintenance.

(3) *(a)* Instructions for on-board maintenance of life-saving appliances complying with the requirements of regulation 161 shall be provided and maintenance shall be carried out accordingly.

(b) The Director may accept, in lieu of the instructions required by paragraph *(a)*, a shipboard planned maintenance programme which includes the requirements of regulation 161.

Maintenance of falls.

(4) *(a)* Falls used in launching shall be turned end for end at intervals of not more than 30 months and be renewed when necessary due to deterioration of the falls or at intervals of not more than 5 years, whichever is the earlier.

(b) The Director may accept, in lieu of the end for ending required in paragraph *(a)*, periodic inspection of the falls and their renewal whenever necessary due to deterioration or at intervals of not more than 4 years, whichever one is earlier.

Spares and repair equipment.

(5) Spares and repair equipment shall be provided for life-saving appliances and their components which are subject to excessive wear or consumption and need to be replaced regularly.

Weekly inspection.

(6) The following tests and inspections shall be carried out weekly —

(a) all survival craft, rescue boats and launching appliances shall be visually inspected to ensure that they are ready for use;

(b) all engines in lifeboats and rescue boats shall be run for a total period of not less than 3 minutes, provided the ambient temperature is above the minimum temperature required for starting and running the engine. During this period of time, it should be demonstrated that the gear box and gear box train are engaging satisfactorily. If the special characteristics of an outboard motor fitted to a rescue boat would not allow

it to be run other than with its propeller submerged for a period of 3 minutes, it should be run for such period as prescribed in the manufacturer's handbook. In special cases, the Director may waive this requirement for ships constructed before 1st. July, 1986; and

(c) the general emergency alarm system shall be tested.

Monthly inspections.

(7) Inspection of the life-saving appliances, including lifeboat equipment, shall be carried out monthly using the checklist required by paragraph *(a)* of regulation 161 to ensure that they are complete and in good order. A report of the inspection shall be entered in the official log-book.

Servicing of inflatable liferafts, inflatable life jackets, marine evacuation systems, and inflated rescue boats.

(8) *(a)* Every inflatable liferaft, inflatable life jacket, and marine evacuation systems shall be serviced —

(i) at intervals not exceeding 12 months, provided where in any case this is impracticable, the Director may extend this period to 17 months; and

(ii) at an approved servicing station which is competent to service them, maintains proper servicing facilities and uses only properly trained personnel.*

Rotational deployment of marine evacuation systems.

(b) In addition to or in conjunction with the servicing intervals of marine evacuation systems required by paragraph *(a)*, each marine evacuation system should be deployed from the ship on a rotational basis at intervals to be agreed by the Director, provided that each system is to be deployed at least once every 6 years.

(c) New and novel inflatable liferaft arrangements approved by the Director pursuant to regulation 129 may be allowed extended service intervals on the following conditions —

(i) the new and novel liferaft arrangements has proved to maintain the same standard, as required by testing procedures, during extended service intervals;

* Refer to the recommendation on Conditions for the Approval of Servicing Stations for Inflatable Liferafts adopted by the Organisation by resolution A.761(18).

(ii) the liferaft system shall be checked on board by certified personnel according to paragraph *(a)*(i);

(iii) service at intervals not exceeding 5 years shall be carried out in accordance with the recommendations of the Organisation.*

(d) All repairs and maintenance of inflated rescue boats shall be carried out in accordance with the manufacturer's instructions. Emergency repairs may be carried out on board the ship. Permanent repairs shall be effected at an approved servicing station.

Periodic servicing of hydrostatic release units.

(9) Hydrostatic release units, other than disposable hydrostatic release units, shall be serviced —

(a) at intervals not exceeding 12 months, provided where in any case this is impracticable, the Director may extend this period to 17 months†; and

(b) at a servicing station which is competent to service them, maintains proper servicing facilities and uses only properly trained personnel.

Marking of stowage locations.

(10) Containers, brackets, racks, and other similar stowage locations for life-saving equipment shall be marked with symbols in accordance with the recommendations of the Organisation,‡ indicating the devices stowed in that location for that purpose. If more than one device is stowed in that location, the number of devices shall also be indicated.

* Refer to the recommendation on Conditions for the Approval of Servicing Stations for Inflatable Liferafts adopted by the Organisation by resolution A.761(18).

† Refer to MSC/Circ.955, Servicing of Life-Saving Appliances and Radio Communication Equipment under the Harmonised System of Survey and Certification (HSSC).

‡ Refer to the Symbols related to Life-Saving Appliances and Arrangements adopted by the Organisation by resolution A.760(18).

Periodic servicing of launching appliances and on-load release gear.

(11) *(a)* Launching appliances —

(i) shall be serviced at recommended intervals in accordance with instructions for on-board maintenance as required by regulation 161;

(ii) shall be subjected to a thorough examination at intervals not exceeding 5 years; and

(iii) shall upon completion of the examination in sub-paragraph (ii) be subjected to a dynamic test of the winch brake in accordance with paragraph 6.1.2.5.2 of the Code.

(b) Lifeboat on-load release gear shall be —

(i) serviced at recommended intervals in accordance with instructions for on-board maintenance as required by regulation 161;

(ii) subjected to a thorough examination and test during the surveys required by regulations 8 and 9 by properly trained personnel familiar with the system; and

(iii) operationally tested under a load of 1.1 times the total mass of the lifeboat when loaded with its full complement of persons and equipment whenever the release gear is overhauled. Such overhauling and test shall be carried out at least once every 5 years.*

* Refer to the recommendation on Testing of Life-Saving Appliances adopted by the Organisation by resolution A.689(17). For life-saving appliances installed on board on or after 1st. July, 1999, refer to the revised recommendation on Testing of Life-Saving Appliances adopted by the Maritime Safety Committee of the Organisation by resolution MSC.81(70).

SECTION II

PASSENGER SHIPS (ADDITIONAL REQUIREMENTS)

Survival craft and rescue boats.

Survival craft.

146. (1) *(a)* Passenger ships engaged on international voyages which are not short international voyages shall carry —

(i) partially or totally enclosed lifeboats complying with the requirements of section 4.5 or 4.6 of the Code on each side of such aggregate capacity as will accommodate not less than 50% of the total number of persons on board. The Director may permit the substitution of lifeboats by liferafts of equivalent total capacity, provided that there shall never be less than sufficient lifeboats on each side of the ship to accommodate 37.5% of the total number of persons on board. The inflatable or rigid liferafts shall comply with the requirements of section 4.2 or 4.3 of the Code and shall be served by launching appliances equally distributed on each side of the ship; and

(ii) in addition, inflatable or rigid liferafts complying with the requirements of section 4.2 or 4.3 of the Code of such aggregate capacity as will accommodate at least 25% of the total number of persons on board. These liferafts shall be served by at least one launching appliance on each side which may be those provided in compliance with the requirements of sub-paragraph (i) or equivalent approved appliances capable of being used on both sides. Stowage of these liferafts need not comply with the requirements of sub-regulation (5) of regulation 138.

(b) Passenger ships engaged on short international voyages and complying with the special standards of subdivision prescribed by sub-regulation (5) of regulation 34 shall carry —

(i) partially or totally enclosed lifeboats complying with the requirements of section 4.5 or 4.6 of the Code of such aggregate capacity as will accommodate at least 30% of the total number of persons on board. The lifeboats shall, as far as practicable, be equally distributed on each side of the ship. In addition, inflatable or rigid liferafts complying with the requirements of section 4.2 or 4.3 of the Code shall be carried

of such aggregate capacity that, together with the lifeboat capacity, the survival craft will accommodate the total number of persons on board. The liferafts shall be served by launching appliances equally distributed on each side of the ship; and

(ii) in addition, inflatable or rigid liferafts complying with the requirements of section 4.2 or 4.3 of the Code of such aggregate capacity as will accommodate at least 25% of the total number of persons on board. These liferafts shall be served by at least one launching appliance on each side which may be those provided in compliance with the requirements of sub-paragraph (i) or equivalent approved appliances capable of being used on both sides. Stowage of these liferafts need not comply with the requirements of sub-regulation (5) of regulation 138.

(c) Passenger ships engaged on short international voyages and not complying with the special standards of subdivision prescribed by sub-regulation (5) of regulation 34 shall carry survival craft complying with the requirements of paragraph *(a)*.

(d) All survival craft required to provide for abandonment by the total number of persons on board shall be capable of being launched with their full complement of persons and equipment within a period of 30 minutes from the time the abandon ship signal is given.

(e) In lieu of meeting the requirements of paragraph *(a)*, *(b)* or *(c)*, passenger ships of less than 500 tons where the total number of persons on board is less than 200, may comply with the following —

(i) they shall carry on each side of the ship, inflatable or rigid liferafts complying with the requirements of section 4.2 or 4.3 of the Code and of such aggregate capacity as will accommodate the total number of persons on board;

(ii) unless the liferafts required by sub-paragraph (i) are stowed in a position providing for 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 will accommodate 150% of the total number of persons on board;

(iii) if the rescue boat required by paragraph *(b)* of sub-regulation (2) is also a partially or totally enclosed lifeboat complying with the requirements of section 4.5 or 4.6 of the Code, it may be included in the aggregate capacity required by sub-paragraph (i), provided that the total capacity available on

either side of the ship is at least 150% of the total number of persons on board; and

(iv) in the event of any one survival craft being lost or rendered unserviceable, there shall be sufficient survival craft available for use on each side, including those which are stowed in a position providing for easy side-to-side transfer at a single open deck level, to accommodate the total number of persons on board.

(f) A marine evacuation system complying with section 6.2 of the Code may be substituted for the equivalent capacity of liferafts and launching appliances required by paragraph *(a)*(i) or *(b)*(i).

Rescue boats.

(2) *(a)* Passenger ships of 500 tons and over shall carry at least one rescue boat complying with the requirements of section 5.1 of the Code on each side of the ship.

(b) Passenger ships of less than 500 tons shall carry at least one rescue boat complying with the requirements of section 5.1 of the Code.

(c) A lifeboat may be accepted as a rescue boat provided it also complies with the requirements for a rescue boat.

Marshalling of liferafts.

(3) *(a)* The number of lifeboats and rescue boats that are carried on passenger ships shall be sufficient to ensure that in providing for abandonment by the total number of persons on board not more than 6 liferafts need be marshalled by each lifeboat or rescue boat.

(b) The number of lifeboats and rescue boats that are carried on passenger ships engaged on short international voyages and complying with the special standards of subdivision prescribed by sub-regulation (5) of regulation 34 shall be sufficient to ensure that in providing for abandonment by the total number of persons on board not more than 9 liferafts need be marshalled by each lifeboat or rescue boat.

Personal life-saving appliances.

Lifebuoys.

147. (1) *(a)* A passenger ship shall carry not less than the number of lifebuoys complying with the requirements of sub-regulation (1) of regulation 132 and section 2.1 of the Code prescribed in the following table —

Length of 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 over	30

(b) Notwithstanding paragraph *(c)* of sub-regulation (1) of regulation 132, passenger ships of under 60 metres in length shall carry not less than 6 lifebuoys provided with self-igniting lights.

Life jackets.

(2) *(a)* In addition to the life jackets required by sub-regulation (2) of regulation 132, every passenger ship shall carry life jackets for not less than 5% of the total number of persons on board. These life jackets shall be stowed in conspicuous places on deck or at muster stations.

(b) Where life jackets for passengers are stowed in staterooms which are located remotely from direct routes between public spaces and muster stations, the additional life jackets for these passengers required under paragraph *(b)* of sub-regulation (2) of regulation 132, shall be stowed either in the public spaces, the muster stations, or on direct routes between them. The life jackets shall be stowed so that their distribution and donning does not impede orderly movement to muster stations and survival craft embarkation stations.

Life jacket lights.

(3) *(a)* On all passenger ships, each life jacket shall be fitted with a light complying with the requirements of paragraph 2.2.3 of the Code.

(b) Lights fitted on life jackets on board passenger ships prior to 1st. July, 1998 and not complying fully with paragraph 2.2.3 of the Code may be accepted by the Director until the life jacket light would normally be replaced or until the first periodical survey after 1st. July, 2002, whichever is the earliest.

Immersion suits and thermal protective aids.

(4) *(a)* All passenger ships shall carry for each lifeboat on the ship at least 3 immersion suits complying with the requirements of section 2.3 of the Code and, in addition, a thermal protective aid complying with the requirements of section 2.5 of the Code for every person to be accommodated in the lifeboat and not provided with an immersion suit. These immersion suits and thermal protective aids need not be carried —

(i) for persons to be accommodated in totally or partially enclosed lifeboats; or

(ii) if the ship is constantly engaged on voyages in warm climates where, in the opinion of the Director, they are unnecessary.

(b) Paragraph *(a)*(i) also apply to partially or totally enclosed lifeboats not complying with the requirements of section 4.5 or 4.6 of the Code, provided they are carried on ships constructed before 1st. July, 1986.

Survival craft and rescue boat embarkation arrangements.

148. (1) On passenger ships, survival craft embarkation arrangements shall be designed for —

(a) all lifeboats to be boarded and launched either directly from the stowed position or from an embarkation deck but not both; and

(b) davit-launched liferafts to be boarded and launched from a position immediately adjacent to the stowed position or from a position to which, in compliance with the requirements of sub-regulation (5) of regulation 138, the liferaft is transferred prior to 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 assigned to crew the rescue boat on board. Notwithstanding the requirements of paragraph *(a)* of sub-regulation (1), if the rescue boat is also a lifeboat and the other lifeboats are boarded and launched from an embarkation deck, the arrangements shall be such that the rescue boat can also be boarded and launched from the embarkation deck.

Stowage of survival craft.

149. The stowage height of a survival craft on a passenger ship shall take into account the requirements of paragraph *(b)* of sub-regulation (1) of regulation 138, the escape provisions of regulation 118, the size of the ship, and the weather conditions likely to be encountered in its intended area of operation. For a davit-launched survival craft, the height of the davit head with the survival craft in embarkation position shall, as far as practicable, not exceed 15 metres to the water-line when the ship is in its lightest seagoing condition.

Muster stations.

150. Every passenger ship shall, in addition to complying with the requirements of regulation 136, have passenger muster stations which shall —

(a) be in the vicinity of, and permit ready access for the passengers to, the embarkation stations unless in the same locations; and

(b) have ample room for marshalling and instruction of the passengers, but at least $0.35m^2$ per passenger.

Additional requirements for ro-ro passenger ships.

151. (1) This regulation applies to all ro-ro passenger ships. Ro-ro passenger ships constructed —

(a) on or after 1st. July, 1998 shall comply with the requirements of paragraphs *(c)* and *(d)* of sub-regulation (2), paragraphs *(a)*, *(b)* and *(c)* of sub-regulation (3), sub-regulations (4) and (5);

(b) on or after 1st. July, 1986 and before 1st. July, 1998 shall comply with the requirements of sub-regulation (5) not later than the first periodical survey after 1st. July, 1998 and with the requirements of paragraphs *(c)* and *(d)* of sub-regulation (2), sub-regulations (3) and (4) not later than the first periodical survey after 1st. July, 2000; and

(c) before 1st. July, 1986 shall comply with the requirements of sub-regulation (5) not later than the first periodical survey after 1st. July, 1998 and with the requirements of sub-regulations (2), (3) and (4) not later than the first periodical survey after 1st. July, 2000.

Liferafts.

(2) *(a)* The ro-ro passenger ship's liferafts shall be served by marine evacuation systems complying with the requirements of section 6.2 of the Code or launching appliances complying with the requirements of paragraph 6.1.5 of the Code, equally distributed on each side of the ship.

(b) Every liferaft on ro-ro passenger ships shall be provided with float-free stowage arrangements complying with the requirements of sub-regulation (4) of regulation 138.

(c) Every liferaft on ro-ro passenger ships shall be of a type fitted with a boarding ramp complying with the requirements of paragraph 4.2, 4.1 or 4.3.4.1 of the Code, as appropriate.

(d) Every liferaft on ro-ro passenger ships shall either be automatically self-righting or be a canopied reversible liferaft which is stable in a seaway and is capable of operating safely whichever way up it is floating. Alternatively, the ship shall carry automatically self-righting liferafts or canopied reversible liferafts, in addition to its normal complement of liferafts, of such aggregate capacity as will accommodate at least 50% of the persons not accommodated in lifeboats. This additional liferaft capacity 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 Director, having regard to the recommendations adopted by the Organisation.*

Fast rescue boats.

(3) *(a)* At least one of the rescue boats on a ro-ro passenger ship shall be a fast rescue boat approved by the Director, having regard to the recommendations adopted by the Organisation.†

* Refer to MSC/Circ.809, Recommendation for canopied reversible liferafts, automatically self-righting liferafts and fast rescue boats, including testing, on ro-ro passenger ships.

† Refer to MSC/Circ.809, Recommendation for canopied reversible liferafts, automatically self-righting liferafts and fast rescue boats, including testing, on ro-ro passenger ships.

(b) Each fast rescue boat shall be served by a suitable launching appliance approved by the Director. When approving such launching appliances, the Director shall take into account that the fast rescue boat is intended to be launched and retrieved even under severe adverse weather conditions, and also shall have regard to the recommendations adopted by the Organisation.*

(c) At least 2 crews of each fast rescue boat shall be trained and drilled regularly having regard to the Seafarers' Training, Certification and Watchkeeping (STCW) Code and recommendations adopted by the Organisation,† including all aspects of rescue, handling, manoeuvring, operating these craft in various conditions, and righting them after capsize.

(d) In the case where the arrangement or size of a ro-ro passenger ship, constructed before 1st. July, 1997, is such as to prevent the installation of the fast rescue boat required by paragraph *(a)*, the fast rescue boat may be installed in place of an existing lifeboat which is accepted as a rescue boat or, in the case of ships constructed prior to 1st. July, 1986, boats for use in an emergency, provided that all of the following conditions are met —

(i) the fast rescue boat installed is served by a launching appliance complying with paragraph *(b)*;

(ii) the capacity of the survival craft lost by the above substitution is compensated by the installation of liferafts capable of carrying at least an equal number of persons served by the lifeboat replaced; and

(iii) such liferafts are served by the existing launching appliances or marine evacuation systems.

Means of rescue.*

(4) *(a)* Each ro-ro passenger ship shall be equipped with efficient means for rapidly recovering survivors from the water and transferring survivors from rescue units or survival craft to the ship.

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* Refer to MSC/Circ.809, Recommendation for canopied reversible liferafts, automatically self-righting liferafts and fast rescue boats, including tasting, on ro-ro passenger ships.

† Refer to the Recommendation on training requirements for crews of fast rescue boats adopted by the Organisation by resolution A.771(18) and to section A-VI/2, table A-VI/2-2 "Specification of the Minimum Standard of Competence in Fast Rescue Boats" of the STCW Code.

* Refer to MSC/Circ.810, Recommendation on means of rescue on ro-ro passenger ships.

(b) The means of transfer of survivors to the ship may be part of a marine evacuation system, or may be part of a system designed for rescue purposes.

(c) If the slide of a marine evacuation system is intended to provide the means of transfer of survivors to the deck of the ship, the slide shall be equipped with handlines or ladders to aid in climbing up the slide.

Life jackets.

(5) *(a)* Notwithstanding the requirements of sub-regulation (2) of regulation 132 and sub-regulation (2) of regulation 147, a sufficient number of life jackets shall be stowed in the vicinity of the muster stations so that passengers do not have to return to their cabins to collect their life jackets.

(b) In ro-ro passenger ships, each life jacket shall be fitted with a light complying with the requirements of paragraph 2.2.3 of the Code.

Information on passengers.

152. (1) All persons on board all passenger ships shall be counted prior to departure.

(2) Details of persons who have declared a need for special care or assistance in emergency situations shall be recorded and communicated to the master prior to departure.

(3) In addition, not later than 1st. January, 1999, the names and gender of all persons on board, distinguishing between adults, children and infants, shall be recorded for search and rescue purposes.

(4) The information required by sub-regulations (1), (2) and (3) shall be kept ashore and made readily available to search and rescue services when needed.

(5) The Director may exempt passenger ships from the requirements of sub-regulation (3), if the scheduled voyages of such ships render it impracticable for them to prepare such records.

Helicopter landing and pick-up areas.

153. (1) All ro-ro passenger ships shall be provided with a helicopter pick-up area approved by the Director, having regard to the recommendations adopted by the Organisation.*

(2) Ro-ro† passenger ships of 130 metres in length and upwards, constructed on or after 1st. July, 1999, shall be fitted with a helicopter landing area approved by the Director, having regard to the recommendations adopted by the Organisation.‡

Decision support system for masters of passenger ships.

154. (1) This regulation applies to all passenger ships. Passenger ships constructed before 1st. July, 1997 shall comply with the requirements of this regulation not later than the date of the first periodical survey after 1st. July, 1999.

(2) In all passenger ships, a decision support system for emergency management shall be provided on the navigation bridge.

(3) The system shall, as a minimum, consist of a printed emergency plan or plans.* All foreseeable emergency situations shall be identified in the emergency plan or plans, including, but not limited to, the following main groups of emergencies —

(a) fire;

(b) damage to ship;

(c) pollution;

(d) unlawful acts threatening the safety of the ship and the security of its passengers and crew;

(e) personnel accidents;

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* Refer to the International Aeronautical and Maritime Search and Rescue Manual (IAMSAR).

† Refer to MSC/Circ.907, Application of SOLAS regulation III/28.2 concerning helicopter landing areas on non-ro-ro passenger ships and to resolution MSC.91(72), which is expected to enter into force on 1st. January, 2002.

‡ Refer to MSC/Circ.895, Recommendation on helicopter landing areas on ro-ro passenger ships.

* Refer to the Guidelines for a structure of an Integrated System of Contingency Planning for Shipboard Emergencies adoped by the Organisation by resolution A.852(20).

(f) cargo-related accidents; and

(g) emergency assistance to other ships.

(4) The emergency procedures established in the emergency plan or plans shall provide decision support to masters for handling any combination of emergency situations.

(5) The emergency plan or plans shall have a uniform structure and be easy to use. Where applicable, the actual loading conditions as calculated for the passenger ship's voyage stability shall be used for damage control purposes.

(6) In addition to the printed emergency plan or plans, the Director may also accept the use of a computer-based decision support system on the navigation bridge which provides all the information contained in the emergency plan or plans, procedures, checklists etc. which is able to present a list of recommended actions to be carried out in foreseeable emergencies.

Drills.

155. (1) This regulation applies to all passenger ships.

(2) On passenger ships, an abandon ship drill and fire drill shall take place weekly. The entire crew need not be involved in every drill, but each crew member must participate in an abandon ship drill and a fire drill each month as required in paragraph *(b)* of sub-regulation (3) of regulation 144. Passengers shall be strongly encouraged to attend these drills.

SECTION III

CARGO SHIPS (ADDITIONAL REQUIREMENTS)

Survival craft and rescue boats.

Survival craft.

156. (1) *(a)* Cargo ships shall carry —

(i) one or more totally enclosed lifeboats complying with the requirements of section 4.6 of the Code of such aggregate capacity on each side of the ship as will accommodate the total number of persons on board; and

(ii) in addition, one or more inflatable or rigid liferafts, complying with the requirements of section 4.2 or 4.3 of the

Code, stowed in a position providing for easy side-to-side transfer at a single open deck level, and of such aggregate capacity as will accommodate the total number of persons on board. If the liferaft or liferafts are not stowed in a position providing for easy side-to-side transfer at a single open deck level, the total capacity available on each side shall be sufficient to accommodate the total number of persons on board.

(b) In lieu of meeting the requirements of paragraph *(a)*, cargo ships may carry —

(i) one or more free-fall lifeboats, complying with the requirements of section 4.7 of the Code, capable of being free-fall launched over the stern of the ship of such aggregate capacity as will accommodate the total number of persons on board; and

(ii) in addition, one or more inflatable or rigid liferafts complying with the requirements of section 4.2 or 4.3 of the Code, on each side of the ship, of such aggregate capacity as will accommodate the total number of persons on board. The liferafts on at least one side of the ship shall be served by launching appliances.

(c) In lieu of meeting the requirements of paragraph *(a)* or *(b)*, cargo ships of less than 85 metres in length other than oil tankers, chemical tankers and gas carriers may comply with the following —

(i) they shall carry on each side of the ship, one or more inflatable or rigid liferafts complying with the requirements of section 4.2 or 4.3 of the Code and of such aggregate capacity as will accommodate the total number of persons on board;

(ii) unless the liferafts required by sub-paragraph (i) are stowed in a position providing for 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 will accommodate 150% of the total number of persons on board;

(iii) if the rescue boat required by sub-regulation (2) is also a totally enclosed lifeboat complying with the requirements of section 4.6 of the Code, it may be included in the aggregate capacity required by sub-paragraph (i), provided that the total capacity available on either side of the ship is at least 150% of the total number of persons on board; and

(iv) in the event of any one survival craft being lost or rendered unserviceable, there shall be sufficient survival craft available for use on each side, including any which are stowed in a position providing for easy side-to-side transfer at a single open deck level, to accommodate the total number of persons on board.

(d) Cargo ships where the horizontal distance from the extreme end of the stem or stern of the ship to the nearest end of the closest survival craft is more than 100 metres shall carry, in addition to the liferafts required by paragraphs *(a)*(ii) and *(b)*(ii), a liferaft stowed as far forward or aft, or one as far forward and another as far aft, as is reasonable and practicable. Such liferaft or liferafts may be securely fastened so as to permit manual release and need not be of the type which can be launched from an approved launching device.

(e) With the exception of the survival craft referred to in paragraph *(a)* of sub-regulation (1) of regulation 141, all survival craft required to provide for abandonment by the total number of persons on board shall be capable of being launched with their full complement of persons and equipment within a period of 10 minutes from the time the abandon ship signal is given.

(f) Chemical tankers and gas carriers carrying cargoes emitting toxic vapours or gases* shall carry, in lieu of totally enclosed lifeboats complying with the requirements of section 4.6 of the Code, lifeboats with a self-contained air support system complying with the requirements of section 4.8 of the Code.

(g) Oil tankers, chemical tankers and gas carriers carrying cargoes having a flashpoint not exceeding 60°C (closed cup test) shall carry, in lieu of totally enclosed lifeboats complying with the requirements of section 4.6 of the Code, fire-protected lifeboats complying with the requirements of section 4.9 of the Code.

Rescue boats.

(2) Cargo ships shall carry at least one rescue boat complying with the requirements of section 5.1 of the Code. A lifeboat may be accepted as a rescue boat, provided that it also complies with the requirements for a rescue boat.

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* Refer to products for which emergency escape respiratory protection is required 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 by resolution MSC.4(48), as amended, and in Chapter 19 of the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (ICC Code), adopted by the Maritime Safety Committee by resolution MSC.5(48), as amended.

(3) In addition to their lifeboats, all cargo ships constructed before 1st. July, 1986 shall carry —

(a) one or more liferafts capable of being launched on either side of the ship and of such aggregate capacity as will accommodate the total number of persons on board. The liferaft or liferafts shall be equipped with a lashing or an equivalent means of securing the liferaft which will automatically release it from a sinking ship; and

(b) where the horizontal distance from the extreme end of the stem or stern of the ship to the nearest end of the closest survival craft is more than 100 metres, in addition to the liferafts required by paragraph *(a)*, a liferaft stowed as far forward or aft, or one as far forward and another as far aft, as is reasonable and practicable. Notwithstanding the requirements of paragraph *(a)*, such liferaft or liferafts may be securely fastened so as to permit manual release.

Personal life-saving appliances.

Lifebuoys.

157. (1) *(a)* Cargo ships shall carry not less than the number of lifebuoys complying with the requirements of sub-regulation (1) of regulation 132 and section 2.1 of the Code prescribed in the following table —

Length of ship in metres	Minimum number of lifebuoys
Under 100	8
100 and under 150	10
150 and under 200	12
200 and over	14

(b) Self-igniting lights for lifebuoys on tankers required by paragraph *(c)* of sub-regulation (1) of regulation 132 shall be of an electric battery type.

Life jacket lights.

(2) *(a)* This sub-regulation applies to all cargo ships.

(b) On cargo ships, each life jacket shall be fitted with a life jacket light complying with the requirements of paragraph 2.2.3 of the Code.

(c) Lights fitted on life jackets on board cargo ships prior to 1st. July, 1998 and not complying fully with paragraph 2.2.3 of the Code may be accepted by the Director until the life jacket light would normally be replaced or until the first periodical survey after 1st. July, 2001, whichever is the earliest.

Immersion suits and thermal protective aids.

(3) *(a)* This sub-regulation applies to all cargo ships.

(b) Cargo ships shall carry for each lifeboat on the ship at least 3 immersion suits complying with the requirements of section 2.3 of the Code or, if the Director considers it necessary and practicable, one immersion suit complying with the requirements of section 2.3 of the Code for every person on board the ship. The ship shall carry, in addition to the thermal protective aids required by paragraphs 4.1.5.1.24, 4.4.8.31 and 5.1.2.2.13 of the Code, thermal protective aids complying with the requirements of section 2.5 of the Code for persons on board not provided with immersion suits. These immersion suits and thermal protective aids need not be required if the ship —

(i) has totally enclosed lifeboats on each side of the ship of such aggregate capacity as will accommodate the total number of persons on board; or

(ii) has totally enclosed lifeboats capable of being launched by free-fall over the stern of the ship of such aggregate capacity as will accommodate the total number of persons on board and which are boarded and launched directly from the stowed position, together with liferafts on each side of the ship of such aggregate capacity as will accommodate the total number of persons on board; or

(iii) is constantly engaged on voyages in warm climates where, in the opinion of the Director, immersion suits are unnecessary.

(c) Cargo ships complying with the requirements of paragraph *(c)* of sub-regulation (1) of regulation 156 shall carry immersion suits complying with the requirements of section 2.3 of the Code for every person on board unless the ship —

(i) has davit-launched liferafts;

(ii) has liferafts served by equivalent approved appliances capable of being used on both sides of the ship and which do not require entry into the water to board the liferaft; or

(iii) is constantly engaged on voyages in warm climates where, in the opinion of the Director, immersion suits are unnecessary.

(d) The immersion suits required by this regulation may be used to comply with the requirements of sub-regulation (3) of regulation 132.

(e) The totally enclosed lifeboats referred to in sub-paragraphs (i) and (ii) of paragraph *(b)* carried on cargo ships constructed before 1st. July, 1986 need not comply with the requirements of section 4.6 of the Code.

Survival craft embarkation and launching arrangements.

158. (1) Cargo ship survival craft embarkation arrangements 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 is transferred prior to launching in compliance with the requirements of sub-regulation (5) of regulation 138.

(2) On cargo ships of 20,000 tons and upwards, lifeboats shall be capable of being launched, where necessary utilising painters, with the ship making headway at speeds up to 5 knots in calm water.

SECTION IV

LIFE-SAVING APPLIANCES AND ARRANGEMENTS REQUIREMENTS

Compliance with LSA Code.

159. All life-saving appliances and arrangements shall comply with the applicable requirements of the Code.

SECTION V

MISCELLANEOUS

Training manual and on-board training aids.

160. (1) This regulation applies to all ships.

(2) A training manual complying with the requirements of sub-regulation (3) shall be provided in each crew mess room and recreation room or in each crew cabin.

(3) The training manual, which may comprise several volumes, shall contain instructions and information, in easily understood terms illustrated wherever possible, on the life-saving appliances provided in the ship and on the best methods of survival. Any part of such information may be provided in the form of audio-visual aids in lieu of the manual. The following shall be explained in detail —

(a) donning of life jackets, immersion suits and anti-exposure suits, as appropriate;

(b) muster at the designated stations;

(c) hoarding, launching and clearing the survival craft and rescue boats, including, where applicable, use of marine evacuation systems;

(d) method of launching from within the survival craft;

(e) release from launching appliances;

(f) methods and use of devices for protection in launching areas, where appropriate;

(g) illumination in launching areas;

(h) use of all survival equipment;

(i) use of all detection equipment;

(j) with the assistance of illustrations, the use of radio life-saving appliances;

(k) use of drogues;

(l) use of engine and accessories;

(m) recovery of survival craft and rescue boats, including stowage and securing;

(n) hazards of exposure and the need for warm clothing;

(o) best use of the survival craft facilities in order to survive;

(p) methods of retrieval, including the use of helicopter rescue gear (slings, baskets, stretchers), breeches-buoy and shore life-saving apparatus and ship's line-throwing apparatus;

(q) all other functions contained in the muster list and emergency instructions; and

(r) instructions for emergency repair of the life-saving appliances.

(4) Every ship fitted with a marine evacuation system shall be provided with on-board training aids in the use of the system.

Instructions for on-board maintenance.

161. Instructions for on-board maintenance of life-saving appliances shall be easily understood, illustrated whenever possible, and, as appropriate, shall include the following for each appliance —

(a) a checklist for use when carrying out the inspections required by sub-regulation (7) of regulation 145;

(b) maintenance and repair instructions;

(c) schedule of periodic maintenance;

(d) diagram of lubrication points with the recommended lubricants;

(e) list of replaceable parts;

(f) list of sources of spare parts; and

(g) log for records of inspections and maintenance.

Muster list and emergency instructions.

162. (1) The muster list shall specify details of the general emergency alarm and public address system prescribed by section 7.2 of the Code and also action to be taken by crew and passengers when this alarm is sounded. The muster list shall also specify how the order to abandon ship will be given.

(2) Each passenger ship shall have procedures in place for locating and rescuing passengers trapped in their staterooms.

(3) The muster list shall show the duties assigned to the different members of the crew including —

(a) closing of the watertight doors, fire doors, valves, scuppers, sidescuttles, skylights, portholes and other similar openings in the ship;

(b) equipping of the survival craft and other life-saving appliances;

(c) preparation and launching of survival craft;

(d) general preparations of other life-saving appliances;

(e) muster of passengers;

(f) use of communication equipment;

(g) manning of fire parties assigned to deal with fire; and

(h) special duties assigned with respect to the use of fire-fighting equipment and installations.

(4) The muster list shall specify which officers are assigned to ensure that life-saving and fire appliances are maintained in good condition and are ready for immediate use.

(5) The muster list shall specify substitutes for key persons who may become disabled, taking into account that different emergencies may call for different actions.

(6) The muster list shall show the duties assigned to members of the crew in relation to passengers in case of emergency. These duties shall include —

(a) warning the passengers;

(b) seeing that they are suitably clad and have donned their life jackets correctly;

(c) assembling passengers at muster stations;

(d) keeping order in the passageways and on the stairways and generally controlling the movements of the passengers; and

(e) ensuring that a supply of blankets is taken to the survival craft.

(7) The muster list shall be prepared before the ship proceeds to sea. After the muster list has been prepared, if any change takes place in the crew which necessitates an alteration in the muster list, the master shall either revise the list or prepare a new list.

(8) The format of the muster list used on passenger ships shall be approved.

CHAPTER IV

RADIO COMMUNICATIONS

PART A

GENERAL

Application.

163. (1) Unless expressly provided otherwise, this Chapter applies to all ships to which these Regulations apply and to cargo ships of 300 tons and upwards.

(2) This Chapter does not apply to ships to which these Regulations would otherwise apply while such ships are being navigated within the Great Lakes of North America and their connecting and tributary waters as far east as the lower exit of the St. Lambert Lock at Montreal in the Province of Quebec, Canada.*

(3) For the purpose of this Chapter —

"ships constructed" means ships the keels of which are laid or which are at a similar stage of construction;

"similar stage of construction" means the stage at which —

(a) construction identifiable with a specific ship begins; and

(b) assembly of that ship has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less.

(4) Every ship shall comply with paragraphs *(d)* and *(f)* of sub-regulation (1) of regulation 170 not later than 1st. August, 1993.

(5) Subject to sub-regulations (4) and (6), every ship constructed before 1st. February, 1995 —

(a) during the period between 1st. February, 1992 and 1st. February, 1999 —

(i) either complies with all applicable requirements of this Chapter; or

* Such ships are subject to special requirements relative to radio for safety purposes, as contained in the relevant agreement between Canada and the United States of America.

(ii) complies with all applicable requirements of Chapter IV of the International Convention for the Safety of Life at Sea, 1974, in force prior to 1st. February, 1992. Passenger ships irrespective of size shall not be granted any exemption from the requirements of regulation 3 of Chapter IV of that Convention; and

(b) after 1st. February, 1999, complies with all the applicable requirements of this Chapter.

(6) Every ship constructed on or after 1st. February, 1995 shall comply with all applicable requirements of this Chapter.

(7) Passenger ships constructed before 1st. July, 1997 shall, as appropriate, comply with the requirements of sub-regulations (4), (5), (6) of regulation 169 and sub-regulation (5) of regulation 170 not later than the date of the first periodical survey after 1st. July, 1997.

(8) No provision in this Chapter shall prevent the use by any ship, survival craft or person in distress, of any means at their disposal to attract attention, make known their position and obtain help.

Interpretation.

164. (1) For the purposes of this Chapter, the following terms shall have the meanings defined below —

"bridge-to-bridge communications" means safety communications between ships from the position from which the ships are normally navigated;

"continuous watch" means that the radio watch concerned shall not be interrupted other than for brief intervals when the ship's receiving capability is impaired or blocked by its own communications or when the facilities are under periodical maintenance or checks;

"Digital Selective Calling (DSC)" means a technique using digital codes which enables a radio station to establish contact with, and transfer information to, another station or group of stations, and complying with the relevant recommendations of the International Radio Consultative Committee (CCIR)*;

* The name of the Committee was changed to "ITU Radiocommunication Sector" (ITU-R) due to Article 1 of the International Telecommunication Constitution, Geneva, 1992.

"direct-printing telegraphy" means automated telegraphy techniques which comply with the relevant recommendations of the CCIR†;

"general radio communications" means operational and public correspondence traffic, other than distress, urgency and safety messages, conducted by radio;

"Global Maritime Distress and Safety System (GMDSS) identities" means maritime mobile services identity, the ship's call sign, INMARSAT identities and serial number identity which may be transmitted by the ship's equipment and used to identify the ship;

"INMARSAT*" means the Organisation established by the Convention on the International Maritime Satellite Organisation (INMARSAT) adopted on 3rd. September, 1976;

"international NAVTEX service" means the co-ordinated broadcast and automatic reception on 518 kHz of maritime safety information by means of narrow-band direct-printing telegraphy using the English language† ;

"locating" means the finding of ships, aircraft, units or persons in distress;

"maritime safety information" means navigational and meteorological warnings, meteorological forecasts and other urgent safety related messages broadcast to ships;

"polar orbiting satellite service" means a service which is based on polar orbiting satellites which receive and relay distress alerts from satellite EPIRBs and which provides their position;

"Radio Regulations" means the Radio Regulations annexed to, or regarded as being annexed to, the most recent International Telecommunication Convention which is in force at any time;

† The name of the Committee was changed to "ITU Radiocommunication Sector" (ITU-R) due to Article 1 of the International Telecommunication Constitution, Geneva, 1992.

* The name of the Organisation was changed to "International Mobile Satellite Organisation" (Inmarsat) by virtue of amendments to its Convention and Operating Agreement adopted by the 10th. (extraordinary) Assembly (5-9 December, 1994).

† Refer to the NAVTEX Manual approved by the Organisation (publication IMO-951E).

"sea area A1" means an area within the radiotelephone coverage of at least one VHF coast station in which continuous DSC alerting is available, as may be defined by a Contracting State*;

"sea area A2" means an area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is available, as may be defined by a Contracting State†;

"sea area A3" means an area, excluding sea areas A1 and A2, within the coverage of an INMARSAT geostationary satellite in which continuous alerting is available;

"sea area A4" means an area outside sea areas A1, A2 and A3.

(2) All other terms and abbreviations which are used in this Chapter and which are defined in the Radio Regulations and in the International Convention on Maritime Search and Rescue (SAR), 1979, as may be amended, shall have the meanings as defined in those Regulations and the SAR Convention.

Exemptions.

165. (1) The Director may grant partial or conditional exemptions to individual ships from the requirements of regulations 170, 171, 172, 173 and 174, provided such ships comply with the functional requirements of regulation 166.

(2) An exemption may be granted under sub-regulation (1) only —

(a) if the conditions affecting safety are such as to render the full application of regulations 170, 171, 172, 173 and 174 unreasonable or unnecessary;

(b) in exceptional circumstances, for a single voyage outside the sea area or sea areas for which the ship is equipped; or

(c) prior to 1st. February, 1999, when the ship will be taken permanently out of service within 2 years of a date prescribed by regulation 163 for the application of a requirement of this Chapter.

* Refer to resolution A.801(19) concerning Provision of Radio Services for the Global Maritime Distress and Safety System (GMDSS).

† Refer to resolution A.801(19) concerning Provision of Radio Services for the Global Maritime Distress and Safety System (GMDSS).

Functional requirements.*

166. Every ship, while at sea, shall be capable —

(a) except as provided in paragraph *(a)* of sub-regulation (1) of regulation 171 and paragraph *(d)*(iii) of sub-regulation (1) of regulation 173, of transmitting ship-to-shore distress alerts by at least 2 separate and independent means, each using a different radio communication service;

(b) of receiving shore-to-ship distress alerts;

(c) of transmitting and receiving ship-to-ship distress alerts;

(d) of transmitting and receiving search and rescue co-ordinating communications;

(e) of transmitting and receiving on-scene communications;

(f) of transmitting and, as required by sub-regulations (7) and (8) of regulation 193, receiving signals for locating†;

(g) of transmitting and receiving‡ maritime safety information;

(h) of transmitting and receiving general radio communications to and from shore-based radio systems or networks subject to sub-regulation (8) of regulation 178; and

(i) of transmitting and receiving bridge-to-bridge communications.

PART B

RESPONSIBILITY OF MASTER

Voyages to be kept within appropriate sea areas.

167. The master shall ensure that the ship keeps its courses on a voyage within the sea areas for which the radio equipment under this Chapter are provided, except in the event of an emergency or unless expressly permitted by the Director to go beyond the appropriate sea areas.

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* It should be noted that ships performing GMDSS functions should use the Guidance for avoidance of false distress alerts adopted by the Organisation by resolution A.814(19).

† Refer to resolution A.614(15) concerning Carriage of Radar Operating in the Frequency Band 9,300-9,500 MHz.

‡ It should be noted that ships may have a need for reception of certain maritime safety information while in port.

Global Maritime Distress and Safety System identities.

168. (1) This regulation applies to all ships on all voyages.

(2) Each Contracting State undertakes to ensure that suitable arrangements are made for registering Global Maritime Distress and Safety System (GMDSS) identities and for making information on these identities available to rescue co-ordination centres on a 24-hour basis. Where appropriate, international organisations maintaining a registry of these identities shall be notified by the Contracting State of these assignments.

PART C

SHIP REQUIREMENTS

Radio installations.

169. (1) Every ship shall be provided with radio installations capable of complying with the functional requirements prescribed by regulation 166 throughout its intended voyage and, unless exempted under regulation 165, complying with the requirements of regulation 170 and, as appropriate for the sea area or areas through which it will pass during its intended voyage, the requirements of either regulation 171, 172, 173 or 174.

(2) Every radio installation shall —

(a) be so located that no harmful interference of mechanical, electrical or other origin affects its proper use, and so as to ensure electromagnetic compatibility and avoidance of harmful interaction with other equipment and systems;

(b) be so located as to ensure the greatest possible degree of safety and operational availability;

(c) be protected against harmful effects of water, extremes of temperature and other adverse environmental conditions;

(d) be provided with reliable, permanently arranged electrical lighting, independent of the main and emergency sources of electrical power, for the adequate illumination of the radio controls for operating the radio installation; and

(e) be clearly marked with the call sign, the ship station identity and other codes as applicable for the use of the radio installation.

(3) Control of the VHF radiotelephone channels, required for navigational safety, shall be immediately available on the navigation bridge convenient to the conning position and, where necessary, facilities should be available to permit radio communications from the wings of the navigation bridge. Portable VHF equipment may be used to meet the latter provision.

(4) In passenger ships, a distress panel shall be installed at the conning position. This panel shall contain either one single button which, when pressed, initiates a distress alert using all radio communication installations required on board for that purpose or one button for each individual installation. The panel shall clearly and visually indicate whenever any button has been pressed. Means shall be provided to prevent inadvertent activation of the button. If the satellite EPIRB is used as the secondary means of distress alerting and is not remotely activated, it shall be acceptable to have an additional EPIRB installed in the wheelhouse near the conning position.

(5) In passenger ships, information on the ship's position shall be continuously and automatically provided to all relevant radio communication equipment to be included in the initial distress alert when the button on the distress panel is pressed.

(6) In passenger ships, a distress alarm panel shall be installed at the conning position. The distress alarm panel shall provide visual and aural indication of any distress alert received on board and shall also indicate through which radio communication service the distress alert has been received.

Radio equipment — general.

170. (1) Every ship shall be provided with —

(a) a VHF radio installation capable of transmitting and receiving —

(i) DSC on the frequency 156.525 MHz (channel 70). It shall be possible to initiate the transmission of distress alerts on channel 70 from the position from which the ship is normally navigated*; and

(ii) radiotelephony on the frequencies 156.300 MHz (channel 6), 156.650 MHz (channel 13) and 156.800 MHz (channel 16);

(b) a radio installation capable of maintaining a continuous DSC watch on VHF channel 70 which may be separate from, or combined with, that required by paragraph *(a)*(i)*;

* Certain ships may be exempted from this requirement (see regulation 172(4)).

* Certain ships may be exempted from this requirement (see regulation 172(4)).

(c) a radar transponder capable of operating in the 9 GHz band which —

(i) shall be so stowed that it can be easily utilised; and

(ii) may be one of those required by paragraph *(b)* of sub-regulation (2) of regulation 131 for a survival craft;

(d) a receiver capable of receiving international NAVTEX service broadcasts if the ship is engaged on voyages in any area in which an international NAVTEX service is provided;

(e) a radio facility for reception of maritime safety information by the INMARSAT enhanced group calling system† if the ship is engaged on voyages in any area of INMARSAT coverage but in which an international NAVTEX service is not provided. Ships engaged exclusively on voyages in areas where an HF direct-printing telegraphy maritime safety information service is provided and fitted with equipment capable of receiving such service, may be exempted from this requirement‡;

(f) subject to sub-regulation (3) of regulation 171, a satellite emergency position-indicating radio beacon (satellite EPIRB)§ which shall be —

(i) capable of transmitting a distress alert either through the polar orbiting satellite service operating in the 406 MHz band or, if the ship is engaged only on voyages within INMARSAT coverage, through the INMARSAT geostationary satellite service operating in the 1.6 GHz band*;

(ii) installed in an easily accessible position;

(iii) ready to be manually released and capable of being carried by one person into a survival craft;

(iv) capable of floating free if the ship sinks and of being automatically activated when afloat; and

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† Refer to resolution A.701(17) concerning carriage on INMARSAT enhanced group call SafetyNET receivers under the GMDSS.

‡ Refer to the recommendation on promulgation of maritime safety information adopted by the Organisation by resolution A.705(17).

§ Refer to resolution A.616(15) concerning search and rescue homing capability.

* Subject to the availability of appropriate receiving and processing ground facilities for each ocean region covered by Inmarsat satellites.

(v) capable of being activated manually.

(2) Until 1st. February, 1999 or until such other date as may be determined by the Organisation, every ship shall, in addition, be fitted with a radio installation consisting of a radiotelephone distress frequency watch receiver capable of operating on 2,182 kHz.†

(3) Until 1st. February, 1999, every ship shall, unless the ship is engaged on voyages in sea area A1 only, be fitted with a device for generating the radiotelephone alarm signal on the frequency 2,182 kHz.‡

(4) The Director may exempt ships constructed on or after 1st. February, 1997 from the requirements prescribed by sub-regulations (2) and (3).

(5) Every passenger ship shall be provided with means for two-way on-scene radio communications for search and rescue purposes using the aeronautical frequencies 121.5 MHz and 123.1 MHz from the position from which the ship is normally navigated.

Radio equipment — sea area A1.

171. (1) In addition to meeting the requirements of regulation 170, every ship engaged on voyages exclusively in sea area A1 shall be provided with a radio installation capable of initiating the transmission of ship-to-shore distress alerts from the position from which the ship is normally navigated, operating either —

(a) on VHF using DSC. This requirement may be fulfilled by the EPIRB prescribed by sub-regulation (3), either by installing the EPIRB close to, or by remote activation from, the position from which the ship is normally navigated;

(b) through the polar orbiting satellite service on 406 MHz. This requirement may be fulfilled by the satellite EPIRB, required by paragraph *(f)* of sub-regulation (1) of regulation 170, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated;

(c) if the ship is engaged on voyages within coverage of MF coast stations equipped with DSC, on MF using DSC;

(d) on HF using DSC; or

† The Maritime Safety Committee, at its 68th. session (28th. May - 6th. June, 1997), decided that watchkeeping by GMDSS ships on frequency 2,182 kHz should cease from 1st. February, 1999.

‡ Refer to resolution A.421(XI) concerning operational standards for radiotelephone alarm signal generators adopted by the Organisation.

(e) through the INMARSAT geostationary satellite service. This requirement may be fulfilled by —

(i) an INMARSAT ship earth station*; or

(ii) the satellite EPIRB, required by paragraph *(f)* of sub-regulation (1) of regulation 170, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated.

(2) The VHF radio installation, required by paragraph *(a)* of sub-regulation (1) of regulation 170, shall also be capable of transmitting and receiving general radio communications using radiotelephony.

(3) Ships engaged on voyages exclusively in sea area A1 may carry, in lieu of the satellite EPIRB required by paragraph *(f)* of sub-regulation (1) of regulation 170, an EPIRB which shall be —

(a) capable of transmitting a distress alert using DSC on VHF channel 70 and providing for locating by means of a radar transponder operating in the 9 GHz band;

(b) installed in an easily accessible position;

(c) ready to be manually released and capable of being carried by one person into a survival craft;

(d) capable of floating free if the ship sinks and being automatically activated when afloat; and

(e) capable of being activated manually.

Radio equipment — sea areas A1 and A2.

172. (1) In addition to meeting the requirements of regulation 170, every ship engaged on voyages beyond sea area A1, but remaining within sea area A2, shall be provided with —

(a) an MF radio installation capable of transmitting and receiving, for distress and safety purposes, on the frequencies —

(i) 2,187.5 kHz using DSC; and

* This requirement can be met by Inmarsat ship earth stations capable of two-way communications, such as Inmarsat-A, Inmarsat-B (resolution A.808(19)) or Inmarsat-C (resolution A.807(19)) ship earth stations. Unless otherwise specified, this footnote applies to all requirements for an Inmarsat ship earth station prescribed by this Chapter.

(ii) 2,182 kHz using radiotelephony;

(b) a radio installation capable of maintaining a continuous DSC watch on the frequency 2,187.5 kHz which may be separate from, or combined with, that required by paragraph *(a)*(i); and

(c) means of initiating the transmission of ship-to-shore distress alerts by a radio service other than MF operating either —

(i) through the polar orbiting satellite service on 406 MHz. This requirement may be fulfilled by the satellite EPIRB, required by paragraph *(f)* of sub-regulation (1) of regulation 170, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated;

(ii) on HF using DSC; or

(iii) through the INMARSAT geostationary satellite service. This requirement may be fulfilled by —

(A) the equipment specified in paragraph *(b)* of sub-regulation (3); or

(B) the satellite EPIRB, required by paragraph *(f)* of sub-regulation (1) of regulation 170, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated.

(2) It shall be possible to initiate transmission of distress alerts by the radio installations specified in paragraphs *(a)* and *(c)* of sub-regulation (1) from the position from which the ship is normally navigated.

(3) The ship shall, in addition, be capable of transmitting and receiving general radio communications using radiotelephony or direct-printing telegraphy by either —

(a) a radio installation operating on working frequencies in the bands between 1,605 kHz and 4,000 kHz or between 4,000 kHz and 27,500 kHz. This requirement may be fulfilled by the addition of this capability in the equipment required by paragraph *(a)* of sub-regulation (1); or

(b) an INMARSAT ship earth station.

(4) The Director may exempt ships constructed before 1st. February, 1997, which are engaged exclusively on voyages within sea area A2, from the requirements of paragraphs *(a)*(i) and *(b)* of sub-regulation (1) of regulation 170,

provided such ships maintain, when practicable, a continuous listening watch on VHF channel 16. This watch shall be kept at the position from which the ship is normally navigated.

Radio equipment - sea areas A1, A2 and A3.

173. (1) In addition to meeting the requirements of regulation 170, every ship engaged on voyages beyond sea areas A1 and A2, but remaining within sea area A3, shall, if it does not comply with the requirements of sub-regulation (2), be provided with —

(a) an INMARSAT ship earth station capable of —

(i) transmitting and receiving distress and safety communications using direct-printing telegraphy;

(ii) initiating and receiving distress priority calls;

(iii) maintaining watch for shore-to-ship distress alerts, including those directed to specifically defined geographical areas;

(iv) transmitting and receiving general radio communications, using either radiotelephony or direct-printing telegraphy;

(b) an MF radio installation capable of transmitting and receiving, for distress and safety purposes, on the frequencies —

(i) 2,187.5 kHz using DSC; and

(ii) 2,182 kHz using radiotelephony;

(c) a radio installation capable of maintaining a continuous DSC watch on the frequency 2,187.5 kHz which may be separate from, or combined with, that required by sub-paragraph (i) of paragraph *(b)*; and

(d) means of initiating the transmission of ship-to-shore distress alerts by a radio service operating either.—

(i) through the polar orbiting satellite service on 406 MHz. This requirement may be fulfilled by the satellite EPIRB, required by paragraph *(f)* of sub-regulation (1) of regulation 170, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated;

(ii) on HF using DSC; or

(iii) through the INMARSAT geostationary satellite service, by an additional ship earth station or by the satellite EPIRB required by paragraph *(f)* of sub-regulation (1) of regulation 170, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated.

(2) In addition to meeting the requirements of regulation 170, every ship engaged on voyages beyond sea areas A1 and A2, but remaining within sea area A3, shall, if it does not comply with the requirements of sub-regulation (1), be provided with —

(a) an MF/HF radio installation capable of transmitting and receiving, for distress and safety purposes, on all distress and safety frequencies in the bands between 1,605 kHz and 4,000 kHz and between 4,000 kHz and 27,500 kHz —

(i) using DSC;

(ii) using radiotelephony; and

(iii) using direct-printing telegraphy;

(b) equipment capable of maintaining DSC watch on 2,187.5 kHz, 8,414.5 kHz and on at least one of the distress and safety DSC frequencies 4,207.5 kHz, 6,312 kHz, 12,577 kHz or 16,804 kHz. At any time, it shall be possible to select any of these DSC distress and safety frequencies. This equipment may be separate from, or combined with, the equipment required by paragraph *(a)*;

(c) means of initiating the transmission of ship-to-shore distress alerts by a radio communication service other than HF operating either —

(i) through the polar orbiting satellite service on 406 MHz. This requirement may be fulfilled by the satellite EPIRB, required by paragraph *(f)* of sub-regulation (1) of regulation 170, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; or

(ii) through the INMARSAT geostationary satellite service. This requirement may be fulfilled by —

(A) an INMARSAT ship earth station; or

(B) the satellite EPIRB, required by paragraph *(f)* of sub-regulation (1) of regulation 170, either by installing the

satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; and

(d) in addition, ships shall be capable of transmitting and receiving general radio communications using radiotelephony or direct-printing telegraphy by an MF/HF radio installation operating on working frequencies in the bands between 1,605 kHz and 4,000 kHz and between 4,000 kHz and 27,500 kHz. This requirement may be fulfilled by the addition of this capability in the equipment required by paragraph *(a)*.

(3) It shall be possible to initiate transmission of distress alerts by the radio installations specified in paragraphs *(a)*, *(b)* and *(d)* of sub-regulation (1) and paragraphs *(a)* and *(c)* of sub-regulation (2) from the position from which the ship is normally navigated.

(4) The Director may exempt ships constructed before 1st. February, 1997, and engaged exclusively on voyages within sea areas A2 and A3, from the requirements of paragraphs *(a)*(i) and *(b)* of sub-regulation (1) of regulation 170, provided such ships maintain, when practicable, a continuous listening watch on VHF channel 16. This watch shall be kept at the position from which the ship is normally navigated.

Radio equipment — sea areas A1, A2, A3 and A4.

174. (1) In addition to meeting the requirements of regulation 170, ships engaged on voyages in all sea areas shall be provided with the radio installations and equipment required by sub-regulation (2) of regulation 173, except that the equipment required by paragraph *(c)*(ii) of sub-regulation (2) of regulation 173 shall not be accepted as an alternative to that required by paragraph *(c)*(i) of sub-regulation (2) of regulation 173, which shall always be provided. In addition, ships engaged on voyages in all sea areas shall comply with the requirements of sub-regulation (3) of regulation 173.

(2) The Director may exempt ships constructed before 1st. February, 1997, and engaged exclusively on voyages within sea areas A2, A3 and A4, from the requirements of paragraphs *(a)*(i) and *(b)* of sub-regulation (1) of regulation 170, provided such ships maintain, when practicable, a continuous listening watch on VHF channel 16. This watch shall be kept at the position from which the ship is normally navigated.

Watches.

175. (1) Every ship, while at sea, shall maintain a continuous watch —

(a) on VHF DSC channel 70, if the ship, in accordance with the requirements of paragraph *(b)* of sub-regulation (1) of regulation 170, is fitted with a VHF radio installation;

(b) on the distress and safety DSC frequency 2,187.5 kHz, if the ship, in accordance with the requirements of paragraph *(b)* of sub-regulation (1) of regulation 172 or paragraph *(c)* of sub-regulation (1) of regulation 173, is fitted with an MF radio installation;

(c) on the distress and safety DSC frequencies 2,187.5 kHz and 8,414.5 kHz and also on at least one of the distress and safety DSC frequencies 4,207.5 kHz, 6,312 kHz, 12,577 kHz or 16,804.5 kHz, appropriate to the time of day and the geographical position of the ship, if the ship, in accordance with the requirements of paragraph *(b)* of sub-regulation (2) of regulation 173 or sub-regulation (1) of regulation 174, is fitted with an MF/HF radio installation. This watch may be kept by means of a scanning receiver;

(d) for satellite shore-to-ship distress alerts, if the ship, in accordance with the requirements of paragraph *(a)* of sub-regulation (1) of regulation 173, is fitted with an INMARSAT ship earth station.

(2) Every ship, while at sea, shall maintain a radio watch for broadcasts of maritime safety information on the appropriate frequency or frequencies on which such information is broadcast for the area in which the ship is navigating.

(3) Until 1st. February, 1999 or until such other date as may be determined by the Organisation,* every ship, while at sea, shall maintain, when practicable, a continuous listening watch on VHF channel 16. This watch shall be kept at the position from which the ship is normally navigated.

(4) Until 1st. February, 1999 or until such other date as may be determined by the Organisation,† every ship required to carry a radiotelephone watch receiver shall maintain, while at sea, a continuous watch on the radiotelephone distress frequency 2,182 kHz. This watch shall be kept at the position from which the ship is normally navigated.

* The Maritime Safety Committee decided (resolution MSC.77(69)) that all GMDSS ships, while at sea, shall continue to maintain, when practicable, continuous listening watch on VHF channel until 1st. February, 2005.

† The Maritime Safety Committee, at its 68th. session (28th. May - 6th. June, 1997), decided that watchkeeping by GMDSS ships on the frequency 2,182 kHz should cease from 1st. February, 1999.

Sources of energy.

176. (1) There shall be available at all times, while the ship is at sea, a supply of electrical energy sufficient to operate the radio installations and to charge any batteries used as part of a reserve source or sources of energy for the radio installations.

(2) A reserve source or sources of energy shall be provided on every ship, to supply radio installations, for the purpose of conducting distress and safety radio communications, in the event of failure of the ship's main and emergency sources of electrical power. The reserve source or sources of energy shall be capable of simultaneously operating the VHF radio installation required by paragraph *(a)* of sub-regulation (1) of regulation 170 and, as appropriate for the sea area or sea areas for which the ship is equipped, either the MF radio installation required by paragraph *(a)* of sub-regulation (1) of regulation 172, the MF/HF radio installation required by paragraph *(a)* of sub-regulation (2) of regulation 173 or sub-regulation (1) of regulation 174, or the INMARSAT ship earth station required by paragraph *(a)* of sub-regulation (1) of regulation 173 and any of the additional loads mentioned in sub-regulations (1), (5) and (8) for a period of at least —

(a) one hour on ships provided with an emergency source of electrical power, if such source of power complies fully with all relevant provisions of regulation 92 or 94, including the supply of such power to the radio installations; and

(b) 6 hours on ships not provided with an emergency source of electrical power complying fully with all relevant provisions of regulation 92 or 94, including the supply of such power to the radio installations.*

The reserve source or sources of energy need not supply independent HF and MF radio installations at the same time.

(3) The reserve source or sources of energy shall be independent of the propelling power of the ship and the ship's electrical system.

(4) Where, in addition to the VHF radio installation, 2 or more of the other radio installations, referred to in sub-regulation (2), can be connected to the reserve source or sources of energy, they shall be capable of simultaneously supplying, for the period specified, as appropriate, in paragraphs *(a)* and *(b)* of sub-regulation (2), the VHF radio installation and —

(a) all other radio installations which can be connected to the reserve source or sources of energy at the same time; or

* For guidance, the following formula is recommended for determining the electrical load to be supplied by the reserve source of energy for each radio installation required for distress conditions: ½ of the current consumption necessary for transmission + the current consumption necessary for reception + the current consumption of any additional loads.

(b) whichever of the other radio installations will consume the most power, if only one of the other radio installations can be connected to the reserve source or sources of energy at the same time as the VHF radio installation.

(5) The reserve source or sources of energy may be used to supply the electrical lighting required by paragraph *(d)* of sub-regulation (2) of regulation 169.

(6) Where a reserve source of energy consists of a rechargeable accumulator battery or batteries —

(a) a means of automatically charging such batteries shall be provided which shall be capable of recharging them to minimum capacity requirements within 10 hours; and

(b) the capacity of the battery or batteries shall be checked, using an appropriate method,* at intervals not exceeding 12 months, when the ship is not at sea.

(7) The siting and installation of accumulator batteries which provide a reserve source of energy shall be such as to ensure —

(a) the highest degree of service;

(b) a reasonable lifetime;

(c) reasonable safety;

(d) that battery temperatures remain within the manufacturer's specifications whether under charge or idle; and

(e) that when fully charged, the batteries will provide at least the minimum required hours of operation under all weather conditions.

(8) If an uninterrupted input of information from the ship's navigational or other equipment to a radio installation required by this Chapter, including the navigation receiver referred to in regulation 181, is needed to ensure its proper performance, means shall be provided to ensure the continuous supply of such information in the event of failure of the ship's main or emergency source of electrical power.

* One method of checking the capacity of an accumulator battery is to fully discharge and recharge the battery, using normal operating current and period (e.g. 10 hours). Assessment of the change condition can be made at any time, but it should be done without significant discharge of the battery when the ship is at sea.

Performance standards.

177. (1) All equipment to which this Chapter applies shall be of a type approved by the Director. Subject to sub-regulation (2), such equipment shall conform to appropriate performance standards not inferior to those adopted by the Organisation.*

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* Refer to the following resolutions adopted by the Assembly of the Organisation —

1. Resolution A.525(13): Performance standards for narrow-band direct-printing telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships.
2. Resolution A.694(17): General requirements for shipborne radio equipment forming part of the global maritime distress and safety system (GMDSS) and for electronic navigational aids.
3. Resolution A.808(19): Performance standards for ship earth stations capable of two-way communications and resolution A.570(14): Type approval of ship earth stations.
4. Resolution A.803(19): Performance standards for shipborne VHF radio installations capable of voice communications and digital selective calling, as amended, and resolution MSC.68(68), annex 1 (valid for equipment installed on or after 1st. January, 2000).
5. Resolution A.804(19): Performance standards for shipborne MF radio installations capable of voice communications and digital selective calling, as amended, and resolution MSC.68(68), annex 2 (valid for equipment installed on or after 1st. January, 2000).
6. Resolution A.806(19): Performance standards for shipborne MF/HF radio installations capable of voice communication, narrow-band direct-printing and digital selective calling, as amended, and resolution MSC.68(68), annex 3 (valid for equipment installed on or after 1st. January, 2000).
7. Resolution A.810(19): Performance standards for float-free satellite emergency position-indicating radio beacons (EPIRBs) operating on 406 MHz (see also Assembly resolution A.696(17): Type approval of satellite emergency position-indicating radio beacons (EPIRBs) operating in the COSPAS-SARSAT system).
8. Resolution A.802(19): Performance standards for survival craft radar transponder for use in search and rescue operations.
9. Resolution A.805(19): Performance standards for float-free VHF emergency position-indicating radio beacons.
10. Resolution A.807(19): Performance standards for INMARSAT-C ship earth stations capable of transmitting and receiving direct-printing communications, as amended, and resolution MSC.68(68), annex 3 (valid for equipment installed on or after 1st. January, 2000), and resolution A.570(14): Type approval of ship earth stations.
11. Resolution A.664(16): Performance standards for enhanced group call equipment.
12. Resolution A.812(19): Performance standards for float-free satellite emergency position-indicating radio beacons operating through the geostationary INMARSAT satellite system on 1.6 GHz.
13. Resolution A.662(16): Performance standards for float-free release and activation arrangements for emergency radio equipment.
14. Resolution A.699(17): System performance standard for the promulgation and co-ordination of maritime safety information using high-frequency narrow-band direct-printing.
15. Resolution A.700(17): Performance standards for narrow-band direct-printing telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships (MSI) by HF.
16. Resolution A.811(19): Performance standards for a shipborne integrated radio communication system (IRCS) when used in the GMDSS.
17. Resolution MSC.80(70), annex 1: Performance standards for on-scene (aeronautical) two-way portable VHF radiotelephone apparatus.

(2) Equipment installed prior to the dates of application prescribed by regulation 163 may be exempted from full compliance with the appropriate performance standards at the discretion of the Director, provided that the equipment is compatible with equipment complying with the performance standards, having due regard to the criteria which the Organisation may adopt in connection with such standards.

Maintenance requirements.

178. (1) Equipment shall be so designed that the main units can be replaced readily without elaborate recalibration or readjustment.

(2) Where applicable, equipment shall be so constructed and installed that it is readily accessible for inspection and on-board maintenance purposes.

(3) Adequate information shall be provided to enable the equipment to be properly operated and maintained, taking into account the recommendations of the Organisation.*

(4) Adequate tools and spares shall be provided to enable the equipment to be maintained.

(5) Radio equipment required by this Chapter shall be maintained to provide the availability of the functional requirements specified in regulation 166 and to meet the recommended performance standards of such equipment.

(6) On ships engaged on voyages in sea areas A1 and A2, the availability shall be ensured by using such methods as duplication of equipment, shore-based maintenance or at-sea electronic maintenance capability, or a combination of these, as may be approved by the Director.

(7) On ships engaged on voyages in sea areas A3 and A4, the availability shall be ensured by using a combination of at least 2 methods such as duplication of equipment, shore-based maintenance or at-sea electronic maintenance capability, as may be approved by the Director, taking into account the recommendations of the Organisation.*

* Refer to the recommendation on general requirements for shipborne radio equipment forming part of the global maritime distress and safety system and for electronic navigational aids adopted by the Organisation by resolution A.694(17) and to resolution A.813(19) on general requirements for electromagnetic compatibility (EMC) for all electrical and electronic ship's equipment.

* Refer to resolution A.702(17) concerning radio maintenance guidelines for the global maritime distress and safety system related to sea areas A3 and A4.

(8) While all reasonable steps shall be taken to maintain the equipment in efficient working order to ensure compliance with all the functional requirements specified in regulation 166, malfunction of the equipment for providing the general radio communications required by paragraph *(h)* of regulation 166 shall not be considered as making a ship unseaworthy or as a reason for delaying the ship in ports where repair facilities are not readily available, provided the ship is capable of performing all distress and safety functions.

(9) Satellite EPIRBs shall be tested at intervals not exceeding 12 months for all aspects of operational efficiency with particular emphasis on frequency stability, signal strength and coding. In cases where it appears proper and reasonable, the Director may extend this period to 17 months. The test may be conducted on board the ship or at an approved testing or servicing station.

Radio personnel.

179. (1) Every ship shall carry personnel qualified for distress and safety radio communication purposes to the satisfaction of the Director.* The personnel shall be holders of certificates specified in the Radio Regulations as appropriate, any one of whom shall be designated to have primary responsibility for radio communications during distress incidents.

(2) In passenger ships, at least one person qualified in accordance with sub-regulation (1) shall be assigned to perform only radio communication duties during distress incidents.

Radio records.

180. A record shall be kept, to the satisfaction of the Director and as required by the Radio Regulations, of all incidents connected with the radio communication service which appear to be of importance to safety of life at sea.

Position-updating.

181. All two-way communication equipment carried on board a ship to which this Chapter applies which is capable of automatically including the ship's position in the distress alert shall be automatically provided with this information from an internal or external navigation receiver, if either is installed. If such a receiver is not installed, the ship's position and the time at which the position was determined shall be manually updated at intervals not exceeding 4 hours, while the ship is underway, so that it is always ready for transmission by the equipment.

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* Refer to the STCW Code, Chapter IV, section B-IV/2.

CHAPTER V

SAFETY OF NAVIGATION

Application.

182. (1) Unless expressly provided otherwise, this Chapter shall apply to all ships on all voyages, except —

(a) warships, naval auxiliaries and other ships owned or operated by a Contracting State and used only on government non-commercial service; and

(b) ships solely navigating the Great Lakes of North America and their connecting and tributary waters as far east as the lower exit of the St. Lambert Lock at Montreal in the Province of Quebec, Canada.

Warships, naval auxiliaries or other ships owned or operated by a Contracting State and used only on government non-commercial service are encouraged to act in a manner consistent, so far as reasonable and practicable, with this Chapter.

(2) The Director may decide to what extent this Chapter shall apply to ships operating solely in waters landward of the baselines which are established in accordance with international law.

(3) A rigidly connected composite unit of a pushing vessel and associated pushed vessel, when designed as a dedicated and integrated tug and barge combination, shall be regarded as a single ship for the purpose of this Chapter.

(4) The Director shall determine to what extent regulations 196 to 209 do not apply to the following categories of ships —

(a) ships below 150 tons engaged on any voyage;

(b) ships below 500 tons not engaged on international voyages; and

(c) fishing vessels.

Interpretation.

183. For the purpose of this Chapter —

"all ships" means any ship, vessel or craft irrespective of type and purpose;

"constructed", in respect of a ship, means a stage of construction where —

(a) the keel is laid;

(b) construction identifiable with a specific ship begins; or

(c) assembly of the ship has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less;

"nautical chart" is a special-purpose map or book, or a specially compiled database from which such a map or book is derived, that is issued officially by or on the authority of a government, authorised Hydrographic Office or other relevant government institution and is designed to meet the requirements of marine navigation*;

"nautical publication" is a special-purpose map or book, or a specially compiled database from which such a map or book is derived, that is issued officially by or on the authority of a government, authorised Hydrographic Office or other relevant government institution and is designed to meet the requirements of marine navigation.†

Exemptions and equivalents.

184. (1) The Director may grant general exemptions from the requirements of regulations 196, 198, 199, 200 (except paragraph *(a)*(vii) of sub-regulation (2)), 201, 203, 205, 206, 207, 208 and 209 to ships without mechanical means of propulsion.

(2) The Director may grant to individual ships exemptions or equivalents of a partial or conditional nature, when any such ship is engaged on a voyage where the maximum distance of the ship from the shore, the length and nature of the voyage, the absence of general navigational hazards, and other conditions affecting safety are such as to render the full application of this Chapter unreasonable or unnecessary, provided that the Director has taken into account the effect such exemptions and equivalents may have upon the safety of all other ships.

(3) The Director shall submit to the Organisation, as soon as possible after 1st. January, in each year, a report summarising all new exemptions and equivalents granted under sub-regulation (2) during the previous calendar year and giving the reasons for granting such exemptions and equivalents. The Organisation shall circulate such particulars to other Contracting States for information.

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* Refer to appropriate resolutions and recommendations of the International Hydrographic Organisation concerning the authority and responsibilities of coastal States in the provision of charting in accordance with regulation 190.

† Refer to appropriate resolutions and recommendations of the International Hydrographic Organisation concerning the authority and responsibilities of coastal States in the provision of charting in accordance with regulation 190.

Navigational warnings.

185. Each Contracting State shall take all steps necessary to ensure that, when intelligence of any dangers is received from whatever reliable source, it shall be promptly brought to the knowledge of those concerned and communicated to other interested governments.*

Meteorological services and warnings.

186. (1) Contracting States undertake to encourage the collection of meteorological data by ships at sea and to arrange for their examination, dissemination and exchange in the manner most suitable for the purpose of aiding navigation.* The Director shall encourage the use of meteorological instruments of a high degree of accuracy and shall facilitate the checking of such instruments upon request. Arrangements may be made by appropriate national meteorological services for this checking to be undertaken, free of charge to the ship.

(2) In particular, Contracting States undertake to carry out, in co-operation, the following meteorological arrangements —

(a) to warn ships of gales, storms and tropical cyclones by the issue of information in text and, as far as practicable, graphic form, using the appropriate shore-based facilities for terrestrial and space radio communication services;

(b) to issue, at least twice daily, by terrestrial and space radio communication services,† as appropriate, weather information suitable for shipping containing data, analyses, warnings and forecasts of weather, waves and ice. Such information shall be transmitted in text and, as far as practicable, graphic form, including meteorological analysis and prognosis charts transmitted by facsimile or in digital form for reconstitution on board the ship's data processing system;

(c) to prepare and issue such publications as may be necessary for the efficient conduct of meteorological work at sea and to arrange, if practicable, for the publication and making available of daily weather charts for the information of departing ships;

* Refer to the Guidance on the IMO/IHO World-Wide Navigational Warning Service adopted by the Organisation by resolution A.706(17), as amended.

* Refer to the Recommendation on weather routeing adopted by the Organisation by resolution A.528(13).

† Refer to paragraphs *(d)* and *(e)* of regulation 170(1).

(d) to arrange for a selection of ships to be equipped with tested marine meteorological instruments (such as a barometer, a barograph, a psychrometer and suitable apparatus for measuring sea temperature) for use in this service, and to take, record and transmit meteorological observations at the main standard times for surface synoptic observations (that is, at least 4 times daily, whenever circumstances permit) and to encourage other ships to take, record and transmit observations in a modified form, particularly when in areas where shipping is sparse;

(e) to encourage companies to involve as many of their ships as practicable in the making and recording of weather observations; these observations to be transmitted using the ship's terrestrial or space radio communications facilities for the benefit of the various national meteorological services;

(f) the transmission of these weather observations is free of charge to the ships concerned;

(g) when in the vicinity of a tropical cyclone, or of a suspected tropical cyclone, ships should be encouraged to take and transmit their observations at more frequent intervals whenever practicable, bearing in mind navigational preoccupations of ships' officers during storm conditions;

(h) to arrange for the reception and transmission of weather messages from and to ships, using the appropriate shore-based facilities for terrestrial and space radio communications services;

(i) to encourage masters to inform ships in the vicinity and also shore stations whenever they experience a wind speed of 50 knots or more (force 10 on the Beaufort scale);

(j) to endeavour to obtain a uniform procedure in regard to the international meteorological services already specified and, as far as practicable, to conform to the technical regulations and recommendations made by the World Meteorological Organisation, to which Contracting States may refer, for study and advice, any meteorological question which may arise in carrying out the present Convention.

(3) The information provided for in this regulation shall be furnished in a form for transmission and be transmitted in the order of priority prescribed by the Radio Regulations. During transmission to all stations of meteorological information, forecasts and warnings, all ship stations must conform to the provisions of the Radio Regulations.

(4) Forecasts, warnings, synoptic and other meteorological data intended for ships shall be issued and disseminated by the national meteorological service

in the best position to serve various coastal and high seas areas, in accordance with mutual arrangements made by Contracting States, in particular as defined by the World Meteorological Organisation's system for the preparation and dissemination of meteorological forecasts and warnings for the high seas under the global maritime distress and safety system (GMDSS).

Ice Patrol Service.

187. (1) The Ice Patrol contributes to safety of life at sea, safety and efficiency of navigation and protection of the marine environment in the North Atlantic. Ships transiting the region of icebergs guarded by the Ice Patrol during the ice season are required to make use of the services provided by the Ice Patrol.

(2) The Contracting States undertake to continue an ice patrol and a service for study and observation of ice conditions in the North Atlantic. During the whole of the ice season, that is, for the period from 15th. February, through 1st. July, of each year, the south-eastern, southern and south-western limits of the region of icebergs in the vicinity of the Grand Banks of Newfoundland shall be guarded for the purpose of informing passing ships of the extent of this dangerous region; for the study of ice conditions in general; and for the purpose of affording assistance to ships and crews requiring aid within the limits of operation of the patrol ships and aircraft. During the rest of the year the study and observation of ice conditions shall be maintained as advisable.

(3) Ships and aircraft used for the Ice Patrol Service and the study and observation of ice conditions may be assigned other duties, provided that such other duties do not interfere with the primary purpose or increase the cost of this service.

(4) The Government of the United States of America agrees to continue the overall management of the Ice Patrol Service and the study and observation of ice conditions, including the dissemination of information therefrom.

(5) The terms and conditions governing the management, operation and financing of the Ice Patrol are set forth in the Rules for the management, operation and financing of the North Atlantic Ice Patrol in the Fourth Schedule, which shall form an integral part of this Chapter.

(6) If, at any time, the United States or Canadian Governments should desire to discontinue providing these services, it may do so and the Contracting States shall settle the question of continuing these services in accordance with their mutual interests. The United States or Canadian Governments shall provide 18 months' written notice to all Contracting States whose ships entitled to fly their flag and whose ships are registered in territories to which those Contracting States have extended this regulation benefit from these services before discontinuing providing these services.

Search and rescue services.

188. (1) Each Contracting State undertakes to ensure that necessary arrangements are made for distress communication and co-ordination in their area of responsibility and for the rescue of persons in distress at sea around its coasts. These arrangements shall include the establishment, operation and maintenance of such search and rescue facilities as are deemed practicable and necessary, having regard to the density of the seagoing traffic and the navigational dangers, and shall, so far as possible, provide adequate means of locating and rescuing such persons.*

(2) Each Contracting State undertakes to make available information to the Organisation concerning its existing search and rescue facilities and the plans for changes therein, if any.

(3) Passenger ships to which Chapter I applies shall have on board a plan for co-operation with appropriate search and rescue services in the event of an emergency. The plan shall be developed in co-operation between the ship, the company, as defined in regulation 255, and the search and rescue services. The plan shall include provisions for periodic exercises to be undertaken to test its effectiveness. The plan shall be developed based on the guidelines developed by the Organisation.

Life-saving signals.

189. Contracting States undertake to arrange that life-saving signals are used by search and rescue facilities engaged in search and rescue operations when communicating with ships or persons in distress.

Hydrographic services.

190. (1) Contracting States undertake to arrange for the collection and compilation of hydrographic data and publication, dissemination and keeping up to date of all nautical information necessary for safe navigation.

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* Refer to the International Convention on Maritime Search and Rescue (SAR), 1979, and to the following resolutions adopted by the Organisation —

(a) homing capability of search and rescue (SAR) aircraft (resolution A.225(VII));

(b) use of radar transponders for search and rescue purposes (resolution A.530(13));

(c) search and rescue homing capability (resolution A.616(15)); and

(d) International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual (resolution A.894(21)).

(2) In particular, Contracting States undertake to co-operate in carrying out, as far as possible, the following nautical and hydrographic services, in the manner most suitable for the purpose of aiding navigation —

(a) to ensure that hydrographic surveying is carried out, as far as possible, adequate to the requirements of safe navigation;

(b) to prepare and issue nautical charts, sailing directions, lists of lights, tide tables and other nautical publications, where applicable, satisfying the needs of safe navigation;

(c) to promulgate notices to mariners in order that nautical charts and publications are kept, as far as possible, up to date; and

(d) to provide data management arrangements to support these services.

(3) Contracting States undertake to ensure the greatest possible uniformity in charts and nautical publications and to take into account, whenever possible, relevant international resolutions and recommendations.*

(4) Contracting States undertake to co-ordinate their activities to the greatest possible degree in order to ensure that hydrographic and nautical information is made available on a worldwide scale as timely, reliably, and unambiguously as possible.

Ships' routeing.

191. (1) Ships' routeing systems contribute to safety of life at sea, safety and efficiency of navigation and protection of the marine environment. Ships' routeing systems are recommended for use by, and may be made mandatory for, all ships, certain categories of ships or ships carrying certain cargoes, when adopted and implemented in accordance with the guidelines and criteria developed by the Organisation.†

(2) The Organisation is recognised as the only international body for developing guidelines, criteria and regulations on an international level for ships' routeing systems. Contracting States shall refer proposals for adoption of ships' routeing systems to the Organisation. The Organisation will collate and disseminate to Contracting States all relevant information with regard to any adopted ships' routeing systems.

* Refer to the appropriate resolutions and recommendations adopted by the International Hydrographic Organisation.

† Refer to the general provisions on ships' routeing adopted by the Organisation by resolution A.572(14), as amended.

(3) The initiation of action for establishing a ships' routeing system is the responsibility of the government concerned. In developing such systems for adoption by the Organisation, the guidelines and criteria developed by the Organisation* shall be taken into account.

(4) Ships' routeing systems should be submitted to the Organisation for adoption. A government implanting ships' routeing systems not intended to be submitted to the Organisation for adoption or which have not been adopted by the Organisation are encouraged to take into account, wherever possible, the guidelines and criteria developed by the Organisation.†

(5) Where 2 or more governments have a common interest in a particular area, they should formulate joint proposals for the delineation and use of a routeing system therein on the basis of an agreement between them. Upon receipt of such proposal and before proceeding with consideration of it for adoption, the Organisation shall ensure that details of the proposal are disseminated to the governments which have a common interest in the area, including countries in the vicinity of the proposed ships' routeing system.

(6) Contracting States shall adhere to the measures adopted by the Organisation concerning ships' routeing. They shall promulgate all information necessary for the safe and effective use of adopted ships' routeing systems. A government or governments concerned may monitor traffic in those systems. Contracting States shall do everything in their power to secure the appropriate use of ships' routeing systems adopted by the Organisation.

(7) A ship shall use a mandatory ships' routeing system adopted by the Organisation as required for its category or cargo carried and in accordance with the relevant provisions in force unless there are compelling reasons not to use a particular ships' routeing system. Any such reason shall be recorded in the ships' log.

(8) Mandatory ships' routeing systems shall be reviewed by the Contracting State concerned in accordance with the guidelines and criteria developed by the Organisation.*

(9) All adopted ships' routeing systems and actions taken to enforce compliance with those systems shall be consistent with international law, including the relevant provisions of the 1982 United Nations Convention on the Law of the Sea.

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* Refer to the general provisions on ships' routeing adopted by the Organisation be resolution A.572(14), as amended.

† Refer to the general provisions on ships' routeing adopted by the Organisation be resolution A.572(14), as amended.

* Refer to the general provisions on ships' routeing adopted by the Organisation be resolution A.572(14), as amended.

(10) Nothing in this regulation nor its associated guidelines and criteria shall prejudice the rights and duties of governments under international law or the legal regimes of straits used for international navigation and archipelagic sea lanes.

Ship reporting systems.†

192. (1) Ship reporting systems contribute to safety of life at sea, safety and efficiency of 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* pursuant to this regulation, shall be used by all ships or certain categories of ships or ships carrying certain cargoes in accordance with the provisions of each system so adopted.

(2) The Organisation is recognised as the only international body for developing guidelines, criteria and regulations on an international level for ship reporting systems. Contracting State shall refer proposals for the adoption of ship reporting systems to the Organisation. The Organisation will collate and disseminate to Contracting States all relevant information with regard to any adopted ship reporting system.

(3) The initiation of action for establishing a ship reporting system is the responsibility of the government concerned. In developing such systems, provision of the guidelines and criteria developed by the Organisation† shall be taken into account.

† This regulation does not address ship reporting systems established by governments for search and rescue purposes, which are covered by Chapter 5 of the 1979 SAR Convention, as amended.

* Refer to the guidelines and criteria adopted by the Maritime Safety Committee of the Organisation by resolution MSC.43(64), as amended by resolution MSC.111(73). Refer also to the general principles for ship reporting systems and ship reporting requirements, including guidelines for reporting incidents involving dangerous goods, harmful substances and marine pollutants, adopted by the Organisation by resolution A.851(20).

† Refer to the guidelines and criteria adopted by the Maritime Safety Committee of the Organisation by resolution MSC.43(64), as amended by resolution MSC.111(73). Refer also to the general principles for ship reporting systems and ship reporting requirements, including guidelines for reporting incidents involving dangerous goods, harmful substances and marine pollutants, adopted by the Organisation by resolution A.851(20).

(4) Ship reporting systems not submitted to the Organisation for adoption do not necessarily need to comply with this regulation. Governments implementing such systems are encouraged to follow, wherever possible, the guidelines and criteria developed by the Organisation.‡ Contracting States may submit such systems to the Organisation for recognition.

(5) Where 2 or more governments have a common interest in a particular area, they should formulate proposals for a co-ordinated ship reporting system on the basis of agreement between them. Before proceeding with a proposal for adoption of a ship reporting system, the Organisation shall disseminate details of the proposal to those governments which have a common interest in the area covered by the proposed system. Where a co-ordinated ship reporting system is adopted and established, it shall have uniform procedures and operations.

(6) After adoption of a ship reporting system in accordance with this regulation, the government or governments concerned shall take all measures necessary for the promulgation of any information needed for the efficient and effective use of the system. Any adopted ship reporting system shall have the capability of interaction and the ability to assist ships with information when necessary. Such systems shall be operated in accordance with the guidelines and criteria developed by the Organisation* pursuant to this regulation.

(7) The master of a ship shall comply with the requirements of adopted ship reporting systems and report to the appropriate authority all information required in accordance with the provisions of each such system.

(8) All adopted ship reporting systems and actions taken to enforce compliance with those systems shall be consistent 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 prejudice the rights and duties of governments under international law or the legal regimes of straits used fir international navigation and archipelagic sea lanes.

(10) The participation of ships in accordance with the provisions of adopted ship reporting systems shall be free of charge to the ships concerned.

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‡ Refer to the guidelines and criteria adopted by the Maritime Safety Committee of the Organisation by resolution MSC.43(64), as amended by resolution MSC.111(73). Refer also to the general principles for ship reporting systems and ship reporting requirements, including guidelines for reporting incidents involving dangerous goods, harmful substances and marine pollutants, adopted by the Organisation by resolution A.851(20).

* Refer to the guidelines and criteria adopted by the Maritime Safety Committee of the Organisation by resolution MSC.43(64), as amended by resolution MSC.111(73). Refer also to the general principles for ship reporting systems and ship reporting requirements, including guidelines for reporting incidents involving dangerous goods, harmful substances and marine pollutants, adopted by the Organisation by resolution A.851(20).

(11) The Organisation shall ensure that adopted ship reporting systems are reviewed under the guidelines and criteria developed by the Organisation.

Vessel traffic services.

193. (1) Vessel traffic services (VTS) contribute to safety of life at sea, safety and efficiency of navigation and protection of the marine environment, adjacent shore areas, work sites and offshore installations from possible adverse effects of maritime traffic.

(2) Contracting States undertake to arrange for the establishment of VTS where, in their opinion, the volume of traffic or the degree of risk justifies such services.

(3) Contracting States planning and implementing VTS shall, wherever possible, follow the guidelines developed by the Organisation.* The use of VTS may only be made mandatory in sea areas within the territorial seas of a coastal State.

(4) Contracting States shall endeavour to secure the participation in, and compliance with, the provisions of vessel traffic services by ships entitled to fly their flag.

(5) Nothing in this regulation or the guidelines adopted by the Organisation shall prejudice the rights and duties of governments under international law or the legal regimes of straits used for international navigation and archipelagic sea lanes.

Establishment and operation of aids to navigation.

194. (1) Each Contracting State undertakes to provide, as it deems practical and necessary, either individually or in co-operation with other Contracting States, such aids to navigation as the volume of traffic justifies and the degree of risk requires.

(2) In order to obtain the greatest possible uniformity in aids to navigation, Contracting States undertake to take into account the international recommendations and guidelines* when establishing such aids.

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* Refer to the Guidelines on vessel traffic services adopted by the Organisation by resolution A.857(20).

* Refer to the appropriate recommendation and guidelines of IALA and to SN/Circ.107, Maritime buoyage system.

(3) Contracting States undertake to arrange for information relating to aids to navigation to be made available to all concerned. Changes in the transmissions of position-fixing systems which could adversely affect the performance of receivers fitted in ships shall be avoided as far as possible and only be effected after timely and adequate notice has been promulgated.

Ships' manning.

195. (1) Contracting States undertake, each for its national ships, to maintain or, if it is necessary, to adopt measures for the purpose of ensuring that, from the point of view of safety of life at sea, all ships shall be sufficiently and efficiently manned.†

(2) Every ship to which Chapter I applies shall be provided with an appropriate minimum safe manning document or equivalent issued by the Director as evidence of the minimum safe manning considered necessary to comply with sub-regulation (1).

(3) On all ships, to ensure effective crew performance in safety matters, a working language shall be established and recorded in the ship's log-book. The company, as defined in regulation 255, or the master, as appropriate, shall determine the appropriate working language. Each seafarer shall be required to understand and, where appropriate, give orders and instructions and to report back in that language. If the working language is not an official language of the State whose flag the ship is entitled to fly, all plans and lists required to be posted shall include a translation into the working language.

(4) On ships to which Chapter I applies, English shall be used on the bridge as the working language for bridge-to-bridge and bridge-to-shore safety communications as well as for communications on board between the pilot and bridge watchkeeping personnel,* unless those directly involved in the communication speak a common language other than English.

† Refer to the principles of safe manning adopted by the Organisation by resolution A.890(21).

* The IMO Standard Marine Communication Phrases (MSC/Circ.794), as amended, may be used in this respect.

Principles relating to bridge design, design and arrangement of navigational systems and equipment and bridge procedures.

196. All decisions which are made for the purpose of applying the requirements of regulations 200, 203, 205, 206, 208 and 209 and which affect bridge design, the design and arrangement of navigational systems and equipment on the bridge and bridge procedures† shall be taken with the aim of —

(a) facilitating the tasks to be performed by the bridge team and the pilot in making full appraisal of the situation and in navigating the ship safely under all operational conditions;

(b) promoting effective and safe bridge resource management;

(c) enabling the bridge team and the pilot to have convenient and continuous access to essential information which is presented in a clear and unambiguous manner, using standardised symbols and coding systems for controls and displays;

(d) indicating the operational status of automated functions and integrated components, systems and sub-systems;

(e) allowing for expeditious, continuous and effective information processing and decision-making by the bridge team and the pilot;

(f) preventing or minimising excessive or unnecessary work and any condition or distraction on the bridge which may cause fatigue or interfere with the vigilance of the bridge team and the pilot; and

(g) minimising the risk of human error and detecting such error, if it occurs, through monitoring and alarm systems, in time for the bridge team and the pilot to take appropriate action.

Maintenance of equipment.

197. (1) The Director shall be satisfied that adequate arrangements are in place to ensure that the performance of the equipment required by this Chapter is maintained.

† Refer to the Guidelines on ergonomic criteria for bridge equipment and layout (MSC/Circ.982) and the Performance standards for IBS (resolution MSC.64(67), annex 1) and for INS (resolution MSC.86(70), annex 3).

(2) Except as provided in paragraph *(b)* of sub-regulation (2) of regulation 8, regulations 9 and 10, while all reasonable steps shall be taken to maintain the equipment required by this Chapter in efficient working order, malfunctions of that equipment shall not be considered as making the ship unseaworthy or as a reason for delaying the ship in ports where repair facilities are not readily available, provided suitable arrangements are made by the master to take the inoperative equipment or unavailable information into account in planning and executing a safe voyage to a port where repairs can take place.

Electromagnetic compatibility.

198. (1) The Director shall ensure that all electrical and electronic equipment on the bridge or in the vicinity of the bridge, on ships constructed on or after 1st. July, 2002, is tested for electromagnetic compatibility, taking into account the recommendations developed by the Organisation.*

(2) Electrical and electronic equipment shall be so installed that electromagnetic interference does not affect the proper function of navigational systems and equipment.

(3) Portable electrical and electronic equipment shall not be operated on the bridge if it may affect the proper function of navigational systems and equipment.

Approval, surveys and performance standards of navigational systems and equipment and voyage data recorder.

199. (1) Systems and equipment required to meet the requirements of regulations 200 and 201 shall be of a type approved by the Director.

(2) Systems and equipment, including associated back-up arrangements, where applicable, installed on or after 1st. July, 2002 to perform the functional requirements of regulations 200 and 201 shall conform to appropriate performance standards not inferior to those adopted by the Organisation.*

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* Refer to the general requirements for electromagnetic compatibility for all electrical and electronic ship's equipment adopted by the Organisation by resolution A.813(19).

* Refer to the following recommendations adopted by the Organisation by the resolutions indicated —

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.694(17));
Recommendation on performance standards for gyro-compasses (resolution A.424(XI));
Recommendation on performance standards for radar equipment (resolution MSC.64(67), annex 4);
Performance standards for automatic radar plotting aids (resolution A.823(19));

(3) When systems and equipment are replaced or added to on ships constructed before 1st. July, 2002, such systems and equipment shall, in so far as is reasonable and practicable, comply with the requirements of sub-regulation (2).

(footnote continued)

Recommendation on performance standards for electronic chart display and information systems (ECDIS) (resolution A.817(19), as amended by resolution MSC.64(67), annex 5, and MSC.86(70), annex 4, as appropriate);
Recommendation on accuracy standards for navigation (resolution A.529(13));
Recommendation on performance standards for shipborne Loran-C and Chayka receivers (resolution A.818(19));
Recommendation on performance standards for shipborne global positioning system receiver equipment (resolution A.819(19), as amended by resolution MSC.112(73));
Recommendation on performance standards for shipborne GLONASS receiver equipment (resolution MSC.53(66), as amended by resolution MSC.113(73));
Recommendation on performance standards for shipborne DGPS and DGLONASS maritime radio beacon receiver equipment (resolution MSC.64(67), annex 2, as amended by resolution MSC.114(73));
Recommendation on performance standards for combined GPS/GLONASS receiver equipment (resolution MSC.74(69), annex 1, as amended by resolution MSC.115(73));
Recommendation on performance standards for heading control systems (resolution MSC.64(67), annex 3);
Recommendation on performance standards for track control systems (resolution MSC.74(69), annex 2);
Recommendation on performance standards for a universal shipborne automatic identification system (AIS) (resolution MSC.74(69), annex 3);
Recommendation on performance standards for echo-sounding equipment (resolution A.224(VII), as amended by resolution MSC.74(69), annex 4);
Recommendation on performance standards for devices to indicate speed and distance (resolution A.824(19), as amended by resolution MSC.96(72));
Performance standards for rate-of-turn indicators (resolution A.526(13));
Recommendation on unification of performance standards for navigational equipment (resolution A.575(14));
Recommendation on methods of measuring noise levels at listening posts (resolution A.343(IX));
Recommendation on performance standards for radar reflectors (resolution A.384(X));
Recommendation on performance standards for magnetic compasses (resolution A.382(X));
Recommendation on performance standards for daylight signalling lamps (resolution MSC.95(72));
Recommendation on performance standards for sound reception systems (resolution MSC.86(70), annex 1);
Recommendation on performance standards for marine transmitting magnetic heading devices (TMHDs) (resolution MSC.86(70), annex 2);
Recommendation on performance standards for voyage data recorders (VDRs) (resolution A.861(20));
Recommendations on performance standards for marine transmitting heading devices (THDs) (resolution MSC.116(73)).

(4) Systems and equipment installed prior to the adoption of performance standards by the Organisation may subsequently be exempted from full compliance with such standards at the discretion of the Director, having due regard to the recommended criteria adopted by the Organisation. For an electronic chart display and information system (ECDIS) to be accepted as satisfying the chart carriage requirement of paragraph *(a)*(iv) of sub-regulation (2) of regulation 200, that system shall conform to the relevant performance standards not inferior to those adopted by the Organisation in effect on the date of installation or, for systems installed before 1st. January, 1999, not inferior to the performance standards adopted by the Organisation on 23rd. November, 1995.*

(5) The Director shall require that the manufacturers have a quality control system audited by a competent authority to ensure continuous compliance with the type approval conditions. Alternatively, the Director may use final product verification procedures where the compliance with the type approval certificate is verified by a competent authority before the product is installed on board ships.

(6) Before giving approval to systems or equipment embodying new features not covered by this Chapter, the Director shall ensure that such features support functions at least as effective as those required by this Chapter.

(7) When equipment, for which performance standards have been developed by the Organisation, is carried on ships in addition to those items of equipment required by regulations 200 and 201, 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 voyage data recorder system, including all sensors, shall be subjected to an annual performance test. The test shall be conducted by an approved testing or servicing facility to verify the accuracy, duration and recoverability of the recorded data. In addition, tests and inspections shall be conducted to determine the serviceability of all protective enclosures and devices fitted to aid location. A copy of the certificate of compliance issued by the testing facility, stating the date of compliance and the applicable performance standards, shall be retained on board the ship.

* Recommendation on performance standards for electronic chart display and information systems (ECDIS) (resolution A.817(19)).

Carriage requirements for shipborne navigational systems and equipment.

Application and requirements.

200. (1) Subject to sub-regulation (4) of regulation 182 —

(a) ships constructed on or after 1st. July, 2002 shall be fitted with navigational systems and equipment which will fulfill the requirements prescribed in paragraphs *(a)* to (i) of sub-regulation (2);

(b) ships constructed before 1st. July, 2002 shall —

(i) subject to sub-paragraphs (ii) and (iii), unless they comply fully with this regulation, continue to be fitted with equipment which fulfills the requirements prescribed in regulations V/11, V/12 and V/20 of the International Convention for the Safety of Life at Sea, 1974 in force prior to 1st. July, 2002;

(ii) be fitted with the equipment or systems required in paragraph *(a)*(vi) of sub-regulation (2) not later than the first survey after 1st. July, 2002, at which time the radio direction-finding apparatus referred to in regulation V/12(p) of the International Convention for the Safety of Life at Sea, 1974 in force prior to 1st. July, 2002 shall no longer be required; and

(iii) be fitted with the system required in paragraph *(d)* of sub-regulation (2) not later than the dates specified in sub-paragraphs (ii) and (iii) of paragraph *(d)* of sub-regulation (2).

Shipborne navigational equipment and systems.

(2) *(a)* All ships, irrespective of size, shall have —

(i) a properly adjusted standard magnetic compass, or other means, independent of any power supply, to determine the ship's heading and display the reading at the main steering position;

(ii) a pelorus or compass bearing device, or other means, independent of any power supply, to take bearings over an arc of the horizon of 360°;

(iii) means of correcting heading and bearings to true at all times;

(iv) nautical charts and nautical publications to plan and display the ship's route for the intended voyage and to plot and monitor positions throughout the voyage; an electronic chart display and information system (ECDIS) may be accepted as meeting the chart carriage requirements of this sub-paragraph;

(v) back-up arrangements to meet the functional requirements of sub-paragraph (iv), if this function is partly or fully fulfilled by electronic means*;

(vi) a receiver for a global navigation satellite system or a terrestrial radio navigation system, or other means, suitable for use at all times throughout the intended voyage to establish and update the ship's position by automatic means;

(vii) if less than 150 tons and if practicable, a radar reflector, or other means, to enable detection by ships navigating by radar at both 9 and 3 GHz;

(viii) when the ship's bridge is totally enclosed and, unless the Director determines otherwise, a sound reception system, or other means, to enable the officer in charge of the navigational watch to hear sound signals and determine their direction;

(ix) a telephone, or other means, to communicate heading information to the emergency steering position, if provided.

(b) All ships of 150 tons and upwards and passenger ships, irrespective of size, shall, in addition to the requirements of paragraph *(a)*, be fitted with —

(i) a spare magnetic compass, interchangeable with the magnetic compass as referred to in sub-paragraph (i) of paragraph *(a)*, or other means, to perform the function referred to in sub-paragraph (i) of paragraph *(a)* by means of replacement or duplicate equipment;

(ii) a daylight signalling lamp, or other means, to communicate by light during day and night using an energy source of electrical power not solely dependent upon the ship's power supply.

* An appropriate folio of paper nautical charts may be used as a back-up arrangement for ECDIS. Other back-up arrangements for ECDIS are acceptable (see appendix 6 to resolution A.817(19), as amended).

(c) All ships of 300 tons and upwards and passenger ships, irrespective of size, shall, in addition to meeting the requirements of paragraph *(b)*, be fitted with —

(i) an echo-sounding device, or other electronic means, to measure and display the available depth of water;

(ii) a 9 GHz radar, or other means, to determine and display the range and bearing of radar transponders and of other surface craft, obstructions, buoys, shorelines and navigational marks to assist in navigation and in collision avoidance;

(iii) an electronic plotting aid, or other means, to plot electronically the range and bearing of targets to determine collision risk;

(iv) speed and distance measuring device, or other means, to indicate speed and distance through the water;

(v) a properly adjusted transmitting heading device, or other means, to transmit heading information for input to the equipment referred to in sub-paragraphs (ii) and (iii) and paragraph *(d)*.

(d) All ships of 300 tons and upwards engaged on international voyages and cargo ships of 500 tons and upwards not engaged on international voyages and passenger ships, irrespective of size, shall be fitted with an automatic identification system (AIS), as follows —

(i) ships constructed on or after 1st. July, 2002;

(ii) ships engaged on international voyages constructed before 1st. July, 2002 —

(A) in the case of passenger ships, not later than 1st. July, 2003;

(B) in the case of tankers, not later than the first survey for safety equipment* on or after 1st. July, 2003;

(C) in the case of ships, other than passenger ships and tankers, of 50,000 tons and upwards, not later than 1st. July, 2004;

* Refer to regulation 9.

(D) in the case of ships, other than passenger ships and tankers, of 10,000 tons and upwards but less than 50,000 tons, not later than 1st. July, 2005;

(E) in the case of ships, other than passenger ships and tankers, of 3,000 tons and upwards but less than 10,000 tons, not later than 1st. July, 2006;

(F) in the case of ships, other than passenger ships and tankers, of 300 tons and upwards but less than 3,000 tons, not later than 1st. July, 2007;

(iii) ships not engaged on international voyages constructed before 1st. July, 2002, not later than 1st. July, 2008;

(iv) the Director may exempt ships from the application of the requirements of this paragraph when such ships will be taken permanently out of service within 2 years after the implementation date specified in sub-paragraphs (ii) and (iii);

(v) AIS shall —

(A) provide automatically to appropriately equipped shore stations, other ships and aircraft information, including the ship's identity, type, position, course, speed, navigational status and other safety-related information;

(B) receive automatically such information from similarly fitted ships;

(C) monitor and track ships; and

(D) exchange data with shore-based facilities;

(vi) the requirements of sub-paragraph (v) shall not be applied to cases where international agreements, rules or standards provide for the protection of navigational information; and

(vii) AIS shall be operated taking into account the guidelines adopted by the Organisation.*

(e) All ships of 500 tons and upwards shall, in addition to meeting the requirements of paragraph *(c)*, with the exception of sub-paragraphs (iii) and (v) of paragraph *(c)*, and the requirements of paragraph *(d)*, have —

* Refer to the guidelines on the operation of AIS on ships to be developed by the Organisation.

(i) a gyro-compass, or other means, to determine and display their heading by shipborne non-magnetic means and to transmit heading information for input to the equipment referred in sub-paragraph (ii) of paragraph *(c)*, paragraph *(d)* and sub-paragraph (v);

(ii) a gyro-compass heading repeater, or other means, to supply heading information visually at the emergency steering position, if provided;

(iii) a gyro-compass bearing repeater, or other means, to take bearings, over an arc of the horizon of 360°, using the gyro-compass, or other means, referred to in sub-paragraph (i). Ships of less than 1,600 tons shall be fitted with such means as far as possible;

(iv) rudder, propeller, thrust, pitch and operational mode indicators, or other means, to determine and display rudder angle, propeller revolutions, the force and direction of thrust and, if applicable, the force and direction of lateral thrust and the pitch and operational mode, all to be readable from the conning position; and

(v) an automatic tracking aid, or other means, to plot automatically the range and bearing of other targets to determine collision risk.

(f) On all ships of 500 tons and upwards, failure of one piece of equipment should not reduce the ship's ability to meet the requirements of sub-paragraphs (i), (ii) and (iv) of paragraph *(a)*.

(g) All ships of 3,000 tons and upwards shall, in addition to meeting the requirements of paragraph *(e)*, have —

(i) a 3 GHz radar or, where considered appropriate by the Director, a second 9 GHz radar, or other means, to determine and display the range and bearing of other surface craft, obstructions, buoys, shorelines and navigational marks to assist in navigation and in collision avoidance which are functionally independent of those referred to in sub-paragraph (ii) of paragraph *(c)*; and

(ii) a second automatic tracking aid, or other means, to plot automatically the range and bearing of other targets to determine collision risk which are functionally independent of those referred to in sub-paragraph (v) of paragraph *(e)*.

(h) All ships of 10,000 tons and upwards shall, in addition to meeting the requirements of paragraph *(g)*, with the exception of sub-paragraph (ii) of paragraph *(g)*, have —

(i) an automatic radar plotting aid, or other means, to plot automatically the range and bearing of at least 20 other targets, connected to a device to indicate speed and distance through the water, to determine collision risks and simulate a trial manoeuvre; and

(ii) a heading or track control system, or other means, to automatically control and keep to a heading or straight track.

(i) All ships of 50,000 tons and upwards shall, in addition to meeting the requirements of paragraph *(h)*, have —

(i) a rate-of-turn indicator, or other means, to determine and display the rate of turn; and

(ii) a speed and distance measuring device, or other means, to indicate speed and distance over the ground in the forward and athwartships direction.

(3) When other means are permitted under this regulation, such means must be approved by the Director in accordance with regulation 199.

(4) The navigational equipment and systems referred to in this regulation shall be so installed, tested and maintained as to minimise malfunction.

(5) Navigational equipment and systems offering alternative modes of operation shall indicate the actual mode of use.

(6) Integrated bridge systems* shall be so arranged that failure of one sub-system is brought to the immediate attention of the officer in charge of the navigational watch by audible and visual alarms and does not cause failure to any other sub-system. In case of failure in one part of an integrated navigational system,† it shall be possible to operate each other individual item of equipment or part of the system separately.

* Refer to resolution MSC.64(67), annex 1, Performance standard for integrated bridge systems.

† Refer to resolution MSC.86(70), annex 3, Performance standard for integrated navigational systems.

Voyage data recorders.

201. (1) To assist in casualty investigations, ships, when engaged on international voyages, subject to sub-regulation (4) of regulation 182, shall be fitted with a voyage data recorder (VDR) as follows —

(a) passenger ships constructed on or after 1st. July, 2002;

(b) ro-ro passenger ships constructed before 1st. July, 2002, not later than the first survey on or after 1st. July, 2002;

(c) passenger ships, other than ro-ro passenger ships, constructed before 1st. July, 2002, not later than 1st. January, 2004; and

(d) ships, other than passenger ships, of 3,000 tons and upwards constructed on or after 1st. July, 2002.

(2) The Director may exempt ships, other than ro-ro passenger ships, constructed before 1st. July, 2002 from being fitted with a VDR where it can be demonstrated that interfacing a VDR with the existing equipment on the ship is unreasonable and impracticable.

International Code of Signals.

202. All ships which, in accordance with the present Convention, are required to carry a radio installation shall carry the International Code of Signals as may be amended by the Organisation. The Code shall also be carried by any other ship which, in the opinion of the Director, has a need to use it.

Navigation bridge visibility.

203. (1) Ships of not less than 45 metres in length, as defined in regulation 128, constructed on or after 1st. July, 1998, shall meet the following requirements —

(a) the view of the sea surface from the conning position shall not be obscured by more than 2 ship lengths, or 500 metres, whichever is less, forward of the bow to 10° on either side under all conditions of draught, trim and deck cargo;

(b) no blind sector, caused by cargo, cargo gear or other obstructions outside of the wheelhouse forward of the beam which obstructs the view of the sea surface as seen from the conning position, shall exceed 10°. The total arc of blind sectors shall not exceed 20°. The clear sectors between blind sectors shall be at least 5°. In the view described in paragraph *(a)*, each individual blind sector shall not exceed 5°;

(c) the horizontal field of vision from the conning position shall extend over an arc of not less than 225°, that is from right ahead to not less than 22.5° abaft the beam on either side of the ship;

(d) from each bridge wing, the horizontal field of vision shall extend over an arc of at least 225°, that is from at least 45° on the opposite bow through right ahead and then from right ahead to right astern through 180° on the same side of the ship;

(e) from the main steering position, the horizontal field of vision shall extend over an arc from right ahead to at least 60° on each side of the ship;

(f) the ship's side shall be visible from the bridge wing;

(g) the height of the lower edge of the navigation bridge front windows above the bridge deck shall be kept as low as possible. In no case shall the lower edge present an obstruction to the forward view as described in this regulation;

(h) the upper edge of the navigation bridge front windows shall allow a forward view of the horizon, for a person with a height of eye of 1,800 millimetres above the bridge deck at the conning position, when the ship is pitching in heavy seas. The Director, if satisfied that a 1,800 millimetres height of eye is unreasonable and impracticable, may allow reduction of the height of eye but not to less than 1,600 millimetres;

(i) windows shall meet the following requirements —

(i) to help avoid reflections, the bridge front windows shall be inclined from the vertical plane top out, at an angle of not less than 10° and not more than 25°;

(ii) framing between navigation bridge windows shall be kept to a minimum and not be installed immediately forward of any work station;

(iii) polarised and tinted windows shall not be fitted;

(iv) a clear view through at least 2 of the navigation bridge front windows and, depending on the bridge configuration, an additional number of clear-view windows shall be provided at all times, regardless of weather conditions.

(2) Ships constructed before 1st. July, 1998 shall, where practicable, meet the requirements of paragraphs *(a)* and *(b)* of sub-regulation (1). Structural alterations or additional equipment need not be required.

(3) On ships of unconventional design which, in the opinion of the Director, cannot comply with this regulation, arrangements shall be provided to achieve a level of visibility that is as near as practical to that prescribed in this regulation.

Pilot transfer arrangements.

Application.

204. (1) *(a)* Ships engaged on voyages in the course of which pilots are likely to be employed shall be provided with pilot transfer arrangements.

(b) Equipment and arrangements for pilot transfer which are installed on or after 1st. January, 1994 shall comply with the requirements of this regulation, and due regard shall be paid to the standards adopted by the Organisation.*

(c) Equipment and arrangements for pilot transfer which are provided on ships before 1st. January, 1994 shall at least comply with the requirements of regulation 17 of the International Convention for the Safety of Life at Sea, 1974 in force prior to that date, and due regard shall be paid to the standards adopted by the Organisation prior to that date.

(d) Equipment and arrangements which are replaced after 1st. January, 1994 shall, in so far as is reasonable and practicable, comply with the requirements of this regulation.

General.

(2) *(a)* All arrangements used for pilot transfer shall efficiently fulfill their purpose of enabling pilots to embark and disembark safely. The appliances shall be kept clean, properly maintained and stowed and shall be regularly inspected to ensure that they are safe to use. They shall be used solely for the embarkation and disembarkation of personnel.

(b) The rigging of the pilot transfer arrangements and the embarkation of a pilot shall be supervised by a responsible officer having means of communication with the navigation bridge who shall arrange for the escort of the pilot by a safe route to and from the navigation bridge. Personnel engaged in rigging and operating any mechanical equipment shall be instructed in the safe procedures to be adopted and the equipment shall be tested prior to use.

* Refer to the recommendation on pilot transfer arrangements adopted by the Organisation by resolution A.889(21) and to MSC/Circ.568/Rev.1, Required boarding arrangements for pilots.

Transfer arrangements.

(3) *(a)* Arrangements shall be provided to enable the pilot to embark and disembark safely on either side of the ship.

(b) In all ships where the distance from sea level to the point of access to, or egress from, the ship exceeds 9 metres, and when it is intended to embark and disembark pilots by means of the accommodation ladder, or by means of mechanical pilot hoists or other equally safe and convenient means in conjunction with a pilot ladder, the ship shall carry such equipment on each side, unless the equipment is capable of being transferred for use on either side.

(c) Safe and convenient access to, and egress from, the ship shall be provided by either —

(i) a pilot ladder requiring a climb of not less than 1.5 metres and not more than 9 metres above the surface of the water, so positioned and secured that —

(A) it is clear of any possible discharges from the ship;

(B) it is within the parallel body length of the ship and, as far as is practicable, within the mid-ship half length of the ship;

(C) each step rests firmly against the ship's side. Where constructional features, such as rubbing bands, would prevent the implementation of this provision, special arrangements shall, to the satisfaction of the Director, be made to ensure that persons are able to embark and disembark safely;

(D) the single length of pilot ladder is capable of reaching the water from the point of access to, or egress from, the ship and due allowance is made for all conditions of loading and trim of the ship, and for an adverse list of 15°. The securing strong point, shackles and securing ropes shall be at least as strong as the side ropes;

(ii) an accommodation ladder in conjunction with the pilot ladder or other equally safe and convenient means, whenever the distance from the surface of the water to the point of access to the ship is more than 9 metres. The accommodation ladder shall be sited leading aft. When in use, the lower end of the accommodation ladder shall rest firmly against the ship's side within the parallel body length of the ship and, as far as is

practicable, within the mid-ship half length and clear of all discharges; or

(iii) a mechanical pilot hoist so located that it is within the parallel body length of the ship and, as far as is practicable, within the mid-ship half length of the ship and clear of all discharges.

Access to ship's deck.

(4) Means shall be provided to ensure safe, convenient and unobstructed passage for any person embarking on, or disembarking from, the ship between the head of the pilot ladder, or of any accommodation ladder or other appliance, and the ship's deck. Where such passage is by means of —

(a) a gateway in the rails or bulwark, adequate handholds shall be provided;

(b) a bulwark ladder, 2 handhold stanchions rigidly secured to the ship's structure at or near their bases and at higher points shall be fitted. The bulwark ladder shall be securely attached to the ship to prevent overturning.

Shipside doors.

(5) Shipside doors used for pilot transfer shall not open outwards.

Mechanical pilot hoists.

(6) *(a)* The mechanical pilot hoist and its ancillary equipment shall be of a type approved by the Director. The pilot hoist shall be designed to operate as a moving ladder to lift and lower one person on the side of the ship, or as a platform to lift and lower one person on the side of the ship. It shall be of such design and construction as to ensure that the pilot can be embarked and disembarked in a safe manner, including a safe access from the hoist to the deck and from the deck to the hoist. Such access shall be gained directly by a platform securely guarded by handrails.

(b) Efficient hand gear shall be provided to lower or recover the person or persons carried, and kept ready for use in the event of power failure.

(c) The hoist shall be securely attached to the structure of the ship. Attachment shall not be solely by means of the ship's side rails. Proper and

strong attachment points shall be provided for hoists of the portable type on each side of the ship.

(d) If belting is fitted in the way of the hoist position, such belting shall be cut back sufficiently to allow the hoist to operate against the ship's side.

(e) A pilot ladder shall be rigged adjacent to the hoist and be available for immediate use so that access to it is available from the hoist at any point of its travel. The pilot ladder shall be capable of reaching the sea level from its own point of access to the ship.

(f) The position on the ship's side where the hoist will be lowered shall be indicated.

(g) An adequate protected stowage position shall be provided for the portable hoist. In very cold weather, to avoid the danger of ice formation, the portable hoist shall not be rigged until its use is imminent.

Associated equipment.

(7) *(a)* The following associated equipment shall be kept at hand ready for immediate use when persons are being transferred —

(i) 2 man-ropes of not less than 28 millimetres in diameter, properly secured to the ship, if required by the pilot;

(ii) a lifebuoy equipped with a self-igniting light;

(iii) a heaving line.

(b) When required by sub-regulation (4), stanchions and bulwark ladders shall be provided.

Lighting.

(8) Adequate lighting shall be provided to illuminate the transfer arrangements overside, the position on deck where a person embarks or disembarks and the controls of the mechanical pilot hoist.

Use of heading and track control systems.

205. (1) In areas of high traffic density, in conditions of restricted visibility and in all other hazardous navigational situations where heading and track control

systems are in use, it shall be possible to establish manual control of the ship's steering immediately.

(2) In circumstances as mentioned in sub-regulation (1), the officer in charge of the navigational watch shall have available without delay the services of a qualified helmsperson who shall be ready at all times to take over steering control.

(3) The change-over from automatic to manual steering or otherwise shall be made by, or under the supervision of, a responsible officer.

(4) The manual steering shall be tested after prolonged use of heading or track control systems and before entering areas where navigation demands special caution.

Operation of steering gear.

206. In areas where navigation demands special caution, ships shall have more than one steering gear power unit in operation when such units are capable of simultaneous operation.

Steering gear: testing and drills.

207. (1) Within 12 hours before departure, the ship's steering gear shall be checked and tested by the ship's crew. The test procedure shall include, where applicable, the operation of the following —

(a) the main steering gear;

(b) the auxiliary steering gear;

(c) the remote steering gear control systems;

(d) the steering positions located on the navigation bridge;

(e) the emergency power supply;

(f) the rudder angle indicators in relation to the actual position of the rudder;

(g) the remote steering gear control system power failure alarms;

(h) the steering gear power unit failure alarms; and

(i) automatic isolating arrangements and other automatic equipment.

(2) The checks and tests shall include —

(a) the full movement of the rudder according to the required capabilities of the steering gear;

(b) a visual inspection of the steering gear and its connecting linkage; and

(c) the operation of the means of communication between the navigation bridge and steering gear compartment.

(3) Simple operating instructions with a block diagram showing the change-over procedures for remote steering gear control systems and steering gear power units shall be permanently displayed on the navigation bridge and in the steering compartment.

(4) All ships' officers concerned with the operation or maintenance of steering gear shall be familiar with the operation of the steering systems fitted on the ship and with the procedures for changing from one system to another.

(5) In addition to the routine checks and test prescribed in sub-regulations (1) and (2), emergency steering drills shall take place at least once every 3 months in order to practice emergency steering procedures. These drills shall include direct control within the steering gear compartment, the communications procedure with the navigation bridge and, where applicable, the operation of alternative power supplies.

(6) The Director may waive the requirements to carry out the checks and tests prescribed in sub-regulations (1) and (2) for ships which regularly engage on voyages of short duration. Such ships shall carry out these checks and tests at least once every week.

(7) The date upon which the checks and tests prescribed in sub-regulations (1) and (2) are carried out and the date and details of emergency steering drills carried out under sub-regulation (5) shall be recorded.

Nautical charts and nautical publications.

208. Nautical charts and nautical publications, such as sailing direction, lists of lights, notices to mariners, tide tables and all other nautical publications necessary for the intended voyage, shall be adequate and up to date.

Records of navigational activities.

209. All ships engaged on international voyages shall keep on board a record of navigational activities and incidents which are of importance to safety of

navigation and which must contain sufficient detail to restore a complete record of the voyage, taking into account the recommendations adopted by the Organisation.* When such information is not maintained in the ship's log-book, it shall be maintained in another form approved by the Director.

Life-saving signals to be used by ships, aircraft or persons in distress.

210. An illustrated table describing the life-saving signals* shall be readily available to the officer of the watch of every ship to which this Chapter applies. The signals shall be used by ships or persons in distress when communicating with life-saving stations, maritime rescue units and aircraft engaged in search and rescue operations.

Operational limitations.

211. (1) This regulation applies to all passenger ships to which Chapter I applies.

(2) A list of all limitations on the operation of a passenger ship, including exemptions from any of these Regulations, restrictions in operating areas, weather restrictions, sea state restrictions, restrictions in permissible loads, trim, speed and any other limitations, whether imposed by the Director or established during the design or the building stages, shall be compiled before the passenger ship is put in service. The list, together with any necessary explanations, shall be documented in a form acceptable to the Director, which shall be kept on board readily available to the master. The list shall be kept updated. If the language used is not English, a translation into that language shall be included.

Danger messages.

212. (1) The master of every ship which meets with dangerous ice, a dangerous derelict, or any other direct danger to navigation, or a tropical storm, or encounters sub-freezing air temperatures associated with gale force winds causing severe ice accretion on superstructures, or winds of force 10 or above on the Beaufort scale for which no storm warning has been received, is bound to communicate the information by all means at his disposal to ships in the vicinity, and also to the competent authorities. The form in which the information is sent is not obligatory. It may be transmitted either in plain language, preferably English, or by means of the International Code of Signals.

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* Refer to the Guidelines for recording events related to navigation to be developed by the Organisation.

* Such life-saving signals are described in the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual, volume III, Mobile Facilities, and illustrated in the International Code of Signals, as amended pursuant to resolution A.80(IV).

(2) Each Contracting State shall take all steps necessary to ensure that when intelligence of any of the dangers specified in sub-regulation (1) is received, it shall be promptly brought to the knowledge of those concerned and communicated to other interested governments.

(3) The transmission of messages regarding the dangers specified is free of cost to the ships concerned.

(4) All radio messages issued under sub-regulation (1) shall be preceded by the safety signal, using the procedure as prescribed by the Radio Regulations as defined in regulation 164.

Information required in danger messages.

213. The following information is required in danger messages —

(a) ice, derelicts and other direct dangers to navigation —

(i) the kind of ice, derelict or danger observed;

(ii) the position of the ice, derelict or danger when last observed;

(iii) the time and date (Universal Co-ordinated Time) when the danger was last observed;

(b) tropical cyclones (storms)* —

(i) a statement that a tropical cyclone has been encountered. This obligation should be interpreted in a broad spirit, and information transmitted whenever the master has good reason to believe that a tropical cyclone is developing or exists in the neighbourhood;

(ii) the time, date (Universal Co-ordinated Time) and position of ship when the observation was taken;

(iii) as much of the following information as is practicable should be included in the message —

(A) barometric pressure,* preferably corrected (stating millibars, millimetres, or inches, and whether corrected or uncorrected);

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* The term "tropical cyclone" is the generic term used by national meteorological services of the World Meteorological Organisation. The terms "hurricane", "typhoon", "cyclone", "severe tropical storm" etc. may also be used, depending on the geographical location.

* The standard international unit for barometric pressure is the hectopascal (hPa), which is numerically equivalent to the millibar (mbar).

(B) barometric tendency (the change in barometric pressure during the past 3 hours);

(C) true wind direction;

(D) wind force (Beaufort scale);

(E) state of the sea (smooth, moderate, rough, high);

(F) swell (slight, moderate, heavy) and the true direction from which it comes. Period or length of swell (short, average, long) would also be of value;

(G) true course and speed of ship;

Subsequent observations.

(c) when a master has reported a tropical cyclone or other dangerous storm, it is desirable, but not obligatory, that further observations be made and transmitted hourly, if practicable, but in any case at intervals of not more than 3 hours, so long as the ship remains under the influence of the storm;

(d) winds of force 10 or above on the Beaufort scale for which no storm warning has been received. This is intended to deal with storms other than the tropical cyclones referred to in paragraph *(b)*. When such a storm is encountered, the message should contain similar information to that listed under paragraph *(b)* but excluding the details concerning sea and swell;

(e) sub-freezing air temperatures associated with gale force winds causing severe ice accretion on superstructures —

(i) time and date (Universal Co-ordinated Time);

(ii) air temperature;

(iii) sea temperature, if practicable;

(iv) wind force and direction.

Examples

Ice

TTT ICE. LARGE BERG SIGHTED IN 4506 N, 4410 W, AT 0800 UTC. MAY 15.

Derelicts

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 cyclone

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.

Icing

TTT EXPERINENCING 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.

Distress messages: obligations and procedures.

214. (1) The master of a ship at sea which is in a position to be able to provide assistance, on receiving a signal from any source that persons are in distress at sea, is bound to proceed with all speed to their assistance, if possible informing them or the search and rescue service that the ship is doing so. If the ship receiving the distress alert is unable or, in the special circumstances of the case,

considers it unreasonable or unnecessary to proceed to their assistance, the master must enter in the log-book the reason for failing to proceed to the assistance of the persons in distress, taking into account the recommendation of the Organisation to inform the appropriate search and rescue service accordingly.

(2) The master of a ship in distress or the search and rescue service concerned, after consultation, so far as may be possible, with the masters of ships which answer the distress alert, has the right to requisition one or more of those ships as the master of the ship in distress or the search and rescue service considered best able to render assistance, and it shall be the duty of the master or masters of the ship or ships requisitioned to comply with the requisition by continuing to proceed with all speed to the assistance of persons in distress.

(3) Masters of ships shall be released from the obligation imposed by sub-regulation (1) on learning that their ships have not been requisitioned and that one or more other ships have been requisitioned and are complying with the requisition. This decision shall, if possible, be communicated to the other requisitioned ships and to the search and rescue service.

(4) The master of a ship shall be released from the obligation imposed by sub-regulation (1) and, if his ship has been requisitioned, from the obligation imposed by sub-regulation (2) on being informed by the persons in distress or by the search and rescue service or by the master of another ship which has reached such persons that assistance is no longer necessary.

(5) This regulation do not prejudice the Convention for the Unification of Certain Rules of Law relating to Assistance and Salvage at Sea, signed at Brussels on 23rd. September, 1910, particularly the obligation to render assistance imposed by Article 11 of that Convention.*

Safe navigation and avoidance of dangerous situations.

215. (1) Prior to proceeding to sea, the master shall ensure that the intended voyage has been planned using the appropriate nautical charts and nautical publications for the area concerned, taking into account the guidelines and recommendations developed by the Organisation.†

(2) The voyage plan shall identify a route which —

(a) takes into account any relevant ships' routeing systems;

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* International Convention on Salvage, 1989, done at London on 28th. April, 1989, entered into force on 14th. July, 1996.

† Refer to the Guidelines for voyage planning adopted by the Organisation by resolution A.893(21).

(b) ensures sufficient sea room for the safe passage of the ship throughout the voyage;

(c) anticipates all known navigational hazards and adverse weather conditions; and

(d) takes into account the marine environmental protection measures that apply, and avoids, as far as possible, actions and activities which could cause damage to the environment.

(3) The owner, the charterer, or the company, as defined in regulation 255, operating the ship or any other person shall not prevent or restrict the master of the ship from taking or executing any decision which, in the master's professional judgment, is necessary for safe navigation and protection of the marine environment.

Misuse of distress signals.

216. The use of an international distress signal, except for the purpose of indicating that a person or persons are in distress, and the use of any signal which may be confused with an international distress signal are prohibited.

CHAPTER VI

CARRIAGE OF CARGOES

PART A

GENERAL PROVISIONS

Application.

217. (1) This Chapter applies to the carriage of cargoes (except liquids in bulk, gases in bulk and those aspects of carriage covered by other Chapters) which, owing to their particular hazards to ships or persons on board, may require special precautions in all ships to which the present regulations apply and in cargo ships of less than 500 tons. For cargo ships of less than 500 tons, the Director, if he considers that the sheltered nature and conditions of voyage are such as to render the application of any specific requirements of this Part or Part B unreasonable or unnecessary, may take other effective measures to ensure the required safety for these ships.

(2) For the purposes of this Part and Part B, the following Codes and Guidance shall be complied with wherever applicable —

(a) the Code of Safe Practice for Cargo Stowage and Securing adopted by the Organisation by resolution A.714(17), as amended;

(b) the Code of Safe Practice for Ships Carrying Timber Deck Cargoes adopted by the Organisation by resolution A.715(17), as amended; 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;

(c) the Code of Safe Practice for Solid Bulk Cargoes (BC Code) adopted by the Organisation by resolution A.434(XI), as amended; and

(d) the Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code) adopted by the Organisation by resolution A.562(14).

Cargo information.

218. (1) The shipper shall provide the master or his representative with appropriate information on the cargo sufficiently in advance of loading to enable the precautions which may be necessary for proper stowage and safe carriage of the cargo to be put into effect. Such information* shall be confirmed in writing† and by appropriate shipping documents prior to loading the cargo on the ship. For the purpose of this regulation, the cargo information required in sub-chapter 1.9 of the Code of Safe Practice for Cargo Stowage and Securing, adopted by the Organisation by resolution A.714(17), as may be amended, shall be provided.

(2) The cargo information shall include —

(a) in the case of general cargo, and of cargo carried in cargo units, a general description of the cargo, the gross mass of the cargo or of the cargo units, and any relevant special properties of the cargo;

(b) in the case of bulk cargo, information on the stowage factor of the cargo, the trimming procedures, likelihood of shifting including angle of repose, if applicable, and any other relevant special properties. In the case of a concentrate or other cargo which may liquefy, additional information in the form of a certificate on the moisture content of the cargo and its transportable moisture limit; and

* Refer to MSC/Circ.663, Form for cargo information.

† Reference to documents in this regulation does not preclude the use of electronic data processing (EDP) and electronic data interchange (EDI) transmission techniques as an aid to paper documentation.

(c) in the case of a bulk cargo not classified in accordance with regulation 227, but which has chemical properties that may create a potential hazard, in addition to the information required by paragraphs *(a)* and *(b)*, information on its chemical properties.

(3) Prior to loading cargo units on board ships, the shipper shall ensure that the gross mass of such units is in accordance with the gross mass declared on the shipping documents.

Oxygen analysis and gas detection equipment.

219. (1) When transporting a bulk cargo which is liable to emit a toxic or flammable gas, or cause oxygen depletion in the cargo space, an appropriate instrument for measuring the concentration of gas or oxygen in the air shall be provided together with detailed instructions for its use. Such an instrument shall be to the satisfaction of the Director.

(2) Masters of ships in which such instruments are provided shall ensure that the crew are trained in the use of such instruments.

Use of pesticides in ships.*

220. Appropriate precautions shall be taken in the use of pesticides in ships, in particular for the purposes of fumigation.

Stowage and securing.

221. (1) Cargo and cargo units carried on or under deck shall be so loaded, stowed and secured as to prevent as far as is practicable, throughout the voyage, damage or hazard to the ship and the persons on board, and loss of cargo overboard.

(2) Cargo carried in a cargo unit shall be so packed and secured within the unit as to prevent, throughout the voyage, damage or hazard to the ship and the persons on board.

(3) Appropriate precautions shall be taken during loading and transport of heavy cargoes or cargoes with abnormal physical dimensions to ensure that no structural damage to the ship occurs and to maintain adequate stability throughout the voyage.

* Refer to the IMO Recommendation on the Safe Use of Pesticides in Ships, as amended.

(4) Appropriate precautions shall be taken during loading and transport of cargo units on board ro-ro ships, especially with regard to the securing arrangements on board such ships and on the cargo units and with regard to the strength of the securing points and lashings.

(5) Containers shall not be loaded to more than the maximum gross weight indicated on the Safety Approval Plate under the International Convention for Safe Containers (CSC).

(6) All cargoes, other than solid and liquid bulk cargoes, shall be loaded, stowed and secured throughout the voyage in accordance with the Cargo Securing Manual approved by the Director or an authorised organisation. In ships with ro-ro cargo spaces, as defined in regulation 108, all securing of such cargoes, in accordance with the Cargo Securing Manual, shall be completed before the ship leaves berth. The Cargo Securing Manual shall be drawn up to a standard at least equivalent to the relevant guidelines developed by the Organisation.*

PART B

SPECIAL PROVISIONS FOR BULK CARGOES OTHER THAN GRAIN

Acceptability for shipment.

222. (1) Prior to loading a bulk cargo, the master shall be in possession of comprehensive information on the ship's stability and on the distribution of cargo for the standard loading conditions. The method of providing such information shall be to the satisfaction of the Director.†

(2) Concentrates or other cargoes which may liquefy shall only be accepted for loading when the actual moisture content of the cargo is less than its transportable moisture limit. Such concentrates and other cargoes may be accepted for loading even when their moisture content exceeds the above limit, provided that safety arrangements to the satisfaction of the Director are made to ensure adequate stability in the case of cargo shifting and further provided that the ship has adequate structural integrity.

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* Refer to the Guidelines on the preparation of the Cargo Securing Manual, approved by the Maritime Safety Committee of the Organisation and promulgated by MSC/Circ.745.

† Refer to —

1. the Recommendation on Intact Stability for Passenger and Cargo Ships under 100 Metres in Length adopted by the Organisation by resolution A.167(ES.IV) and to amendments to this Recommendation, adopted by the Organisation by resolution A.206(VII); and

2. the Recommendation on a Severe Wind and Rolling Criterion (Weather Criterion) for the Intact Stability of Passenger and Cargo Ships of 24 Metres in Length and Over, adopted by the Organisation by resolution A.562(14).

(3) Prior to loading a bulk cargo which is not a cargo classified in accordance with regulation 227 but which has chemical properties that may create a potential hazard, special precautions for its safe carriage shall be taken.

Loading, unloading and stowage of bulk cargoes.

223. (1) For the purpose of this regulation, "terminal representative" means a person appointed by the terminal or other facility, where the ship is loading or unloading, who has responsibility for operations conducted by that terminal or facility with regard to the particular ship.

(2) To enable the master to prevent excessive stresses in the ship's structure, the ship shall be provided with a booklet, which shall be written in a language with which the ship's officers responsible for cargo operations are familiar. If this language is not English, the ship shall be provided with a booklet written also in the English language. The booklet shall, as a minimum, include —

(a) stability data, as required by regulation 60;

(b) ballasting and deballasting rates and capacities;

(c) maximum allowable load per unit surface area of the tank top plating;

(d) maximum allowable load per hold;

(e) general loading and unloading instructions with regard to the strength of the ship's structure, including any limitations on the most adverse operating conditions during loading, unloading, ballasting operations and the voyage;

(f) any special restrictions such as limitations on the most adverse operating conditions imposed by the Director or authorised organisation; and

(g) where strength calculations are required, maximum permissible forces and moments on the ship's hull during loading, unloading and the voyage.

(3) Before a solid bulk cargo is loaded or unloaded, the master and the terminal representative shall agree on a plan which shall ensure that the permissible forces and moments on the ship are not exceeded during loading or unloading, and shall include the sequence, quantity and rate of loading or unloading, taking into consideration the speed of loading or unloading, the number of pours and the deballasting or ballasting capability of the ship. The plan and any subsequent amendments thereto shall be lodged with the appropriate authority of the Port State.

(4) Bulk cargoes shall be loaded and trimmed reasonably level, as necessary, to the boundaries of the cargo space so as to minimise the risk of shifting and to ensure that adequate stability will be maintained throughout the voyage.

(5) When bulk cargoes are carried in between-decks, the hatchways of such between-decks shall be closed in those cases where the loading information indicates an unacceptable level of stress of the bottom structure if the hatchways are left open. The cargo shall be trimmed reasonably level and shall either extend from side to side or be secured by additional longitudinal divisions of sufficient strength. The safe load-carrying capacity of the between-decks shall be observed to ensure that the deck structure is not overloaded.

(6) The master and terminal representative shall ensure that loading and unloading operations are conducted in accordance with the agreed plan.

(7) If during loading or unloading any of the limits of the ship referred to in sub-regulation (2) are exceeded or are likely to become so if the loading or unloading continues, the master has the right to suspend operation and the obligation to notify accordingly the appropriate authority of the Port State with which the plan has been lodged. The master and the terminal representative shall ensure that corrective action is taken. When unloading cargo, the master and terminal representative shall ensure that the unloading method does not damage the ship's structure.

(8) The master shall ensure that ship's personnel continuously monitor cargo operations. Where possible, the ship's draught shall be checked regularly during loading or unloading to confirm the tonnage figures supplied. Each draught and tonnage observation shall be recorded in a cargo log-book. If significant deviations from the agreed plan are detected, cargo or ballast operations or both shall be adjusted to ensure that the deviations are corrected.

PART C

CARRIAGE OF GRAIN

Interpretation.

224. For the purposes of this Part, unless expressly provided otherwise —

"grain" includes wheat, maize (corn), oats, rye, barley, rice, pulses, seeds and processed forms thereof whose behaviour is similar to that of grain in its natural state;

"International Grain Code" means the International Code for the Safe Carriage of Grain in Bulk adopted by the Maritime Safety Committee of the

Organisation by resolution MSC.23(59), as may be amended by the Organisation, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of Article VIII of the present Convention concerning the amendment procedures applicable to the Annex other than Chapter I.

Requirements for cargo ships carrying grain.

225. (1) In addition to any other applicable requirements of the present regulations, a cargo ship carrying grain shall comply with the requirements of the International Grain Code, and hold a document of authorisation as required by that Code. For the purpose of this regulation, the requirements of the Code shall be treated as mandatory.

(2) A ship without such a document shall not load grain until the master satisfies the Director, or the Contracting State of the port of loading on behalf of the Director, that the ship will comply with the requirements of the International Grain Code in its proposed loaded condition.

CHAPTER VII

CARRIAGE OF DANGEROUS GOODS

PART A

CARRIAGE OF DANGEROUS GOODS IN PACKAGED FORM OR IN SOLID FORM IN BULK

Application.

226. (1) Unless expressly provided otherwise, this Part applies to dangerous goods classified under regulation 227 which are carried in packaged form or in solid form in bulk (referred to in this Part as dangerous goods), in all ships to which these Regulations apply and in cargo ships of less than 500 tons.

(2) This Part does not apply to ships' stores and equipment.

(3) The carriage of dangerous goods is prohibited except in accordance with this Part. In addition, the requirements of Part D shall apply to the carriage of INF cargo as defined in regulation 240.

(4) In addition to this Part, the safe packing, marking, labelling and stowage of specific dangerous goods or categories of dangerous goods and the precautions necessary in their relation to other cargo shall be in accordance with

the International Maritime Dangerous Goods Code (IMDG Code) and the relevant sections and the related parts of Appendix B of the Code of Safe Practice for Solid Bulk Cargoes (BC Code) adopted by the Organisation by resolution A.434(XI) and as amended and adopted by the Organisation from time to time.

Classification.

227. Dangerous goods shall be divided into the following classes —

(a) Class 1 - explosives;

(b) Class 2 - gases: compressed, liquefied or dissolved under pressure;

(c) Class 3 - flammable* liquids;

(d) Class 4.1 - flammable† solids;

(e) Class 4.2 - substances liable to spontaneous combustion;

(f) Class 4.3 - substances which, in contact with water, emit flammable‡ gases;

(g) Class 5.1 - oxidising substances;

(h) Class 5.2 - organic peroxides;

(i) Class 6.1 - toxic substances;

(j) Class 6.2 - infectious substances;

(k) Class 7 - radioactive materials;

(l) Class 8 - corrosives;

(m) Class 9 - miscellaneous dangerous substances and articles, that is any other substance which experience has shown, or may show, to be of such a dangerous character that this Part shall apply to it.

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* Flammable has the same meaning as inflammable.

† Flammable has the same meaning as inflammable.

‡ Flammable has the same meaning as inflammable.

Packaging.

228. (1) The packaging of goods shall be —

(a) well made and in good condition;

(b) of such a character that any interior surface with which the contents may come in contact is not dangerously affected by the substance being conveyed; and

(c) capable of withstanding the ordinary risks of handling and carriage by sea.

(2) Where the use of absorbent or cushioning material is customary in the packaging of liquids in receptacles, that material shall be —

(a) capable of minimising the dangers to which the liquid may give rise;

(b) so disposed as to prevent movement and ensure that the receptacle remains surrounded; and

(c) where reasonably possible, of sufficient quantity to absorb the liquid in the event of breakage of the receptacle.

(3) Receptacles containing dangerous liquids shall have an ullage at the filling temperature sufficient to allow for the highest temperature during the course of normal carriage.

(4) Cylinders or receptacles for gases under pressure shall be adequately constructed, tested, maintained and correctly filled.

(5) Empty uncleaned receptacles which have been used previously for the carriage of dangerous goods shall be subject to the provisions of this Part for filled receptacles, unless adequate measures have been taken to nullify any hazard.

Marking, labelling and placarding.

229. (1) Packages containing dangerous goods shall be durably marked with the correct technical name. Trade names alone shall not be used.

(2) Packages containing dangerous goods shall be provided with distinctive labels or stencils of the labels, or placards as appropriate, so as to make clear the dangerous properties of the goods contained therein.

(3) The method of marking the correct technical name and of affixing labels or applying stencils of labels, or of affixing placards on packages containing dangerous goods, shall be such that this information will still be identifiable on packages surviving at least 3 months' immersion in the sea. In considering suitable marking, labelling and placarding methods, account shall be taken of the durability of the materials used and of the surface of the package.

(4) Packages containing dangerous goods shall be so marked and labelled, except that —

(a) packages containing dangerous goods of a low degree of hazard or packed in limited quantities*; or

(b) when special circumstances permit, packages that are stowed and handled in units that are identified by labels or placards,

may be exempted from labelling requirements as provided for in the IMDG Code.

Documents.

230. (1) In all documents relating to the carriage of dangerous goods by sea where the goods are named, the correct technical name of the goods shall be used (trade names alone shall not be used) and the correct description given in accordance with the classification set out in regulation 227.

(2) The shipping documents prepared by the shipper shall include, or be accompanied by, a signed certificate or declaration that the shipment offered for carriage is properly packaged and marked, labelled or placarded, as appropriate, and in proper condition for carriage.

(3) The persons responsible for the packing of dangerous goods in a freight container or road vehicle shall provide a signed container packing certificate or vehicle packing declaration stating that the cargo in the unit has been properly packed and secured and that all applicable transport requirements have been met. Such a certificate or declaration may be combined with the document referred to in sub-regulation (2).

(4) Where there is due cause to suspect that a freight container or road vehicle in which dangerous goods are packed is not in compliance with the requirements of sub-regulation (2) or (3), or where a container packing certificate or vehicle packing declaration is not available, the freight container or vehicle shall not be accepted for shipment.

* Refer to the specific exemptions provided in the IMDG Code.

(5) Each ship carrying dangerous goods shall have a special list or manifest setting forth, in accordance with the classification set out in regulation 227, the dangerous goods on board and the location thereof. A detailed stowage plan, which identifies by class and sets out the location of all dangerous goods on board, may be used in place of such a special list or manifest. A copy of one of these documents shall be made available before departure to the person or organisation designated by the Port State authority.

(6) Every ship carrying dangerous goods shall carry the IMDG Code and the relevant sections and related parts of Appendix B of the BC Code, as appropriate.

Stowage and securing.

231. (1) Dangerous goods shall be loaded, stowed and secured safely and appropriately in accordance with the nature of the goods. Incompatible goods shall be segregated from one another.

(2) Explosives (except ammunition) which present a serious risk shall be stowed in a magazine which shall be kept securely closed while at sea. Such explosives shall be segregated from detonators. Electrical apparatus and cables in any compartment in which explosives are carried shall be so designed and used as to minimise the risk of fire or explosion.

(3) Dangerous goods in packaged form which give off dangerous vapours shall be stowed in an approved ventilated space or on deck. Dangerous goods in solid form in bulk which give off dangerous vapours shall be stowed in a well ventilated space.

(4) In ships carrying flammable liquids or gases, special precautions shall be taken where necessary against fire or explosion.

(5) Substances which are liable to spontaneous heating or combustion shall not be carried unless adequate precautions have been taken to minimise the likelihood of the outbreak of fire.

(6) All cargoes, other than solid and liquid bulk cargoes, shall be loaded, stowed and secured throughout the voyage in accordance with the Cargo Securing Manual approved by the Director or an authorised organisation. In ships with ro-ro cargo spaces, as defined in regulation 108, all securing of such cargoes, in accordance with the Cargo Securing Manual, shall be completed before the ship leaves berth. The Cargo Securing Manual shall be drawn up to a standard at least equivalent to the relevant guidelines developed by the Organisation.*

* Refer to the Guidelines on the preparation of the Cargo Securing Manual, approved by the Maritime Safety Committee of the Organisation and promulgated by MSC/Circ.745.

Explosives in passenger ships.†

232. (1) Explosives in division 1.4, compatibility group S may be carried in any amount in passenger ships. No other explosives may be carried except any one of the following —

(a) explosives articles for life-saving purposes, if the total net explosives mass of such articles does not exceed 50 kg per ship;

(b) explosives in compatibility groups C, D and E, if the total net explosives mass does not exceed 10 kg per ship;

(c) explosives articles in compatibility group G other than those requiring special stowage, if the total net explosives mass does not exceed 10 kg per ship;

(d) explosives articles in compatibility group B, if the total net explosives mass does not exceed 5 kg per ship; or

(e) articles in compatibility group N shall only be allowed in passenger ships if the total net explosives mass does not exceed 50 kg per ship and no other explosives, apart from division 1.4 compatibility group S, are carried.

(2) Notwithstanding the provisions of sub-regulation (1), additional quantities or types of explosives may be carried in passenger ships in which special safety measures approved by the Director are taken.

Reporting of incidents involving dangerous goods.

233. (1) When an incident takes place involving the loss or likely loss overboard of packaged dangerous goods into the sea, the master, or other person having charge of the ship, shall report the particulars of such an incident without delay and to the fullest extent possible to the nearest coastal State. The report shall be based on the guidelines and general principles adopted by the Organisation.*

(2) In the event of the ship referred to in sub-regulation (1) being abandoned, or in the event of a report from such a ship being incomplete or unobtainable, the owner, charterer, manager or operator of the ship, or their agents shall, to the fullest extent possible, assume the obligations placed upon the master by this regulation.

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† Refer to Class 1 of the IMDG Code.

* Refer to the general principles for ship reporting systems and ship reporting requirements, including guidelines for reporting incidents involving dangerous goods, harmful substances or marine pollutants adopted by the Organisation by resolution A.851(20).

PART B

CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS LIQUID CHEMICALS IN BULK

Interpretation.

234. For the purpose of this Part, unless expressly provided otherwise —

"chemical tanker" means a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product listed in Chapter 17 of the IBC Code;

"International Bulk Chemical Code (IBC Code)" means the International Code for the Construction and Equipment of Ships Carrying Dangerous Liquid Chemicals in Bulk adopted by the Organisation and as amended and adopted by the Organisation from time to time;

"ship constructed" means a ship the keel of which is laid or which is at a similar stage of construction;

"similar stage of construction" means the stage at which —

(a) construction identifiable with a specific ship begins; and

(b) assembly of that ship has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less.

Application to chemical tankers.

235. (1) Unless expressly provided otherwise, this Part applies to chemical tankers constructed on or after 1st. July, 1986 including those of less than 500 tons. Such tankers shall comply with the requirements of this Part in addition to any other applicable requirements of these Regulations.

(2) Any chemical tanker, irrespective of the date of construction, which undergoes repairs, alterations, modifications and outfitting related thereto shall continue to comply with at least the requirements previously applicable to the ship. Such a ship if constructed before 1st. July, 1986 shall, as a rule, comply with the requirements for a ship constructed on or after that date to at least the same extent as before undergoing such repairs, alterations, modifications or outfitting. Repairs, alterations and modifications of a major character, and outfitting related thereto, shall meet the requirements for a ship constructed on or after 1st. July, 1986 in so far as the Director deems reasonable and practicable.

(3) A ship, irrespective of the date of construction, which is converted to a chemical tanker, shall be treated as a chemical tanker constructed on the date on which such conversion commenced.

Requirements for chemical tankers.

236. (1) A chemical tanker shall comply with the requirements of the IBC Code as applicable and shall, in addition to the requirements of regulations 9, 10 and 11 as applicable, be surveyed and certified as provided for in that Code. For the purpose of this regulation, the requirements of the Code shall be treated as mandatory.

(2) A chemical tanker holding a certificate issued pursuant to sub-regulation (1) shall be subject to the control established in regulation 20. For this purpose, such certificate shall be treated as a certificate issued under regulations 13 and 14.

(3) Chemical tankers, other than those defined in regulation 234, constructed before 1st. July, 1986, including those of less than 500 tons, shall comply with the requirements of the Bulk Chemical Code adopted by the Assembly of the Organisation by resolution A.212(VII) as amended, as applicable.

(4) For chemical tankers, other than those defined in regulation 234, constructed before 1st. July, 1986, including those of less than 500 tons, the IBC Code shall be considered at least equivalent to the Bulk Chemical Code (resolution A.212(VII)) up to and including the tenth set of amendment.

(5) Where the provisions of the IBC Code are applied to chemical tankers constructed before 1st. July, 1986 and, where the requirements of the Code have been fully complied with, paragraph 4 of the Certificate of Fitness issued under resolution A.212(VII) shall be endorsed as follows —

> "As permitted by resolution MSC.7(48), the ship has been surveyed in accordance with the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk and found to comply with the relevant provisions thereof.".

(6) A chemical tanker shall carry at least one copy of the IBC Code or the Bulk Chemical Code, as appropriate.

PART C

CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK

Interpretation.

237. For the purpose of this Part, unless expressly provided otherwise —

"gas carrier" means a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas or other product listed in Chapter 19 of the IGC Code;

"International Gas Carrier Code (IGC Code)" means the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk adopted by the Organisation and as amended and adopted by the Organisation from time to time;

"ship constructed" means a ship the keel of which is laid or which is at a similar stage of construction;

"similar stage of construction" means the stage at which —

(a) construction identifiable with a specific ship begins; and

(b) assembly of that ship has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less.

Application to gas carriers.

238. (1) Unless expressly provided otherwise, this Part applies to gas carriers constructed on or after 1st. July, 1986 including those of less than 500 tons. Such gas carriers shall comply with the requirements of this Part in addition to any other applicable requirements of these Regulations.

(2) Any gas carrier, irrespective of the date of construction, which undergoes repairs, alterations, modifications and outfitting related thereto shall continue to comply with at least the requirements previously applicable to the ship. Such a ship if constructed before 1st. July, 1986 shall, as a rule, comply with the requirements for a ship constructed on or after that date to at least the same extent as before undergoing such repairs, alterations, modifications or outfitting. Repairs, alterations and modifications of a major character, and outfitting related thereto, shall meet the requirements for a ship constructed on or after 1st. July, 1986 in so far as the Director deems reasonable and practicable.

(3) A ship, irrespective of the date of construction, which is converted to a gas carrier, shall be treated as a gas carrier constructed on the date on which such conversion commenced.

Requirements for gas carriers.

239. (1) A gas carrier shall comply with the requirements of the IGC Code as applicable and shall, in addition to the requirements of regulations 9, 10 and 11 as applicable, be surveyed and certified as provided for in that Code. For the purpose of this regulation, the requirements of the Code shall be treated as mandatory.

(2) A gas carrier holding a certificate issued pursuant to sub-regulation (1) shall be subject to the control established in regulation 20. For this purpose, such certificate shall be treated as a certificate issued under regulations 13 and 14.

(3) Gas carriers, other than those defined in regulation 237, constructed before 1st. July, 1986 including those of less than 500 tons, shall comply with the requirements of the Gas Carrier Code adopted by the Assembly of the Organisation by resolution A.328(IX) and the Code for Existing Ships Carrying Liquefied Gases in Bulk adopted by the Assembly of the Organisation by resolution A.329(IX) as amended, as applicable.

(4) For gas carriers, other than those defined in regulation 237, constructed before 1st. July, 1986 including those of less than 500 tons, the IGC Code shall be considered at least equivalent to the Gas Carrier Code (resolution A.328(IX)) up to and including the fourth set of amendment.

(5) Where the provisions of the IGC Code are applied to gas carriers constructed before 1st. July, 1986 and, where the requirements of the Code have been fully complied with, paragraph 5 of the Certificate of Fitness issued under resolution A.328(IX) shall be endorsed as follows —

> "As permitted by resolution MSC.7(48), the ship has been surveyed in accordance with the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk and found to comply with the relevant provisions thereof.".

(6) A gas carrier shall carry the IGC Code or the Gas Carrier Code and the Code for Existing Ships Carrying Liquefied Gases in Bulk, as appropriate.

PART D

SPECIAL REQUIREMENTS FOR CARRIAGE OF PACKAGED IRRADIATED NUCLEAR FUEL, PLUTONIUM AND HIGH-LEVEL RADIOACTIVE WASTES ON BOARD SHIPS

Interpretation.

240. For the purpose of this Part, unless expressly provided otherwise —

"high-level radioactive wastes" means liquid wastes resulting from the operation of the first stage extraction system or the concentrated wastes from subsequent extraction stages, in a facility for reprocessing irradiated nuclear fuel, or solids, into which such liquid wastes have been converted;

"IMDG Code" means the International Maritime Dangerous Goods Code adopted by the Assembly of the Organisation by resolution A.716(17), as amended by the Maritime Safety Committee;

"INF cargo" means packaged irradiated nuclear fuel, plutonium and high-level radioactive wastes carried as cargo in accordance with Class 7 of IMDG Code, schedule 10, 11, 12 or 13;

"INF Code" means the International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships, adopted by the Maritime Safety Committee of the Organisation by resolution MSC.88(71), as may be amended by the Organisation, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of Article VII of the present Convention concerning the amendment procedures applicable to the Annex other than Chapter I;

"irradiated nuclear fuel" means material containing uranium, thorium or plutonium isotopes which has been used to maintain a self-sustaining nuclear chain reaction;

"plutonium" means the resultant mixture of isotopes of that material extracted from irradiated nuclear fuel from processing.

Application to ships carrying INF cargo.

241. (1) Except as provided for in sub-regulation (2), this Part shall apply to all ships regardless of the date of construction and size, including cargo ships of less than 500 tons, engaged in the carriage of INF cargo.

(2) This Part and the INF Code do not apply to warships, naval auxiliary or other vessels owned or operated by a Contracting State and used, for the time

being, only on government non-commercial service. The Director may require such ships to carry INF cargo act in a manner consistent, so far as reasonable and practicable, with this Part and the INF Code.

Requirements for ships carrying INF cargo.

242. (1) A ship carrying INF cargo shall comply with the requirements of the INF Code in addition to any other applicable requirements of the present regulations and shall be surveyed and certified as provided for in that Code.

(2) A ship holding a certificate issued pursuant to sub-regulation (1) shall be subject to the control established in regulations 20 and 267. For this purpose, such certificate shall be treated as a certificate issued under regulation 13 or 14.

CHAPTER VIII

NUCLEAR SHIPS

Application.

243. This Chapter applies to all nuclear ships except ships of war.

Application of other Chapters.

244. The regulations contained in the other Chapters apply to nuclear ships except as modified by this Chapter.*

Exemptions.

245. A nuclear ship shall not, in any circumstances, be exempted from compliance with any requirement of these Regulations.

Approval of reactor installation.

246. The design, construction and standards of inspection and assembly of the reactor installation shall be subject to the approval and satisfaction of the Director and shall take account of the limitations which will be imposed on surveys by the presence of radiation.

* Refer to the Code of Safety for Nuclear Merchant Ships (resolution A.491(XII)) which supplements the requirements of this Chapter.

Suitability of reactor installation.

247. The reactor installation shall be designed, having regard to the special conditions of service on board ship, both in normal and exceptional circumstances of navigation.

Radiation safety.

248. All necessary measures shall be taken to ensure that there are no unreasonable radiation or other nuclear hazards, at sea or in port, to the crew, passengers or public, or to the waterways or food or water resources.

Safety assessment.

249. (1) A safety assessment shall be prepared to permit evaluation of the nuclear power plant and safety of the ship to ensure that there are no unreasonable radiation or other hazards, at sea or in port, to the crew, passengers or public, or to the waterways or food or water resources. The Director, when satisfied, shall approve such safety assessment which shall always be kept up-to-date.

(2) The safety assessment shall be made available sufficiently in advance to the Contracting State of the countries which a nuclear ship intends to visit so that they may evaluate the safety of the ship.

Operating manual.

250. A fully detailed operating manual shall be prepared for the information and guidance of the operating personnel in their duties on all matters relating to the operation of the nuclear power plant and having an important bearing on safety. The Director, when satisfied, shall approve such operating manual and a copy shall be kept on board the ship. The operating manual shall always be kept up-to-date.

Surveys.

251. Survey of nuclear ships shall include the applicable requirements of regulation 8, or of regulations 9, 10 and 11, except in so far as surveys are limited by the presence of radiation. In addition, the surveys shall include any special requirements of the safety assessment. They shall, in all cases, notwithstanding the provisions of regulations 9 and 11, be carried out not less frequently than once a year.

Certificates.

252. (1) Sub-regulation (1) of regulation 13 and regulation 15 shall not apply to nuclear ships.

(2) A Nuclear Passenger Ship Safety Certificate shall be issued after inspection and survey to a nuclear passenger ship which complies with the requirements of Chapters II-1, II-2, III, IV and this Chapter, and any other relevant requirements of these Regulations.

(3) A Nuclear Cargo Ship Safety Certificate shall be issued after inspection and survey to a nuclear cargo ship which satisfies the requirements for cargo ships on survey set out in regulation 11, and complies with the requirements of Chapters II-1, II-2, III, IV and this Chapter, and any other relevant requirements of these Regulations.

(4) Nuclear Passenger Ship Safety Certificates and Nuclear Cargo Ship Safety Certificates shall state the following —

> "That the ship, being a nuclear ship, complied with all requirements of Chapter VIII of the Convention and conformed to the safety assessment approved for the ship.".

(5) Nuclear Passenger Ship Safety Certificates and Nuclear Cargo Ship Safety Certificates shall be valid for a period of not more than one year.

(6) Nuclear Passenger Ship Safety Certificates and Nuclear Cargo Ship Safety Certificates shall be issued either by the Director or by any person or organisation duly authorised by him.

Special control.*

253. In additional to the control established by regulation 20, nuclear ships shall be subject to special control before entering and while in Brunei Darussalam, directed towards verifying that there is on board a valid Nuclear Ship Safety Certificate and that there are no unreasonable radiation or other hazards, at sea or in port, to the crew, passengers or public, or to the waterways or food or water resources.

* Refer to the IMO/IAEA Safety Recommendation on the use of ports by nuclear merchant ships.

Casualties.

254. In the event of any accident likely to lead to an environmental hazard —

(a) the master of a Brunei Darussalam nuclear ship shall immediately inform the Director. The master shall also immediately inform the competent Government authority of the country in whose waters the ship may be, or whose waters the ship approaches in a damaged condition;

(b) the master of any nuclear ship which is in, or near to, or which is bound for Brunei Darussalam in a damaged condition shall immediately inform the Director.

CHAPTER IX

MANAGEMENT FOR SAFE OPERATION OF SHIPS

Interpretation.

255. For the purpose of this Chapter, unless expressly provided otherwise —

"bulk carrier" means a ship which is constructed generally with single deck, top-side tanks and hopper side tanks in cargo spaces, and is intended primarily to carry dry cargo in bulk, and includes such types as ore carriers and combination carriers*;

"chemical tanker" means a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product listed in Chapter 17 of the IBC Code;

"company" means the owner of the ship or any other organisation or person such as the manager, or the bareboat charterer, who has assumed the responsibility for operation of the ship from the owner of the ship and who on assuming such responsibility has agreed to take over all the duties and responsibilities imposed by the International Safety Management Code;

"gas carrier" means a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas or other product listed in Chapter 19 of the IGC Code;

* Refer to resolution MSC.79(70) relating to interpretation of provisions of Chapter XII on additional safety measures for bulk carriers.

"high speed craft" means a craft of a maximum speed in metres per second (m/s) equal to or exceeding —

$$3.7\ \nabla^{0.1667}$$

where ∇ = displacement corresponding to the designed water-line (m^3), excluding craft the hull of which is supported completely clear above the water surface in non-displacement mode by aerodynamic forces generated by ground effect;

"International Safety Management (ISM) Code" means the International Management Code for the Safe Operation of Ships and for Pollution Prevention adopted by the Organisation by resolution A.741(18), as may be amended by the Organisation, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of Article VIII of the present Convention concerning the amendment procedures applicable to the Annex other than Chapter I;

"mobile offshore drilling unit (MODU)" means a vessel capable of engaging in drilling operations for the exploration for, or exploitation of, resources beneath the seabed such as liquid or gaseous hydrocarbons, sulphur or salt;

"oil tanker" means an oil tanker as defined in Regulation 1 of Annex I of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973.

Application.

256. (1) This Chapter applies to ships, regardless of the date of construction, as follows —

(a) passenger ships including passenger high speed craft, not later than 1st. July, 1998;

(b) oil tankers, chemical tankers, gas carriers, bulk carriers and cargo high speed craft of 500 tons and upwards, not later than 1st. July, 1998; and

(c) other cargo ships and mobile offshore drilling units of 500 tons and upwards, not later than 1st. July, 2002.*

(2) This Chapter does not apply to ships operated by the Government used for non-commercial purposes.

* The Maritime Safety Committee, at its 66th session, decided that mobile offshore drilling units not propelled by mechanical means need not comply with the requirements of this Chapter.

Safety management requirements.

257. (1) The company and the ship shall comply with the requirements of the International Safety Management Code. For the purpose of this regulation, the requirements of the Code shall be treated as mandatory.

(2) The ship shall be operated by a company holding a Document of Compliance referred to in regulation 258.

Certification.

258. (1) A Document of Compliance shall be issued to every company which complies with the requirements of the International Safety Management Code. This document shall be issued by the Director, by an authorised organisation, or at the request of the Director by another Contracting State.

(2) A copy of the Document of Compliance shall be kept on board the ship in order that the master can produce it on request for verification.

(3) A Safety Management Certificate shall be issued to every ship by the Director or an authorised organisation. The Director or an authorised organisation shall, before issuing the Safety Management Certificate, verify that the company and its shipboard management operate in accordance with the approved safety management system.

Maintenance of conditions.

259. The safety management system shall be maintained in accordance with the provisions of the International Safety Management Code.

Verification and control.

260. (1) The Director, another Contracting State at the request of the Director or an authorised organisation shall periodically verify the proper functioning of the ship's safety management system.

(2) A ship required to hold a certificate issued pursuant to sub-regulation (3) of regulation 258 shall be subject to control in accordance with regulation 267. For this purpose, such certificate shall be treated as a certificate issued under regulation 13 or 14.

CHAPTER X

SAFETY MEASURES FOR HIGH SPEED CRAFT

Interpretation.

261. For the purpose of this Chapter —

"craft constructed" means a craft the keel of which is laid or which is at a similar stage of construction;

"high speed craft" is a craft of a maximum speed in metres per second (m/s) equal to or exceeding -

$$3.7\ \nabla^{0.1667}$$

where ∇ = displacement corresponding to the designed water-line (m^3), excluding craft the hull of which is supported completely clear above the water surface in non-displacement mode by aerodynamic forces generated by ground effect;

"High Speed Craft Code, 1994 (1994 HSC Code)" means the International Code of Safety for High Speed Craft adopted by the Organisation by resolution MSC.36(63), as may be amended by the Organisation, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of Article VIII of the present Convention concerning the amendment procedures applicable to the Annex other than Chapter I;

"High Speed Craft Code, 2000 (2000 HSC Code)" means the International Code of Safety for High Speed Craft, 2000, adopted by the Organisation, provided that such amendment are adopted, brought into force and take effect in accordance with the provisions of Article VIII of the present Convention concerning the amendment procedures applicable to the Annex other than Chapter I;

"similar stage of construction" means a stage at which —

(a) construction identifiable with a specific craft begins; and

(b) assembly of that craft has commenced comprising at least 50 tonnes or 3% of the estimated mass of all structural material, whichever is the less.

Application.

262. (1) This Chapter applies to high speed craft constructed on or after 1st. January, 1996, as follows —

(a) passenger craft which do not proceed in the course of their voyage more than 4 hours at operational speed from a place of refuge when fully laden; and

(b) cargo craft of 500 tons and upwards which do not proceed in the course of their voyage more than 8 hours at operational speed from a place of refuge when fully laden.

(2) Any craft, irrespective of the date of construction, which undergoes repairs, alterations, modifications and outfitting related thereto shall continue to comply with at least the requirements previously applicable to the craft. Such a craft, if constructed before 1st. July, 2002, shall, as a rule, comply with the requirements for a craft constructed on or after that date to at least the same extent as it did before undergoing such repairs, alterations, modifications or outfitting. Repairs, alterations and modifications of a major character, and outfitting related thereto, shall meet the requirements for a craft constructed on or after 1st. July, 2002 in so far as the Director deems reasonable and practicable.

Requirements for high speed craft.

263. (1) Notwithstanding the provisions of Chapters I, II, III and IV and regulations 199, 200 and 201 —

(a) a high speed craft constructed on or after 1st. January, 1996 but before 1st. 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 provided for in that Code shall be deemed to have complied with the requirements of Chapters I, II, III and IV and regulations 199, 200 and 201. For the purpose of this regulation, the requirements of the Code shall be treated as mandatory;

(b) a high speed craft constructed on or after 1st. 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 provided in the Code shall be deemed to have complied with the requirements of Chapters I, II, III and IV and regulations 199, 200 and 201.

(2) The certificates and permits issued under the High Speed Craft Code shall have the same force and the same recognition as the certificates issued under Chapter I.

CHAPTER XI

SPECIAL MEASURES TO ENHANCE MARITIME SAFETY

Authorisation of authorised organisations.

264. Authorised organisations defined in regulation 3 shall comply with the guidelines adopted by the Organisation by resolution A.739(18), as may be amended by the Organisation and the specifications adopted by the Organisation by resolution A.789(19), as may be amended by the Organisation, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of Article VIII of the present Convention concerning the amendment procedures applicable to the Annex other than Chapter I.

Enhanced surveys.

265. Bulk carriers as defined in regulation 255 and oil tankers as defined in regulation 25 shall be subject to an enhanced programme of inspections in accordance with the guidelines adopted by the Organisation by resolution A.744(18), as may be amended by the Organisation, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of Article VIII of the present Convention concerning the amendment procedures applicable to the Annex other than Chapter I.

Ship identification number.

266. (1) This regulation applies to all passenger ships of 100 tons and upwards and to all cargo ships of 300 tons and upwards.

(2) Every ship shall be provided with an identification number which conforms to the IMO ship identification number scheme adopted by the Organisation.*

(3) The ship's identification number shall be inserted on the certificates and certified copies thereof issued under regulation 13 or 14.

(4) For ships constructed before 1st. January, 1996, this regulation shall take effect when a certificate is renewed on or after 1st. January, 1996.

* Refer to the IMO Ship Identification Number Scheme adopted by the Organisation by resolution A.600(15).

Port State control on operational requirements.†

267. (1) A ship when in a port of another Contracting State is subject to control by officers duly authorised by the Government of such State, concerning operational requirements in respect of the safety of ships, when there are clear grounds for believing that the master or crew are not familiar with essential shipboard procedures relating to the safety of ships.

(2) In the circumstances defined in sub-regulation (1), the Contracting State carrying out the control shall take such steps as will ensure that the ship shall not sail until the situation has been brought to order in accordance with the requirements of the present Convention.

(3) Procedures relating to the Port State control prescribed in regulation 20 shall apply to this regulation.

(4) Nothing in this regulation shall be construed to limit the rights and obligations of a Contracting State carrying out control over operational requirements specifically provided for in the regulations.

CHAPTER XII

ADDITIONAL SAFETY MEASURES FOR BULK CARRIERS

Interpretation.

268. For the purpose of this Chapter —

"bulk carrier" means a ship which is constructed generally with single deck, top-side tanks and hopper side tanks in cargo spaces, and is intended primarily to carry dry cargo in bulk, and includes such types as ore carriers and combination carriers;

"bulk carrier bulkhead and double bottom strength standards" means the standards for the evaluation of scantlings of the transverse watertight vertically corrugated bulkhead between the 2 foremost cargo holds and for the evaluation of allowable hold loading of the foremost cargo hold, adopted by resolution 4 of the Conference of Contracting States to the International Convention for the Safety of Life at Sea, 1974, on 27th. November, 1997, as may be amended by the Organisation, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of Article VIII of the present Convention concerning the amendment procedures applicable to the Annex other than Chapter I;

† Refer to the procedures for Port State control adopted by the Organisation by resolution A.787(19), as amended by resolution A.882(21).

"bulk carrier of single side skin construction" means a bulk carrier in which a cargo hold is bounded by the side shell;

"length", of a bulk carrier, means the length as defined in the International Convention on Load Lines in force;

"ships constructed" means ships the keels of which are laid or which are at a similar stage of construction;

"solid bulk cargo" means any material, other than liquid or gas, consisting of a combination of particles, granules or any larger pieces of material, generally uniform in composition, which is loaded directly into the cargo spaces of a ship without any intermediate form of containment.

Application.*

269. Bulk carriers shall comply with the requirements of this Chapter in addition to the applicable requirements of other Chapters.

Implementation schedule.

270. (1) Bulk carriers to which regulations 271 and 273 apply shall comply with the provisions of such regulations according to the following schedule with reference to the enhanced programme of inspections by regulation 265 —

(a) bulk carriers which are 20 years of age and over on 1st. July, 1999, by the date of the first intermediate survey or the first periodical survey after 1st. July, 1999, whichever comes first;

(b) bulk carriers which are 15 years of age and over but less than 20 years of age on 1st. July, 1999, by the date of the first periodical survey after 1st. July, 1999, but not later than 1st. July, 2002; and

(c) bulk carriers which are less than 15 years of age on 1st. July, 1999, by the date of the first periodical survey after the date on which the ship reaches 15 years of age but not later than the date on which the ship reaches 17 years of age.

(2) This regulation applies to bulk carriers constructed before 1st. July, 1999.

* Refer to the Interpretation of the provisions of SOLAS Chapter XII on additional safety measures for bulk carriers adopted by the Maritime Safety Committee of the Organisation by resolution MSC.79(70).

Damage stability requirements applicable to bulk carriers.

271. (1) Bulk carriers of 150 metres in length and upwards of single side skin construction, designed to carry solid bulk cargoes having a density of 1,000 kg/m^3 and above, constructed on or after 1st. July, 1999 shall, when loaded to summer load line, be able to withstand flooding of any one cargo hold in all loading conditions and remain afloat in a satisfactory condition of equilibrium, as specified in sub-regulation (3).

(2) Bulk carriers of 150 metres in length and upwards of single side skin construction, designed to carry solid bulk cargoes having a density of 1,780 kg/m^3 and above, constructed on or after 1st. July, 1999 shall, when loaded to summer load line, be able to withstand flooding of the foremost cargo hold in all loading conditions and remain afloat in a satisfactory condition of equilibrium, as specified in sub-regulation (3). This requirement shall be complied with in accordance with the implementation schedule specified in regulation 270.

(3) Subject to sub-regulation (6), the condition of equilibrium after flooding shall satisfy the condition of equilibrium laid down in the annex to resolution A.320(IX), regulation equivalent to regulation 27 of the International Convention on Load Lines, 1966, as amended by resolution A.514(13). The assumed flooding need only take into account flooding of the cargo hold space. The permeability of a loaded hold shall be assumed as 0.9 and the permeability of an empty hold shall be assumed as 0.95, unless a permeability relevant to a particular cargo is assumed for the volume of a flooded hold occupied by cargo and a permeability of 0.95 is assumed for the remaining empty volume of the hold.

(4) Bulk carriers constructed before 1st. July, 1999 which have been assigned a reduced freeboard in compliance with regulation 27(7) of the International Convention on Load Lines, 1966, as adopted on 5th. April, 1966, may be considered as complying with sub-regulation (2).

(5) Bulk carriers which have been assigned a reduced freeboard in compliance with the provisions of paragraph (8) of the regulation equivalent to regulation 27 of the International Convention on Load Lines, 1966, adopted by resolution A.320(IX), as amended by resolution A.514(13), may be considered as complying with sub-regulation (1) or (2), as appropriate.

(6) On bulk carriers which have assigned reduced freeboard in compliance with the provisions of Regulation 27(8) set out in Annex B of the Protocol of 1988 relating to the International Convention on Load Lines, 1966, the condition of equilibrium after flooding shall satisfy the relevant provisions of that Protocol.

Structural strength of bulk carriers.

272. (1) Bulk carriers of 150 metres in length and upwards of single side skin construction, designed to carry solid bulk cargoes having a density of 1,000 kg/m^3 and above, shall have sufficient strength to withstand flooding of any one cargo hold in all loading and ballast conditions, taking also into account dynamic effects resulting from the presence of water in the hold, and taking into account the recommendations adopted by the Organisation.*

(2) This regulation applies to bulk carriers constructed on or after 1st. July, 1999.

Structural and other requirements for bulk carriers.

273. (1) Bulk carriers of 150 metres in length and upwards of single side skin construction, carrying solid bulk cargoes having a density of 1,780 kg/m^3 and above, shall comply with the requirements of this regulation in accordance with the implementation schedule specified in regulation 270.

(2) The transverse watertight bulkhead between the 2 foremost cargo holds and the double bottom of the foremost cargo hold shall have sufficient strength to withstand flooding of the foremost cargo hold, taking also into account dynamic effects resulting from the presence of water in the hold, in compliance with the bulk carrier bulkhead and double bottom strength standards. For the purpose of this regulation, the bulk carrier bulkhead and double bottom strength standards shall be treated as mandatory.

(3) In considering the need for, and the extent of, strengthening of the transverse watertight bulkhead or double bottom to meet the requirements of sub-regulation (2), the following restrictions may be taken into account —

(a) restrictions on the distribution of the total cargo weight between the cargo holds; and

(b) restrictions on the maximum deadweight.

(4) For bulk carriers using either of, or both, the restrictions given in sub-regulation (3) for the purpose of fulfilling the requirements of sub-regulation (2), these restrictions shall be complied with whenever solid bulk cargoes having a density of 1,780 kg/m^3 and above are carried.

(5) This regulation applies to bulk carriers constructed before 1st. July, 1999.

* Refer to resolution 3, Recommendation on Compliance with SOLAS Regulation 5 of Chapter XII, adopted by the 1997 SOLAS Conference.

Survey of cargo hold structure of bulk carriers.

274. (1) A bulk carrier of 150 metres in length and upwards of single side skin construction, of 10 years of age and over, shall not carry solid bulk cargoes having a density of 1,780 kg/m^3 and above unless it has satisfactorily undergone either —

(a) a periodical survey in accordance with the enhanced programme of inspections required by regulation 265; or

(b) a survey of all cargo holds to the same extent as required for periodical surveys in the enhanced survey programme of inspections required by regulation 265.

(2) This regulation applies to bulk carriers constructed before 1st. July, 1999.

Information on compliance with requirements for bulk carriers.

275. (1) The booklet required by sub-regulation (2) of regulation 223 shall be endorsed by the Director or the recognised organisations to indicate that regulations 271, 272, 273 and 274 as appropriate, are complied with.

(2) Any restrictions imposed on the carriage of solid bulk cargoes having a density of 1,780 kg/m^3 and above in accordance with the requirements of regulation 274 shall be identified and recorded in the booklet referred to in sub-regulation (1).

(3) A bulk carrier to which sub-regulation (2) applies shall be permanently marked on the side shell at amidships, port and starboard, with a solid equilateral triangle having sides of 500 millimetres and its apex 300 millimetres below the deck line, and painted a contrasting colour to that of the hull.

Requirements for bulk carriers not being capable of complying with regulation 271(2) due to design configuration of their cargo holds.

276. (1) For bulk carriers being within the application limits of sub-regulation (2) of regulation 271, which have been constructed with an insufficient number of transverse watertight bulkheads to satisfy that regulation, the Director may allow relaxation from the application of sub-regulation (2) of regulation 271 and regulation 273 on condition that they shall comply with the following requirements —

(a) for the foremost cargo hold, the inspections prescribed for the annual survey in the enhanced programme of inspections required by

regulation 265 shall be replaced by the inspections prescribed therein for the intermediate survey of cargo holds;

(b) are provided with bilge well high level alarms in all cargo holds, or in cargo conveyor tunnels, as appropriate, giving an audible and visual alarm on the navigation bridge, as approved by the Director or recognised organisation in accordance with regulation 264; and

(c) are provided with detailed information on specific cargo hold flooding scenarios. This information shall be accompanied by detailed instructions on evacuation preparedness under the provisions of section 8 of the International Safety Management (ISM) Code and be used as the basis for crew training and drills.

(2) This regulation applies to bulk carriers constructed before 1st. July, 1999.

Solid bulk cargo density declaration.

277. (1) Prior to loading bulk cargo on a bulk carrier, the shipper shall declare the density of the cargo, in addition to providing the cargo information required by regulation 218.

(2) For bulk carriers to which regulation 273 applies, unless such bulk carriers comply with all the relevant requirements of this Chapter applicable to the carriage of solid bulk cargoes having a density of 1,780 kg/m^3 and above, any cargo declared to have a density within the range 1,250 kg/m^3 to 1,780 kg/m^3 shall have its density verified by an accredited testing organisation.*

Loading instrument.

278. (1) Bulk carriers of 150 metres in length and upwards shall be fitted with a loading instrument capable of providing information on hull girder shear forces and bending moments, taking into account the recommendation adopted by the Organisation.†

(2) Bulk carriers of 150 metres in length and upwards constructed before 1st. July, 1999 shall comply with the requirements of sub-regulation (1) not later than the date of the first intermediate survey or periodical survey of the ship to be carried out after 1st. July, 1999.

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* In verifying the density of solid bulk cargoes, reference may be made to MSC/Circ.908, Uniform Method of Measurement of the Density of Bulk Cargoes.

† Refer to resolution 5, Recommendation on Loading Instruments adopted by the 1997 SOLAS Conference.

(3) This regulation applies to bulk carriers regardless of their date of construction.

CHAPTER XIII

MISCELLANEOUS

Prescription of forms and certificates.

279. The forms and certificates contained in the First and Second Schedules shall be used in all cases to which they are applicable, and shall be modified as directed by the Director to meet other cases.

Savings.

280. Any order, notice, form or certificate issued or made under or in accordance with the Merchant Shipping (Safety Convention) Regulations, 1984 (S 27/84) which is revoked by these Regulations shall continue to be in force to the extent that they are not inconsistent with or not replaced by the provisions of these Regulations, until revoked or replaced by the provisions of these Regulations.

Revocation.

281. The Merchant Shipping (Safety Convention) Regulations, 1984 (S 27/84) are hereby revoked.

FIRST SCHEDULE regulation 279

Form of Safety Certificate for Passenger Ships

PASSENGER SHIP SAFETY CERTIFICATE
This Certificate shall be supplemented by a Record of Equipment (Form P)

BRUNEI DARUSSALAM

for $\frac{\text{an}^*}{\text{a short}}$ international voyage

Issued under the provisions of the
INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974
as modified by the Protocol of 1988 relating thereto

under the authority of the Government of
Brunei Darussalam

by _____
(person or organisation authorised)

Name of ship	Official Number or Call Sign	Port of Registry	Gross Tonnage	Sea areas in which ship is certified to operate (Reg.IV/2)	Date Built**

IMO Number: .....

THIS IS TO CERTIFY —

1. That the ship has been surveyed in accordance with the requirements of Regulation I/7 of the Convention.

2. That the survey showed that:

2.1 the ship complied with the requirements of the Convention as regards:

.1 the structure, main and auxiliary machinery, boilers and other pressure vessels;

.2 the watertight subdivision arrangements and details;

.3 the following subdivision load lines:

Subdivision load lines assigned and marked on the ship's side amidships (Regulation II-1/13)	Freeboard	To apply when the spaces in which passengers are carried include the following alternative spaces
C.1	.....	.....
C.2	.....	.....
C.3	.....	.....

* Delete as appropriate.
** Date on which keel was laid or ship was at a similar stage of construction or, where applicable, date on which work for a conversion or an alteration or modification of a major character was commenced.

2.2 the ship complied with the requirements of the Convention as regards structural fire protection, fire safety systems and appliances and fire control plans;

2.3 the life-saving appliances and the equipment of the lifeboats, liferafts and rescue boats were provided in accordance with the requirements of the Convention;

2.4 the ship was provided with a line-throwing appliance and radio installations used in life-saving appliances in accordance with the requirements of the Convention;

2.5 the ship complied with the requirements of the Convention as regards radio installations;

2.6 the function of the radio installations used in life-saving appliances complied with the requirements of the Convention;

2.7 the ship complied with the requirements of the Convention as regards shipborne navigational equipment, means of embarkation for pilots and nautical publications;

2.8 the ship was provided with lights, shapes, means of making sound signals and distress signals, in accordance with the requirements of the Convention and the International Regulations for Preventing Collision at Sea in force;

2.9 in all other respects the ship complied with the relevant requirements of the Convention.

3. That an Exemption Certificate has/has not* been issued.

This Certificate is valid until .....

Issued at .....
(Place of issue)

....
(Date of Issue) *(Signature of authorised official issuing the Certificate)*

(Seal or stamp of authority, as appropriate)

* Delete as appropriate.

Endorsement where the renewal survey has been completed and Regulation I/14 (d) applies

The ship complies with the relevant requirements of the Convention, and this Certificate shall, in accordance with Regulation I/14 *(d)* of the Convention, be accepted as valid until .....

Signed :.....
(Signature of authorised official)

Place :.....

Date :.....

(Seal or stamp of authority, as appropriate)

Endorsement to extend the validity of the Certificate until reaching the port of survey or for a period of grace where Regulation I/14 (e) or I/14 (f) applies

This Certificate shall, in accordance with Regulation I/14 *(e)* / I/14 *(f)** of the Convention, be accepted as valid until .....

Signed :.....
(Signature of authorised official)

Place :.....

Date :.....

(Seal or stamp of authority, as appropriate)

* Delete as appropriate.

Form of Safety Construction Certificate for Cargo Ships

CARGO SHIP SAFETY CONSTRUCTION CERTIFICATE

BRUNEI DARUSSALAM

Issued under the provisions of the
INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974
as modified by the Protocol of 1988 relating thereto

under the authority of the Government of
Brunei Darussalam

by _____
(person or organisation authorised)

Name of ship	Official Number or Call Sign	Port of Registry	Gross Tonnage	Date Built*

IMO Number : .....

Type of ship** : Bulk carrier
Oil tanker
Chemical tanker
Gas carrier
Cargo ship other than any of the above

Deadweight of ship (metric tons)*** : .....

THIS IS TO CERTIFY –

1. That the ship has been surveyed in accordance with the requirements of Regulation I/10 of the Convention.

2. That the survey showed that the condition of the structure, machinery and equipment as defined in the above Regulation was satisfactory and the ship complied with the relevant requirements of Chapters II-1 and II-2 of the Convention (other than those relating to fire safety systems and appliances and fire control plans).

3. That the last two inspections of the outside of the ship's bottom took place on..... and .....

4. That an Exemption Certificate has/has not** been issued.

This Certificate is valid until .....**** subject to the annual and intermediate surveys and inspections of the outside of the ship's bottom in accordance with Regulation I/10 of the Convention.

Issued at .....
(Place of issue)

....
(Date of Issue) *(Signature of authorised official issuing the Certificate)*

(Seal or stamp of the issuing authority, as appropriate)

---

* Date on which keel was laid or ship was at a similar stage of construction or, where applicable, date on which work for a conversion or an alteration or modification of a major character was commenced.

** Delete as appropriate.

*** For oil tankers, chemical tankers and gas carriers only.

**** Date of expiry in accordance with Regulation I/14 *(a)* of the Convention. The day and month of this date correspond to the anniversary date as defined in Regulation I/2 *(n)* of the Convention, unless amended in accordance with Regulation I/14 *(h)*.

Endorsement for annual and intermediate surveys

THIS IS TO CERTIFY that, at a survey required by Regulation I/10 of the Convention, the ship was found to comply with the relevant requirements of the Convention.

Annual survey:

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Annual/Intermediate* survey:

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Annual/Intermediate* survey:

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Annual survey:

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Annual/Intermediate survey in accordance with Regulation I/14 (h) (iii)

THIS IS TO CERTIFY that, at an annual/intermediate* survey in accordance with Regulation I/14 *(h)* (iii) of the Convention, the ship was found to comply with the relevant requirements of the Convention.

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

* Delete as appropriate.

*Endorsement for inspections of the outside of the ship's bottom**

THIS IS TO CERTIFY that, at an inspection required by Regulation I/10 of the Convention, the ship was found to comply with the relevant requirements of the Convention.

First inspection:

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Second inspection:

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Endorsement to extend the Certificate if valid for less than 5 years where Regulation I /14 (c) applies

The ship complies with the relevant requirements of the Convention and this Certificate shall, in accordance with Regulation I/14 *(c)* of the Convention, be accepted as valid until .....

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Endorsement where the renewal survey has been completed and Regulation I /14 (d) applies

The ship complies with the relevant requirements of the Convention and this Certificate shall, in accordance with Regulation I/14 *(d)* of the Convention, be accepted as valid until .....

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

* Provision may be made for additional inspections.

Endorsement to extend the validity of the Certificate until reaching the port of survey or for a period of grace where Regulation I/14 (e) or I/14 (f) applies

This Certificate shall, in accordance with Regulation I/14 *(e)* / I/14 *(f)** of the Convention, be accepted as valid until .....

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Endorsement for advancement of anniversary date where Regulation I/14 (h) applies

In accordance with Regulation I/14 *(h)* of the Convention, the new anniversary date is .....

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

In accordance with Regulation I/14*(h)* of the Convention, the new anniversary date is .....

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

* Delete as appropriate.

Form of Safety Equipment Certificate for Cargo Ships

CARGO SHIP SAFETY EQUIPMENT CERTIFICATE
This Certificate shall be supplemented by a Record of Equipment (Form E)

BRUNEI DARUSSALAM

Issued under the provisions of the
INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974
as modified by the Protocol of 1988 relating thereto

under the authority of the Government of
Brunei Darussalam

by _____
(person or organisation authorised)

Name of ship	Official Number or Call Sign	Port of Registry	Gross Tonnage	Length of ship (Reg III/3.12)	Date Built*

IMO Number : .....

Type of ship** : Bulk carrier
Oil tanker
Chemical tanker
Gas carrier
Cargo ship other than any of the above

Deadweight of ship (metric tons)*** : .....

THIS IS TO CERTIFY –

1. That the ship has been surveyed in accordance with the requirements of Regulation I/8 of the Convention.

2. That the survey showed that:

2.1 the ship complied with the relevant requirements of the Convention as regards fire safety systems and appliances and fire control plans;

2.2 the life-saving appliances and the equipment of the lifeboats, liferafts and rescue boats were provided in accordance with the requirements of the Convention;

2.3 the ship was provided with a line-throwing appliance and radio installations used in life-saving appliances in accordance with the requirements of the Convention;

2.4 the ship complied with the requirements of the Convention as regards shipborne navigational equipment, means of embarking for pilots and nautical publications;

2.5 the ship was provided with lights, shapes, means of making sound signals and distress signals, in accordance with the requirements of the Convention and the International Regulations for Preventing Collisions at Sea in force;

2.6 in all other respects the ship complied with the relevant requirements of the Convention.

3. That an Exemption Certificate has/has not** been issued.

---

* Date on which keel was laid or ship was at a similar stage of construction or, where applicable, date on which work for a conversion or an alteration or modification of a major character was commenced.

** Delete as appropriate.

*** For oil tankers, chemical tankers and gas carriers only.

This Certificate is valid until .....* subject to the annual and periodical surveys in accordance with Regulation I/8 of the Convention.

Issued at .....
(Place of issue)

....
(Date of Issue) *(Signature of authorised official issuing the Certificate)*

(Seal or stamp of the issuing authority, as appropriate)

* Date of expiry in accordance with Regulation I/14 *(a)* of the Convention. The day and month of this date correspond to the anniversary date as defined in Regulation I/2 *(n)* of the Convention, unless amended in accordance with Regulation I/14 *(h)*.

Endorsement for annual and periodical surveys

THIS IS TO CERTIFY that, at a survey required by Regulation I/8 of the Convention, the ship was found to comply with the relevant requirements of the Convention.

Annual survey:

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Annual/Periodical* survey:

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Annual/Periodical* survey:

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Annual survey:

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Annual/Periodical survey in accordance with Regulation I/14 (h) (iii)

THIS IS TO CERTIFY that, at an annual/periodical* survey in accordance with Regulation I/14 *(h)* (iii) of the Convention, the ship was found to comply with the relevant requirements of the Convention.

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

* Delete as appropriate.

Endorsement to extend the Certificate if valid for less than 5 years where Regulation I/14 (c) applies

The ship complies with the relevant requirements of the Convention, and this Certificate shall, in accordance with Regulation I/14 *(c)* of the Convention, be accepted as valid until .....

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Endorsement where the renewal survey has been completed and Regulation I/14 (d) applies

The ship complies with the relevant requirements of the Convention, and this Certificate shall, in accordance with Regulation I/14 *(d)* of the Convention, be accepted as valid until .....

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Endorsement to extend the validity of the Certificate until reaching the port of survey or for a period of grace where Regulation I/14 (e) or I/14 (f) applies

This Certificate shall, in accordance with Regulation I/14 *(e)* / I/14 *(f)** of the Convention, be accepted as valid until .....

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

* Delete as appropriate.

Endorsement for advancement of anniversary date where Regulation I/14 (h) applies

In accordance with Regulation I/14 *(h)* of the Convention, the new anniversary date is .....

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

In accordance with Regulation I/14 *(h)* of the Convention, the new anniversary date is .....

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Form of Safety Radio Certificate for Cargo Ships

CARGO SHIP SAFETY RADIO CERTIFICATE
This Certificate shall be supplemented by a Record of Equipment of Radio Facilities (Form R)

BRUNEI DARUSSALAM

Issued under the provisions of the
INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974
as modified by the Protocol of 1988 relating thereto

under the authority of the Government of
Brunei Darussalam

by _____
(person or organisation authorised)

Name of ship	Official Number or Call Sign	Port of Registry	Gross Tonnage	Sea areas in which ship is certified to operate (Reg.IV/2)	Date Built*

IMO Number: .....

THIS IS TO CERTIFY —

1. That the ship has been surveyed in accordance with the requirements of Regulation I/9 of the Convention.

2. That the survey showed that:

2.1 the ship complied with the requirements of the Convention as regards radio installations;

2.2 the functioning of the radio installations used in life-saving appliances complied with the requirements of the Convention.

3. That an Exemption Certificate has/has not** been issued.

This Certificate is valid until .....*** subject to the periodical surveys in accordance with Regulation I/9 of the Convention.

Issued at .....
(Place of issue)

....
(Date of Issue) *(Signature of authorised official issuing the Certificate)*

(Seal or stamp of the issuing authority, as appropriate)

---

* Date on which keel was laid or ship was at a similar stage of construction or, where applicable, date on which work for a conversion or an alteration or modification of a major character was commenced.

** Delete as appropriate.

*** Date of expiry in accordance with Regulation I/14 *(a)* of the Convention. The day and month of this date correspond to the anniversary date as defined in Regulation I/2 *(n)* of the Convention, unless amended in accordance with Regulation I/14 *(h)*.

Endorsement for periodical surveys

THIS IS TO CERTIFY that, at a survey required by Regulation I/9 of the Convention, the ship was found to comply with the relevant requirements of the Convention.

Periodical survey:

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Periodical survey:

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Periodical survey:

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Periodical survey:

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Periodical survey in accordance with Regulation I/14 (h) (iii)

THIS IS TO CERTIFY that, at a periodical survey in accordance with Regulation I/14 *(h)* (iii) of the Convention, the ship was found to comply with the relevant requirements of the Convention.

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Endorsement to extend the Certificate if valid for less than 5 years where Regulation I/14 (c) applies

The ship complies with the relevant requirements of the Convention, and this Certificate shall, in accordance with Regulation I/14 *(c)* of the Convention, be accepted as valid until .....

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Endorsement where the renewal survey has been completed and Regulation I/14 (d) applies

The ship complies with the relevant requirements of the Convention, and this Certificate shall, in accordance with Regulation I/14 *(d)* of the Convention, be accepted as valid until .....

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Endorsement to extend the validity of the Certificate until reaching the port of survey or for a period of grace where Regulation I/14 (e) or I/14 (f) applies

This Certificate shall, in accordance with Regulation I/14 *(e)* / I/14 *(f)** of the Convention, be accepted as valid until .....

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

* Delete as appropriate.

Endorsement for advancement of anniversary date where Regulation I/14 (h) applies

In accordance with Regulation I/14 *(h)* of the Convention, the new anniversary date is .....

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

In accordance with Regulation I/14 *(h)* of the Convention, the new anniversary date is .....

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Form of Exemption Certificate

EXEMPTION CERTIFICATE

BRUNEI DARUSSALAM

Issued under the provisions of the
INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974
as modified by the Protocol of 1988 relating thereto

under the authority of the Government of
Brunei Darussalam

by _____
(person or organisation authorised)

Name of ship	Official Number or Call Sign	Port of Registry	Gross Tonnage

IMO Number: .....

THIS IS TO CERTIFY –

That the ship is, under the authority conferred by Regulation ..... of the Convention, exempted from the requirements of ..... of the Convention.

Conditions, if any, on which the Exemption Certificate is granted:

.....

.....

Voyages, if any, for which the Exemption Certificate is granted:

.....

.....

This Certificate is valid until ..... subject to the ..... Certificate, to which this Certificate is attached, remaining valid.

Issued at .....
(Place of issue)

....
(Date of Issue) *(Signature of authorised official issuing the Certificate)*

(Seal or stamp of the issuing authority, as appropriate)

Endorsement to extend the Certificate if valid for less than 5 years where Regulation I/14 (c) applies

This Certificate shall, in accordance with Regulation I/14 *(c)* of the Convention, be accepted as valid until ..... subject to the ..... Certificate, to which this Certificate is attached, remaining valid.

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Endorsement where the renewal survey has been completed and Regulation I/14 (d) applies

This Certificate shall, in accordance with Regulation I/14 *(d)* of the Convention, be accepted as valid until ..... subject to the ..... Certificate, to which this Certificate is attached, remaining valid.

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

Endorsement to extend the validity of the Certificate until reaching the port of survey or for a period of grace where Regulation I/14 (e) or I/14 (f) applies

This Certificate shall, in accordance with Regulation I/14 *(e)* / I/14 *(f)** of the Convention, be accepted as valid until ..... subject to the ..... Certificate, to which this Certificate is attached, remaining valid.

Signed : .....
(Signature of authorised official)

Place : .....

Date : .....

(Seal or stamp of authority, as appropriate)

* Delete as appropriate.

SECOND SCHEDULE regulation 279

RECORD OF EQUIPMENT FOR THE PASSENGER SHIP SAFETY CERTIFICATE (FORM P)

This Record shall be permanently attached to the Passenger Ship Safety Certificate

RECORD OF EQUIPMENT FOR COMPLIANCE WITH THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974 AS MODIFIED BY THE PROTOCOL OF 1988 RELATING THERETO

1 *Particulars of ship*

Name of ship .....

Official Number or Call Sign .....

Number of passengers for which certified .....

Minimum number of persons with required qualifications to operate the radio installations .....

2 *Details of life-saving appliances*

1	Total number of persons for which life-saving appliances are provided	.....	
		Port side	Starboard side
2	Total number of lifeboats	.....	.....
2.1	Total number of persons accommodated by them	.....	.....
2.2	Number of partially enclosed lifeboats (regulation III/21 and section 4.5 of LSA Code)	.....	.....
2.3	Number of totally enclosed lifeboats (regulation III/21 and section 4.6 of LSA Code)	.....	.....
2.4	Other lifeboats	.....	.....
2.4.1	Number	.....	.....
2.4.2	Type	.....	.....
3	Number of motor lifeboats (included in the total lifeboats shown above)	.....	
3.1	Number of lifeboats fitted with searchlights	.....	
4	Number of rescue boats	.....	
4.1	Number of boats which are included in the total lifeboats shown above	.....	

2 *Details of life-saving appliances (continued)*

5	Liferafts	.....
5.1	Those for which approved launching appliances are required	.....
5.1.1	Number of liferafts	.....
5.1.2	Number of persons accommodated by them	.....
5.2	Those for which approved launching appliances are not required	.....
5.2.1	Number of liferafts	.....
5.2.2	Number of persons accommodated by them	.....
6	Buoyant apparatus	.....
6.1	Number of apparatus	.....
6.2	Number of persons capable of being supported	.....
7	Number of lifebuoys	.....
8	Number of life jackets	.....
9	Immersion suits	.....
9.1	Total number	.....
9.2	Number of suits complying with the requirements for life jackets	.....
10	Number of thermal protective aids*	.....
11	Radio installations used in life-saving appliances	.....
11.1	Number of radar transponders	.....
11.2	Number of two-way VHF radiotelephone apparatus	.....

3 *Details of radio facilities*

	Item	Actual provision
1	Primary systems	.....
1.1	VHF radio installation	.....
1.1.1	DSC encoder	.....
1.1.2	DSC watch receiver	.....
1.1.3	Radiotelephony	.....
1.2	MF radio installation	.....
1.2.1	DSC encoder	.....
1.2.2	DSC watch receiver	.....
1.2.3	Radiotelephony	.....
1.3	MF/HF radio installation	.....
1.3.1	DSC encoder	.....
1.3.2	DSC watch receiver	.....
1.3.3	Radiotelephony	.....
1.3.4	Direct-printing radiotelegraphy	.....
1.4	INMARSAT ship earth station	.....

* Excluding those required by paragraphs 4.1.5.1.24; 4.4.8.31 and 5.1.2.2.13 of the LSA Code.

3 *Details of radio facilities (continued)*

Item		Actual provision
2	Secondary means of alerting	.....
3	Facilities for reception of maritime safety information	.....
3.1	NAVTEX receiver	.....
3.2	EGC receiver	.....
3.3	HF direct-printing radiotelegraph receiver	.....
4	Satellite EPIRB	.....
4.1	COSPAS-SARSAT	.....
4.2	INMARSAT	.....
5	VHF EPIRB	.....
6	Ship's radar transponder	.....

4 *Methods used to ensure availability of radio facilities* (regulations IV/15.6 and 15.7)

4.1 Duplication of equipment .....

4.2 Shore-based maintenance .....

4.3 At-sea maintenance capability .....

5 *Details of navigational systems and equipment*

Item		Actual provision
1.1	Standard magnetic compass*	.....
1.2	Spare magnetic compass*	.....
1.3	Gyro-compass*	.....
1.4	Gyro-compass heading repeater*	.....
1.5	Gyro-compass bearing repeater*	.....
1.6	Heading or track control system*	.....
1.7	Pelorus or compass bearing device*	.....
1.8	Means of correcting heading and bearings	.....
1.9	Transmitting heading device (THD)*	.....
2.1	Nautical charts/Electronic chart display and information system (ECDIS)*	.....
2.2	Back-up arrangements for ECDIS	.....
2.3	Nautical publications	.....
2.4	Back-up arrangements for electronic nautical publications	.....
3.1	Receiver for a global navigation satellite system/terrestrial radio navigation system*†	.....

* *Alternative means of meeting this requirement are permitted under regulation 200. In case of other means, they shall be specified.*

† *Delete as appropriate.*

5 *Details of navigational systems and equipment (continued)*

Item		Actual provision
3.2	9 GHz radar*	.....
3.3	Second radar (3 GHz/9 GHz†)*	.....
3.4	Automatic radar plotting aid (ARPA)*	.....
3.5	Automatic tracking aid*	.....
3.6	Second automatic tracking aid*	.....
3.7	Electronic tracking aid*	.....
4	Automatic identification system (AIS)	.....
5	Voyage data recorder (VDR)	.....
6.1	Speed and distance measuring device (through the water)*	.....
6.2	Speed and distance measuring device (over the ground in the forward and athwartship direction)*	.....
7	Echo-sounding device*	.....
8.1	Rudder, propeller, thrust, pitch and operational mode indicator*	.....
8.2	Rate-of-turn indicator*	.....
9	Sound reception system*	.....
10	Telephone to emergency steering system*	.....
11	Daylight signaling lamp*	.....
12	Radar reflector*	.....
13	International Code of Signals	.....

THIS IS TO CERTIFY that this Record is correct in all respects

Issued at .....
(Place of issue)

....
(Date of issue) *(Signature of authorised official issuing the Certificate)*

(Seal or stamp of the issuing authority, as appropriate)

* *Alternative means of meeting this requirement are permitted under regulation 200. In case of other means, they shall be specified.*

† *Delete as appropriate.*

RECORD OF EQUIPMENT FOR THE CARGO SHIP SAFETY EQUIPMENT CERTIFICATE (FORM E)

This Record shall be permanently attached to the Cargo Ship Safety Equipment Certificate

RECORD OF EQUIPMENT FOR COMPLIANCE WITH THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974 AS MODIFIED BY THE PROTOCOL OF 1988 RELATING THERETO

1 *Particulars of ship*

Name of ship .....

Official Number or Call Sign .....

2 *Details of life-saving appliances*

1	Total number of persons for which life-saving appliances are provided	.....	
		Port side	Starboard side
2	Total number of lifeboats	.....	.....
2.1	Total number of persons accommodated by them	.....	.....
2.2	Number of totally enclosed lifeboats (regulation III/31 and section 4.6 of LSA Code)	.....	.....
2.3	Number of lifeboats with a self-contained air support system (regulation III/31 and section 4.8 of LSA Code)	.....	.....
2.4	Number of fire-protected lifeboats (regulation III/31 and section 4.9 of LSA Code)	.....	.....
2.5	Other lifeboats	.....	.....
2.5.1	Number	.....	.....
2.5.2	Type	.....	.....
2.6	Number of freefall lifeboats	.....	
2.6.1	Totally enclosed (regulation III/31 and section 4.7 of LSA Code)	.....	
2.6.2	Self-contained (regulation III/31 and section 4.8 of LSA Code)	.....	
2.6.3	Fire-protected (regulation III/31 and section 4.9 of LSA Code)	.....	
3	Number of motor lifeboats (included in the total lifeboats shown above)	.....	
3.1	Number of lifeboats fitted with searchlights	.....	

2 *Details of life-saving appliances (continued)*

4	Number of rescue boats	.....
4.1	Number of boats which are included in the total lifeboats shown above	.....
5	Liferafts	.....
5.1	Those for which approved launching appliances are required	.....
5.1.1	Number of liferafts	.....
5.1.2	Number of persons accommodated by them	.....
5.2	Those for which approved launching appliances are not required	.....
5.2.1	Number of liferafts	.....
5.2.2	Number of persons accommodated by them	.....
5.3	Number of liferafts required by regulation III/31.1.4	.....
6	Number of lifebuoys	.....
7	Number of life jackets	.....
8	Immersion suits	.....
8.1	Total number	.....
8.2	Number of suits complying with the requirements for life jackets	.....
9	Number of thermal protective aids*	.....
10	Radio installations used in life-saving appliances	.....
10.1	Number of radar transponders	.....
10.2	Number of two-way VHF radiotelephone apparatus	.....

3 *Details of navigational systems and equipment*

	Item	Actual provision
1.1	Standard magnetic compass†	.....
1.2	Spare magnetic compass†	.....
1.3	Gyro-compass†	.....
1.4	Gyro-compass heading repeater†	.....
1.5	Gyro-compass bearing repeater†	.....
1.6	Heading or track control system†	.....
1.7	Pelorus or compass bearing device†	.....
1.8	Means of correcting heading and bearings	.....
1.9	Transmitting heading device (THD)†	

* *Excluding those required by paragraphs 4.1.5.1.24; 4.4.8.31 and 5.1.2.2.13 of the LSA Code.*

† *Alternative means of meeting this requirement are permitted under regulation 200. In case of other means, they shall be specified.*

‡ *Delete as appropriate.*

3 *Details of navigational systems and equipment (continued)*

	Item	Actual provision
2.1	Nautical charts/Electronic chart display and information system (ECDIS)†	.....
2.2	Back-up arrangements for ECDIS	.....
2.3	Nautical publications	.....
2.4	Back-up arrangements for electronic nautical publications	.....
3.1	Receiver for a global navigation satellite system/terrestrial radio navigation system†‡	.....
3.2	9 GHz radar*	.....
3.3	Second radar (3 GHz/9 GHz†)*	.....
3.4	Automatic radar plotting aid (ARPA)*	.....
3.5	Automatic tracking aid*	.....
3.6	Second automatic tracking aid*	.....
3.7	Electronic tracking aid*	.....
4	Automatic identification system (AIS)	.....
5	Voyage data recorder (VDR)	.....
6.1	Speed and distance measuring device (through the water)*	
6.2	Speed and distance measuring device (over the ground in the forward and athwartship direction)*	....
7	Echo-sounding device*	.....
8.1	Rudder, propeller, thrust, pitch and operational mode indicator*	.....
8.2	Rate-of-turn indicator*	.....
9	Sound reception system*	.....
10	Telephone to emergency steering system*	.....
11	Daylight signaling lamp*	....
12	Radar reflector*	
13	International Code of Signals	

THIS IS TO CERTIFY that this Record is correct in all respects

Issued at .....
(Place of issue)

....
(Date of issue) *(Signature of authorised official issuing the Certificate)*

(Seal or stamp of the issuing authority, as appropriate)

* Alternative means of meeting this requirement are permitted under regulation 200. In case of other means, they shall be specified.

† Delete as appropriate.

RECORD OF EQUIPMENT FOR THE CARGO SHIP SAFETY RADIO CERTIFICATE (FORM R)

This Record shall be permanently attached to the Cargo Ship Safety Radio Certificate

RECORD OF EQUIPMENT OF RADIO FACILITIES FOR COMPLIANCE WITH THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974 AS MODIFIED BY THE PROTOCOL OF 1988 RELATING THERETO

1 *Particulars of ship*

Name of ship .....

Official Number or Call Sign .....

Minimum number of persons with required qualifications to operate the radio installations .....

2 *Details of radio facilities*

Item		Actual provision
1	Primary systems	.....
1.1	VHF radio installation	.....
1.1.1	DSC encoder	.....
1.1.2	DSC watch receiver	.....
1.1.3	Radiotelephony	.....
1.2	MF radio installation	.....
1.2.1	DSC encoder	.....
1.2.2	DSC watch receiver	.....
1.2.3	Radiotelephony	.....
1.3	MF/HF radio installation	.....
1.3.1	DSC encoder	.....
1.3.2	DSC watch receiver	.....
1.3.3	Radiotelephony	.....
1.3.4	Direct-printing telegraphy	.....
1.4	INMARSAT ship earth station	.....
2	Secondary means of alerting	.....
3	Facilities for reception of maritime safety information	.....
3.1	NAVTEX receiver	.....
3.2	EGC receiver	.....
3.3	HF direct-printing radiotelegraph receiver	.....

2 *Details of radio facilities (continued)*

Item		Actual provision
4	Satellite EPIRB	.....
4.1	COSPAS-SARSAT	.....
4.2	INMARSAT	.....
5	VHF EPIRB	.....
6	Ship's radar transponder	.....

3 *Methods used to ensure availability of radio facilities*
(regulations IV/15.6 and 15.7)

3.1 Duplication of equipment.....

3.2 Shore-based maintenance.....

3.3 At-sea maintenance capability.....

THIS IS TO CERTIFY that this Record is correct in all respects

Issued at .....
(Place of issue)

.....
(Date of issue)

.....
(Signature of authorised official issuing the Certificate)

(Seal or stamp of the issuing authority, as appropriate)

THIRD SCHEDULE

regulations 114, 115, 118 and 124

TABLE 1

Bulkheads not bounding either main vertical zones or horizontal zones

Spaces		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control stations	(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
Stairways	(2)		A-0[a]	A-0	A-0	A-0	A-0	A-15	A-15	A-0[c]	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
Evacuation stations and external escape routes	(4)					A-0	A-60[b,d]	A-60[b,d]	A-60[b,d]	A-0[d]	A-0	A-60[b]	A-60[b]	A-60[b]	A-60[b]
Open deck spaces	(5)						A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of minor fire risk	(6)						B-0	B-0	B-0	C	A-0	A-0	A-30	A-0	A-30
Accommodation spaces of moderate fire risk	(7)							B-0	B-0	C	A-0	A-15	A-60	A-15	A-60
Accommodation spaces of greater fire risk	(8)								B-0	C	A-0	A-30	A-60	A-15	A-60
Sanitary and similar spaces	(9)									C	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having 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 of moderate fire risk	(11)											A-0[a]	A-0	A-0	A-15
Machinery spaces and main galleys	(12)												A-0[a]	A-0	A-60
Store rooms, workshops, pantries etc.	(13)													A-0[a]	A-0
Other spaces in which flammable liquids are stowed	(14)														A-30

See notes following Table 2.

TABLE 2

Decks not forming steps in main vertical zones nor bounding horizontal zones

Space below ↓ Space above →	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control stations (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
Stairways (2)	A-0	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]	A-60	A-0	A-0	A-15	A-15	A-0	A-0	A-0	A-30	A-0	A-30
Evacuation stations and external 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 spaces (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
Accommodation spaces of minor 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 of 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
Accommodation spaces of 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 spaces (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 having 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-0[a]	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of 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-0[a]	A-0	A-0	A-30
Machinery spaces 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 spaces in which flammable liquids are stowed (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 be applied to Tables 1 and 2, as appropriate.

a Where adjacent spaces are in the same numerical category and superscript "a" appears, a bulkhead or deck between such spaces need not be fitted if deemed unnecessary by the Director. For example, in category (12) a bulkhead need not be required between a galley and its annexed pantries, provided the pantry bulkhead and decks maintain the integrity of the galley boundaries. A bulkhead is, however, required between a galley and machinery space even though both spaces are in category (12).

b The ship's side, to the water-line in the lightest seagoing condition, superstructure and deckhouse sides situated below and adjacent to liferafts and evacuation slides may be reduced to 'A-30'.

c Where public toilets are installed completely within the stairway enclosure, the public toilet bulkhead within the stairway enclosure can be of 'B' class integrity.

d Where spaces of categories (6), (7), (8) and (9) are located completely within the outer perimeter of the assembly station, the bulkheads of these spaces are allowed to be of 'B-0' class integrity. Control positions for audio, video and light installations may be considered as part of the assembly station.

TABLE 3

Fire integrity of bulkheads separating adjacent spaces

Spaces		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations	(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]	B-0[e]	A-60	A-0	A-0	A-15 A-0[d]	*	A-15
Accommodation spaces	(3)			C[e]	A-0[a] B-0[e]	B-0[e]	A-60	A-0	A-0	A-15 A-0[d]	*	A-30 A-0[d]
Stairways	(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-15
Service spaces (low risk)	(5)					C[e]	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category A	(6)						*	A-0	A-0	A-60	*	A-60
Other machinery spaces	(7)							A-0[b]	A-0	A-0	*	A-0
Cargo spaces	(8)								*	A-0	*	A-0
Service spaces (high risk)	(9)									A-0[b]	*	A-30
Open decks	(10)											A-0
Special category and ro-ro spaces	(11)											A-0

See notes following Table 4.

TABLE 4

Fire integrity of decks separating adjacent spaces

Space below ↓ Space above →		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations	(1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0	*	A-30
Corridors	(2)	A-0	*	*	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Accommodation spaces	(3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30 A-0[d]
Stairways	(4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	A-0	*	A-0
Service spaces (low risk)	(5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category 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 spaces	(8)	A-60	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
Service spaces (high 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 decks	(10)	*	*	*	*	*	*	*	*	*	-	A-0
Special category and ro-ro spaces	(11)	A-60	A-15	A-30 A-0[d]	A-15	A-0	A-30	A-0	A-0	A-30	A-0	A-0

Notes : To be applied to both Tables 3 and 4 as appropriate.

a For clarification as to which applies, see sub-paragraphs (ii) and (v) of regulation 114(2)*(b)*.

b Where spaces are of the same numerical category and superscript "b" appears, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose (example, in category (9)). A galley next to a galley does not require a bulkhead, but a galley next to a paint room requires as 'A-0' bulkhead.

c Bulkheads separating the wheelhouse and chartroom from each other may have a 'B-0' rating.

d See sub-subparagraphs (B)(III) and (B)(IV) of regulation 114(2)*(b)*(iv).

e For the application of sub-subparagraph (A)(II) of regulation 114(2)*(b)*(i), 'B-0' and 'C', where appearing in Table 3, shall be read as 'A-0'.

f Fire insulation need not be fitted if the machinery space in category (7), in the opinion of the Director, has little or no fire risk.

* Where an asterisk appears in the tables, the division is required to be of steel or other equivalent material, but is not required to be of 'A' class standard. However, where a deck, except in a category (10) space, is penetrated for the passage of electric cables, pipes and vent ducts, such penetrations shall be made tight to prevent the passage of flame and smoke. Divisions between control stations (emergency generators) and open decks may have air intake openings without means for closure, unless a fixed gas fire-extinguishing system is fitted.

For the application of sub-subparagraph (A)(II) of regulation 114(2)*(b)*(i), an asterisk, where appearing in Table 4, except for categories (8) and (10), shall be read as 'A-0'.

TABLE 5

Fire integrity of bulkheads separating adjacent spaces

Spaces		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control station	(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[c]	B-0	B-0 A-0[c]	B-0	A-60	A-0	A-0	A-0	*	A-30
Accommodation spaces	(3)			C[a,b]	B-0 A-0[c]	B-0	A-60	A-0	A-0	A-0	*	A-30
Stairways	(4)				B-0 A-0[c]	B-0 A-0[c]	A-60	A-0	A-0	A-0	*	A-30
Service spaces (low risk)	(5)					C	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category A	(6)						*	A-0	A-0[g]	A-60	*	A-60[f]
Other machinery spaces	(7)							A-0[d]	A-0	A-0	*	A-0
Cargo spaces	(8)								*	A-0	*	A-0
Service spaces (high risk)	(9)									A-0[d]	*	A-30
Open decks	(10)										–	A-0
Ro-ro and vehicle spaces	(11)											*[h]

See notes following Table 6.

TABLE 6

Fire integrity of decks separating adjacent spaces

Space below ↓ Space above →		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations	(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 spaces	(3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30
Stairways	(4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	A-0	*	A-30
Service spaces (low risk)	(5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category A	(6)	A-60	A-60	A-60	A-60	A-60	*	A-60[i]	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 spaces	(8)	A-60	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
Service spaces (high risk)	(9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0[d]	*	A-30
Open decks	(10)	*	*	*	*	*	*	*	*	*	–	*
Ro-ro and vehicle spaces	(11)	A-60	A-30	A-30	A-30	A-0	A-60	A-0	A-0	A-30	*	*[h]

Notes : To be applied to Tables 5 and 6, as appropriate.

a No special requirements are imposed upon bulkheads in methods IIC and IIIC fire protection.

b In case of method IIIC, 'B' class bulkheads of 'B-0' rating shall be provided between spaces or groups of spaces of 50 m^2 and over in area.

c For clarification as to which applies, see sub-paragraphs (ii) and (iv) of regulation 114(2)*(c)*.

d Where spaces are of the same numerical category and superscript "d" appears, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose (example, in category (9)). A galley next to a galley does not require a bulkhead, but a galley next to a paint room requires an 'A-0' bulkhead.

e Bulkheads separating the wheelhouse, chartroom and radio room from each other may have a 'B-0' rating.

f An 'A-0' rating may be used if no dangerous goods are intended to be carried or if such goods are stowed not less than 3 metres horizontally from such a bulkhead.

g For cargo spaces in which dangerous goods are intended to be carried, regulation 124(3)*(h)* applies.

h Bulkheads and decks separating ro-ro spaces shall be capable of being closed reasonably gastight and such divisions shall have 'A' class integrity in so far as reasonable and practicable, if in the opinion of the Director it has little or no fire risk.

i Fire insulation need not be fitted in the machinery space in category (7) if, in the opinion of the Director, it has little or no fire risk.

* Where an asterisk appears in the tables, the division is required to be of steel or other equivalent material but is not required to be of 'A' class standard. Where a deck, except an open deck, is penetrated for the passage of electric cables, pipes and vent ducts, such penetrations shall be made tight to prevent the passage of flame and smoke. Divisions between control stations (emergency generators) and open decks may have air intake openings without means for closure, unless a fixed gas fire-extinguishing system is fitted.

TABLE 7

Fire integrity of bulkheads separating adjacent spaces

Spaces		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Control stations	(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 spaces	(3)			C	B-0 A-0[a]	B-0	A-60	A-0	A-60	A-0	*
Stairways	(4)				B-0 A-0[a]	B-0 A-0[a]	A-60	A-0	A-60	A-0	*
Service spaces (low risk)	(5)					C	A-60	A-0	A-60	A-0	*
Machinery spaces of category A	(6)						*	A-0	A-0[d]	A-60	*
Other machinery spaces	(7)							A-0[b]	A-0	A-0	*
Cargo pump rooms	(8)								*	A-60	*
Service spaces (high risk)	(9)									A-0[b]	*
Open decks	(10)										-

See notes following Table 8.

TABLE 8

Fire integrity of decks separating adjacent spaces

Space below ↓ Space above →		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Control stations	(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 spaces	(3)	A-60	A-0	*	A-0	*	A-60	A-0	–	A-0	*
Stairways	(4)	A-0	A-0	A-0	*	A-0	A-60	A-0	–	A-0	*
Service spaces (low risk)	(5)	A-15	A-0	A-0	A-0	*	A-60	A-0	–	A-0	*
Machinery spaces of category 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 rooms	(8)	–	–	–	–	–	A-0[d]	A-0	*	–	*
Service spaces (high risk)	(9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	–	A-0[b]	*
Open decks	(10)	*	*	*	*	*	*	*	*	*	–

Notes : To be applied to Tables 7 and 8, as appropriate.

a For clarification as to which applies, see sub-paragraphs (ii) and (iv) of regulation 114(2)(*c*).

b Where spaces are of the same numerical category and superscript "b" appears, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose (example, in category (9)). A galley next to a galley does not require a bulkhead, but a galley next to a paint room requires an 'A-0' bulkhead.

c Bulkheads separating the wheelhouse, chartroom and radio room from each other may have a 'B-0' rating.

d Bulkheads and decks between cargo pump rooms and machinery spaces of category A may be penetrated by cargo pump shaft glands and similar gland penetrations, provided that gastight seals with efficient lubrication or other means of ensuring the permanence of the gas seal are fitted in way of the bulkheads or deck.

e Fire insulation need not be fitted in the machinery space in category (7) if, in the opinion of the Director, it has little or no fire risk.

* Where an asterisk appears in the table, the division is required to be of steel or other equivalent material but is not required to be of 'A' class standard. Where a deck, except an open deck, is penetrated for the passage of electric cables, pipes and vent ducts, such penetrations shall be made tight to prevent the passage of flame and smoke. Divisions between control stations (emergency generators) and open decks may have air intake openings without means for closure, unless a fixed gas fire-extinguishing system is fitted.

TABLE 9

Application of the requirements to different modes of carriage of dangerous goods in ships and cargo spaces

Where **X** appears in this table, it means this requirement is applicable to all classes of dangerous goods as given in the appropriate line of Table 11, except as indicated by the notes.

Reg 124(2)(b) / Regulation 124(3)	*Weather decks ((i) to (v) inclusive)*	(i) *Not specifically designed*	(ii) *Container cargo spaces*	(iii) *Closed ro-ro spaces* [5]	(iii) *Open ro-ro spaces*	(iv) *Solid dangerous goods in bulk*	(v) *Shipborne barges*
(a)(i)	X	X	X	X	X	For application of requirements of regulation 124 to different classes of dangerous goods, see Table 10	X
(a)(ii)	X	X	X	X	X		-
(a)(iii)	-	X	X	X	X		X
(a)(iv)	-	X	X	X	X		X
(b)	-	X	X	X	X		X[4]
(c)	-	X	X	X	-		X[4]
(d)(i)	-	X	X[1]	X	-		X[4]
(d)(ii)	-	X	X[1]	X	-		X[4]
(e)	-	X	X	X	-		-
(f)(i)	X	X	X	X	X		-
(f)(ii)	X	X	X	X	X		-
(g)	X	X	-	-	X		-
(h)	X	X	X[2]	X	X		-
(i)	-	-	-	X[3]	X		-
(j)(i)	-	-	-	X	-		-
(j)(ii)	-	-	-	X	-		-

Notes :

1 For classes 4 and 5.1 not applicable to closed freight containers.
For classes 2, 3, 6.1 and 8 when carried in closed freight containers, the ventilation rate may be reduced to not less than 2 air changes. For the purpose of this requirement, a portable tank is a closed freight container.

2 Applicable to decks only.

3 Applies only to closed ro-ro spaces, not capable of being sealed.

4 In the special case where the barges are capable of containing flammable vapours or alternatively if they are capable of discharging flammable vapours to a safe space outside the barge carrier compartment by means of ventilation ducts connected to the barges, these requirements may be reduced or waived to the satisfaction of the Director.

5 Special category spaces shall be treated as closed ro-ro spaces when dangerous goods are carried.

TABLE 10

Application of the requirements to different classes of dangerous goods for ships and cargo spaces carrying solid dangerous goods in bulk.

Class / Regulation 124(3)	4.1	4.1	4.3[6]	5.1	6.1	8	9
(a)(i)	X	X	-	X	-	-	X
(a)(ii)	X	X	-	X	-	-	X
(b)	X	X[7]	X	X[8]	-	-	X[8]
(d)(i)	-	X[7]	X	-	-	-	-
(d)(ii)	X[9]	X[7]	X	X[7,9]	-	-	X[7,9]
(d)(iii)	X	X	X	X	X	X	X
(f)	X	X	X	X	X	X	X
(h)	X	X	X	X[7]	-	-	X[10]

Notes :

6 The hazards of substances in this class which may be carried in bulk are such that special consideration shall be given by the Director to the construction and equipment of the ship involved in addition to meeting the requirements enumerated in this table.

7 Only applicable to Seedcake containing solvent extractions, to Ammonium nitrate and to Ammonium nitrate fertilisers.

8 Only applicable to Ammonium nitrate and to Ammonium nitrate fertilisers. However, a degree of protection in accordance with standards contained in the International Electrotechnical Commission publication 60079, Electrical apparatus for explosive gas atmospheres, is sufficient.

9 Only suitable wire mesh guards are required.

10 The requirements of the Code of Safe Practice for Solid Bulk Cargoes, adopted by resolution A.434(XI), as amended, are sufficient.

TABLE 11

Application of the requirements to different classes of dangerous goods except solid dangerous goods in bulk

Class / Reg. 124(3)	1.1 to 1.6	1.4S	2.1	2.2	2.3	3.1 3.2 liquids ≤23°C[15]	3.3 liquids >23°C[15] ≤61°C	4.1	4.2	4.3	5.1	5.2	6.1 liquids	6.1 liquids ≤23°C[15]	6.1 liquids >23°C[15] ≤61°C	6.1 solids	8 liquids	8 liquids ≤23°C[15]	8 liquids >23°C[15] ≤61°C	8 solids	9
(a)(i)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
(a)(ii)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-
(a)(iii)	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(a)(iv)	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(b)	X	-	X	-	-	X	-	-	-	-	-	-	-	X	-	-	-	X	-	-	-
(c)	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	-
(d)(i)	-	-	X	-	X	X	-	X[11]	X[11]	X	X[11]	-	-	X	X	X[11]	-	X	X	-	X[11]
(d)(ii)	-	-	X	-	-	X	-	-	-	-	-	-	-	X	X	-	-	X	X	-	-
(e)	-	-	-	-	-	X	-	-	-	-	-	-	X	X	X	-	-	X	-	-	-
(f)	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X[14]
(g)	-	-	-	-	-	X	X	X	X	X	X	-	-	X	X	-	-	X	X	-	-
(h)	X[12]	-	X	X	X	X	X	X	X	X	X[13]	-	-	X	X	-	-	X	X	-	-
(i)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
(j)(i)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
(j)(ii)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Notes :

11 When "mechanically-ventilated spaces" are required by the International Maritime Dangerous Goods Code, as amended.
12 Stow 3 metres horizontally away from the machinery space boundaries in all cases.
13 Refer to the International Maritime Dangerous Goods Code, as amended.
14 As appropriate to the goods to be carried.
15 Refers to flashpoint.

FOURTH SCHEDULE regulation 187(5)

APPENDIX TO CHAPTER V

RULES FOR THE MANAGEMENT, OPERATION AND FINANCING OF THE NORTH ATLANTIC ICE PATROL

1. In these Rules —

"contributing government" means a Contracting State undertaking to contribute to the costs of the Ice Patrol Service pursuant to these Rules;

"extreme limits of ice of all types" in the North Atlantic Ocean is defined by a line connecting the following points —

A - 42° 23'.00 N, 59° 25'.00 W	J - 39° 49'.00 N, 41° 00'.00 W
B - 41° 23'.00 N, 57° 00'.00 W	K - 40° 39'.00 N, 39° 00'.00 W
C - 40° 47'.00 N, 55° 00'.00 W	L - 41° 19'.00 N, 38° 00'.00 W
D - 40° 07'.00 N, 53° 00'.00 W	M - 43° 00'.00 N, 37° 27'.00 W
E - 39° 18'.00 N, 49° 39'.00 W	N - 44° 00'.00 N, 37° 29'.00 W
F - 38° 00'.00 N, 47° 35'.00 W	O - 46° 00'.00 N, 37° 55'.00 W
G - 37° 41'.00 N, 46° 40'.00 W	P - 48° 00'.00 N, 38° 28'.00 W
H - 38° 00'.00 N, 45° 33'.00 W	Q - 50° 00'.00 N, 39° 07'.00 W
I - 39° 05'.00 N, 43° 00'.00 W	R - 51° 25'.00 N, 39° 45'.00 W;

"ice season" means the annual period between 15th. February and 1st. July;

"managing and operating" means maintaining, administering and operating the Ice Patrol, including the dissemination of information received therefrom;

"region of icebergs guarded by the Ice Patrol" means the south-eastern, southern and south-western limits of the region of icebergs in the vicinity of the Grand Banks of Newfoundland;

"routes passing through regions of icebergs guarded by the Ice Patrol" means —

(a) routes between Atlantic coast ports of Canada (including inland ports approached from the North Atlantic through the Gut of Canso and Cabot Straits) and ports of Europe, Asia or Africa approached from the North Atlantic through or north of the Straits of Gibraltar (except routes which pass south of the extreme limits of ice of all types);

(b) routes via Cape Race, Newfoundland, between Atlantic coast ports of Canada (including inland ports approached from the North Atlantic through the Gut of Canso and Cabot Straits) west of Cape Race, Newfoundland, and Atlantic coast ports of Canada north of Cape Race, Newfoundland;

(c) routes between Atlantic and Gulf Coast ports of the United States of America (including inland ports approached from the North Atlantic through the Gut of Canso and Cabot Straits) and ports of Europe, Asia or Africa approached from the North Atlantic through or north of the Straits of Gibraltar (except routes which pass south of the extreme limits of ice of all types;

(d) routes via Cape Race, Newfoundland, between Atlantic and Gulf Coast ports of the United States of America (including inland ports approached from the North Atlantic through the Gut of Canso and Cabot Straits) and Atlantic coast ports of Canada north of Cape Race, Newfoundland.

2. Each Contracting State specially interested in these services whose ships pass through the region of icebergs during the ice season undertakes to contribute to the Government of the United States of America its proportionate share of the costs for the management and operation of the Ice Patrol Service. The contribution to the Government of the United States of America shall be based on the ration which the average annual gross tonnage of that contributing government's ships passing through the region of icebergs guarded by the Ice Patrol during the previous 3 ice seasons bears to the combined average annual gross tonnage of all ships that passed through the region of icebergs guarded by the Ice Patrol during the previous 3 ice seasons.

3. All contributions shall be calculated by multiplying the ratio described in rule 2 by the average actual annual cost incurred by the Governments of the United States of America and Canada of managing and operating ice patrol services during the previous 3 years. This ratio shall be computed annually, and shall be expressed in terms of a lump sum per-annum fee.

4. Each of the contributing governments has the right to alter or discontinue its contribution, and other interested governments may undertake to contribute

to the expense. The contributing government which avails itself of this right shall continue to be responsible for its current contribution up to 1st. September following the date of giving notice of intention to alter or discontinue its contribution. To take advantage of such right, it must give notice to the managing government at least 6 months before 1st. September.

5. Each contributing government shall notify the Secretary-General of its undertaking pursuant to rule 2, who shall notify all Contracting States.

6. The Government of the United States of America shall furnish annually to each contributing government a statement of the total cost incurred by the Governments of the United States of America and Canada of managing and operating the Ice Patrol for that year and of the average percentage share for the past 3 years of each contributing government.

7. The managing government shall publish annual accounts including a statement of costs incurred by the governments providing the services for the past 3 years and the total gross tonnage using the service for the past 3 years. The accounts shall be publicly available. Within 3 months after having received the cost statement, contributing governments may request more detailed information regarding the costs incurred in managing and operating the Ice Patrol.

8. These Rules shall be operative beginning with the ice season of 2002.

Made this 7th. day of Syawal, Hijriah 1424 corresponding to the 1st. day of December, 2003.

PEHIN ORANG KAYA AMAR PAHLAWAN
DATO SERI SETIA HAJI AWANG ZAKARIA
BIN DATU MAHAWANGSA HAJI SULAIMAN
Minister of Communications,
Brunei Darussalam.