MERCHANT SHIPPING ACT (CHAPTER 179, SECTION 100)

MERCHANT SHIPPING (SAFETY CONVENTION) REGULATIONS

ARRANGEMENT OF REGULATIONS

First Schedule
Second Schedule
The Schedules

[1st September 1984]

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

CHAPTER I

GENERAL PROVISIONS

PART A — APPLICATION, DEFINITIONS, ETC.

Regulation 1

Application

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

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

Regulation 2

Definitions

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

"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;

[S 40/2000 wef 03/02/2000]

"approved" means approved by the Director;

"authorised organisation" means an organisation authorised under the Act for the survey or inspection of Singapore ships and the issue of any certificate under Part V of the Act;

[S 866/2014 wef 01/01/2015]

"cargo ship" means any ship which is not a passenger ship;

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

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

[S 366/2010 wef 01/07/2010]

"Director" means the Director of Marine appointed under section 4 of the Act;

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

"IMO", "Organisation" or "Organization" means the International Maritime Organization;

[S 802/2015 wef 01/01/2016]

"inflammable" has the same meaning as "flammable";

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

"mile" means 1,852 metres;

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

[*Deleted by S 802/2015 wef 01/01/2016*]

"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;

"passenger ship" means a ship which carries more than 12 passengers;

"surveyor of ships" means a person appointed under section 5 of the Act;

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

"tons" means tons gross tonnage.

Regulation 3

Exceptions

(*a*) These Regulations, unless expressly provided otherwise, do not apply to —

(i) ships of war and troopships;

(ii) cargo ships of less than 500 tons;

(iii) ships not propelled by mechanical means;

(iv) wooden ships of primitive build;

(v) pleasure yachts not engaged in trade; and

(vi) fishing vessels.

(*b*) 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.

Regulation 4

Exemptions

(*a*) 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.

(*b*) 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 of these Regulations 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.

(*c*) For the purpose of paragraph (*b*), the requirements of the following Codes wherever applicable shall be complied with to the satisfaction of the Director:

(i) 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;

(ii) 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

(iii) mobile offshore drilling units with the Code for Mobile Offshore Drilling Units adopted by the Organisation by resolution A 414 (XI).

Regulation 5

Equivalents

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

Regulation 6

Inspection and Survey

(*a*) The inspection and survey of ships, so far as regards the enforcement of the provisions 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.

[S 40/2000 wef 03/02/2000]

(*b*) The surveyors of ships and authorised organisations may —

(i) require repairs to a ship; and

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

(*c*) 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. 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. 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.

(*d*) 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.

(*e*) The owner of every ship in relation to which these Regulations apply shall apply for the surveys required under Regulations 7, 8, 9 and 10 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.

Regulation 7

Surveys of Passenger Ships

(*a*) A passenger ship shall be subject to the surveys specified below —

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

(ii) a renewal survey once every 12 months, except where Regulation 14(*b*), (*e*), (*f*) and (*g*) is applicable; and

(iii) additional surveys, as the occasion arises.

[S 40/2000 wef 03/02/2000]

(*b*) The surveys referred to above shall be carried out as follows:

(i) 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, materials 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 also 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 the provisions of these Regulations and of the Merchant Shipping (Prevention of Collisions at Sea) Regulations (Rg 10) in force.

(ii) 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 is fit for the service for which it is intended, and that it complies with the requirements of these Regulations. The lights, shapes, means of making sound signals and distress signals carried by the ship shall also be subject to the abovementioned survey for the purpose of ensuring that they comply with the requirements of these Regulations and of the Merchant Shipping (Prevention of Collisions at Sea) Regulations in force.

[S 40/2000 wef 03/02/2000]

(iii) An additional survey, either general or partial according to the circumstances, shall be made after a repair resulting from investigations prescribed in Regulation 11, 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 all in respects satisfactory, and that the ship complies in all respects with the provisions of these Regulations and of the Merchant Shipping (Prevention of Collisions at Sea) Regulations in force, and such that the ship is fit for the service for which it is intended.

[S 40/2000 wef 03/02/2000]

(*c*) For the purpose of paragraph (*b*) the rules for the construction and survey of a vessel shall be the rules of the authorised organisation under which the vessel is classed, insofar as such rules are not in conflict with the requirements of these Regulations or any rule or directive made by the Director.

Regulation 8

Surveys of Life-Saving Appliances and Other Equipment of Cargo Ships

(*a*) The life-saving appliances and other equipment of cargo ships of 500 tons and upwards as referred to in paragraph (*b*)(i) shall be subject to the surveys specified below —

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

(ii) a renewal survey at intervals of 5 years, except where Regulation 14(*b*), (*e*), (*f*) and (*g*) is applicable;

(iii) 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 sub-paragraph (iv);

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

(v) an additional survey as prescribed for passenger ships in Regulation 7(*b*)(iii).

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

(i) 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 embarkation for pilots and other equipment to which Chapters II-1, II-2, III 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 abovementioned survey for the purpose of ensuring that they comply with the requirements of these Regulations and, where applicable, the Merchant Shipping (Prevention of Collisions at Sea) Regulations (Rg 10) in force;

(ii) the renewal and periodical surveys shall include an inspection of the equipment referred to in paragraph (*b*)(i) to ensure that it complies with the relevant requirements of these Regulations and the Merchant Shipping (Prevention of Collisions at Sea) Regulations in force, is in satisfactory condition and is fit for the service for which the ship is intended;

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

(*c*) The periodical and annual surveys referred to in paragraph (*a*)(iii) and (iv) shall be endorsed on the Cargo Ship Safety Equipment Certificate.

[S 40/2000 wef 03/02/2000]

Regulation 9

Surveys of Radio Installations of Cargo Ships

(*a*) 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 surveys specified below —

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

(ii) a renewal survey at intervals of 5 years, except where Regulation 14(*b*), (*e*), (*f*) and (*g*) is applicable;

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

(iv) an additional survey as prescribed for passenger ships in Regulation 7(*b*)(iii).

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

(i) 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;

(ii) 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.

(*c*) The periodical surveys referred to in paragraph (*a*)(iii) shall be endorsed on the Cargo Ship Safety Radio Certificate.

[S 40/2000 wef 03/02/2000]

Regulation 10

Surveys of Structure, Machinery and Equipment of Cargo Ships

(*a*) The structure, machinery and equipment (other than items in respect of which a Cargo Ship Safety Equipment Certificate and a Cargo Ship Safety Radio Certificate are issued) of a cargo ship as referred to in paragraph (*b*)(i) shall be subject to the surveys and inspections specified below —

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

(ii) a renewal survey at intervals of 5 years, except where Regulation 14(*b*), (*e*), (*f*) and (*g*) is applicable;

(iii) 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 sub-paragraph (iv);

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

(v) a minimum of 2 inspections of the outside of the ship's bottom during any 5-year period, except where Regulation 14(*e*) or (*f*) is applicable. Where Regulation 14(*e*) or (*f*) 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;

(vi) an additional survey as prescribed for passenger ships in Regulation 7(*b*)(iii).

[S 40/2000 wef 03/02/2000]

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

(i) 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, materials, 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.

(ii) the renewal survey shall include an inspection of the structure, machinery and equipment as referred to in sub-paragraph (i) 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;

(iii) 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 electrical installation to ensure that they remain satisfactory for the service for which the ship is intended. In the 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 installation in dangerous zones;

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

(v) 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.

[S 40/2000 wef 03/02/2000]

(*c*) The intermediate and annual surveys and the inspections of the outside of the ship's bottom referred to in paragraph (*a*)(iii), (iv) and (v) shall be endorsed on the Cargo Ship Safety Construction Certificate.

[S 40/2000 wef 03/02/2000]

(*d*) An additional survey, either general or partial according to the circumstances, shall be made when required after an investigation prescribed in Regulation 11, 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 is fit to proceed to sea without danger to the ship or persons on board.

(*e*) For the purpose of paragraphs (*a*) to (*d*), the rules for the construction and survey of a vessel shall be the rules of the authorised organisation under which the vessel is classed, insofar as such rules are not in conflict with the requirements of these Regulations or any rule or directive made by the Director.

Regulation 11

Maintenance of Conditions after Survey

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 the provisions of 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 7, 8, 9 or 10 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

[S 40/2000 wef 03/02/2000]

(*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 7, 8, 9 or 10, 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 Singapore, the master or owner shall also report immediately to the Director.

[S 40/2000 wef 03/02/2000]

Regulation 12

Issue or Endorsement of Certificates

(*a*)(i) A certificate called 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.

(ii) A certificate called 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.

(iii) A certificate called 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 V and any other relevant requirements of these Regulations.

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

(v) (1) A certificate called a Cargo Ship Safety Certificate may 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, IV and V and any other relevant requirements of these Regulations, as an alternative to the certificates referred to sub-paragraphs (ii), (iii) and (iv);

[S 432/2014 wef 01/07/2014]

(2) A reference in this Chapter to a Cargo Ship Safety Construction Certificate, Cargo Ship Safety Equipment Certificate or Cargo Ship Safety Radio Certificate

shall, in the case where a Cargo Ship Safety Certificate is issued under sub-paragraph (1), include a reference to a Cargo Ship Safety Certificate.

[S 432/2014 wef 01/07/2014]

(vi) The Passenger Ship Safety Certificate, the Cargo Ship Safety Equipment Certificate and the Cargo Ship Safety Radio Certificate referred to in sub-paragraphs (i), (iii) and (iv), or the Cargo Ship Safety Certificate referred to in sub-paragraph (v), as the case may be, shall be supplemented by a Record of Equipment in the form set out in the Second Schedule.

[S 432/2014 wef 01/07/2014]

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

[S 432/2014 wef 01/07/2014]

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

[S 432/2014 wef 01/07/2014]

(*b*) 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 3rd February 2000 shall remain valid until it expires.

[S 40/2000 wef 03/02/2000]

Regulation 13

Issue or Endorsement of Certificates by another Government

The Director may, at the request of a Contracting State, cause a foreign ship in Singapore 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 12.

[S 40/2000 wef 03/02/2000]

Regulation 14

Duration and Validity of Certificates

(*a*) 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.

(*b*)(i) Notwithstanding the requirements of paragraph (*a*), 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 —

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

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

(ii) 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 —

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

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

(iii) 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 —

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

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

(*c*) 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 paragraph (*a*), provided that the surveys referred to in Regulations 8, 9 and 10 applicable when a certificate is issued for a period of 5 years are carried out as appropriate.

(*d*) 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.

(*e*) If a ship at the 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 —

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

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

(*f*) A certificate issued to a ship engaged on short voyages which has not been extended under the foregoing provisions of 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 —

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

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

(*g*) 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*)(ii), (*e*) or (*f*). In these special circumstances, the new certificate shall be valid 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.

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

(i) 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;

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

(iii) 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.

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

(i) if the relevant surveys and inspections are not completed within the periods specified under Regulations 7(*a*), 8(*a*), 9(*a*) and 10(*a*);

(ii) if the certificate is not endorsed in accordance with these Regulations;

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

[S 40/2000 wef 03/02/2000]

Regulation 15

Forms of Certificates and Records of Equipment

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

[S 40/2000 wef 03/02/2000]

Regulation 16

Availability of Certificates

The Certificates issued under Regulations 12 and 13 shall be readily available on board for examination at all times.

[S 40/2000 wef 03/02/2000]

Regulation 17

Acceptance of Certificates

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.

[S 40/2000 wef 03/02/2000]

Regulation 18

Qualification of Certificates

(*a*) 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.

(*b*) This annex shall state that in the circumstances there is no infringement of the provisions 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.

Regulation 19

*Control**

* Reference is made to Resolution A.787 (19) — "Procedures for Port State Control" — adopted by the Organisation on 23 November 1995.

[S 40/2000 wef 03/02/2000]

(*a*) 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 12 or Regulation 13 are valid.

(*b*) 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 the provisions of Regulation 11(*a*) and (*b*).

(*c*) In the circumstances specified in paragraph (*b*) 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.

(*d*) 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.

[S 40/2000 wef 03/02/2000]

(*e*) 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 paragraph (*d*), if it is unable to take action as specified in paragraphs (*c*) and (*d*) or if the ship has been allowed to proceed to the next port of call.

[S 40/2000 wef 03/02/2000]

(*f*) 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.

Regulation 20

Privileges

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

PART C — CASUALTIES

Regulation 21

Casualties

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

PART D — PENALTY

Regulation 22

Penalty

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

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

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

(*b*) Any owner or master who contravenes paragraph (*a*) shall be guilty of an offence and shall be 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

Regulation 1

Application

(*a*)(i) 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 January 2009.

(ii) For the purpose of this Chapter, the term "a similar stage of construction" means the stage at which —

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

(2) assembly of that ship has commenced comprising at least 50 tonnes or one per cent of the estimated mass of all structural material, whichever is less.

(iii) For the purpose of this Chapter —

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

(2) "all ships" means ships constructed before, on or after 1st January 2009;

(3) 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) "alterations and modifications of a major character" means, in the context of cargo ship subdivision and stability, any modification to the construction which affects the level of subdivision of that ship. Where a cargo ship is subject to such modification, it shall be demonstrated that the *A/R* ratio calculated for the ship after such modifications is not less than the *A/R* ratio calculated for the ship before the modification. However, in those cases where the ship's *A/R* ratio before modification is equal to or greater than unity, it is only necessary that the ship after modification has an "*A*" value which is not less than "*R*", calculated for the modified ship.

(*b*) Unless expressly provided otherwise, ships constructed before 1st January 2009 shall comply with the requirements which are applicable under this Chapter in force immediately before that date.

(*c*) 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 the date on which any relevant amendments enter into force, 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 the date on which any relevant amendments enter into force, in so far as the Director deems reasonable and practicable.

(*d*) 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 Singapore ships or classes of Singapore ships which, in the course of their voyage, do not proceed more than 20 miles from the nearest land.

(*e*) 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.

[S 686/2008 wef 01/01/2009]

Regulation 2

Definitions

For the purpose of this Chapter, unless expressly provided otherwise —

(*a*) "subdivision length ("L_s ")" of the ship 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 draught;

(*b*) "mid-length" is the mid-point of the subdivision length of the ship;

(*c*) "aft terminal" is the aft limit of the subdivision length;

(*d*) "forward terminal" is the forward limit of the subdivision length;

(*e*) "length ("L")" is the length as defined in the International Convention on Load Lines in force;

(*f*) "freeboard deck" is the deck as defined in the International Convention on Load Lines in force;

(*g*) "forward perpendicular" is the forward perpendicular as defined in the International Convention on Load Lines in force;

(*h*) "breadth ("B")" is the greatest moulded breadth of the ship at or below the deepest subdivision draught;

(*i*) "draught ("d")" is the vertical distance from the keel line at mid-length to the waterline in question;

(*j*) "deepest subdivision draught ("d_s ")"is the waterline which corresponds to the summer load line draught of the ship;

(*k*) "light service draught ("d_l ")" is the service draught corresponding to the lightest anticipated loading and associated tankage, including, however, such ballast as may be necessary for stability or immersion or both. Passenger ships should include the full complement of passengers and crew on board;

(*l*) "partial subdivision draught ("d_p ")" is the light service draught plus 60% of the difference between the light service draught and the deepest subdivision draught;

(*m*) "trim" is the difference between the draught forward and the draught aft, where the draughts are measured at the forward and aft terminals respectively, disregarding any rake of keel;

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

(*o*) "machinery spaces" are spaces between the watertight boundaries of a space containing the main and auxiliary propulsion machinery, including boilers, generators and electric motors primarily intended for propulsion. In the case of unusual arrangements, the Director may define the limits of the machinery spaces;

(*p*) "weathertight" means that in any sea conditions water will not penetrate into the ship;

(*q*) "watertight" means having scantlings and arrangements capable of preventing the passage of water in any direction under the head of water likely to occur in intact and damaged conditions. In the damaged condition, the head of water is to be considered in the worst situation at equilibrium, including intermediate stages of flooding;

(*r*) "design pressure" means the hydrostatic pressure for which each structure or appliance assumed watertight in the intact and damage stability calculations is designed to withstand;

(*s*) "bulkhead deck" in a passenger ship means the uppermost deck at any point in the subdivision length ("L_s") to which the main bulkheads and the ship's shell are carried watertight and the lowermost deck from which passenger and crew evacuation will not be impeded by water in any stage of flooding for damage cases defined in Regulation 8 and in Part B-2 of this Chapter. The bulkhead deck may be a stepped deck. In a cargo ship the freeboard deck may be taken as the bulkhead deck;

(*t*) "deadweight" is the difference in tonnes between the displacement of a ship in water of a specific gravity of 1.025 at the draught corresponding to the assigned summer freeboard and the lightweight of the ship;

(*u*) "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;

(*v*) "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;

(*w*) "ro-ro passenger ship" means a passenger ship with ro-ro spaces or special category spaces as defined in Regulation 3 of Chapter II-2;

(*x*) "bulk carrier" means a bulk carrier as defined in Regulation 1(*a*) of Chapter XII;

(*y*) "keel line" is a line parallel to the slope of the keel passing amidships through —

(i) the top of the keel at centreline or line of intersection of the inside of shell plating with the keel if a bar keel extends below that line, on a ship with a metal shell;

(ii) in the case of wood ships and composite ships, the lower edge of the keel rabbet. When the form at the lower part of the midship section is of a hollow character, or where thick garboards are fitted, keel line means a line parallel to the slope of the keel passing amidships through the line of the flat of the bottom continued inward where it intersects the centreline amidships;

(*z*) "amidship" is at the middle of the length ("L");

[S 686/2008 wef 01/01/2009]

[S 366/2010 wef 01/07/2010]

(*aa*) "2008 IS Code" means the International Code on Intact Stability, 2008, consisting of an introduction, Part A (the provisions of which shall be treated as mandatory) and Part B (the provisions of which shall be treated as recommendatory), as adopted by resolution MSC.267(85), and any amendment thereto which has come into force and has been accepted by the Government;

[S 366/2010 wef 01/07/2010]

(*ab*) "Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers" means the International Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers, adopted by the Maritime Safety Committee by resolution MSC.287(87), and any

amendment thereto which has come into force and has been accepted by the Government;

[S 622/2011 wef 01/01/2012]

(*ac*) "IGF Code" means the International Code of Safety for Ships Using Gases or Other Low-flashpoint Fuels as adopted by the Maritime Safety Committee of the Organization by resolution MSC.391(95), as may be amended by the Organization, 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 to the Convention other than Chapter I;

[S 669/2016 wef 01/01/2017]

(*ad*) "Low-flashpoint fuel" means gaseous or liquid fuel having a flashpoint lower than permitted under Regulation 4(*b*)(i)(1) of Chapter II-2.

[S 669/2016 wef 01/01/2017]

Regulation 3

Definitions relating to Parts C, D and E

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

(*a*) "steering gear control system" is the equipment by which orders are transmitted from the navigating 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;

(*b*) "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 (e.g. tiller or quadrant) necessary for effecting movement of the rudder for the purpose of steering the ship under normal service conditions;

(*c*) "steering gear power unit" is —

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

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

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

(*d*) "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;

(*e*) "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;

(*f*) "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 electrical power;

(*g*) "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;

(*h*) "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;

(*i*) "main generating station" is the space in which the main source of electrical power is situated;

(*j*) "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;

(*k*) "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;

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

(*m*) "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. The power actuating systems may share common mechanical components (i.e. tiller, quadrant and rudder stock) or components serving the same purpose;

(*n*) "maximum ahead service speed" is the greatest speed which the ship is designed to maintain in service at sea at the deepest sea-going draught;

(*o*) "maximum astern speed" is the speed which it is estimated the ship can attain at the designed maximum astern power at the deepest sea-going draught;

(*p*) "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, stabilizing, ventilation and air conditioning machinery, and similar spaces, and trunks to such spaces;

(*q*) "machinery spaces of category A" are those spaces and trunks to such spaces which contain —

(i) internal combustion machinery used for main propulsion; or

(ii) 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

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

(*r*) "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 centralized;

(*s*) "chemical tanker" means a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product listed in either —

(i) 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 Organization; or

(ii) chapter VI of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk adopted by the Assembly of the Organization by resolution A.212(VII), hereinafter referred to as "the Bulk Chemical Code", as has been or may be amended by the Organization,

whichever is applicable;

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

(i) 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 Organization; or

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

whichever is applicable.

[S 686/2008 wef 01/01/2009]

PART A-1 — STRUCTURE OF SHIPS

Regulation 3-1

Structural, Mechanical and Electrical Requirements for Ships

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 the provisions of Regulation 1 of Chapter XI-1, or with requirements determined by the Director which provide an equivalent level of safety.

[S 691/2006 wef 01/01/2007]

Regulation 3-2

Protective Coatings of Dedicated Seawater Ballast Tanks in All Types of Ships and Double-side Skin Spaces of Bulk Carriers

(*a*) Paragraphs (*b*) and (*d*) of this Regulation shall apply to ships of not less than 500 tons:

(i) for which the building contract is placed on or after 1st July 2008;

(ii) in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1st January 2009; or

(iii) the delivery of which is on or after 1st July 2012.

(*b*) All dedicated seawater ballast tanks arranged in ships and double-side skin spaces arranged in bulk carriers of 150 m in length and upwards shall be coated during construction in accordance with the Performance Standard for Protective

Coatings for Dedicated Seawater Ballast Tanks in All Types of Ships and Double-side Skin Spaces of Bulk Carriers, adopted by the Maritime Safety Committee by resolution MSC.215(82), as may be amended by the Organization, 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.

(*c*) All dedicated seawater ballast tanks arranged in oil tankers and bulk carriers constructed on or after 1st July 1998, for which paragraph (*b*) is not applicable, 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 Organization*. Where appropriate, sacrificial anodes shall also be used.

(*d*) Maintenance of the protective coating system shall be included in the overall ship's maintenance scheme. The effectiveness of the protective coating system shall be verified during the life of a ship by an authorised organization based on the guidelines developed by the Organization†.

[S 339/2008 wef 01/07/2008]

Regulation 3-3

Safe Access to Tanker Bows

(*a*) For the purpose of this Regulation and Regulation 3-4, tankers include oil tankers as defined in Regulation 2(*l*), chemical tankers as defined in Regulation 8(*b*) of Chapter VII and gas carriers as defined in Regulation 11(*b*) of Chapter VII.

(*b*) Every tanker shall be provided with the means to enable the crew to gain safe access to the bow even in severe weather conditions. Such means of access shall be approved by the Director based on the guidelines developed by the Organization**.

[S 691/2006 wef 01/01/2007]

Regulation 3-4

Emergency Towing Arrangements and Procedures

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

†Refer to the guidelines to be developed by the Organization.

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

(*a*) *Emergency towing arrangements on tankers*

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

(ii) For tankers constructed on or after 1st July 2002 —

(1) 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

(2) 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*.

(iii) 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*.

(*b*) *Emergency towing procedures on ships*

(i) This paragraph shall apply to —

(1) all passenger ships;

(2) cargo ships constructed on or after 1st January 2010; and

(3) cargo ships constructed before 1st January 2010, with effect from 1st January 2012.

(ii) Ships shall be provided with a ship-specific emergency towing procedure. Such a procedure shall be carried aboard the ship for use in emergency situations and shall be based on existing arrangements and equipment available on board the ship.

(iii) The procedure** shall include —

(1) drawings of fore and aft deck showing possible emergency towing arrangements;

(2) inventory of equipment on board that can be used for emergency towing;

*Refer to the Guidelines on emergency towing arrangements for tankers, adopted by the Maritime Safety Committee by resolution MSC.35(63), as amended.

** Refer to the Guidelines for owners/operators on preparing emergency towing procedures and (MSC.1/Circ.1255).

(3) means and methods of communication; and

(4) sample procedures to facilitate the preparation for and conducting of emergency towing operations.

[S 664/2009 wef 01/01/2010]

Regulation 3-5

New Installation of Materials containing Asbestos

(*a*) This Regulation shall apply to materials used for structure, machinery, electrical installations and equipment covered by the present Convention.

(*b*) For all ships, new installation of materials which contain asbestos shall be prohibited.

[S 691/2006 wef 01/01/2007]

[S 793/2010 wef 01/01/2011]

Regulation 3-6

Access to and within Spaces in, and forward of, the Cargo Area of Oil Tankers and Bulk Carriers

(*a*) *Application*

(i) This Regulation shall apply to —

(1) oil tankers of not less than 500 tons; and

(2) bulk carriers, as defined in Regulation 1 of Chapter IX, of not less than 20,000 tons,

that are constructed on or after 1st January 2006.

(ii) Oil tankers of not less than 500 tons; and bulk carriers, as defined in Regulation 1 of Chapter IX, of not less than 20,000 tons that are constructed on or after 1st January 2005 but before 1st January 2006 shall comply with Regulation 3-6 in force before 1st January 2006.

(iii) Regulation 12-2 of Chapter II-1 shall apply to oil tankers of not less than 500 tons that are constructed on or after 1st October 1994 but before 1st January 2005.

(*b*) *Means of access to cargo and other spaces*

(i) Each space of a ship shall be provided with means of access to enable, throughout the life of the ship, overall and close-up inspections and thickness measurements of the ship's structure to be carried out by —

(1) any authorised organisation, as defined in Regulation 2 of Chapter I;

(2) the Company, as defined in Regulation 1 of Chapter IX;

(3) the ship's personnel; or

(4) other persons.

(ii) Each permanent means of access shall comply with —

(1) the requirements of paragraph (*e*);

(2) the technical provisions for means of access for inspections adopted by the Maritime Safety Committee by resolution MSC.158(78), as amended by any amendment made by the Organization that has been adopted and brought into force, and that has taken effect, in accordance with article VIII of the Convention concerning the amendment procedures applicable to the Annex other than Chapter I.

(iii) Where —

(1) a permanent means of access may be susceptible to damage during normal cargo loading and unloading operations; or

(2) it is impracticable to provide a permanent means of access,

the Director may allow a portable means of access that is specified in the technical provisions referred to in sub-paragraph (ii)(2) to be provided, in lieu of a permanent means of access, if the means of attaching, rigging, suspending or supporting the portable means of access forms a permanent part of the ship's structure.

(iv) The equipment for providing a portable means of access shall be capable of being readily erected or deployed by the ship's personnel.

(v) The construction and materials of each means of access, and the attachment of each means of access to the ship's structure, shall be to the satisfaction of the Director.

(vi) Each means of access shall be subjected to a survey prior to, or in conjunction with, the use of the means of access in carrying out surveys in accordance with Regulation 10 of Chapter I.

(*c*) *Safe access to cargo holds, cargo tanks, ballast tanks and other spaces*

(i) Safe access* to any cargo hold, cargo tank, cofferdam, ballast tank or other space in the cargo area shall —

(1) be provided direct from the open deck; and

(2) be such as to allow the complete inspection of the cargo hold, cargo tank, cofferdam, ballast tank or space in the cargo area, as the case may be.

(ii) Safe access* to any double bottom space or to forward ballast tanks may be provided from a pump-room, deep cofferdam, pipe tunnel, cargo hold, double hull space or any similar compartment not intended for the carriage of oil or hazardous cargoes.

(iii) Any tank or subdivision of a tank that is not less than 35 m in length shall be fitted with at least two access hatchways with ladders, which shall be located as far apart as practicable.

(iv) Any tank that is less than 35 m in length shall be fitted with at least one access hatchway with ladder.

(v) Where any tank is subdivided by any swash bulkhead or other similar obstruction which does not allow ready means of access throughout the tank, the tank shall be fitted with at least two access hatchways with ladders.

(vi) Each cargo hold shall be provided with at least two means of access, which —

(1) shall be located as far apart as practicable; and

(2) in general, should be arranged diagonally, for example, one near the forward bulkhead on the port side, and another near the aft bulkhead on the starboard side.

(*d*) *Ship structure access manual*

(i) The means of access to carry out overall and close-up inspections and thickness measurements of a ship's structure shall be described in a ship structure access manual approved by the Director, an updated copy of which shall be kept on board the ship.

(ii) The contents of a ship structure access manual shall include the following for each space:

(1) plans showing the means of access to the space, with the appropriate technical specifications and dimensions;

(2) plans showing the means of access within the space to enable an overall inspection to be carried out, with the appropriate technical specifications and dimensions, and indicating from where each area in the space can be inspected;

*Refer to recommendations for entering enclosed spaces aboard ships adopted by the Organization by resolution A.864(20).

(3) plans showing the means of access within the space to enable a close-up inspection to be carried out, with the appropriate technical specifications and dimensions, and indicating the position of each critical structural area, whether each means of access is permanent or portable, and from where each area in the space can be inspected;

(4) instructions for inspecting and maintaining the structural strength of all means of access and all means of attachment, taking into account any corrosive atmosphere that may be within the space;

(5) instructions for safety guidance when rafting is used for close-up inspections and thickness measurements;

(6) instructions for the rigging and use of any portable means of access in a safe manner;

(7) an inventory of all portable means of access;

(8) records of periodical inspections and maintenance of all means of access.

(iii) In sub-paragraph (ii), "critical structural area" means an area within a ship which has been identified —

(1) from calculations, to require monitoring; or

(2) from the service history of similar or sister ships, to be sensitive to cracking, buckling, deformation or corrosion which would impair the structural integrity of the ship.

(*e*) *General technical specifications*

(i) For access through horizontal openings, hatches or manholes, the dimensions shall be sufficient —

(1) to allow a person wearing a self-contained air-breathing apparatus and protective equipment to ascend or descend any ladder without obstruction; and

(2) to provide a clear opening of not less than 600 mm x 600 mm to facilitate the hoisting of an injured person from the bottom of the space.

(ii) Where access to a cargo hold is arranged through a cargo hatch, the top of the ladder shall be placed as close as possible to the hatch coaming.

(iii) Any access hatch coaming with a height greater than 900 mm shall have steps on the outside in conjunction with the ladder.

(iv) For access through vertical openings or manholes in swash bulkheads, floors, girders and web frames providing passage through the length and breadth of the space, the minimum opening shall —

(1) be not less than 600 mm x 800 mm; and

(2) be at a height of not more than 600 mm from the bottom shell plating, unless gratings or other footholds are provided.

(v) For oil tankers of less than 5,000 tonnes deadweight, the Director may approve smaller dimensions for an opening referred to in paragraph (*e*)(i) or (iv) if —

(1) there are special circumstances; and

(2) it is proved to the satisfaction of the Director that a person can traverse the opening, or that an injured person can be removed through the opening.

[S 691/2006 wef 01/01/2007]

Regulation 3-7

Construction Drawings Maintained On Board and Ashore

(*a*) A set of as-built construction drawings* and other plans showing any subsequent structural alterations shall be kept on board a ship constructed on or after 1st January 2007.

(*b*) An additional set of such drawings shall be kept ashore by the Company, as defined in Regulation 1 of Chapter IX.

[S 691/2006 wef 01/01/2007]

Regulation 3-8

*Towing and Mooring Equipment***

** Refer to MSC/Circ.1175 on Guidance on shipboard towing and mooring equipment.

(*a*) This Regulation applies to ships constructed on or after 1st January 2007, but does not apply to emergency towing arrangements provided in accordance with Regulation 3-4.

(*b*) Ships shall be provided with arrangements, equipment and fittings of sufficient safe working load to enable the safe conduct of all towing and mooring operations associated with the normal operation of the ship.

*Refer to MSC/Circ.1135 on As-built contruction drawings to be maintained on board the ship and ashore.

(*c*) Arrangements, equipment and fittings provided in accordance with paragraph (*b*) shall meet the appropriate requirements of the Director or an authorised organization.

(*d*) Each fitting or item or equipment provided under this Regulation shall be clearly marked with any restriction associated with its safe operation, taking into account the strength of its attachment to the ship's structure.

[S 691/2006 wef 01/01/2007]

Regulation 3-9

Means of Embarkation on and Disembarkation from Ships

(*a*) Ships constructed on or after 1st January 2010 shall be provided with means of embarkation on and disembarkation from ships for use in port and in port-related operations, such as gangways and accommodation ladders, in accordance with paragraph (*b*), unless the Director deems that compliance with a particular provision is unreasonable or impractical*.

(*b*) The means of embarkation and disembarkation required in paragraph (*a*) shall be constructed and installed based on the Guidelines developed by the Organisation**.

(*c*) For all ships the means of embarkation and disembarkation shall be inspected and maintained** in suitable condition for their intended purpose, taking into account any restrictions related to safe loading. All wires used to support the means of embarkation and disembarkation shall be maintained as specified in Regulation 20(*d*) of Chapter III.

[S 664/2009 wef 01/01/2010]

Regulation 3-10

Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers

(*a*) This Regulation shall apply to oil tankers of 150 m in length and above and to bulk carriers of 150 m in length and above, constructed with single deck, top-side tanks and hopper side tanks in cargo spaces, excluding ore carriers and combination carriers:

(i) for which the building contract is placed on or after 1st July 2016;

*Circumstances where compliance may be deemed unreasonable or impractical may include where the ship:
1. has small freeboards and is provided with boarding ramps; or
2. is engaged in voyages between designated ports where appropriate shore accommodation or embarkation ladders (platforms) are provided.

**Refer to the Guidelines for construction, installation, maintenance and inspection/survey of means of embarkation and disembarkation set out in circular MSC.1/Circ.1331 issued by the Organisation.

(ii) in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1st July 2017; or

(iii) the delivery of which is on or after 1st July 2020.

(*b*) Ships shall be designed and constructed for a specified design life to be safe and environmentally friendly, when properly operated and maintained under the specified operating and environmental conditions, in intact and specified damage conditions, throughout their life.

(i) *Safe and environmentally friendly* means the ship shall have adequate strength, integrity and stability to minimise the risk of loss of the ship or pollution to the marine environment due to structural failure, including collapse, resulting in flooding or loss of watertight integrity.

(ii) *Environmentally friendly* also includes the ship being constructed of materials for environmentally acceptable recycling.

(iii) *Safety* also includes the ship's structure, fittings and arrangements providing for safe access, escape, inspection and proper maintenance and facilitating safe operation.

(iv) *Specified operating and environmental conditions* are defined by the intended operating area for the ship throughout its life and cover the conditions, including intermediate conditions, arising from cargo and ballast operations in port, waterways and at sea.

(v) *Specified design life* is the nominal period that the ship is assumed to be exposed to operating and/or environmental conditions and/or the corrosive environment and is used for selecting appropriate ship design parameters. However, the ship's actual service life may be longer or shorter depending on the actual operating conditions and maintenance of the ship throughout its life cycle.

(*c*) The requirements of paragraphs (*b*) to (*b*)(v) shall be achieved through satisfying applicable structural requirements of an organisation which is recognized by the Director in accordance with the provisions of Regulation 1 of Chapter XI-1, conforming to the functional requirements of the Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers.

(*d*) A Ship Construction File with specific information on how the functional requirements of the Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers have been applied in the ship design and construction shall be provided upon delivery of a new ship, and kept on board the ship and ashore* and updated as appropriate throughout the ship's service. The contents of the Ship

* Refer to the Guidelines for the information to be included in a Ship Construction File (MSC.1/Circ.1343).

Construction File shall, at least, conform to the guidelines developed by the Organisation*.

[S 622/2011 wef 01/01/2012]

Regulation 3-11

Corrosion Protection of Cargo Oil Tanks of Crude Oil Tankers

(*a*) Paragraph (*c*) shall apply to crude oil tankers*, as defined in regulation 1 of Annex I to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, of 5,000 tonnes deadweight and above —

(i) for which the building contract is placed on or after 1st January 2013; or

(ii) in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1st July 2013; or

(iii) the delivery of which is on or after 1st January 2016.

(*b*) Paragraph (*c*) shall not apply to combination carriers or chemical tankers as defined in regulations 1 of Annexes I and II, respectively, to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto. For the purpose of this Regulation, chemical tankers also include chemical tankers certified to carry oil.

(*c*) All cargo oil tanks of crude oil tankers shall be —

(i) coated during the construction of the ship in accordance with the Performance Standard for Protective Coatings for Cargo Oil Tanks of Crude Oil Tankers, adopted by the Maritime Safety Committee by Resolution MSC.288(87), and any amendment thereto which has come into force and has been accepted by the Government; or

(ii) protected by alternative means of corrosion protection or utilization of corrosion resistance material to maintain required structural integrity for 25 years in accordance with the Performance Standard for Alternative Means of Corrosion Protection for Cargo Oil Tanks of Crude Oil Tankers, adopted by the Maritime Safety Committee by Resolution MSC.289(87), and any amendment thereto which has come into force and has been accepted by the Government.

(*d*) The Director may exempt a crude oil tanker from the requirements of paragraph (*c*) to allow the use of novel prototype alternatives to the coating system specified in paragraph (*c*)(i), for testing, provided they are subject to suitable

* Refer to Guidelines for the information to be included in a Ship Construction File (MSC./Circ.1343).

*Refer to items 1.11.1 or 1.11.4 of the Supplement to the International Oil Pollution Prevention Certificate (Form B).

controls, regular assessment and acknowledgement of the need for immediate remedial action if the system fails or is shown to be failing. Such exemption shall be recorded on an exemption certificate.

(*e*) The Director may exempt a crude oil tanker from the requirements of paragraph (*c*) if the ship is built to be engaged solely in the carriage of cargoes and cargo handling operations not causing corrosion**. Such exemption and conditions for which it is granted shall be recorded on an exemption certificate.

[S 622/2011 wef 01/01/2012]

Regulation 3-12

Protection against Noise

(*a*) This Regulation shall apply to ships of 1,600 gross tonnage and above —

(i) for which the building contract is placed on or after 1st July 2014;

(ii) in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1st January 2015; or

(iii) the delivery of which is on or after 1st July 2018,

unless the Director deems that compliance with a particular provision is unreasonable or impractical.

[S 432/2014 wef 01/07/2014]

(*b*) On ships delivered before 1st July 2018 and —

(i) contracted for construction before 1st July 2014 and the keels of which are laid, or which are at a similar stage of construction, on or after 1st January 2009 but before 1st January 2015; or

(ii) in the absence of a building contract, the keels of which are laid, or which are at a similar stage of construction, on or after 1st January 2009 but before 1st January 2015,

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 spaces are required to be manned. Ear protectors shall be provided for personnel required to enter such spaces, if necessary.

[S 432/2014 wef 01/07/2014]

**Refer to the guidelines to be developed by the Organisation.

* Refer to the Code on Noise Levels on Board Ships, adopted by the Organisation by resolution A.468(XII).

(*c*) Ships shall be constructed to reduce onboard noise and to protect personnel from the noise in accordance with the Code on Noise Levels on Board Ships, adopted by the Maritime Safety Committee by resolution MSC.337(91), 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 these Regulations other than Chapter I. For the purpose of this Regulation, although the Code on Noise Levels on Board Ships is treated as a mandatory instrument, recommendatory parts as specified in Chapter I of the Code shall be treated as non-mandatory, provided that amendments to such recommendatory parts are adopted by the Maritime Safety Committee in accordance with its Rules of Procedure.

[S 432/2014 wef 01/07/2014]

(*d*) Notwithstanding the requirements of paragraph (*a*), this Regulation does not apply to the types of ships listed in paragraph 1.3.4 of the Code on Noise Levels on Board Ships.

[S 432/2014 wef 01/07/2014]

PART B

Subdivision And Stability

Regulation 4

General

(*a*) The damage stability requirements in Parts B-1 through B-4 shall apply to cargo ships of 80 m in length (L) and upwards and to all passenger ships regardless of length but shall exclude those cargo ships which are shown to comply with subdivision and damage stability regulations in other instruments* developed by the Organization.

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

*Cargo ships shown to comply with the following may be excluded from the application of Part B-1:
.1 Annex I to MARPOL 73/78, except that combination carriers with type B freeboards are not exluded;
.2 International Bulk Chemical Code;
.3 International Gas Carrier Code;
.4 Guidelines for the design and construction of offshore supply vessels in resolution A.469 (XII);
.5 Code of Safety for Special Purpose Ships in resolution A.534(13), as amended;
.6 Damage stability requirements for regulation 27 of the 1966 Load Lines Convetion as applied in compliance with resolutions A.320(IX) and A.514(13), provided that in the case of cargo ships to which regulation 27(9) applies, main transverse watertight bulkheads, to be considered effective, are spaced according to paragraph (12)(*f*) of resolution A.320(IX), except that ships intended for the carriage of deck cargo are not excluded; and
.7 Damage stability requirements of regulation 27 of the 1988 Load Lines Protocol, except that ships intended for the carriage of deck cargo are not excluded.

(*c*) 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 subdivision length "L_s" of the ship and with the service, in such manner that the highest degree of subdivision corresponds with the ships of greatest subdivision length "L_s" primarily engaged in the carriage of passengers.

(*d*) Where it is proposed to fit decks, inner skins or longitudinal bulkheads of sufficient tightness to seriously restrict the flow of water, the Director shall be satisfied that proper consideration is given to beneficial or adverse effects of such structures in the calculations.

[S 686/2008 wef 01/01/2009]

PART B-1

Stability

Regulation 5

*Intact Stability**

* Refer to the Code on Intact Stability for All Types of Ships covered by IMO Instruments, adopted by the Organization by resolution A.749(18).

(*a*) Every passenger ship regardless of size and every cargo ship having a length ("L") of 24 m and upwards, shall be inclined upon its completion and the elements of its stability determined. In addition to any other applicable requirements of these Regulations, ships having a length of 24 metres and upwards constructed on or after 1st July 2010 shall, at the minimum, comply with the requirements of Part A of the 2008 IS Code.

[S 366/2010 wef 01/07/2010]

(*b*) The Director may allow the inclining test of an individual cargo ship to be dispensed with provided basic stability data is 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, as required by Regulation 5-1. A weight survey shall be carried out upon completion and the ship shall be inclined whenever, in comparison with the data derived from the sister ship, a deviation from the lightship displacement exceeding 1% for ships of 160 m or more in length and 2% for ships of 50 m or less in length and as determined by linear interpolation for intermediate lengths or a deviation from the lightship longitudinal centre of gravity exceeding 0.5% of L_s is found.

(*c*) 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.

(*d*) Where any alterations are made to a ship so as to materially affect the stability information supplied to the master, amended stability information shall be provided. If necessary, the ship shall be re-inclined. The ship shall be re-inclined if anticipated deviations exceed one of the values specified in paragraph (*e*).

(*e*) At periodical intervals not exceeding five 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_s is found or anticipated.

(*f*) Every 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.

[S 686/2008 wef 01/01/2009]

Regulation 5-1

Stability Information to be supplied to the Master[*]

[*] Refer also to the Guidelines for the preparation of intact stability information (MSC/Circ.456); Guidance on the intact stability of existing tankers during transfer operations (MSC/Circ.706); and the Revised Guidance to the master for avoiding dangerous situations in following and quartering seas (MSC.1/Circ.1228).

(*a*) The master shall be supplied with such information satisfactory to the Director as is necessary to enable the master 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.

(*b*) The information should include —

(i) curves or tables of minimum operational metacentric height (GM) versus draught which assures compliance with the relevant intact and damage stability requirements, alternatively corresponding curves or tables of the maximum allowable vertical centre of gravity (KG) versus draught, or with the equivalents of either of these curves;

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

(iii) all other data and aids which might be necessary to maintain the required intact stability and stability after damage.

(*c*) The stability information shall show the influence of various trims in cases where the operational trim range exceeds +/- 0.5% of L_s.

(*d*) For ships which have to fulfill the stability requirements of Part B-1, information referred to in paragraph (*b*) is determined from considerations related to the subdivision index, in the following manner:

Minimum required GM (or maximum permissible vertical position of centre of gravity KG) for the three draughts d_s, d_p and d_l are equal to the GM (or KG values) of corresponding loading cases used for the calculation of survival factor "s_i". For intermediate draughts, values to be used shall be obtained by linear interpolation applied to the GM value only between the deepest subdivision draught and the partial subdivision draught and between the partial load line and the light service draught respectively. Intact stability criteria will also be taken into account by retaining for each draft the maximum among minimum required GM values, or the minimum of maximum permissible KG values for both criteria. If the subdivision index is calculated for different trims, several required GM curves will be established in the same way.

(*e*) When curves or tables of minimum operational metacentric height (GM) versus draught are not appropriate, the master should ensure that the operating condition does not deviate from a studied loading condition, or verify by calculation that the stability criteria are satisfied for this loading condition.

[S 686/2008 wef 01/01/2009]

Regulation 6

Required Subdivision Index "R"[*]

[*] The Maritime Safety Committee, in adopting the Regulations contained in Parts B to B-4, invited Administrations to note that the Regulations should be applied in conjunction with the explanatory notes developed by the Organization in order to ensure their uniform application.

(*a*) The subdivision of a ship is considered sufficient if the attained subdivision index "A", determined in accordance with Regulation 7, is not less than the required subdivision index "R" calculated in accordance with this Regulation and if, in addition, the partial indices A_s, A_p and A_l are not less than 0.9R for passenger ships and 0.5R for cargo ships.

(*b*) For all ships to which the damage stability requirements of this Chapter apply, the degree of subdivision to be provided shall be determined by the required subdivision index "R", as follows:

(i) In the case of cargo ships greater than 100 m in L_s:

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

(ii) In the case of cargo ships not less than 80 m in L_s and not greater than 100 m in L_s:

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

where "R_o" is the value "R" as calculated in accordance with the formula in sub-paragraph (i).

(iii) In the case of passenger ships:

$$R = 1 - \frac{5000}{L_s + 2.5N + 15,225},$$

where —

"N" = $N_1 + 2N_2$,

"N_1" = number of persons for whom lifeboats are provided,

"N_2" = number of persons (including officers and crew) the ship is permitted to carry in excess of N_1.

(iv) Where the conditions of service are such that compliance with sub-paragraph (iii) on the basis of "$N = N_1 + 2N_2$" is impracticable and where the Director considers that a suitably reduced degree of hazard exists, a lesser value of "N" may be taken but in no case less than "$N = N_1 + N_2$".

[S 686/2008 wef 01/01/2009]

Regulation 7

Attained Subdivision Index "A"

(*a*) The attained subdivision index "A" is obtained by the summation of the partial indices A_s, A_p and A_l (weighted as shown) calculated for the draughts "d_s", "d_p" and "d_l" defined in Regulation 2 in accordance with the following formula:

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

Each partial index is a summation of contributions from all damage cases taken in consideration, using the following formula:

$$A = \sum p_i \, s_i$$

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, as defined in Regulation 7-1; and

"s_i" accounts for the probability of survival after flooding the compartment or group of compartments under consideration, and includes the effect of any horizontal subdivision, as defined in Regulation 7-2.

(*b*) In the calculation of "A", the level trim shall be used for the deepest subdivision draught and the partial subdivision draught. The actual service trim shall be used for the light service draught. If in any service condition, the trim variation in comparison with the calculated trim is greater than 0.5% of L_s, one or more additional calculations of "A" are to be submitted for the same draughts but different trims so that, for all service conditions, the difference in trim in comparison with the reference trim used for one calculation will be less than 0.5% of L_s.

(*c*) When determining the positive righting lever (GZ) of the residual stability curve, the displacement used should be that of the intact condition. That is, the constant displacement method of calculation should be used.

(*d*) The summation indicated by the above formula shall be taken over the ship's subdivision length "L_s" for all cases of flooding in which a single compartment or two or more adjacent compartments are involved. In the case of unsymmetrical arrangements, the calculated "A" value should be the mean value obtained from calculations involving both sides. Alternatively, it should be taken as that corresponding to the side which evidently gives the least favourable result.

(*e*) 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. Additionally, cases of simultaneous flooding of a wing compartment or group of compartments and the adjacent inboard compartment or group of compartments, but excluding damage of transverse extent greater than one half of the ship breadth "B", may be added. For the purpose of this regulation, transverse extent is measured inboard from ship's side, at right angle to the centreline at the level of the deepest subdivision draught.

(*f*) In the flooding calculations carried out according to the regulations, only one breach of the hull and only one free surface need to be assumed. The assumed vertical extent of damage is to extend from the baseline upwards to any watertight horizontal subdivision above the waterline or higher. However, if a lesser extent of damage will give a more severe result, such extent is to be assumed.

(*g*) If pipes, ducts or tunnels are situated within the assumed extent of damage, arrangements are to be made to ensure that progressive flooding cannot thereby extend to compartments other than those assumed flooded. However, 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.

[S 686/2008 wef 01/01/2009]

Regulation 7-1

Calculation of the Factor "p_i"

(*a*) The factor "p_i" for a compartment or group of compartments shall be calculated in accordance with sub-paragraphs (*a*)(i) and (*a*)(ii) using the following notations:

"j" = the aftmost damage zone number involved in the damage starting with no.1 at the stern;

"n" = the number of adjacent damage zones involved in the damage;

"k" = the number of a particular longitudinal bulkhead as barrier for transverse penetration in a damage zone counted from shell towards the centre line. The shell has k = 0;

"x1" = the distance from the aft terminal of "L_s" to the aft end of the zone in question;

"x2" = the distance from the aft terminal of "L_s" to the forward end of the zone in question;

"b" = the mean transverse distance in metres measured at right angles to the centreline at the deepest subdivision loadline between the shell and an assumed vertical plane extended between the longitudinal limits used in calculating the factor "p_i" and which is a tangent to, or common with, all or part of the outermost portion of the longitudinal bulkhead under consideration. This vertical plane shall be so orientated that the mean transverse distance to the shell is a maximum, but not more than twice the least distance between the plane and the shell. If the upper part of a longitudinal bulkhead is below the deepest subdivision loadline the vertical plane used for determination of "b" is assumed to extend upwards to the deepest subdivision waterline. In any case, "b" is not to be taken greater than B/2.

If the damage involves a single zone only —

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

If the damage involves two adjacent zones —

$$
\begin{aligned}
p_i = {} & p(x1_j, x2_{j+1})\bullet[r(x1_j, x2_{j+1}, b_k) - r(x1_j, x2_{j+1}, b_{k-1})] \\
& - p(x1_j, x2_j)\bullet[r(x1_j, x2_j, b_k) - r(x1_j, x2_j, b_{k-1})] \\
& - p(x1_{j+1}, x2_{j+1})\bullet[r(x1_{j+1}, x2_{j+1}, b_k) \\
& - r(x1_{j+1}, x2_{j+1}, b_{k-1})]
\end{aligned}
$$

If the damage involves three or more adjacent zones —

$$
\begin{aligned}
p_i = {} & p(x1_j, x2_{j+n-1})\bullet[r(x1_j, x2_{j+n-1}, b_k) - r(x1_j, x2_{j+n-1}, b_{k-1})] \\
& - p(x1, x2_{j+n-2})\bullet[r(x1_j, x2_{j+n-2}, b_k) \\
& - r(x1, x2_{j+n-2}, b_{k-1})] \\
& - p(x1_{j+1}, x2_{j+n-1})\bullet[r(x1_{j+1}, x2_{j+n-1}, b_k) \\
& - r(x1_{j+1}, x2_{j+n-1}, b_{k-1})] \\
& + p(x1_{j+1}, x2_{j+n-2})\bullet[r(x1_{j+1}, x2_{j+n-2}, b_k) \\
& - r(x1_{j+1}, x2_{j+n-2}, b_{k-1})]
\end{aligned}
$$

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

(*a*)(i) The factor "p(x1, x2)" is to be calculated according to the following formulae:

Overall normalized max damage length:	$J_{max} = 10/33$
Knuckle point in the distribution:	$J_{kn} = 5/33$
Cumulative probability at J_{kn}:	$p_k = 11/12$
Maximum absolute damage length:	$l_{max} = 60$ m
Length where normalized distribution ends:	$L^* = 260$ m
Probability density at J = 0:	

$$b_0 = 2\left[\frac{p_k}{J_{kn}} - \frac{1 - p_k}{J_{max} - J_{kn}}\right] \qquad J_k = \frac{J_m}{2} + \frac{1 - \sqrt{1 + (1 - 2p_k)b_0 J_m + \frac{1}{4} b_0^2 J_m^2}}{b_0} \qquad b_{12} = b_0$$

When $L_s \le L^*$;

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

When Ls> L*:

$$J_m * = \min\left\{J_k * J_{max}, \frac{l_{max}}{2\,L^*}\right\} \qquad J_k = \frac{1 - \sqrt{1 + (1 - 2p_k)b_0 J_m * + \frac{1}{4} b_0^2 J_m *^2}}{b_0} \qquad b_{11} = 2\left[\frac{p_k}{J_k} - \frac{1 - p_k}{J_m - J_k}\right] \qquad b_{21} = \frac{p_k - 1}{(J_m - J_k)} \qquad b_{22} = \frac{p_k - 1}{(J_m - J_k)}$$

The non-dimensional damage length —

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

The normalized length of a compartment or group of compartments —

J_n is to be taken as the lesser of J and J_m.

(*a*)(i)(1) Where neither limits of the compartment or group of compartments under consideration coincides with the aft or forward terminals —

$J \leq J_k$:

$$p(x1,\ x2) = p_1 = \frac{1}{6} J_2 (b_{11} J + 3b_{12})$$

$J > J_k$:

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

$({J_n}^2 - {J_k}^2) + b_{22} J (J_n - J_k)$

(2) Where the aft limit of the compartment or group of compartments under consideration coincides with the aft terminal or the forward limit of the compartment or group of compartments under consideration coincides with the forward terminal —

$J \leq J_k$:

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

$J > J_k$:

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

(3) Where the compartment or groups of compartments considered extends over the entire subdivision length, "L_s" —

$$p(x1,\ x2) = 1$$

(*a*) (ii) The factor "r(x1, x2, b)" shall be determined by the following formulae:

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

where

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

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

(*a*) (ii)(1) Where the compartment or groups of compartments considered extends over the entire subdivision length, "L_s" —

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

(2) Where neither limits of the compartment or group of compartments under consideration coincides with the aft or forward terminals —

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

where $J_0 = \min(J, J_b)$

(3) Where the aft limit of the compartment or group of compartments under consideration coincides with the aft terminal or the forward limit of the compartment or group of compartments under consideration coincides with the forward terminal —

$$G = \frac{1}{2} \ddot{A}n (G_2 + G_1 \ddot{A}n J)$$

[S 686/2008 wef 01/01/2009]

Regulation 7-2

Calculation of the Factor "s_i"

(*a*) The factor s_i shall be determined for each case of assumed flooding, involving a compartment or group of compartments, in accordance with the following notations and the provisions in this Regulation:

"θ_e" is the equilibrium heel angle in any stage of flooding, in degrees;

"θ_v" is the angle, in any stage of flooding, where the righting lever becomes negative, or the angle at which an opening incapable of being closed weathertight becomes submerged;

"GZ_{max}" is the maximum positive righting lever, in metres, up to the angle, "θ_v";

"Range" is the range of positive righting levers, in degrees, measured from the angle, "θ_e". The positive range is to be taken up to the angle "θ_v";

"flooding stage" is any discrete step during the flooding process, including the stage before equalization (if any) until final equilibrium has been reached.

(*a*)(i) The factor "s_i", for any damage case at any initial loading condition, "d_i", shall be obtained from the formula —

$$S_i = \text{minimum } \{ S_{intermediate,i} \text{ or } S_{final,i} \bullet S_{mom,i} \}$$

where —

"$S_{intermediate,i}$" is the probability to survive all intermediate flooding stages until the final equilibrium stage, and is calculated in accordance with paragraph (*b*);

"$S_{final,i}$" is the probability to survive in the final equilibrium stage of flooding. It is calculated in accordance with paragraph (*c*);

"$S_{mom,i}$" is the probability to survive heeling moments, and is calculated in accordance with paragraph (*d*).

(*b*) The factor "$S_{intermediate,i}$" is applicable only to passenger ships (for cargo ships "$S_{intermediate,i}$" shall be taken as unity) and shall be taken as the least of the "s"-factors obtained from all flooding stages including the stage before equalization, if any, and is to be calculated as follows:

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

where "GZ_{max}" is not to be taken as more than 0.05 m and "Range" as not more than 7°. $S_{intermediate} = 0$, if the intermediate heel angle exceeds 15°. Where cross-flooding fittings are required, the time for equalization shall not exceed 10 min.

(*c*) The factor "$S_{final,i}$" shall be obtained from the formula —

$$s_{final,i} = K \cdot \left[\frac{GZ_{max}}{0.12} \cdot \frac{Range}{16}\right]^{\frac{1}{4}}$$

where —

"GZ_{max}" is not to be taken as more than 0.12 m;

"Range" is not to be taken as more than 16°;

$$K = 1, \text{ if } \theta_e \leq \theta_{min}$$
$$K = 0, \text{ if } \theta_e \geq \theta_{max}$$
$$K = \sqrt{\frac{\theta_{max} - \theta_e}{\theta_{max} - \theta_{min}}} \text{ otherwise,}$$

[S 277/2016 wef 01/07/2016]

where —

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

"θ_{max}" is 15° for passenger ships and 30° for cargo ships.

(*d*) The factor "$S_{mom,i}$" is applicable only to passenger ships (for cargo ships "$S_{mom,i}$" shall be taken as unity) and shall be calculated at the final equilibrium from the formula —

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

where —

"Displacement" is the intact displacement at the subdivision draught;

"M_{heel}" is the maximum assumed heeling moment as calculated in accordance with sub-paragraph (*d*)(i); and

$S_{mom,i} \leq 1$

(*d*)(i) The heeling moment "M_{heel}" is to be calculated as follows:

$$M_{heel} = \text{maximum}\{M_{passenger} \text{ or } M_{wind} \text{ or } M_{Survivalcraft}\}$$

(*d*)(i)(1)"$M_{passenger}$" is the maximum assumed heeling moment resulting from movement of passengers, and is to be obtained as follows:

$$M_{passenger} = (0.075 \bullet N_p) \bullet (0.45 \bullet B) \text{ (tm)}$$

where —

"N_p" is the maximum number of passengers permitted to be on board in the service condition corresponding to the deepest subdivision draught under consideration; and

"B" is the beam of the ship.

Alternatively, the heeling moment may be calculated assuming the passengers are distributed with 4 persons per square metre 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. In doing so, a weight of 75 kg per passenger is to be assumed.

(2) "M_{wind}" is the maximum assumed wind force acting in a damage situation —

$M_{wind} = (P \bullet A \bullet Z) / 9{,}806$ (tm)

where —

"P" =120 N/m^2;

"A" = projected lateral area above waterline;

"Z" = distance from centre of lateral projected area above waterline to T/2; and

"T" = ship's draught, "d_i".

(3) "$M_{Survivalcraft}$" is the maximum assumed heeling moment due to the launching of all fully loaded davit-launched survival craft on one side of the ship. It shall be calculated using the following assumptions:

(A) 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;

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

(C) 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;

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

(E) 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.

(*e*) Unsymmetrical flooding is to be kept to a minimum consistent with the 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 equalization devices are provided they shall be operable from above the bulkhead deck. These fittings together with their controls shall be acceptable to the Director*. Suitable information concerning the use of equalization devices shall be supplied to the master of the ship.

*Reference is made to the Recommendation on a standard method for establishing compliance with the requirements for cross-flooding arrangements in passengers ships, adopted by the Organization by resolution A.266(VIII), as may be amended.

(*e*)(i) Tanks and compartments taking part in such equalization shall be fitted with air pipes or equivalent means of sufficient cross-section to ensure that the flow of water into the equalization compartments is not delayed.

(ii) In all cases, "s_i" is to be taken as zero in those cases where the final waterline, taking into account sinkage, heel and trim, immerses —

(1) the lower edge of openings through which progressive flooding may take place and such flooding is not accounted for in the calculation of factor "s_i". Such openings shall include air-pipes, ventilators and openings which are closed by means of weathertight doors or hatch covers; and

(2) any part of the bulkhead deck in passenger ships considered a horizontal evacuation route for compliance with Chapter II-2.

(iii) The factor "s_i" is to be taken as zero if, taking into account sinkage, heel and trim, any of the following occurs in any intermediate stage or in the final stage of flooding:

(1) immersion of any vertical escape hatch in the bulkhead deck intended for compliance with Chapter II-2;

(2) any controls intended for the operation of watertight doors, equalization devices, valves on piping or on ventilation ducts intended to maintain the integrity of watertight bulkheads from above the bulkhead deck become inaccessible or inoperable;

(3) immersion of any part of piping or ventilation ducts carried through a watertight boundary that is located within any compartment included in damage cases contributing to the attained index "A", if not fitted with watertight means of closure at each boundary.

(iv) However, where compartments assumed flooded due to progressive flooding are taken into account in the damage stability calculations multiple values of "$S_{intermediate,i}$" may be calculated assuming equalization in additional flooding phases.

(v) Except as provided in sub-paragraph (*e*)(iii)(1), openings closed by means of watertight manhole covers and flush scuttles, small watertight hatch covers, remotely operated sliding watertight doors, side scuttles of the non-opening type as well as watertight access doors and hatch covers required to be kept closed at sea need not be considered.

(*f*) Where horizontal watertight boundaries are fitted above the waterline under consideration the "s"-value calculated for the lower compartment or group of compartments shall be obtained by multiplying the value as determined in sub-paragraph (*a*)(i) by the reduction factor "v_m" according to

sub-paragraph (*f*)(i), which represents the probability that the spaces above the horizontal subdivision will not be flooded.

(*f*)(i) The factor "v_m" shall be obtained from the formula —

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

where —

"$H_{j,\ n,\ m}$" is the least height above the baseline, in metres, within the longitudinal range of $x_{1(j)}...x_{2(j+n-1)}$ of the mth horizontal boundary which is assumed to limit the vertical extent of flooding for the damaged compartments under consideration;

"$H_{j,\ n,\ m-1}$" is the least height above the baseline, in metres, within the longitudinal range of $x_{1(j)}...x_{2(j+n-1)}$ of the $(m-1)^{th}$ horizontal boundary which is assumed to limit the vertical extent of flooding for the damaged compartments under consideration;

"j" signifies the aft terminal of the damaged compartments under consideration;

"m" represents each horizontal boundary counted upwards from the waterline under consideration;

"d" is the draught in question as defined in Regulation 2; and

"x_1" and "x_2" represent the terminals of the compartment or group of compartments considered in Regulation 7-1.

(*f*)(i)(1) The factors "$v(H_{j,\ n,\ m}, d)$" and "$v(H_{j,\ n,\ m-1}, d)$" shall be obtained from the formulae —

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

if $(H_m - d)$ is less than, or equal to, 7.8m;

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

in all other cases,

where —

"$v(H_{j,\ n,\ m}, d)$" is to be taken as 1, if "H_m" coincides with the uppermost watertight boundary of the ship within the range $(x1_{(j)}...x2_{(j+n-1)})$, and

"$v(H_{j,\ n,\ 0}, d)$" is to be taken as 0.

In no case is "v_m" to be taken as less than zero or more than 1.

(ii) In general, each contribution "dA" to the index "A" in the case of horizontal subdivisions is obtained from the formula —

$$dA = p_i \bullet [v_1 \bullet s_{min1} + (v_2 - v_1) \bullet s_{min2} + \bullet\bullet\bullet\bullet + (1 - v_{m-1}) \bullet s_{min\ m}]$$

where —

v_m = the "v"-value calculated in accordance with sub-paragraph (*f*)(i);

s_{min} = the least "s"-factor for all combinations of damages obtained when the assumed damage extends from the assumed damage height, "H_m" downwards.

[S 686/2008 wef 01/01/2009]

Regulation 7-3

Permeability

(*a*) For the purpose of the subdivision and damage stability calculations of the Regulations, the permeability of each general compartment or part of a compartment 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
Intended for liquids	*0 or 0.95

(*b*) For the purpose of the subdivision and damage stability calculations of the Regulations, the permeability of each cargo compartment or part of a compartment shall be as follows:

Spaces	**Permeability at draught "d_s"**	**Permeability at draught "d_p"**	**Permeability at draught "d_l"**
Dry cargo spaces	0.70	0.80	0.95
Container spaces	0.70	0.80	0.95
Ro-ro spaces	0.90	0.90	0.95
Cargo liquids	0.70	0.80	0.95

* Whichever results in the more severe requirement.

(*c*) Other figures for permeability may be used if substantiated by calculations.

[S 686/2008 wef 01/01/2009]

Regulation 8

Special Requirements concerning Passenger Ship Stability

(*a*) A passenger ship intended to carry 400 or more persons shall have watertight subdivision abaft the collision bulkhead so that "s_i" = 1 for the three loading conditions on which is based the calculation of the subdivision index and for a damage involving all the compartment within 0.08 L measured from the forward perpendicular.

(*b*) A passenger ship intended to carry 36 or more persons is to be capable of withstanding damage along the side shell to an extent specified in paragraph (*c*). Compliance with this Regulation is to be achieved by demonstrating that "s_i", as defined in Regulation 7-2, is not less than 0.9 for the three loading conditions on which is based the calculation of the subdivision index.

(*c*) The damage extent to be assumed when demonstrating compliance with paragraph (*b*), is to be dependent on both "N" as defined in Regulation 6, and "L_s" as defined in Regulation 2, such that —

(i) the vertical extent of damage is to extend from the ship's moulded baseline to a position up to 12.5 m above the position of the deepest subdivision draught as defined in Regulation 2, unless a lesser vertical extent of damage were to give a lower value of "s_i", in which case this reduced extent is to be used;

(ii) where 400 or more persons are to be carried, a damage length of 0.03 L_s but not less than 3 m is to be assumed at any position along the side shell, in conjunction with a penetration inboard of 0.1 B but not less than 0.75 m measured inboard from the ship side, at right angle to the centreline at the level of the deepest subdivision draught;

(iii) where less than 400 persons are carried, damage length is to be assumed at any position along the shell side between transverse watertight bulkheads provided that the distance between two adjacent transverse watertight bulkheads is not less than the assumed damage length. If the distance between adjacent transverse watertight bulkheads is less than the assumed damage length, only one of these bulkheads shall be considered effective for the purpose of demonstrating compliance with paragraph (*b*);

(iv) where 36 persons are carried, a damage length of 0.015 L_s but not less than 3 m is to be assumed, in conjunction with a penetration inboard of 0.05 B but not less than 0.75 m; and

(v) where more than 36, but fewer than 400 persons are carried, the values of damage length and penetration inboard, used in the determination of the assumed extent of damage, are to be obtained by linear interpolation between the values of damage length and penetration which apply for ships carrying 36 persons and 400 persons as specified in sub-paragraphs (iv) and (ii).

[S 686/2008 wef 01/01/2009]

Regulation 8-1

System Capabilities and Operational Information after a Flooding Casualty on Passenger Ships

(*a*) *Application*

Passenger ships having length, as defined in Regulation 2(*e*) of Chapter II-1, of 120 metres or more, or having 3 or more main vertical zones, shall comply with the provisions of this Regulation.

(*b*) *Availability of essential systems in case of flooding damage**

A passenger ship constructed on or after 1st July 2010 shall be designed so that the systems specified in Regulation 21(*d*) of Chapter II-2 remain operational when the ship is subject to flooding of any single watertight compartment.

(*c*) *Operational information after a flooding casualty*

For the purpose of providing operational information to the Master for safe return to port after a flooding casualty, passenger ships constructed on or after 1st January 2014 shall, based on guidelines developed by the Organisation*, have:

(i) on-board stability computers; or

(ii) shore-based support.

[S 847/2013 wef 01/01/2014]

PART B-2

Subdivision, Watertight And Weathertight Integrity

Regulation 9

* Refer to the Interim Explanatory Notes for the Assessment of Passenger Ship Systems' Capabilities after a Fire or Flooding Casualty (MSC.1/Circ.1369).

* Refer to the Guidelines on Operational Information for Masters of Passenger Ships for Safe Return to Port by Own Power or Under Tow (MSC.1/Circ.1400).

Double Bottoms in Passenger Ships and Cargo Ships other than Tankers

(*a*) 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.

(*b*) Where a double bottom is required to be fitted 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 will be deemed satisfactory if the inner bottom is not lower at any part than a plane parallel with the keel line and which is located not less than a vertical distance "h" measured from the keel line, as calculated by the formula —

$$h = B/20$$

However, in no case is the value of "h" to be less than 760 mm, and need not be taken as more than 2,000 mm.

(*c*) Small wells constructed in the double bottom in connection with drainage arrangements of holds, etc., shall not extend downward more than necessary. A well extending to the outer bottom is, however, permitted at the after end of the shaft tunnel. Other wells (e.g., for lubricating oil under main engines) may be permitted by the Director if satisfied that the arrangements give protection equivalent to that afforded by a double bottom complying with this Regulation. In no case shall the vertical distance from the bottom of such a well to a plane coinciding with the keel line be less than 500 mm.

(*d*) A double bottom need not be fitted in way of watertight tanks, including dry tanks of moderate size, provided the safety of the ship is not impaired in the event of bottom or side damage.

(*e*) In the case of passenger ships to which the provisions of Regulation 1(*e)* apply and which are engaged on regular service within the limits of a short international voyage as defined in Regulation 3 of Chapter III, the Director may permit a double bottom to be dispensed with if satisfied that the fitting of a double bottom in that part would not be compatible with the design and proper working of the ship.

(*f*) Any part of a passenger ship or a cargo ship that is not fitted with a double bottom in accordance with paragraphs (*a*), (*d*) or (*e*) shall be capable of withstanding bottom damages, as specified in paragraph (*h*), in that part of the ship.

(*g*) In the case of unusual bottom arrangements in a passenger ship or a cargo ship, it shall be demonstrated that the ship is capable of withstanding bottom damages as specified in paragraph (*h*).

(*h*) Compliance with paragraphs (*f*) or (*g*) is to be achieved by demonstrating that "s_i", when calculated in accordance with Regulation 7-2, is not less than 1 for all service conditions when subject to a bottom damage assumed at any position along the ship's bottom and with an extent specified in sub-paragraph (ii) below for the affected part of the ship —

(i) Flooding of such spaces shall not render emergency power and lighting, internal communication, signals or other emergency devices inoperable in other parts of the ship.

(ii) Assumed extent of damage shall be as follows:

	For 0.3 L from the forward perpendicular of the ship	Any other part of the ship
Longitudinal extent	1/3 $L^{2/3}$ or 14.5 m, whichever is less	1/3 $L^{2/3}$ or 14.5 m, whichever is less
Transverse extent	B/6 or 10 m, whichever is less	B/6 or 5 m, whichever is less
Vertical extent, measured from the keel line	B/20 or 2 m, whichever is less	B/20 or 2 m, whichever is less

(iii) If any damage of a lesser extent than the maximum damage specified in sub-paragraph (ii) would result in a more severe condition, such damage should be considered.

(*i*) In case of large lower holds in passenger ships, the Director may require an increased double bottom height of not more than B/10 or 3 m, whichever is less, measured from the keel line. Alternatively, bottom damages may be calculated for these areas, in accordance with paragraph (*h*), but assuming an increased vertical extent.

[S 686/2008 wef 01/01/2009]

Regulation 10

Construction of Watertight Bulkheads

(*a*) Each watertight subdivision bulkhead, whether transverse or longitudinal, shall be constructed having scantlings as specified in Regulation 2(*q*). In all cases, watertight subdivision bulkheads shall be capable of supporting at least the pressure due to a head of water up to the bulkhead deck.

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

[S 686/2008 wef 01/01/2009]

Regulation 11

Initial Testing of Watertight Bulkheads, etc.

(*a*) Testing watertight spaces not intended to hold liquids and cargo holds intended to hold ballast 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.

(*b*) The forepeak, double bottom (including duct keels) and inner skins shall be tested with water to a head corresponding to the requirements of Regulation 10(*a*).

(*c*) Tanks which are intended to hold liquids, and which form part of the watertight subdivision of the ship, shall be tested for tightness and structural strength with water to a head corresponding to its design pressure. The water head is in no case to be less than the top of the air pipes or to a level of 2.4 m above the top of the tank, whichever is the greater.

(*d*) The tests referred to in paragraphs (*b*) and (*c*) 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.

[S 686/2008 wef 01/01/2009]

Regulation 12

Peak and Machinery Space Bulkheads, Shaft Tunnels, etc.

(*a*) A 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 0.05 L or 10 m, whichever is the less, and, except as may be permitted by the Director, not more than 0.08 L or 0.05 L + 3 m, whichever is the greater.

(*b*) Where any part of the ship below the waterline extends forward of the forward perpendicular, e.g., a bulbous bow, the distances stipulated in paragraph (*a*) shall be measured from a point either —

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

(ii) at a distance 0.015 L forward of the forward perpendicular; or

(iii) at a distance 3 m forward of the forward perpendicular,

whichever gives the smallest measurement.

(*c*) The bulkhead may have steps or recesses provided they are within the limits prescribed in paragraph (*a*) or (*b*).

(*d*) No doors, manholes, access openings, ventilation ducts or any other openings shall be fitted in the collision bulkhead below the bulkhead deck.

(*e*)(i) Except as provided in sub-paragraph (*e*)(ii), the collision bulkhead may be pierced below the bulkhead deck by not more than one pipe for dealing with fluid in the forepeak tank, provided that the pipe is fitted with a screw-down 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, however, authorize 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. All valves shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable.

(ii) If the forepeak is divided to hold two different kinds of liquids the Director may allow the collision bulkhead to be pierced below the bulkhead deck by two pipes, each of which is fitted as required by sub-paragraph (*e*)(i), 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.

(*f*) Where a long forward superstructure is fitted the collision bulkhead shall be extended weathertight to the deck next above the bulkhead deck. The extension need not be fitted directly above the bulkhead below provided it is located within the limits prescribed in paragraph (*a*) or (*b*) with the exception permitted by paragraph (*g*) and that the part of the deck which forms the step is made effectively weathertight. 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.

(*g*) Where bow doors are fitted and a sloping loading ramp forms part of the extension of the collision bulkhead above the bulkhead deck the ramp shall be weathertight over its complete length. In cargo ships the part of the ramp which is more than 2.3 m above the bulkhead deck may extend forward of the limit specified in paragraph (*a*) or (*b*). Ramps not meeting the above requirements shall be disregarded as an extension of the collision bulkhead.

(*h*) The number of openings in the extension of the collision bulkhead above the bulkhead 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.

(*i*) Bulkheads shall be fitted separating the machinery space from cargo and accommodation spaces forward and aft and made watertight up to the bulkhead deck. In passenger ships an afterpeak bulkhead shall also be fitted and made watertight up to the bulkhead deck. The afterpeak bulkhead may, however, be stepped below the bulkhead deck, provided the degree of safety of the ship as regards subdivision is not thereby diminished.

(*j*) In all cases stern tubes shall be enclosed in watertight spaces of moderate volume. In passenger ships 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 bulkhead deck will not be immersed. In cargo ships other measures to minimize 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.

[S 686/2008 wef 01/01/2009]

Regulation 13

Openings in Watertight Bulkheads below the Bulkhead Deck in Passenger Ships

(*a*) 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.

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

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

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

(*c*) No doors, manholes, or access openings are permitted in watertight transverse bulkheads dividing a cargo space from an adjoining cargo space, except as provided in sub-paragraph (i)(i) and in Regulation 14.

(*d*) Subject to paragraph (*j*), not more than one door, apart from the doors to shaft tunnels, may be fitted in each watertight bulkhead within spaces containing the main and auxiliary propulsion machinery including boilers serving the needs of

propulsion. Where two 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 two shafts are fitted and only two doors where there are more than two 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.

(*e*)(i) Watertight doors, except as provided in sub-paragraph (i)(i) or Regulation 14, shall be power-operated sliding doors complying with the requirements of paragraph (*g*) capable of being closed simultaneously from the central operating console at the navigation bridge in not more than 60 s with the ship in the upright position.

(ii) 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 15º 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 1 m above the sill on the centreline of the door.

(iii) 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 minimize 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, as defined in Regulation 2(*h*), such distance being measured at right angles to the centreline at the level of the deepest subdivision draught, the operation of the watertight doors clear of the damaged portion of the ship is not impaired.

(*f*) 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 sub-paragraph (*g*)(i)(5) and at the location where hand operation above the bulkhead deck is required by sub-paragraph (*g*)(i)(4).

(*g*)(i) Each power-operated sliding watertight door:

(1) shall have a vertical or horizontal motion;

(2) shall, subject to paragraph (*j*), be normally limited to a maximum clear opening width of 1.2 m. The Director may permit larger doors 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; and

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

(3) shall 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;

(4) 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 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 s with the ship in the upright position;

(5) shall 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;

(6) shall be provided with an audible alarm, distinct from any other alarm in the area, which will sound whenever the door is closed remotely by power and which shall sound for at least 5 s but no more than 10 s 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

(7) shall 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 s or more than 40 s with the ship in the upright position.

(ii) 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 Regulation 42(*c*)(i)(3) in the event of failure of either the main or emergency source of electrical power.

(iii) Power-operated sliding watertight doors shall have either —

(1) a centralized hydraulic system with two 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 three times, i.e. closed-open-closed, against an adverse list of 15º. 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 minimize 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 hydraulic accumulators. These alarms are to be audible and visual and shall be situated on the central operating console at the navigation bridge; or

(2) 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 three times, i.e. closed-open-closed, against an adverse list of 15º. 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

(3) 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 Regulation 42(*d*)(ii) — 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 three times, i.e. closed-open-closed, against an adverse list of 15º.

For the systems specified in sub-paragraphs (*g*)(iii)(1), (*g*)(iii)(2) and (*g*)(iii)(3), 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.

(iv) Control handles shall be provided at each side of the bulkhead at a minimum height of 1.6 m 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.

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

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

(vii) 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.

(viii) 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 sub-paragraph (*g*)(iii). Loss of any such power supply should activate an audible and visual alarm at the central operating console at the navigation bridge.

(*h*)(i) The central operating console at the navigation bridge shall have a "master mode" switch with two modes of control: a "local control" mode which shall allow any door to be locally opened and locally closed after use without automatic closure, and a "doors closed" mode which shall automatically close any door that is open. The "doors closed" mode shall automatically close any door that is open. The "doors closed" mode shall permit doors to be opened locally and shall automatically re-close 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.

(ii) 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

*Refer to the following publication IEC 60529 (2003):
.1 electrical motors, associated circuits and control components; protected to IPX 7 standard;
.2 door position indicators and associated circuit components; protected to IPX 8 standard; and
.3 door movement warning signals; protected to IPX 6 standard.
Other arrangements for the enclosures of electrical components may be fitted provided the Director is satisfied that an equivalent protection is achieved. The water pressure IPX 8 shall be based on the pressure that may occur at the location of the component during flooding for a period of 36 hours.

remotely the red light shall indicate the intermediate position by flashing. The indicating circuit shall be independent of the control circuit for each door.

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

(*i*)(i) 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, as defined in Regulation 2(*h*), such distance being measured at right angles to the centreline at the level of the deepest subdivision draught.

(ii) Should any such doors be accessible during the voyage, they shall be fitted with a device which prevents unauthorized opening. When it is proposed to fit such doors, the number and arrangements shall receive the special consideration of the Director.

(*j*) Portable plates on bulkheads shall not be permitted except in machinery spaces. The Director may permit not more than one power-operated sliding watertight door in each watertight bulkhead larger than those specified in sub-paragraph (*g*)(i)(2) to be substituted for these portable plates, provided these doors are intended to remain closed during navigation except in case of urgent necessity at the discretion of the master. These doors need not meet the requirements of sub-paragraph (*g*)(i)(4) regarding complete closure by hand-operated gear in 90 s.

(*k*)(i) Where trunkways or tunnels for access from crew accommodation to the stokehold, for piping, or for any other purpose are carried through watertight bulkheads, they shall be watertight and in accordance with the requirements of Regulation 16-1. 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 bulkhead deck. 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.

(ii) Where it is proposed to fit tunnels piercing watertight bulkheads, these shall receive the special consideration of the Director.

(iii) 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.

[S 686/2008 wef 01/01/2009]

Regulation 13-1

Openings in Watertight Bulkheads and Internal Decks in Cargo Ships

(*a*) 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.

(*b*) 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 minimizing 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.

(*c*) 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.

(*d*) 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*. Should any of the doors or ramps be accessible during the voyage, they shall be fitted with a device which prevents unauthorized opening.

(*e*) 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.

[S 686/2008 wef 01/01/2009]

Regulation 14

*Refer to Interpretations of regulations of part B-1 of SOLAS Chapter II-1 (MSC/Circ.651).

Passenger Ships Carrying Goods Vehicles and Accompanying Personnel

(*a*) This Regulation applies to passenger ships designed or adapted for the carriage of goods vehicles and accompanying personnel.

(*b*) If in such a ship the total number of passengers which include personnel accompanying vehicles does not exceed $12 + A_d/25$, where "A_d" = 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 m, the provisions of Regulations 13(*i*)(i) and 13(*i*)(ii) 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.

(*c*) The ship may not be certified for a higher number of passengers than assumed in paragraph (*b*), if a watertight door has been fitted in accordance with this Regulation.

[S 686/2008 wef 01/01/2009]

Regulation 15

Openings in the Shell Plating below the Bulkhead Deck of Passenger Ships and the Freeboard Deck of Cargo Ships

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

(*b*) 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.

(*c*)(i) 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 draught, or 500 mm, whichever is the greater.

(ii) All sidescuttles the sills of which are below the bulkhead deck of passenger ships and the freeboard deck of cargo ships, as permitted by sub-paragraph (*c*)(i), shall be of such construction as will effectively prevent any person opening them without the consent of the master of the ship.

(*d*) Efficient hinged inside deadlights so arranged 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 m plus 2.5% of the breadth of the ship above the deepest subdivision draught, 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.

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

(ii) Sidescuttles may, however, 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.

(*f*) Automatic ventilating sidescuttles shall not be fitted in the shell plating below the bulkhead deck of passenger ships and the freeboard deck of cargo ships without the special sanction of the Director.

(*g*) 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.

(*h*)(i) 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.

(*h*)(ii)(1) Subject to the requirements of the International Convention on Load Lines in force, and except as provided in sub-paragraph (*h*)(iii), each separate discharge led through the shell plating from spaces below the bulkhead deck of passenger ships and the freeboard deck of cargo ships 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 two automatic non-return valves without positive means of closing, provided that the inboard valve is situated above the deepest subdivision draught 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.

(2) The requirements of the International Convention on Load Lines in force shall apply to discharges led through the shell plating from spaces above the bulkhead deck of passenger ships and the freeboard deck of cargo ships.

(iii) 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. In manned machinery spaces the valves may be controlled locally and shall be provided with indicators showing whether they are open or closed.

(iv) Moving parts penetrating the shell plating below the deepest subdivision draught shall be fitted with a watertight sealing arrangement acceptable to the Director. The inboard gland shall be located within a watertight space of such volume that, if flooded, the bulkhead deck will not be submerged. The Director may require that if such compartment is flooded, essential or emergency power and lighting, internal communication, signals or other emergency devices must remain available in other parts of the ship.

(v) 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.

(*i*) Gangway, cargo and fuelling ports fitted below the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall be watertight and in no case be so fitted as to have their lowest point below the deepest subdivision draught.

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

(ii) If the inboard opening is situated below the bulkhead deck of passenger ships and the freeboard deck of cargo ships, 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 draught.

[S 686/2008 wef 01/01/2009]

Regulation 15-1

External Openings in Cargo Ships

(*a*) All external openings leading to compartments assumed intact in the damage analysis, which are below the final damage waterline, are required to be watertight.

(*b*) External openings required to be watertight in accordance with paragraph (*a*) shall, except for cargo hatch covers, be fitted with indicators on the bridge.

(*c*) Openings in the shell plating below the deck limiting the vertical extent of damage shall be fitted with a device that prevents unauthorized opening if they are accessible during the voyage.

(*d*) 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.

[S 686/2008 wef 01/01/2009]

Regulation 16

Construction and Initial Tests of Watertight Doors, Sidescuttles, etc.

(*a*) In all ships —

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

(ii) such valves, doors and mechanisms shall be suitably marked to ensure that they may be properly used to provide maximum safety; and

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

(*b*) In passenger ships and cargo ships, watertight doors shall be tested by water pressure to a head of water they might sustain in a final or intermediate stage of flooding. Where testing of individual doors is not carried out because of possible damage to insulation or outfitting items, testing of individual doors may be replaced by a prototype pressure test of each type and size of door with a test pressure corresponding at least to the head required for the intended location. The prototype test shall be carried out before the door is fitted. The installation method and procedure for fitting the door on board shall correspond to that of the prototype test. When fitted on board, each door shall be checked for proper seating between the bulkhead, the frame and the door.

[S 686/2008 wef 01/01/2009]

Regulation 16-1

Construction and Initial Tests of Watertight Decks, Trunks, etc.

(*a*) 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.

(*b*) 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 Regulation 7-2.

(*c*) 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.

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

[S 686/2008 wef 01/01/2009]

Regulation 17

Internal Watertight Integrity of Passenger Ships above the Bulkhead Deck

(*a*) The Director may require that 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 watertight 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. Where openings, pipes, scuppers, electric cables etc. are carried through the partial watertight bulkheads or decks within the immersed part of the bulkhead deck, arrangements shall be made to ensure the watertight integrity of the structure above the bulkhead deck*.

(*b*) 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.

(*c*) The open end of air pipes terminating within a superstructure shall be at least 1 m above the waterline when the ship heels to an angle of 15º, 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 paragraph are without prejudice to the provisions of the International Convention on Load Lines in force.

*Refer to the Guidance notes on the integrity of flooding boundaries above the bulkhead deck of passenger ships for proper application of regulations II-1/8 and 20, paragraph (a), of SOLAS 1974, as amended (MSC/Circ. 541, as may be amended).

(*d*) Sidescuttles, gangway, cargo and fuelling ports and other means for closing openings in the shell plating above the bulkhead deck 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 draught**.

(*e*) 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.

[S 686/2008 wef 01/01/2009]

Regulation 17-1

Integrity of the Hull and Superstructure, Damage Prevention and Control on Ro-ro Passenger Ships

(*a*)(i) Subject to the provisions of sub-paragraphs (*a*)(ii) and (*a*)(iii), all accesses that lead to spaces below the bulkhead deck shall have a lowest point which is not less than 2.5 m above the bulkhead deck.

(ii) 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.

(iii) 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, e.g. the movement of machinery and stores, subject to such accesses being made watertight, alarmed and indicated on the navigation bridge.

(*b*) 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 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.

**Refer to the Recommendation on strength and security and locking arrangements of shell doors on ro-ro passenger ships, adopted by the Organization by resolution A.793(19).

(*c*) 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 spaces.

[S 686/2008 wef 01/01/2009]

PART B-3

Subdivision load line assignment for passenger ships

Regulation 18

Assigning, Marking and Recording of Subdivision Load Lines for Passenger Ships

(*a*) 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 intended for alternating modes of operation may, if the owners desire, have one or more additional load lines assigned and marked to correspond with the subdivision draughts which the Director may approve for the alternative service configurations. Each service configuration so approved shall comply with Part B-1 of this Chapter independently of the results obtained for other modes of operation.

(*b*) The subdivision load lines assigned and marked shall be recorded in the Passenger Ship Safety Certificate, and shall be distinguished by the notation P1 for the principal passenger service configuration, and P2, P3, etc., for the alternative configurations. The principal passenger configuration shall be taken as the mode of operation in which the required subdivision index "R" will have the highest value.

(*c*) 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.

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

(*e*) 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.

(*f*) 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.

(*g*) 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 service configuration is submerged.

[S 686/2008 wef 01/01/2009]

PART B-4

Stability Management

Regulation 19

Damage Control Information

(*a*) 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*.

(*b*) Watertight doors in passenger ships permitted to remain open during navigation shall be clearly indicated in the ship's stability information.

(*c*) General precautions to be included 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.

(*d*) Specific precautions to be included shall consist of a listing of elements (i.e. closures, security of cargo, sounding of alarms, etc.) considered by the Director to be vital to the survival of the ship, passengers and crew.

(*e*) In case of ships to which damage stability requirements of Part B-1 apply, damage stability information shall provide the master a simple and easily understandable way of assessing the ship's survivability in all damage cases involving a compartment or group of compartments**.

[S 686/2008 wef 01/01/2009]

Regulation 20

Loading of Passenger Ships

*Refer to the Guidelines for damage control plans (MSC/Circ.919).

**Refer to the guidelines to be developed by the Organization.

(*a*) 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.

(*b*) 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.

(*c*) The provisions of this Regulation are without prejudice to the provisions of the International Convention for the Prevention of Pollution from Ships in force.

[S 686/2008 wef 01/01/2009]

Regulation 21

Periodical Operation and Inspection of Watertight Doors, etc., in Passenger Ships

(*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 watertight bulkheads, in use at sea, shall be operated daily.

(*c*) 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.

(*d*) A record of all drills and inspections required by this Regulation shall be entered in the log book with an explicit record of any defects which may be disclosed.

[S 686/2008 wef 01/01/2009]

Regulation 22

Prevention and Control of Water Ingress, etc.

(*a*) All watertight doors shall be kept closed during navigation except that they may be opened during navigation as specified in paragraphs (*c*) and (*d*). Watertight doors of a width of more than 1.2 m in machinery spaces as permitted by

Regulation 13(*j*) may only be opened in the circumstances detailed in that Regulation. Any door which is opened in accordance with this paragraph shall be ready to be immediately closed.

(*b*) Watertight doors located below the bulkhead deck having a maximum clear opening width of more than 1.2 m shall be kept closed when the ship is at sea, except for limited periods when absolutely necessary as determined by the Director.

(*c*) 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.

(*d*) 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.

(*e*) Portable plates on bulkheads 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 necessary precautions shall be taken in replacing them to ensure that the joints are watertight. Power-operated sliding watertight doors permitted in machinery spaces in accordance with Regulation 13(*j*) shall be closed before the ship leaves port and shall remain closed during navigation except in case of urgent necessity at the discretion of the master.

(*f*) Watertight doors fitted in watertight bulkheads dividing cargo between deck spaces in accordance with Regulation 13(*i*)(i) 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.

(*g*) Gangway, cargo and fuelling ports fitted below the bulkhead deck shall be effectively closed and secured watertight before the ship leaves port, and shall be kept closed during navigation.

(*h*) The following doors, located above the bulkhead deck, 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:

(i) cargo loading doors in the shell or the boundaries of enclosed superstructures;

(ii) bow visors fitted in positions as indicated in sub-paragraph (i);

(iii) cargo loading doors in the collision bulkhead; and

(iv) ramps forming an alternative closure to those defined in sub-paragraphs (i) to (iii) inclusive.

(*i*) Provided that where a door cannot be opened or closed while the ship is at the berth such a 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.

(*j*) Notwithstanding the requirements of sub-paragraphs (*h*)(i) and (*h*)(iv), the Director may authorize 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.

(*k*) The master shall ensure that an effective system of supervision and reporting of the closing and opening of the doors referred to in paragraph (*h*) is implemented.

(*l*) The master shall ensure, before the ship proceeds on any voyage, that an entry in the official log book is made of the time of the last closing of the doors specified in paragraph (*h*) and the time of any opening of particular doors in accordance with paragraph (*j*).

(*m*) Hinged doors, portable plates, sidescuttles, gangway, cargo and bunkering 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.

(*n*) Where in a between-decks, the sills of any of the sidescuttles referred to in Regulation 15(*c*)(ii) are below a line drawn parallel to the bulkhead deck at side and having its lowest point 1.4 m 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 paragraph the appropriate allowance for fresh water may be made when applicable.

(i) 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.

(ii) For any ship that has one or more sidescuttles so placed that the requirements of paragraph (*n*) would apply when it was floating at its

deepest subdivision draught, 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 m plus 2.5% of the breadth of the ship above the waterline 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 m.

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

(*p*) If cargo is carried in spaces referred to in Regulation 15(*e*)(ii), 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.

(*q*) When a rubbish-chute, etc., is not in use, both the cover and the valve required by Regulation 15(*j*)(ii) shall be kept closed and secured.

[S 686/2008 wef 01/01/2009]

Regulation 22-1*

Flooding Detection Systems for Passenger Ships Carrying 36 or More Persons Constructed on or after 1st July 2010

A flooding detection system for watertight spaces below the bulkhead deck shall be provided based on the guidelines developed by the Organization*.

[S 686/2008 wef 01/01/2009]

Regulation 23

Special Requirements for Ro-ro Passenger Ships

(*a*) Special category spaces and ro-ro 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 unauthorized access by passengers thereto can be detected whilst the ship is underway.

(*b*) 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 space, shall be kept on board and posted at an appropriate place.

* Refer to the guidelines to be developed by the Organization.

(*c*) All accesses from the ro-ro deck and vehicle ramps that lead to spaces below the bulkhead deck shall be closed before the ship leaves the berth on any voyage and shall remain closed until the ship is at its next berth.

(*d*) The master shall ensure that an effective system of supervision and reporting of the closing and opening of such accesses referred to in paragraph (*c*) is implemented.

(*e*) 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 22(*m*), is made of the time of the last closing of the accesses referred to in paragraph (*c*).

(*f*) Notwithstanding the requirements of paragraph (*c*), 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.

(*g*) 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.

(*h*) Notwithstanding the requirements of paragraph (*g*), 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.

(*i*) 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.

[S 686/2008 wef 01/01/2009]

Regulation 24

Prevention and Control of Water Ingress, etc., in Cargo Ships

(*a*) Openings in the shell plating below the deck limiting the vertical extent of damage shall be kept permanently closed while at sea.

(*b*) Notwithstanding the requirements of paragraph (*c*), the Director may authorize 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.

(*c*) Watertight doors or ramps fitted internally to subdivide large cargo spaces 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.

(*d*) The use of access doors and hatch covers intended to ensure the watertight integrity of internal openings shall be authorized by the officer of the watch.

[S 686/2008 wef 01/01/2009]

Regulation 25

Water Level Detectors on Single Hold Cargo Ships other than Bulk Carriers

(*a*) Single hold cargo ships other than bulk carriers constructed before 1st January 2007 shall comply with the requirements of this Regulation not later than 31st December 2009.

(*b*) Ships having a length (L) of less than 80 m, or of 100 m or less if constructed before 1st July 1998, and a single cargo hold below the freeboard deck or cargo holds below the freeboard deck which are not separated by at least one bulkhead made watertight up to that deck, shall be fitted in such space or spaces with water level detectors*.

(*c*) The water level detectors required by paragraph (*b*) shall —

(i) give an audible and visual alarm at the navigation bridge when the water level above the inner bottom in the cargo hold reaches a height of not less than 0.3 m, and another when such level reaches not more than 15% of the mean depth of the cargo hold; and

(ii) be fitted at the aft end of the hold, or above its lowest part where the inner bottom is not parallel to the designed waterline. Where webs or partial watertight bulkheads are fitted above the inner bottom, the Director may require the fitting of additional detectors.

(*d*) The water level detectors required by paragraph (*b*) need not be fitted in ships complying with Regulation 12 of Chapter XII, or in ships having watertight side compartments each side of the cargo hold length extending vertically at least from inner bottom to freeboard deck.

[S 686/2008 wef 01/01/2009]

PART C — Machinery Installations

(Except where expressly provided otherwise Part C applies to passenger ships and cargo ships)

Regulation 26

General

*Refer to the Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers, adopted by the Maritime Safety Committee by resolution MSC.188(79).

(*a*) 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.

(*b*) 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.

(*c*) 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 —

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

(ii) the sources of steam supply;

(iii) the boiler feed water systems;

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

(v) the sources of lubricating oil pressure;

(vi) the sources of water pressure;

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

(viii) the mechanical air supply for boilers;

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

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

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

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

(*e*) All boilers, all parts of machinery, all 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.

(*f*) 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 15r either way under static conditions and 22.5r under dynamic conditions (*rolling*) either way and simultaneously inclined dynamically (*pitching*) 7.5r by bow or stern. The Director may permit deviation from these angles, taking into consideration the type, size and service conditions of the ship.

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

(*h*) 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.

(*i*) 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 waterline, shall be inspected as part of the surveys prescribed in Regulation 10(*a*) of Chapter I and replaced as necessary, or at an interval recommended by the manufacturer.

(*j*) 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.

(*k*) Location and arrangement of vent pipes for fuel oil service, settling and lubricating 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. Two 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 8 h at maximum continuous rating of the propulsion plant and normal operating load at sea of the generator plant*. This paragraph applies only to ships constructed on or after 1st July 1998.

[S 366/2010 wef 01/07/2010]

Regulation 27

Machinery

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

(*b*) 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.

*Refer to Regulation 4(*b*) of Chapter II-2 on Arrangements for oil fuel, lubricating oil and other flammable oils.

(*c*) 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.

(*d*) Internal combustion engines of a cylinder diameter of 200 mm 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 minimize the possibility of injury to personnel.

(*e*) 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.

Regulation 28

Means of Going Astern

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

(*b*) 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.*

(*c*) 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 and chief engineer.*

(*d*) 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 paragraphs (*b*) and (*c*).

Regulation 29

Steering gear

(*a*) 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.

*Reference is made to the Recommendation on Information to be Included in the Manoeuvring Booklets adopted by the Organisation by resolution A 209 (VII).

The main steering gear and the auxiliary steering gear shall be so arranged that the failure of one of them will not render the other one inoperative.

(*b*)(i) 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.

(ii) 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 sub-paragraph (*c*)(ii), 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.

(iii) 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.

(*c*) The main steering gear and rudder stock shall be —

(i) of adequate strength and capable of steering the ship at maximum ahead service speed which shall be demonstrated;

(ii) 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, but where it is impractical to demonstrate compliance with this requirement during sea trials with the ship at its deepest seagoing draught and running ahead at the speed corresponding to the number of maximum continuous revolutions of the main engine and maximum design pitch, the ship (regardless of the date of its construction) may demonstrate compliance with this requirement by one of the following methods:

(1) during sea trials the ship is at even keel and the rudder fully submerged whilst running ahead at the speed corresponding to the number of maximum continuous revolutions of the main engine and maximum design pitch;

(2) where full rudder immersion during sea trials cannot be achieved, an appropriate ahead speed must be calculated using the

submerged rudder blade area in the proposed sea trial loading condition and the calculated ahead speed must result in a force and torque applied to the main steering gear which is at least as great as if it was being tested with the ship at its deepest seagoing draught and running ahead at the speed corresponding to the number of maximum continuous revolutions of the main engine and maximum design pitch;

(3) the rudder force and torque at the sea trial loading condition have been reliably predicted and extrapolated to the full load condition and the speed of the ship must correspond to the number of maximum continuous revolutions of the main engine and maximum design pitch of the propeller;

[S 802/2015 wef 01/01/2016]

(iii) operated by power where necessary to meet the requirement of sub-paragraph (ii) and in any case, when the Director requires a rudder stock of over 120 mm diameter in way of the tiller, excluding strengthening for navigation in ice; and

(iv) 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.

(*d*) The auxiliary steering gear shall be —

(i) of adequate strength and capable of steering the ship at navigable speed and of being brought speedily into action in an emergency;

(ii) 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, but where it is impractical to demonstrate compliance with this requirement during sea trials with the ship at its deepest seagoing draught and running ahead at one half of the speed corresponding to the number of maximum continuous revolutions of the main engine and maximum design pitch or 7 knots, whichever is greater, the ship (regardless of the date of its construction), including a ship constructed before 1 January 2009, may demonstrate compliance with this requirement by one of the following methods:

(1) during sea trials the ship is at even keel and the rudder fully submerged whilst running ahead at one half of the speed corresponding to the number of maximum continuous revolutions of the main engine and maximum design pitch or 7 knots, whichever is greater;

(2) where full rudder immersion during sea trials cannot be achieved, an appropriate ahead speed must be calculated using the submerged rudder blade area in the proposed sea trial loading condition and the calculated ahead speed must result in a force and torque applied to the auxiliary steering gear which is at least as great as if it was being tested with the ship at its deepest seagoing draught and running ahead at one half of the speed corresponding to the number of maximum continuous revolutions of the main engine and maximum design pitch or 7 knots, whichever is greater;

(3) the rudder force and torque at the sea trial loading condition have been reliably predicted and extrapolated to the full load condition; and

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(iii) operated by power where necessary to meet the requirements of sub-paragraph (ii) and in any case when the Director requires a rudder stock of over 230 mm diameter in way of the tiller, excluding strengthening for navigation in ice.

(*e*) Main and auxiliary steering gear power units shall be —

(i) arranged to re-start automatically when power is restored after a power failure; and

(ii) capable of being brought into operation from a position on the navigating 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 navigating bridge.

(*f*)(i) Where the main steering gear comprises two or more identical power units, an auxiliary steering gear need not be fitted, provided that —

(1) in a passenger ship, the main steering gear is capable of operating the rudder as required by paragraph (*c*)(ii) while any one of the power units is out of operation;

(2) in a cargo ship, the main steering gear is capable of operating the rudder as required by paragraph (*c*)(ii) while operating with all power units;

(3) 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.

(ii) [Omitted as having had effect.]

(iii) Steering gears, other than the hydraulic type, shall achieve standards equivalent to the requirements of this paragraph to the satisfaction of the Director.

(*g*) Steering gear control shall be provided —

(i) for the main steering gear, both on the navigating bridge and in the steering gear compartment;

(ii) where the main steering gear is arranged in accordance with paragraph (*f*), by two independent control systems, both operable from the navigating 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;

(iii) for the auxiliary steering gear, in the steering gear compartment and, if power operated, it shall also be operable from the navigating bridge and shall be independent of the control system for the main steering gear.

(*h*) Any main and auxiliary steering gear control system operable from the navigating bridge shall comply with the following:

(i) 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;

(ii) means shall be provided in the steering gear compartment for disconnecting any control system operable from the navigating bridge from the steering gear it serves;

(iii) the system shall be capable of being brought into operation from a position on the navigating bridge;

(iv) in the event of a failure of electrical power supply to the control system, an audible and visual alarm shall be given on the navigating bridge; and

(v) short circuit protection only shall be provided for steering gear control supply circuits.

(*i*) The electric power circuits and the steering gear control systems with their associated components, cables and pipes required by this Regulation and by Regulation 30 shall be separated as far as is practicable throughout their length.

(*j*) A means of communication shall be provided between the navigating bridge and the steering gear compartment.

(*k*) The angular position of the rudder shall —

(i) if the main steering gear is power operated, be indicated on the navigating bridge. The rudder angle indication shall be independent of the steering gear control system; and

(ii) be recognizable in the steering gear compartment.

(*l*) Hydraulic power-operated steering gear shall be provided with the following:

(i) arrangements to maintain the cleanliness of the hydraulic fluid taking into consideration the type and design of the hydraulic system;

(ii) 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 navigating bridge and in the machinery space where they can be readily observed; and

(iii) 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.

(*m*) The steering gear compartment shall be —

(i) readily accessible and, as far as practicable, separated from machinery spaces; and

(ii) 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.

(*n*) Where the rudder stock is required to be over 230 mm 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 sub-paragraph (*d*)(ii) 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.

(*o*) 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 two or more identical power units complying with the provisions of paragraph (*f*).

(*p*) Every tanker, chemical tanker or gas carrier of 10,000 tons and upwards shall, subject to paragraph (*q*) comply with the following:

(i) 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;

(ii) the main steering gear shall comprise either —

(1) two independent and separate power actuating systems, each capable of meeting the requirements of sub-paragraph (*c*)(ii); or

(2) at least two identical power actuating systems which, acting simultaneously in normal operation, shall be capable of meeting the requirements of sub-paragraph (*c*)(ii). Where necessary to comply with this requirement, inter-connection 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;

(iii) steering gears other than of the hydraulic type shall achieve equivalent standards.

(*q*) 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 paragraph (*p*), 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 —

(i) 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

(ii) 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 tonnes deadweight, adopted by the Organisation shall also be applied*.

(*r*) [Omitted as having had effect.]

(*s*) Every tanker, chemical tanker or gas carrier of 10,000 tons and upwards, constructed before 1st September 1984, shall comply with the following:

*Reference is made to 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 Tonnes Deadweight, adopted by the Organisation by resolution A 467 (XII).

(i) the requirements of paragraphs (*g*)(i), (*h*)(ii), (*h*)(iv), (*j*), (*k*), (*l*)(ii), (*l*)(iii) and (*m*)(ii);

(ii) two independent steering gear control systems shall be provided each of which can be operated from the navigating bridge. This does not require duplication of the steering wheel or steering lever;

(iii) if the steering gear control system in operation fails, the second system shall be capable of being brought into immediate operation from the navigating bridge; and

(iv) 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.

(*t*) In addition to the requirements of paragraph (*s*), 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 —

(i) an independent means of restraining the rudder;

(ii) 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

(iii) 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 navigating bridge so that the other system remains fully operational.

Regulation 30

Additional Requirements for Electric and Electrohydraulic Steering Gear

(*a*) Means for indicating that the motors of electric and electrohydraulic steering gear are running shall be installed on the navigating bridge and at a suitable main machinery control position.

(*b*) Each electric or electrohydraulic steering gear comprising one or more power units shall be served by at least two exclusive circuits fed directly from the main switchboard; however, 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.

(*c*) 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 paragraph 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 51.

(*d*) When in a ship of less than 1,600 tons an auxiliary steering gear which is required by sub-paragraph (*d*)(iii) of Regulation 29 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 paragraph (*c*) may be waived by the Director if he is satisfied with the protection arrangement together with the requirements of paragraph (*e*) and sub-paragraph (*g*)(iii) of Regulation 29 applicable to auxiliary steering gear.

Regulation 31

Machinery Controls

(*a*) Main and auxiliary machinery essential for the propulsion and safety of the ship shall be provided with effective means for its operation and control.

(*b*) 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:

(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 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;

(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 or at the manoeuvring platform as appropriate;

(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;

(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 propeller shall be maintained until local control is in operation;

(viii) indicators shall be fitted on the navigation bridge for —

(1) propeller speed and direction of rotation in the case of fixed pitch propellers; or

(2) 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.

[S 691/2006 wef 01/01/2007]

(x) [*Deleted by S 691/2006 wef 01/01/2007*]

(*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 46 to 50 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.

(*e*) Ships constructed on or after 1st July 1998 shall, in lieu of paragraphs (*a*) to (*d*), comply with the following, except that ships constructed before 1st July 2004 need not comply with sub-paragraph (ii)(10):

(i) 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.

(ii) where remote control of propulsion machinery from the navigation bridge is provided, the following shall apply:

(1) 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;

(2) 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;

(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 and at the manoeuvring platform;

(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 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;

(6) 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;

(7) 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;

(8) 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;

(9) 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;

[S 691/2006 wef 01/01/2007]

(10) automation systems shall be designed —

(A) to ensure that threshold warning of impending or imminent slowdown or shutdown of the propulsion system is given to the officer in charge of the navigational watch in time to assess navigational circumstances in an emergency; and

(B) in particular, to control, monitor and report on propulsion, to alert the officer in charge of the navigational watch to any change in propulsion, and to take safety action to slow down or stop propulsion, while providing the officer in charge of the navigational watch an opportunity to manually intervene, except where such manual intervention will result in the total failure of the engine, the propulsion

equipment or both the engine and the propulsion equipment within a short time, for example, in the case of overspeed.

[S 691/2006 wef 01/01/2007]

(iii) 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 46 to 50 shall apply as appropriate. Particular consideration shall be given to protect such spaces against fire and flooding.

(iv) 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.

[S 217/2004 wef 01/07/2004]

[S 691/2006 wef 01/01/2007]

Regulation 32

Steam Boilers and Boiler Feed Systems

(*a*) Every steam boiler and every unfired steam generator shall be provided with not less than two safety valves of adequate capacity. However, 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.

(*b*) 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.

(*c*) Water tube boilers serving turbine propulsion machinery shall be fitted with a high-water-level alarm.

(*d*) 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 two 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.

(*e*) 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.

(*f*) Every boiler essential for the safety of the ship and designed to contain water at a specified level shall be provided with at least two means for indicating its water level, at least one of which shall be a direct reading gauge glass.

Regulation 33

Steam Pipe Systems

(*a*) 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.

(*b*) Means shall be provided for draining every steam pipe in which dangerous water hammer action might otherwise occur.

(*c*) 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.

Regulation 34

Air Pressure Systems

(*a*) 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.

(*b*) 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.

(*c*) 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.

(*d*) Provision shall be made to reduce to a minimum the entry of oil into the air pressure system and to drain these systems.

Regulation 35

Ventilating Systems in Machinery Spaces

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.

Regulation 35-1

Bilge Pumping Arrangements

(*a*) This Regulation applies to ships constructed on or after 1st January 2009.

(*b*) Passenger ships and cargo ships —

(i) 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.

(ii) 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.

(iii) 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.

(iv) 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 pump when containing water ballast.

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

(vi) Provision 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.

(1) 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 15 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.

(2) 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.

(3) Provisions for the drainage of closed vehicle and ro-ro spaces and special category spaces shall also comply with paragraphs (*f*)(i)(4) and (*f*)(i)(5) of Regulation 20 of Chapter II-2.

[S 793/2010 wef 01/01/2011]

(*c*) Passenger ships —

(i) The bilge pumping system required by sub-paragraph (*b*)(i) 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, it may allow such provision to be dispensed with if calculations made in accordance with the conditions laid down in Regulations 7 and 8 show that the survival capability of the ship will not be impaired.

(ii) At least three power pumps shall be fitted connected to the bilge main, one of which may be driven by the propulsion machinery. Where the bilge pump numeral is 30 or more, one additional independent power pump shall be provided. The bilge pump numeral shall be calculated as follows:

when P_1 is greater than P —

bilge pump numeral = $72.\left[\frac{M+2P_1}{V+P_1-P}\right]$

in other cases —

bilge pump numeral = $72.\left[\frac{M+2P}{V}\right]$

where —

"L" = the length of the ship (*metres*) as defined in Regulation 2;

"M" = the volume of the machinery space (cubic metres), as defined in Regulation 2, that is below the bulkhead deck; 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 and crew spaces below the bulkhead deck (cubic metres), which are provided for the accomodation and use of passengers and crew, excluding baggage, store, provision and mail rooms;

"V" = the whole volume of the ship below the bulkhead deck (cubic metres);

"P_1" = KN,

where:

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

"K" = 0.056 L

However, where the value of KN is greater than the sum of P and the whole volume of the actual passenger spaces above the bulkhead deck, the figure to be taken as "P1" is that sum or two-thirds KN, whichever is the greater.

(iii) 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 two or more watertight compartments, the pumps available for bilge service shall be distributed as far as is possible throughout these compartments.

(iv) On a ship of 91.5 m in length and upwards or having a bilge pump numeral, calculated in accordance with sub-paragraph (ii), 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:

(1) 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

(2) 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.

(v) 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 sub-paragraph (*b*)(i).

(vi) Each power bilge pump shall be capable of pumping water through the required main bilge pipe at a speed of not less than 2 m/s. Independent power bilge pumps situated in machinery spaces shall have direct suctions from these spaces, except that not more than two such suctions shall be required in any one space. Where two 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.

(*vii*) (A) In addition to the direct bilge suction or suctions required by sub-paragraph (vi), 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.

(B) 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.

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

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

(ix) The diameter "d" of the bilge main shall be calculated according to the following formula. However, 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) as defined in Regulation 2; 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 sub-paragraph (*b*)(vi)(2) 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 "1" 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.

(x) 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 2 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.

(xi) 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 sub-paragraph (i); 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.

(xii) All cocks and valves referred to in sub-paragraph (xi) 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.

(*d*) Cargo ships —

At least two 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.

[S 686/2008 wef 01/01/2009]

Regulation 36

[*Deleted by S 432/2014 wef 01/07/2014*]

Regulation 37

Communication between Navigating Bridge and Machinery Space

(*a*) At least two independent means shall be provided for communicating orders from the navigating 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 navigating bridge. Appropriate means of communication shall be provided to any other positions from which the engines may be controlled.

(*b*) For ships constructed on or after 1st October 1994, in lieu of the requirements of paragraph (*a*), there shall be provided at least two independent means for communicating orders from the navigating 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 navigating bridge. Appropriate means of communication shall be provided from the navigating bridge and the engine room to any other position from which the speed or direction of thrust of the propellers may be controlled.

Regulation 38

Engineers' Alarm

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.

Regulation 39

Location of Emergency Installations in Passenger Ships

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

(Except where expressly provided otherwise
Part D applies to passenger ships and cargo ships)

Regulation 40

General

(*a*) Electrical installations shall be such that —

(i) all electrical auxiliary services necessary for maintaining the ship in normal operational and habitable conditions will be ensured without recourse to the emergency source of electrical power;

(ii) electrical services essential for safety will be ensured under various emergency conditions; and

(iii) the safety of passengers, crew and ship from electrical hazards will be ensured.

(*b*) The Director shall take appropriate steps to ensure uniformity in the implementation and application of the provisions of this Part in respect of electrical installations*.

Regulation 41

Main Source of Electrical Power and Lighting Systems

(*a*)(i) A main source of electrical power of sufficient capacity to supply all those services mentioned in Regulation 40(*a*)(i) shall be provided. This main source of electrical power shall consist of at least two generating sets.

(ii) 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.

(iii) The arrangements of the ship's main source of electrical power shall be such that the services referred to in Regulation 40(*a*)(i) can be maintained regardless of the speed and direction of rotation of the propulsion machinery or shafting.

(iv) 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 Regulation 42(*b*)(i) to (*b*)(iii) or Regulation 43(*b*)(i) to (*b*)(iv).

* Reference is made to the Recommendations published by the International Electrotechnical Commission and, in particular, Publication 92 — Electrical Installations in Ships.

(v) Where transformers constitute an essential part of the electrical supply system required by this paragraph, the system shall be so arranged as to ensure the same continuity of the supply as is stated in this paragraph.

(*b*)(i) 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.

(ii) 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 Regulation 42(*b*)(i) and (*b*)(ii) or Regulation 43(*b*)(i) to (*b*)(iii) inoperative.

(iii) 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.

(*c*) 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.

(*d*) 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 two parts which shall normally be connected by removable links or other approved means; so far as is practicable, the connexion 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.

(*e*) Ships constructed on or after 1st July 1998 —

(i) in addition to paragraphs (*a*) to (*c*), shall comply with the following:

(1) 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;

(2) load shedding or other equivalent arrangements shall be provided to protect the generators required by this Regulation against sustained overload;

(3) where the main source of electrical power is necessary for propulsion of the ship, the main busbar shall be subdivided into at least two 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

(ii) need not comply with paragraph (*d*).

(*f*) In passenger ships constructed on or after 1st July 2010, supplementary lighting shall be provided in all cabins to clearly indicate the exit, so that occupants will be able to find their way to the door. Such lighting, which may be connected to an emergency source of power or have a self-contained source of electrical power in each cabin, shall automatically illuminate when power to the normal cabin lighting is lost, and shall remain on for a minimum of 30 minutes.

[S 366/2010 wef 01/07/2010]

[S 284/2012 wef 01/07/2012]

Regulation 42

Emergency Source of Electrical Power in Passenger Ships

(Sub-paragraphs (*b*)(vi)(1) and (*d*)(ii) of this Regulation apply to ships constructed on or after 1st February 1992)

(*a*)(i) A self-contained emergency source of electrical power shall be provided.

(ii) 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.

(iii) 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.

(iv) 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.

(*b*) 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 hereinafter, if they depend upon an electrical source for their operation:

(i) For a period of 36 hours, emergency lighting —

(1) at every muster and embarkation station and over the sides as required by Regulations 11(*d*) and 16(*g*) of Chapter III;

(2) in alleyways, stairways and exits giving access to the muster and embarkation stations, as required by Regulation 11(*e*) of Chapter III;

(3) in all service and accommodation alleyways, stairways and exists, personnel lift cars;

(4) in the machinery spaces and main generating stations including their control positions;

(5) in all control stations, machinery control rooms, and at each main and emergency switchboard;

(6) at all stowage positions for firemen's outfits;

(7) at the steering gear; and

(8) at the fire pump, the sprinkler pump and the emergency bilge pump referred to in sub-paragraph (*b*)(iv) and at the starting position of their motors.

(ii) For a period of 36 hours —

(1) the navigation lights and other lights required by the International Regulations for Preventing Collisions at Sea in force; and

(2) on ships constructed on or after 1st February 1995, the VHF radio installation required by sub-paragraphs (*a*)(i) and (*a*)(ii) of Regulation 7 of Chapter IV; and, if applicable:

(*aa*) the MF radio installation required by sub-paragraphs (*a*)(i) and (*a*)(ii) of Regulation 9 and sub-paragraphs (*a*)(ii) and (*a*)(iii) of Regulation 10 of Chapter IV;

(*bb*) the ship earth station required by sub-paragraph (*a*)(i) of Regulation 10 of Chapter IV; and

(*cc*) the MF/HF radio installation required by sub-paragraphs (*b*)(i) and (*b*)(ii) of Regulation 10 and paragraph (*a*) of Regulation 11 of Chapter IV.

(iii) For a period of 36 hours —

(1) all internal communication equipment required in an emergency;

(2) the shipborne navigational equipment as required by Regulation 12 of Chapter V; where such provision is unreasonable or impracticable the Director may waive this requirement for ships of less than 5,000 tons;

(3) the fire detection and fire alarm system, and the fire door holding and release system; and

(4) for intermittent operation of the daylight signalling 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.

(iv) For a period of 36 hours —

(1) one of the fire pumps required by Regulation 4(*c*)(i) and (*c*)(iii) of Chapter II-2;

(2) the automatic sprinkler pump, if any; and

(3) the emergency bilge pump and all the equipment essential for the operation of electrically powered remote controlled bilge valves.

(v) For the period of time required by Regulation 29(*n*) the steering gear if required to be so supplied by that Regulation.

(vi) For a period of half an hour —

(1) any watertight doors required by Regulation 15 to be power operated together with their indicators and warning signals; and

(2) 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.

(vii) 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 sub-paragraph (*b*)(i) to (*b*)(v) but not less than 12 hours.

(*c*) The emergency source of electrical power may be either a generator or an accumulator battery, which shall comply with the following:

(i) Where the emergency source of electrical power is a generator, it shall be —

(1) driven by a suitable prime-mover with an independent supply of fuel having a flashpoint (closed cup test) of not less than 43°C;

(2) 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 paragraph (*d*) 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

(3) provided with a transitional source of emergency electrical power according to paragraph (*d*).

(ii) Where the emergency source of electrical power is an accumulator battery, it shall be capable of —

(1) 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;

(2) automatically connecting to the emergency switchboard in the event of failure of the main source of electrical power; and

(3) immediately supplying at least those services specified in paragraph (*d*).

(iii) The following provision in paragraph (*c*)(i)(2) 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".

(iv) 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.

(*d*) The transitional source of emergency electrical power required by sub-paragraph (*c*)(i)(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:

(i) For half an hour —

(1) the lighting required by sub-paragraphs (*b*)(i) and (*b*)(ii)(1); and

(2) all services required by sub-paragraphs (*b*)(iii)(1), (*b*)(iii)(3) and (*b*)(iii)(4) unless such services have an independent supply for the period specified from an accumulator battery suitably located for use in an emergency.

(ii) Power to operate the watertight doors, as required by sub-paragraph (*g*)(iii)(3) of Regulation 15, 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 sub-paragraph (*g*)(ii) of Regulation 15 for half an hour.

(*e*)(i) The emergency switchboard shall be installed as near as is practicable to the emergency source of electrical power.

(ii) 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.

(iii) 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 sub-paragraph (*c*)(i)(3) or paragraph (*d*) are being discharged.

(iv) 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.

(v) 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.

(*f*) 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.

(*g*) Provision shall be made for the periodic testing of the complete emergency system and shall include the testing of automatic starting arrangements.

Regulation 42-1

Supplementary Emergency Lighting for Ro/ro Passenger Ships

This Regulation applies to all passenger ships with ro/ro cargo spaces or special category spaces as defined in Regulation 3 of Chapter II-2.

In addition to the emergency lighting required by paragraph (*b*) of Regulation 42 of Chapter II-1, on every passenger ship with ro/ro cargo spaces or special category spaces as defined in Regulation 3 of Chapter II-2:

(i) 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; and 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

(ii) 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 sub-paragraph (i), is provided.

Regulation 43

Emergency Source of Electrical Power in Cargo Ships

(*a*)(i) A self-contained emergency source of electrical power shall be provided.

(ii) 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.

(iii) 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.

(iv) 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.

(*b*) 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 hereinafter, if they depend upon an electrical source for their operation:

(i) For a period of 3 hours, emergency lighting at every muster and embarkation station and over the sides as required by Regulations 11(*d*) and 16(*g*) of Chapter III.

(ii) For a period of 18 hours, emergency lighting —

(1) in all service and accommodation alleyways, stairways and exits, personnel lift cars and personnel lift trunks;

(2) in the machinery spaces and main generating stations including their control positions;

(3) in all control stations, machinery control rooms, and at each main and emergency switchboard;

(4) at all stowage positions for firemen's outfits;

(5) at the steering gear;

(6) at the fire pump referred to in sub-paragraph (*b*)(v) at the sprinkler pump, if any, and at the emergency bilge pump, if any, and at the starting positions of their motors; and

(7) in all cargo pump-rooms of tankers constructed on or after 1st July 2002.

[S 314/2002 wef 01/07/2002]

(iii) For a period of 18 hours —

(1) the navigation lights and other lights required by the International Regulations for Preventing Collisions at Sea in force; and

(2) on ships constructed on or after 1st February 1995, the VHF radio installation required by sub-paragraphs (*a*)(i) and (*a*)(ii) of Regulation 7 of Chapter IV; and, if applicable:

(*aa*) the MF radio installation required by sub-paragraphs (*a*)(i) and (*a*)(ii) of Regulation 9 and sub-paragraphs (*a*)(ii) and (*a*)(iii) of Regulation 10 of Chapter IV;

(*bb*) the ship earth station required by sub-paragraph (*a*)(i) of Regulation 10 of Chapter IV; and

(*cc*) the MF/HF radio installation required by sub-paragraphs (*b*)(i) and (*b*)(ii) of Regulation 10 and paragraph (*a*) of Regulation 11 of Chapter IV.

(iv) For a period of 18 hours —

(1) all internal communication equipment as required in an emergency;

(2) the shipborne navigational equipment as required by Regulation 12 of Chapter V; where such provision is unreasonable or impracticable the Director may waive this requirement for ships of less than 5,000 tons;

(3) the fire detection and fire alarm system; and

(4) intermittent operation of the daylight signalling 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.

(v) For a period of 18 hours one of the fire pumps required by Regulation 4(*c*)(i) and (*c*)(iii) of Chapter II-2 if dependent upon the emergency generator for its source of power.

(vi) For the period of time required by Regulation 29(*n*) the steering gear where it is required to be so supplied by that Regulation.

(2) 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 sub-paragraphs (*b*)(ii) to (*b*)(v) but not less than 12 hours.

(*c*) The emergency source of electrical power may be either a generator or an accumulator battery, which shall comply with the following:

(i) Where the emergency source of electrical power is a generator, it shall be —

(1) driven by a suitable prime-mover with an independent supply of fuel, having a flashpoint (closed cup test) of not less than 43°C;

(2) 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 (i)(3) is provided; where the emergency generator is automatically started, it shall be automatically connected to the emergency switchboard; those services referred to in paragraph (*d*) 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

(3) provided with a transitional source of emergency electrical power as specified in paragraph (*d*) unless an emergency generator is provided capable both of supplying the services mentioned in that paragraph and of being automatically started and supplying the

required load as quickly as is safe and practicable subject to a maximum of 45 seconds.

(ii) Where the emergency source of electrical power is an accumulator battery, it shall be capable of —

(1) 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;

(2) automatically connecting to the emergency switchboard in the event of failure of the main source of electrical power; and

(3) immediately supplying at least those services specified in paragraph (*d*).

(iii) The following provision in paragraph (*c*)(i)(2) 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".

(iv) 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.

(*d*) The transitional source of emergency electrical power where required by sub-paragraph (*c*)(i)(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:

(i) the lighting required by sub-paragraphs (*b*)(i), (*b*)(ii) and (*b*)(iii)(1). 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

(ii) all services required by sub-paragraphs (*b*)(iv)(1), (*b*)(iv)(3) and (*b*)(iv)(4) unless such services have an independent supply for the period specified from an accumulator battery suitably located for use in an emergency.

(*e*)(i) The emergency switchboard shall be installed as near as is practicable to the emergency source of electrical power.

(ii) 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.

(iii) 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 sub-paragraph (*c*)(ii) or paragraph (*d*) are being discharged.

(iv) 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.

(v) 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.

(*f*) 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.

(*g*) Provision shall be made for the periodic testing of the complete emergency system and shall include the testing of automatic starting arrangements.

Regulation 44

Starting Arrangements for Emergency Generating Sets

(*a*) 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.

(*b*) 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 three starts within 30 minutes unless manual starting can be demonstrated to be effective.

(*ba*) Ships constructed on or after 1st October 1994 shall, in lieu of the provision of the second sentence of paragraph (*b*), 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.

(*c*) The stored energy shall be maintained at all times, as follows:

(i) electrical and hydraulic starting systems shall be maintained from the emergency switchboard;

(ii) 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;

(iii) 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.

(*d*)(i) 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.

(ii) When manual starting is not practicable, the requirements of paragraphs (*b*) and (*c*) shall be complied with except that starting may be manually initiated.

Regulation 45

Precautions against Shock, Fire and other Hazards of Electrical Origin

(Paragraphs (*j*) and (*k*) of this Regulation apply to ships constructed on or after 1st January 2007)

(*a*)(i) 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 equipment are —

(1) supplied at a voltage not exceeding 50 V direct current or 50 V, root mean square between conductors; auto-transformers shall not be used for the purpose of achieving this voltage; or

(2) supplied at a voltage not exceeding 250 V by safety isolating transformers supplying only one consuming device; or

(3) constructed in accordance with the principle of double insulation.

[S 282/2006 wef 01/07/2007]

(ii) 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.

(iii) All electrical apparatus shall be so constructed and so installed as not to cause injury when handled or touched in the normal manner.

(*b*) 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.

(*c*)(i) 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.

(ii) The requirement of sub-paragraph (i) does not preclude under conditions approved by the Director the use of —

(1) impressed current cathodic protective systems;

(2) limited and locally earthed systems; or

(3) insulation level monitoring devices provided the circulation current does not exceed 30 mA under the most unfavourable conditions.

(ii)(A) For ships constructed on or after 1st October 1994, the requirement of sub-paragraph (i) 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.

(iii) Where the hull return system is used, all final subcircuits, i.e. all circuits fitted after the last protective device, shall be two-wire and special precautions shall be taken to the satisfaction of the Director.

(*d*)(i) 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 3,000 V (line to line) and over, provided that any possible resulting current does not flow directly through any of the dangerous spaces.

(ii) When a distribution system, whether primary or secondary, for power, heating or lighting, with no connexion 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.

(iii) Ships constructed on or after 1st October 1994 shall, in lieu of the provisions of sub-paragraph (i), comply with the following requirements:

(1) Except as permitted by sub-paragraph (2), earthed distribution systems shall not be used in a tanker;

(2) The requirement of sub-paragraph (1) 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:

(*aa*) 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;

(*bb*) limited and locally earthed systems, provided that any possible resulting current does not flow directly through any of the dangerous spaces; or

(*cc*) alternating current power networks of 1,000 V root mean square (line to line) and over, provided that any possible resulting current does not flow directly through any of the dangerous spaces.

(*e*)(i) Except as permitted by the Director in exceptional circumstances, all metal sheaths and armour of cables shall be electrically continuous and shall be earthed.

(ii) 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.

(iii) 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.

(iv) 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.

(v) Cables and wiring shall be installed and supported in such a manner as to avoid chafing or other damage.

(vi) 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.

(*f*)(i) Each separate circuit shall be protected against short circuit and against overload, except as permitted in Regulations 29 and 30 or where the Director may exceptionally otherwise permit.

(ii) The rating or appropriate setting of the overload protective device for each circuit shall be permanently indicated at the location of the protective device.

(*g*) 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.

(*h*) 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.

(*i*)(i) Accumulator batteries shall be suitably housed, and compartments used primarily for their accommodation shall be properly constructed and efficiently ventilated.

(ii) 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 paragraph (*j*).

(iii) Accumulator batteries shall not be located in sleeping quarters except where hermetically sealed to the satisfaction of the Director.

(*j*) No electrical equipment shall be installed in any space where flammable mixtures are liable to collect, for example in compartments assigned principally to accumulator batteries, in paint lockers, acetylene stores or similar spaces, unless the Director is satisfied that such equipment is —

(i) essential for operational purposes;

(ii) of a type which will not ignite the mixture concerned;

(iii) appropriate to the space concerned; and

(iv) appropriately certified for safe usage in the dusts, vapours or gases likely to be encountered.

[S 282/2006 wef 01/07/2006]

(*k*) In tankers, electrical equipment, cables and wiring shall not be installed in hazardous locations unless it conforms with standards not inferior to those acceptable to the Organization*. However, for locations not covered by such standards, electrical equipment, cables and wiring which do not conform to the standards may be installed in hazardous locations based on a risk assessment to the satisfaction of the Director, to ensure that an equivalent level of safety is assured.

[S 282/2006 wef 01/07/2006]

(*l*) In a passenger ship, distribution systems shall be so arranged that fire in any main vertical zone as is defined in Regulation 3 of Chapter II-2 will not interfere with services essential for safety in any other such zone. This requirement will be met if main and emergency feeders passing through any such zone are separated both vertically and horizontally as widely as is practicable.

[S 282/2006 wef 01/07/2006]

PART E — Additional Requirements for Periodically Unattended Machinery Spaces

(Part E except Regulation 54 applies to cargo ships)

Regulation 46

General

(*a*) 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.

(*b*) 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.

(*c*) Every ship shall be provided with documentary evidence, to the satisfaction of the Director, of its fitness to operate with periodically unattended machinery spaces.

Regulation 47

Fire Precautions

*Refer to the standards published by the International Electrotechnical Commission, IEC 60092-502:1999 'Electrical installations in ships — Tankers'.

(*a*) Means shall be provided to detect and give alarms at an early stage in case of fires —

(i) in boiler air supply casings and exhausts (uptakes); and

(ii) in scavenging air belts of propulsion machinery,

unless the Director considers this to be unnecessary in a particular case.

(*b*) Internal combustion engines of 2,250 kW and above or having cylinders of more than 300 mm bore shall be provided with crankcase oil mist detectors or engine bearing temperature monitors or equivalent devices.

Regulation 48

Protection against Flooding

(*a*) 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.

(*b*) Where the bilge pumps are capable of being started automatically, means shall be provided to indicate when the influx of liquid in 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.

(*c*) 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.

Regulation 49

Control of Propulsion Machinery from the Navigating Bridge

(*a*) 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 navigating bridge.

(i) 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.

(ii) The main propulsion machinery shall be provided with an emergency stopping device on the navigating bridge which shall be independent of the navigating bridge control system.

(*b*) Propulsion machinery orders from the navigating bridge shall be indicated in the main machinery control room or at the propulsion machinery control position as appropriate.

(*c*) 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 navigating 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.

(*d*) 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.

(*e*) 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.

(*f*) Indicators shall be fitted on the navigating 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.

(*g*) 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.

Regulation 50

Communication

A reliable means of vocal communication shall be provided between the main machinery control room or the propulsion machinery control position as appropriate, the navigating bridge and the engineer officers' accommodation.

Regulation 51

Alarm Systems

(*a*) An alarm system shall be provided indicating any fault requiring attention and shall —

(i) 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;

(ii) have a connexion to the engineers' public rooms and to each of the engineers' cabins through a selector switch, to ensure connexion to at least one of those cabins. The Director may permit equivalent arrangements;

(iii) activate an audible and visual alarm on the navigating bridge for any situation which requires action by or attention of the officer on watch;

(iv) as far as is practicable be designed on the fail-to-safety principle; and

(v) activate the engineers' alarm required by Regulation 38 if an alarm function has not received attention locally within a limited time.

(*b*)(i) 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.

(ii) Failure of the normal power supply of the alarm system shall be indicated by an alarm.

(*c*)(i) 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.

(ii) Acceptance at the position referred to in paragraph (*a*) 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 indications of individual alarms shall remain until the fault has been corrected, when the alarm system shall automatically reset to the normal operating condition.

Regulation 52

Safety Systems

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 shut-down of that part of the plant and that an alarm shall be given. Shut-down 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 shut-down 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.

Regulation 53

Special Requirements for Machinery, Boiler and Electrical Installations

(*a*) 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.

(*b*) The main source of electrical power shall comply with the following:

(i) 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.

(ii) 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.

(*c*) Where stand-by machines are required for other auxiliary machinery essential to propulsion, automatic change-over devices shall be provided.

(*d*) *Automatic control and alarm system*

(i) 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.

(ii) An alarm shall be given on the automatic change-over.

(iii) An alarm system complying with Regulation 51 shall be provided for all important pressures, temperatures and fluid levels and other essential parameters.

(iv) A centralized control position shall be arranged with the necessary alarm panels and instrumentation indicating any alarm.

(*e*) Means shall be provided to keep the starting air pressure at the required level where internal combustion engines are used for main propulsion.

Regulation 54

Special Consideration in Respect of Passenger Ships

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.

PART F — ALTERNATIVE DESIGN AND ARRANGEMENTS

Regulation 55

Alternative design and arrangements

(*a*) *Purpose*

The purpose of this Regulation is to provide a methodology for alternative design and arrangements for machinery, electrical installations and low-flashpoint fuel storage and distribution systems.

[S 669/2016 wef 01/01/2017]

(*b*) *General*

(i) Machinery, electrical installation and low-flashpoint fuel storage and distribution systems design and arrangements may deviate from the requirements set out in Part C, D, E or G, provided that the alternative design and arrangements meet the intent of the requirements concerned and provide an equivalent level of safety to this Chapter.

(ii) When any alternative design or arrangement deviates from the prescriptive requirements of Part C, D, E or G, an engineering analysis, evaluation and approval of the design and arrangement must be carried out in accordance with this Regulation.

[S 669/2016 wef 01/01/2017]

(*c*) *Engineering analysis*

The engineering analysis must be prepared and submitted to the Director, based on the guidelines developed by the Organization* and must include, as a minimum, all of the following elements:

(i) determination of the ship type, machinery, electrical installations, low-flashpoint fuel storage and distribution systems, and spaces concerned;

(ii) identification of the prescriptive requirements with which the machinery, electrical installations and low-flashpoint fuel storage and distribution systems will not comply;

(iii) identification of the reason why the proposed design will not meet the prescriptive requirements supported by compliance with other recognised engineering or industry standards;

(iv) determination of the performance criteria for the ship, machinery, electrical installation, low-flashpoint fuel storage and distribution system or the spaces concerned addressed by the relevant prescriptive requirements:

(1) the performance criteria must provide a level of safety not inferior to the relevant prescriptive requirements contained in Part C, D, E or G; and

(2) the performance criteria must be quantifiable and measurable;

(v) 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;

(vi) technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and

(vii) risk assessment based on identification of the potential faults and hazards associated with the proposal.

[S 669/2016 wef 01/01/2017]

(*d*) *Evaluation of the alternative design and arrangements*

(i) The engineering analysis required in paragraph (*c*) shall be evaluated and approved by the Director, taking into account the guidelines developed by the Organisation*.

*Refer to the Guidelines on Alternative Design and Arrangements for SOLAS Chapters II-1 and III (MSC.1/Circ.1212) and the Guidelines for the Approval of Alternatives and Equivalents as Provided for in Various IMO Instruments (MSC.1/Circ.1455).

*Refer to the Guidelines on Alternative Design and Arrangements for SOLAS Chapters II-1 and III (MSC.1/Circ.1212).

(ii) 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.

[S 366/2010 wef 01/07/2010]

(*e*) *Exchange of information*

The Director shall communicate to the Organisation pertinent information concerning the approved alternative design and arrangements for circulation to all Contracting Governments.

[S 669/2016 wef 01/01/2017]

(*f*) *Re-evaluation due to change of condition*

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.

[S 669/2016 wef 01/01/2017]

PART G — SHIPS USING LOW-FLASHPOINT FUELS

Regulation 56

Application

(*a*) Except as provided for in paragraphs (*d*) and (*e*), this Part applies to any ship using low-flashpoint fuels —

(i) for which the building contract is placed on or after 1 January 2017;

(ii) in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 July 2017; or

(iii) the delivery of which is on or after 1 January 2021.

Every such ship using low-flashpoint fuels must comply with the requirements of this Part in addition to any other applicable requirements of these Regulations.

(*b*) Except as provided for in paragraphs (*d*) and (*e*), a ship, irrespective of the date of construction, including one constructed before 1 January 2009, which converts to using low-flashpoint fuels on or after 1 January 2017 must be treated as a ship using low-flashpoint fuels on the date on which such conversion commenced.

(*c*) Except as provided for in paragraphs (*d*) and (*e*), a ship using low-flashpoint fuels, irrespective of the date of construction, including one constructed before 1 January 2009, which, on or after 1 January 2017, undertakes to use low-flashpoint fuels different from those which it was originally approved to use before 1 January 2017 must be treated as a ship using low-flashpoint fuels on the date on which such undertaking commenced.

(*d*) This Part does not apply to gas carriers, as defined in Regulation 11(*b*) of Chapter VII —

(i) using their cargoes as fuel and complying with the requirements of the IGC Code, as defined in Regulation 11(*a*) of Chapter VII; or

(ii) using other low-flashpoint gaseous fuels, provided that the fuel storage and distribution systems design and arrangements for such gaseous fuels comply with the requirements of the IGC Code for gas as a cargo.

(*e*) This Part does not apply to ships owned or operated by a Contracting Government and used, for the time being, only in Government non-commercial service. However, ships owned or operated by a Contracting Government and used, for the time being, only in Government non-commercial service are encouraged to act in a manner consistent, so far as reasonable and practicable, with this Part.

[S 669/2016 wef 01/01/2017]

Regulation 57

Requirements for Ships Using Low-flashpoint Fuels

Except as provided in Regulation 56(*d*) and (*e*), ships using low-flashpoint fuels must comply with the requirements of the IGF Code.

[S 669/2016 wef 01/01/2017]

CHAPTER II-2

CONSTRUCTION — FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

PART A — GENERAL

Regulation 1

*Application**

[S 432/2014 wef 01/07/2014]

* The application date of 1st July 2012 was introduced by resolution MSC.308(88). However, this resolution amended paragraph (*w*) (definition of "Fire Test Procedures Code") of Regulation 3 of Chapter II-2, and inserted sub-paragraph (3) of Regulation 7(*d*)(i) of Chapter II-2 only, and all other Regulations with the original application date of 1st July 2002 were not amended.

(*a*) *Application*

(i) Unless expressly provided otherwise, this Chapter shall apply to ships constructed on or after 1st July 2012.

[S 284/2012 wef 01/07/2012]

(ii) For the purpose of this Chapter:

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

(2) the expression "all ships" means ships, irrespective of type, constructed before, on or after 1st July 2012; and

[S 284/2012 wef 01/07/2012]

(3) 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.

(iii) For the purpose of this Chapter, the expression a "similar stage of construction" means the stage at which:

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

(2) assembly of that ship has commenced comprising at least 50 tonnes or one per cent of the estimated mass of all structural material, whichever is less.

[S 314/2002 wef 01/07/2002]

(*b*) *Applicable requirements to existing ships*

(i) Unless expressly provided otherwise, for ships constructed before 1st July 2012, the Director shall ensure that the requirements which are applicable under Chapter II-2 of these Regulations in force before 1st July 2012 are complied with.

(ii) Ships constructed before 1st July 2002 shall also comply with:

(1) paragraphs (*c*), (*f*)(v) and (*f*)(vii) as appropriate;

(2) paragraphs (*c*)(iv)(2) to (5) and (*d*)(iii) of Regulation 13 and Part E, except paragraphs (*c*)(ii)(2) and (3) of Regulation 16 thereof, as appropriate, not later than the date of the first survey after 1st July 2002;

(3) paragraphs (*d*)(i)(3) and (*f*)(iv) of Regulation 10 for new installations only;

[S 339/2008 wef 01/07/2008]

(4) paragraphs (*e*)(vi) of Regulation 10 not later than 1st October 2005 for passenger ships of 2,000 tons and above;

[S 339/2008 wef 01/07/2008]

(5) paragraphs (*c*)(i)(3)(B) and (*c*)(iv) of Regulation 5 not later than the date of the first survey after 1st July 2008 for passenger ships;

[S 339/2008 wef 01/07/2008]

[S 366/2010 wef 01/07/2010]

[S 622/2011 wef 01/01/2012]

(6) paragraph (*b*)(vi) of Regulation 4, if constructed on or after 1st September 1984; and

[S 366/2010 wef 01/07/2010]

[S 622/2011 wef 01/01/2012]

(7) paragraph (*e*)(vii)(1) of Regulation 4.

[S 622/2011 wef 01/01/2012]

(iii) Ships constructed on or after 1st July 2002 but before 1st July 2010 shall comply with paragraphs (*g*)(i)(1), (*g*)(iv)(4)(B) and (C) and (*g*)(v)(2)(A)(II) of Regulation 9 in force immediately before 1st July 2010.

[S 366/2010 wef 01/07/2010]

(iv) The following ships, with cargo spaces intended for the carriage of packaged dangerous goods, shall comply with paragraph (*c*) of Regulation 19, except when carrying dangerous goods specified as classes 6.2 and 7 and dangerous goods in limited quantities* and excepted quantities** in accordance with tables 19.1 and 19.3, not later than the date of the first renewal survey on or after 1st January 2011:

(1) cargo ships of 500 tons and upwards and passenger ships constructed on or after 1st September 1984 but before 1st January 2011; and

(2) cargo ships of less than 500 tons constructed on or after 1st February 1992 but before 1st January 2011,

and notwithstanding these provisions:

(3) cargo ships of 500 tons and upwards and passenger ships constructed on or after 1st September 1984 but before 1st July 1986 need not comply with paragraph (*c*)(iii) of Regulation 19 provided that they comply with paragraph (*b*)(iii) of

*Refer to chapter 3.4 of the IMDG Code (as defined in Regulation 1 of Chapter VII).

**Refer to chapter 3.5 of the IMDG Code (as defined in Regulation 1 of Chapter VII).

Regulation 54 of Chapter II-2 of the Merchant Shipping (Safety Convention) Regulations 1984 (G.N. No. S 219/84)***;

(4) cargo ships of 500 tons and upwards and passenger ships constructed on or after 1st July 1986 but before 1st February 1992 need not comply with paragraph (*c*)(iii) of Regulation 19 provided that they comply with paragraph (*b*)(iii) of Regulation 54 of Chapter II-2 of the Merchant Shipping (Safety Convention) Regulations 1984 (G.N. No. S 219/84) as amended by the Merchant Shipping (Safety Convention) (Amendment) Regulations 1986 (G.N. No. S 139/86)****;

(5) cargo ships of 500 tons and upwards and passenger ships constructed on or after 1st September 1984 but before 1st July 1998 need not comply with paragraphs (*c*)(x)(1) and (*c*)(x)(2) of Regulation 19;

[S 432/2014 wef 01/07/2014]

(6) cargo ships of less than 500 tons constructed on or after 1st February 1992 but before 1st July 1998 need not comply with paragraphs (*c*)(x)(1) and (*c*)(x)(2) of Regulation 19;

[S 793/2010 wef 01/01/2011]

(7) cargo ships of 500 gross tonnage and upwards and passenger ships constructed on or after 1st February 1992 but before 1st July 2002 need not comply with Regulation 19(*c*)(iii) provided that they comply with Regulation 54(*b*)(iii) as adopted by resolution MSC.13(57); and

[S 432/2014 wef 01/07/2014]

(8) cargo ships of 500 gross tonnage and upwards and passenger ships constructed on or after 1st September 1984 but before 1st July 2002 need not comply with Regulations 19(*c*)(i), 19(*c*)(v), 19(*c*)(vi) and 19(*c*)(ix), provided that they comply with Regulations 54(*b*)(i), 54(*b*)(v), 54(*b*)(vi) and 54(*b*)(ix) as adopted by resolution MSC.1(XLV).

[S 432/2014 wef 01/07/2014]

(v) Ships constructed before 1st July 2012 shall also comply with Regulation 10(*j*)(i)(2), as adopted by resolution MSC.338(91).

[S 432/2014 wef 01/07/2014]

***Regulation 54 of Chapter II-2 of the Merchant Shipping (Safety Convention) Regulations 1984 (G.N. No. S 219/84) was introduced by amendments adopted by Resolution MSC.1(XLV) Annex 3.

****Regulation 54 of Chapter II-2 of the Merchant Shipping (Safety Convention) Regulations 1984 (G.N. No. S 219/84) as amended by the Merchant Shipping (Safety Convention) (Amendment) Regulations 1986 (G.N. No. S 139/84) was introduced by amendments adopted by Resolution MSC.6(48) Annex 4.

(vi) Vehicle carriers constructed before 1 January 2016, including those constructed before 1 July 2012, must comply with paragraph (*b*)(ii) of Regulation 20-1, as adopted by resolution MSC.365(93).

[S 802/2015 wef 01/01/2016]

(vii) Tankers constructed before 1 January 2016, including those constructed before 1 July 2012, must comply with Regulation 16(*c*)(iii) except sub-paragraph (3) of that Regulation.

[S 802/2015 wef 01/01/2016]

(viii) Regulations 4(*e*)(v)(1)(A) and 4(*e*)(v)(1)(C) apply to ships constructed on or after 1 January 2002 but before 1 January 2016, and Regulation 4(*e*)(v)(2)(A) applies to all ships constructed before 1 January 2016.

[S 802/2015 wef 01/01/2016]

(*c*) *Repairs, alterations, modifications and outfitting*

(i) 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 2012, 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.

[S 284/2012 wef 01/07/2012]

(ii) 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 2012 in so far as the Director deems reasonable and practicable.

[S 314/2002 wef 01/07/2002]

[S 284/2012 wef 01/07/2012]

(*d*) *Exemptions*

(i) 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, which, in the course of their voyage, do not sail at distances of more than 20 miles from the nearest land.

*Refer to port State concurrence with SOLAS exemptions (MSC/Circ.606).

(ii) 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:

(1) the rules annexed to the Special Trade Passenger Ships Agreement, 1971; and

(2) the rules annexed to the Protocol on Space Requirements for Special Trade Passenger Ships, 1973.

[S 314/2002 wef 01/07/2002]

(*e*) *Applicable requirements depending on ship type*

Unless expressly provided otherwise:

(i) requirements not referring to a specific ship type shall apply to ships of all types; and

(ii) requirements referring to "tankers" shall apply to tankers subject to the requirements specified in paragraph (*f*) below.

[S 314/2002 wef 01/07/2002]

(*f*) *Application of requirements for tankers*

(i) Requirements for tankers in this Chapter shall apply to tankers carrying crude oil or petroleum products having a flashpoint not exceeding 60ºC (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.

(ii) Where liquid cargoes other than those referred to in paragraph (*f*)(i) 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 8(*a*) of Chapter VII, the Bulk Chemical Code, the International Gas Carrier Code, as defined in Regulation 11(*a*) of Chapter VII, and the Gas Carrier Code, as appropriate.

(1) A liquid cargo with a flashpoint of less than 60ºC 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:

(A) the foam shall be of alcohol resistant type;

(B) 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 Organization;* and

(C) 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 min of foam generation may be accepted.**

(2) 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 concerned may agree to waive the requirements for refrigeration systems in accordance with paragraph 15.14.3 of the International Bulk Chemical Code.

(iii) Liquid cargoes with a flashpoint exceeding 60ºC 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.

(iv) Tankers carrying petroleum products with a flashpoint exceeding 60ºC (closed cup test), as determined by an approved flashpoint apparatus, shall comply with the requirements provided in paragraphs (*b*)(i)(4)(D) and (*j*)(ii)(3) of Regulation 10 and the requirements for cargo ships other than tankers, except that, in lieu of the fixed fire-extinguishing system required in paragraph (*g*) of Regulation 10, they shall be fitted with a fixed deck foam system which shall comply with the provisions of the Fire Safety Systems Code.

(v) 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 Organization.*

*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.553).

*Refer to the Guidelines for inert gas systems (MSC/Circ.353), as amended by MSC/Circ.387.

(vi) 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.

(vii) The requirements of paragraphs (*e*)(x)(1)(A) and (D) of Regulations 4, 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. However, exising monitoring systems already fitted having a pre-set level not greater than 30% of the lower flammable limit may be accepted.

[S 314/2002 wef 01/07/2002]

Regulation 2

Fire safety objectives and functional requirements

(*a*) *Fire safety objectives*

(i) The fire safety objectives of this Chapter are to:

(1) prevent the occurrence of fire and explosion;

(2) reduce the risk to life caused by fire;

(3) reduce the risk of damage caused by fire to the ship, its cargo and the environment;

(4) contain, control and suppress fire and explosion in the compartment of origin; and

(5) provide adequate and readily accessible means of escape for passengers and crew.

[S 314/2002 wef 01/07/2002]

(*b*) *Functional requirements*

(i) In order to achieve the fire safety objectives set out in paragraph (*a*) above, the following functional requirements are embodied in the Regulations of this Chapter as appropriate:

(1) division of the ship into main vertical and horizontal zones by thermal and structural boundaries;

(2) separation of accommodation spaces from the remainder of the ship by thermal and structural boundaries;

(3) restricted use of combustible materials;

(4) detection of any fire in the zone of origin;

(5) containment and extinction of any fire in the space of origin;

(6) protection of means of escape and access for fire-fighting;

(7) ready availability of fire-extinguishing appliances; and

(8) minimization of possibility of ignition of flammable cargo vapour.

[S 314/2002 wef 01/07/2002]

(*c*) *Achievement of the fire safety objectives*

The fire safety objectives set out in paragraph (*a*) above shall be achieved by ensuring compliance with the prescriptive requirements specified in Parts 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 paragraph (*b*) and to achieve the fire safety objectives set out in paragraph (*a*) when either:

(i) the ship's designs and arrangements, as a whole, complies with the relevant prescriptive requirements in Parts B, C, D, E or G;

(ii) the ship's designs and arrangements, as a whole, have been reviewed and approved in accordance with Part F; or

(iii) Part(*s*) of the ship's designs 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 Parts B, C, D, E or G.

[S 314/2002 wef 01/07/2002]

Regulation 3

Definitions

For the purpose of this Chapter, unless expressly provided otherwise, the following definitions shall apply:

(*a*) "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;

(*b*) " "A" class divisions" are those divisions formed by bulkheads and decks which comply with the following criteria:

(i) they are constructed of steel or other equivalent material;

(ii) they are suitably stiffened;

(iii) they are insulated with approved non-combustible materials such that the average temperature of the unexposed side will not rise more than 140ºC above the original temperature, nor will the temperature, at any one point, including any joint, rise more than 180ºC above the original temperature, within the time listed below:

class "A-60"	60 min
class "A-30"	30 min
class "A-15"	15 min
class "A-0"	0 min;

(iv) they are constructed as to be capable of preventing the passage of smoke and flame to the end of the one-hour standard fire test; and

(v) the Director has required 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.

(*c*) "Atriums" are public spaces within a single main vertical zone spanning three or more open decks.

(*d*) " "B" class divisions" are those divisions formed by bulkheads, decks, ceilings or linings which comply with the following criteria:

(i) 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;

(ii) they have an insulation value such that the average temperature of the unexposed side will not rise more than 140ºC above the original temperature, nor will the temperature at any one point, including any joint, rise more than 225ºC above the original temperature, within the time listed below:

class "B-15"	15 min

class "B-0" 0 min;

(iii) they are 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

(iv) the Director has required 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.

(*e*) "Bulkhead deck" is the uppermost deck up to which the transverse watertight bulkheads are carried.

(*f*) "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 abovementioned spaces.

(*g*) "Cargo ship" is a ship as defined in Regulation 2 of Chapter I.

(*h*) "Cargo spaces" are spaces used for cargo, cargo oil tanks, tanks for other liquid cargo and trunks to such spaces.

(*i*) "Central control station" is a control station in which the following control and indicator functions are centralized:

(i) fixed fire detection and fire alarm systems;

(ii) automatic sprinkler, fire detection and fire alarm systems;

(iii) fire door indicator panels;

(iv) fire door closure;

(v) watertight door indicator panels;

(vi) watertight door closures;

(vii) ventilation fans;

(viii) general/fire alarms;

(ix) communication systems including telephones; and

(x) microphones to public address systems.

(*j*) " "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.

(*k*) "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 8(*a*) of Chapter VII.

(*l*) "Closed ro-ro spaces" are ro-ro spaces which are neither open ro-ro spaces nor weather decks.

(*m*) "Closed vehicle spaces" are vehicle spaces which are neither open vehicle spaces nor weather decks.

(*n*) "Combination carrier" is a cargo ship designed to carry both oil and solid cargoes in bulk.

(*o*) "Combustible material" is any material other than a non-combustible material.

(*p*) "Continuous "B" "class ceilings or linings are those "B" class ceilings or linings which terminate at an "A" or "B" class division.

(*q*) "Continuously manned central control station" is a central control station which is continuously manned by a responsible member of the crew.

(*r*) "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 centralized. Spaces where the fire recording or fire control equipment is centralized are also considered to be a fire control station.

(*s*) "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.

(*t*) "Dangerous goods" are those goods referred to in the IMDG Code, as defined in Regulation 1 of Chapter VII.

[S 217/2004 wef 01/07/2004]

(*u*) "Deadweight" is the difference in tonnes between the displacement of a ship in water of a specific gravity of 1.025 at the load waterline corresponding to the assigned summer freeboard and the lightweight of the ship.

(*v*) "Fire Safety Systems Code" means the International Code for Fire Safety Systems as adopted by the Maritime Safety Committee of the Organization by resolution MSC.98(73), as may be amended by the Organization, 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.

(*w*) "Fire Test Procedures Code" means the International Code for Application of Fire Test Procedures, 2010 (2010 FTP Code) as adopted by the Maritime Safety Committee of the Organisation by resolution MSC.307(88), 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.

[S 284/2012 wef 01/07/2012]

(*x*) "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.

(*y*) "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 11(*a*) of Chapter VII.

(*z*) "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.

(*aa*) "Helicopter facility" is a helideck including any refuelling and hangar facilities.

(*bb*) "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.

(*cc*) "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.

(*dd*) "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, stabilizing, ventilation and air conditioning machinery, and similar spaces, and trunks to such spaces.

(*ee*) "Machinery spaces of category A" are those spaces and trunks to such spaces which contain either:

(i) internal combustion machinery used for main propulsion;

(ii) 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

(iii) any oil-fired boiler or oil fuel unit, or any oil-fired equipment other than boilers, such as inert gas generators, incinerators, etc.

[S 366/2010 wef 01/07/2010]

(*ff*) "Main vertical zones" are those sections into which the hull, superstructure and deckhouses are divided by "A" class divisions, the mean length and width of which on any deck does not in general exceed 40 m.

(*gg*) "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.

(*hh*) "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.

(*ii*) "Open ro-ro spaces" are those ro-ro spaces that 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.

(*jj*) "Open vehicle spaces" are those vehicle spaces 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.

(*kk*) "Passenger ship" is a ship as defined in Regulation 2 of Chapter I.

(*ll*) "Prescriptive requirements" means the construction characteristics, limiting dimensions, or fire safety systems specified in Parts B, C, D, E or G.

(*mm*) "Public spaces" are those portions of the accommodation which are used for halls, dining rooms, lounges and similar permanently enclosed spaces.

(*nn*) "Rooms containing furniture and furnishings of restricted fire risk", for the purpose of Regulation 9, are those rooms containing furniture and

furnishings of restricted fire risk (whether cabins, public spaces, offices or other types of accommodation) in which:

(i) case furniture such as desks, wardrobes, dressing tables, bureaux, dressers, are constructed entirely of approved non-combustible materials, except that a combustible veneer not exceeding 2 mm may be used on the working surface of such articles;

(ii) free-standing furniture such as chairs, sofas, tables, are constructed with frames of non-combustible materials;

(iii) 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;

(iv) floor coverings have low flame-spread characteristics;

(v) exposed surfaces of bulkheads, linings and ceilings have low flame-spread characteristics;

(vi) 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

(vii) bedding components have qualities of resistance to the ignition and propagation of flame, this being determined in accordance with the Fire Test Procedures Code.

(*oo*) "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 and/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.

(*pp*) "Ro-ro passenger ship" means a passenger ship with ro-ro spaces or special category spaces.

(*qq*) "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 (e.g. aluminium alloy with appropriate insulation).

(*rr*) "Sauna" is a hot room with temperatures normally varying between 80°-120°C where the heat is provided by a hot surface (e.g. by an

electrically-heated oven). The hot room may also include the space where the oven is located and adjacent bathrooms.

(*ss*) "Service spaces" are those spaces used for galleys, pantries containing cooking appliances, lockers, mail and specie rooms, storerooms, workshops other than those forming part of the machinery spaces, and similar spaces and trunks to such spaces.

(*tt*) "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 m.

(*uu*) "A 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.

(*vv*) "Tanker" is a ship as defined in Regulation 2 of Chapter I.

(*ww*) "Vehicle spaces" are cargo spaces intended for carriage of motor vehicles with fuel in their tanks for their own propulsion.

(*xx*) "Weather deck" is a deck which is completely exposed to the weather from above and from at least two sides.

(*yy*) "Cabin balcony" is an open deck space which is provided for the exclusive use of the occupants of a single cabin and has direct access from such a cabin.

[S 339/2008 wef 01/07/2008]

(*zz*) "Safe area", in the context of a casualty, is, from the perspective of habitability, any area which is not flooded or which is outside the main vertical zone in which a fire has occurred, and which can safely accommodate all persons on board to protect them from hazards to life or health and provide them with basic services.

[S 366/2010 wef 01/07/2010]

(*aaa*) "Safety centre" is a control station dedicated to the management of emergency situations. The operation, control and monitoring of safety systems are an integral part of the safety centre.

[S 366/2010 wef 01/07/2010]

(*bbb*) "Fire damper" is, for the purpose of implementing Regulation 9(*g*) adopted by resolution MSC.365(93), as may be amended, a device installed in a ventilation duct, which under normal conditions remains open, allowing flow in the duct, and is closed during a fire, preventing

the flow in the duct to restrict the passage of fire, and in relation to this —

(i) "automatic fire damper" is a fire damper that closes independently in response to exposure to fire products;

(ii) "manual fire damper" is a fire damper that is intended to be opened or closed by the crew by hand at the damper itself; and

(iii) "remotely operated fire damper" is a fire damper that is closed by the crew through a control located at a distance away from the controlled damper.

[S 802/2015 wef 01/01/2016]

(*ccc*) "Smoke damper" is, for the purpose of implementing Regulation 9(*g*) adopted by resolution MSC.365(93), as may be amended, a device installed in a ventilation duct, which under normal conditions remains open, allowing flow in the duct, and is closed during a fire, preventing the flow in the duct to restrict the passage of smoke and hot gases (but is not expected to contribute to the integrity of a fire-rated division penetrated by a ventilation duct) and in relation to this —

(i) "automatic smoke damper" is a smoke damper that closes independently in response to exposure to smoke or hot gases;

(ii) "manual smoke damper" is a smoke damper intended to be opened or closed by the crew by hand at the damper itself; and

(iii) "remotely operated smoke damper" is a smoke damper that is closed by the crew through a control located at a distance away from the controlled damper.

[S 802/2015 wef 01/01/2016]

(*ddd*) "Vehicle carrier" means a cargo ship with multi-deck ro-ro spaces designed for the carriage of empty cars and trucks as cargo.

[S 802/2015 wef 01/01/2016]

PART B — PREVENTION OF FIRE AND EXPLOSION

Regulation 4

Probability of Ignition

(*a*) *Purpose*

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:

(i) means shall be provided to control leaks of flammable liquids;

(ii) means shall be provided to limit the accumulation of flammable vapours;

(iii) the ignitability of combustible materials shall be restricted;

(iv) ignition sources shall be restricted;

(v) ignition sources shall be separated from combustible materials and flammable liquids; and

(vi) the atmosphere in cargo tanks shall be maintained out of the explosive range.

[S 366/2010 wef 01/07/2010]

(*b*) *Arrangements for oil fuel, lubricating oil and other flammable oils*

(i) Limitations in the use of oils as fuel

The following limitations shall apply to the use of oil as fuel:

(1) except as otherwise permitted by this paragraph, no oil fuel with a flashpoint of less than 60ºC shall be used;*

[S 366/2010 wef 01/07/2010]

(2) in emergency generators oil fuel with a flashpoint of not less than 43ºC may be used;

(3) the use of oil fuel having a flashpoint of less than 60ºC but not less than 43ºC may be permitted (e.g., 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/or 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;

[S 669/2016 wef 01/01/2017]

*Refer to the Recommended procedures to prevent the illegal or accidental use of low flashpoint cargo oil as fuel adopted by the Organization by resolution A.565(14).

(4) in cargo ships, to which Part G of Chapter II-1 is not applicable, the use of oil fuel having a lower flashpoint than otherwise specified in sub-paragraph (1), 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; and

[S 669/2016 wef 01/01/2017]

(5) in ships, to which Part G of Chapter II-1 is applicable, the use of oil fuel having a lower flashpoint than otherwise specified in sub-paragraph (1) is permitted.

[S 669/2016 wef 01/01/2017]

(ii) Arrangements for oil fuel

In a ship in which oil fuel is used, the arrangements for the storage, distribution and utilization 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.

(1) Location of oil fuel systems

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.

(2) Ventilation of machinery spaces

The ventilation of machinery spaces shall be sufficient under normal conditions to prevent accumulation of oil vapour.

(3) Oil fuel tanks

(A) Fuel oil, lubricating oil and other flammable oils shall not be carried in forepeak tanks.

[S 366/2010 wef 01/07/2010]

(B) As far as practicable, oil fuel tanks shall be part of the ships 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 60ºC. In general, the use of free-standing oil fuel tanks shall be avoided. When such tanks are employed their use shall be prohibited in machinery spaces of category A 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.

[S 366/2010 wef 01/07/2010]

(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 or pipes 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. However, where the Director considers that these latter requirements are impracticable, it may permit termination of sounding pipes in machinery spaces on condition that all of the following requirements are met:

(1) an oil-level gauge is provided meeting the requirements of paragraph (*b*)(ii) (3) (E) (II);

(2) 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

(3) the termination 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:

(1) 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

(2) 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 paragraph (*b*)(ii)(3)(E)(II) which are acceptable to the Director shall be maintained in the proper condition to ensure their continued accurate functioning in service.

(4) Prevention of overpressure

Provisions shall be made to prevent overpressure in any oil tank 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.

(5) Oil fuel piping

(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 material of adequate strength and shall be constructed to the satisfaction of the Director. For valves, fitted to oil fuel tanks and which are under static pressure, steel or spheroidal-graphite cast iron may be accepted. However, 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 locatd immediately above or near unit of high temperature including boilers, steam pipelines, exhaust manifolds, silencers or other equipment required to be insulated by paragraph (*b*)(ii)(6). 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.

(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

*Refer to recommendations published by the International Organization for Standardization, in particular, Publications ISO 15540:1999 on Test methods for fire resistance of hose assemblies and ISO 15541:1999 on Requirements for the test bench of fire resistance of hose assemblies.

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 pressurized 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 isolations 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.

(6) Protection of high temperature surfaces

(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.

(iii) Arrangements for lubricating oil

(1) The arrangements for the storage, distribution and utilization 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 the provisions of paragraphs (*b*)(ii)(1), (*b*)(ii)(3)(C) to (E), (*b*)(ii)(4), (*b*)(ii)(5)(A), (*b*)(ii)(5)(C) and (*b*)(ii)(6), except that:

(A) this does not preclude the use of sight-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 authorized in machinery spaces; however, the requirements of paragraphs (*b*)(ii)(3)(E)(I)(1) and (3) need not be applied on condition that the sounding pipes are fitted with appropriate means of closure.

(C) The provisions of paragraph (*b*)(ii)(3)(D) 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.

(iv) Arrangements for other flammable oils

The arrangements for the storage, distribution and utilization 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 the provisions of paragraphs (*b*)(ii)(3)(C), (*b*)(ii)(3)(E), (*b*)(ii)(5)(C) and (*b*)(ii)(6) and with the provisions of paragraphs (*b*)(ii)(4) and (*b*)(ii)(5)(A) in respect of strength and construction.

(v) Arrangements for oil fuel in periodically unattended machinery spaces

In addition to the requirements of paragraphs (*b*)(i) to (iv), the oil fuel and lubricating oil systems in a periodically unattended machinery space shall comply with the following:

(1) 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 (e.g. 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

(2) 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.

[S 314/2002 wef 01/07/2002]

(vi) Regulations which apply to ships constructed on or after 1st September 1984 but before 1st July 2002

(1) Limitations in the use of oil as fuel

The following limitations shall apply to the use of oil as fuel:

(A) except as otherwise permitted by this sub-paragraph, no oil fuel with a flashpoint of less than 60ºC shall be used;

(B) in emergency generators, oil fuel with a flashpoint of not less than 43°C may be used;

(C) subject to such additional precautions as the Director may consider necessary and on condition that the ambient temperature of the space in which such oil fuel is stored or used shall not be allowed to rise to within 10°C below the flashpoint of such oil fuel, the Director may permit the general use of oil fuel having a flashpoint of less than 60°C but not less than 43°C; and

(D) in cargo ships, the use of fuel having an otherwise lower flashpoint than that specified in this sub-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 on a case by case basis.

The flashpoint of oils shall be determined by an approved closed cup method.

(2) Oil fuel arrangements

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:

(A) 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.

(B) The ventilation of machinery spaces shall be sufficient under all normal conditions to prevent the accumulation of oil vapour.

(C) 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 a fuel tank's common boundary 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 machinery spaces of category A 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.

(D) No oil fuel tank shall be situated where spillage or leakage therefrom can constitute a hazard by falling on heated surfaces. 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.

(E) Every oil fuel pipe, which, if damaged, would allow oil to escape from a storage, settling or daily service tank situated above the double bottom shall be fitted, directly on the tank, with a cock or valve 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 or pipes outside the tunnel or similar space. If such additional valve is fitted in the machinery space it shall be operated from a position outside this space.

(F) 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 a sounding pipe might arise. In particular, sounding pipes shall not terminate in passenger or crew spaces. As a general rule, sounding pipes shall not terminate in machinery spaces. However, where the Director considers that these latter requirements (i.e. the requirements that

sounding pipes shall not terminate in machinery spaces) are impracticable, he may permit their termination in machinery spaces, on condition that all the following requirements are met:

(1) an oil-level gauge which meets the requirements of sub-paragraph (II) is provided;

(2) 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;

(3) 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. Provision 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. Such means (i.e. other oil-level gauges), like the means provided in sub-paragraph (I)(1), are subject to the following conditions:

(1) in passenger ships, such means shall not require penetration below the top of the oil fuel tank, and a failure of such means or an overfilling of the tank shall not permit the release of fuel;

(2) in cargo ships, a failure of such means or an overfilling of the oil fuel tank shall not permit the 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-paragraph (II)(1) or (II)(2), which are acceptable to the Director, shall be

maintained in the proper condition to ensure their continued accurate functioning in service.

(G) Provision shall be made to prevent overpressure in any oil tank or in any part of the oil fuel system, including the filling pipes. Any relief valves and air or overflow pipes shall discharge to a position which, in the opinion of the Director, is safe.

(H) Oil fuel pipes and their valves and fittings shall be of steel or other approved material, except that the restricted use of flexible pipes shall be permissible in positions where the Director is satisfied that such flexible pipes 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.

(I) For ships constructed on or after 1st February 1992, all 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 for an alarm to be given of a fuel line failure.

(J) For ships constructed on or after 1st February 1992, all surfaces with temperatures above 220°C which may be impinged as a result of a fuel system failure shall be properly insulated.

(K) For ships constructed on or after 1st February 1992, oil fuel lines shall be screened or otherwise suitably protected to avoid, as far as practicable, oil spray or oil leakages onto hot surfaces, into machinery air intakes, or other sources of ignition. The number of joints in such piping systems shall be kept to a minimum.

(L) For ships constructed on or after 1st February 1992 but before 1st July 1998, a suitable enclosure on engines having an output of 375 kW or less, having fuel injection pumps serving more than one injector, may be used as an alternative to the jacketed piping system referred to in sub-paragraph (I).

(3) Lubricating oil arrangements

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 the provisions of sub-paragraphs (2)(A), (2)(D), (2)(E), (2)(F), (2)(G) and (2)(H), and additionally, in the case of ships constructed on or after 1st July 1998, with the provisions of sub-paragraphs (2)(J) and (2)(K), except that —

(A) this does not preclude the use of sight-flow glasses in lubricating systems, provided that they are shown by testing to have a suitable degree of fire resistance;

(B) subject to sub-paragraph (C), sounding pipes may be authorised in machinery spaces; and

(C) the requirements of sub-paragraphs (2)(F)(I)(1) and (2)(F)(I)(3) need not be applied if the sounding pipes are fitted with appropriate means of closure.

(4) Arrangements for other flammable oils

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. In locations where means of ignition are present, such arrangements shall at least comply with the provisions of sub-paragraphs (2)(D) and (2)(F), and additionally, in the case of ships constructed on or after 1st July 1998, with the provisions of sub-paragraphs (2)(J) and (2)(K), and with the provisions of sub-paragraphs (2)(G) and (2)(H) in respect of strength and construction.

(5) Periodically unattended machinery spaces

In addition to the requirements of sub-paragraphs (1) to (4), the oil fuel and lubricating oil systems shall comply with the following:

(A) 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, e.g. 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.

(B) 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.

(6) Prohibition of carriage of flammable oils in forepeak tanks

Oil fuel, lubricating oil and other flammable oils shall not be carried in forepeak tanks.

[S 366/2010 wef 01/07/2010]

(*c*) *Arrangements for gaseous fuel for domestic purpose*

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.

(*d*) *Miscellaneous items of ignition sources and ignitability*

(i) Electric radiators

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.

(ii) Waste receptacles

Waste receptacles shall be constructed of non-combustible materials with no openings in the sides or bottom.

(iii) Insulation surfaces protected against oil penetration

In spaces where penetration of oil products is possible, the surface of insulation shall be impervious to oil or oil vapours.

(iv) Primary deck coverings

Primary deck coverings, if applied within accommodation and service spaces and control stations, or if applied on cabin balconies of passenger ships constructed on or after 1st July 2008, shall be of approved material which will not readily ignite, this being determined in accordance with the Fire Test Procedures Code.

[S 339/2008 wef 01/07/2008]

(*e*) *Cargo areas of tankers*

(i) Separation of cargo oil tanks

(1) Cargo pump-rooms, cargo tanks, slop tanks and cofferdams shall be positioned forward of machinery spaces. However, 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, however, need not comply with the requirements of Regulation 10(*i*). 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.

(2) 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 an accommodation space, main cargo control stations, control station, or service spaces. A recess provided in accordance with paragraph (*e*)(i)(1) need not be taken into account when the position of these spaces is being determined.

(3) However, 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 two additional portable fire extinguishers. Accommodation spaces, main cargo control spaces, control stations 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 the provisions of this paragraph.

(4) In combination carriers only:

(A) The slop tanks shall be surrounded by cofferdams except where the boundaries of the slop tanks, where slop may be carried on dry cargo voyages, 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 gas tight 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 paragraph (*e*)(i)(4)(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. However, the Director may permit cargo oil lines to be placed in special ducts provided there 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.

(5) 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 m. The fire protection requirements for such a navigation position shall be that required for control stations, as specified in Regulation (*b*)(iv)(2) and other provisions for tankers, as applicable.

(6) 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 mm, extending from side to side. Special consideration shall be given to the arrangements associated with stern loading.

(ii) Restriction on boundary openings

(1) Except as permitted in paragraph (*e*)(ii)(2), 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 m from the end of the superstructure or deckhouse facing the cargo area. This distance need not exceed 5 m.

(2) The Director may permit access doors in boundary bulkheads facing the cargo area or within the 5 m limits specified in paragraph (*e*)(ii)(1), to main cargo control stations and to such service spaces used as provision rooms, storerooms 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 spaces containing sources of vapour ignition. The boundary of such a space shall be insulated to "A-60" 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 paragraph (*e*)(ii)(1). Wheelhouse doors and windows may be located within the limits specified in paragraph (*e*)(ii)(1) so long as they are designed to ensure that the wheelhouse can be made rapidly and efficiently gas and vapour tight.

(3) Windows and sidescuttles facing the cargo area and on the sides of the superstructures and deckhouses within the limits specified in paragraph (*e*)(ii)(1) shall be of the fixed (non-opening) type. Such windows and sidescuttles, except wheelhouse windows, shall be constructed to "A-60" class standard except that "A-0" class standard is acceptable for windows and sidescuttles outside the limit specified in Regulation 9(*b*)(iv)(2)(E) class standard.

[S 339/2008 wef 01/07/2008]

(4) 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 Regulation 13–1(*b*) of Chapter II-1 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.

[S 686/2008 wef 01/01/2009]

(5) Permanent approved gas tight 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 gas tightness of the bulkhead or deck is maintained.

(6) The arrangement of ventilation inlets and outlets and other deckhouse and superstructure boundary space openings shall be such as to complement the provisions of paragraph (*e*)(iii) and Regulation 11(*f*). 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.

(iii) Cargo tank venting

(1) General requirements

The venting systems of cargo tanks are to 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 minimize 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 paragraphs (*e*)(iii) (2) to (5) and Regulation 11(*f*) will apply.

(2) Venting arrangements

(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 Regulation 11(*f*)(i)(1). For tankers constructed on or after 1 January 2017, any isolation must also continue to permit the passage of large volumes of vapour, air or inert gas mixtures during cargo loading and ballasting, or during discharging in accordance with Regulation 11(*f*)(i)(2).

[S 669/2016 wef 01/01/2017]

(C) If cargo loading and ballasting or discharging of a cargo tank or cargo tank group is intended, which is isolated from a common venting system, that cargo tank or cargo tank

group shall be fitted with a means for over-pressure or under-pressure protection as required in Regulation 11(*f*)(iii)(2).

(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.

(3) Safety devices in venting systems

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 Organization. *Ullage openings shall not be used for pressure equalization. They shall be provided with self-closing and tightly sealing covers. Flame arresters and screens are not permitted in these openings.

(4) Vent outlets for cargo handling and ballasting

(A) Vent outlets for cargo loading, discharging and ballasting required by Regulation 11(*f*)(i)(2) shall:

(I)(1) permit the free flow of vapour mixtures; or

(I)(2) permit the throttling of the discharge of the vapour mixtures to achieve a velocity of not less than 30 m/s;

(II) be so arranged that the vapour mixture is discharged vertically upwards;

(III) where the method is by free flow of vapour mixtures, be such that the outlet shall be not less than 6 m above the cargo tank deck or fore and aft gangway if situated within 4 m of the gangway and located not less than 10 m 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

* Refer to MSC/Circ.677 on Revised standards for the design, testing and locating of devices to prevent the passage of flame into cargo tanks in tankers and to MSC/Cir.450/Rev.1 on Revised factors to be taken into consideration when designing cargo tank venting and gas-freeing arrangements.

(IV) where the method is by high-velocity discharge, be located at a height not less than 2 m above the cargo tank deck and not less than 10 m 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 paragraph (*e*)(iii) and Regulation 11(*f*) 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.

(5) Isolation of slop tanks in combination carriers

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 Regulation 1(*f*)(i) are carried.

(iv) Ventilation

(1) Ventilation systems in cargo pump-rooms

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 minimize the possibility of accumulation of flammable vapours. The number of air changes 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.

(2) Ventilation systems in combination carriers

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 (*e*)(i)(4), 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.

(v) Inert gas systems

(1)
Application

(A) For tankers of 20,000 tonnes deadweight and upwards constructed on or after 1 July 2002 but before 1 January 2016, the protection of the cargo tanks must be achieved by a fixed inert gas system in accordance with the requirements of the Fire Safety Systems Code except that the Director may accept other equivalent systems or arrangements as described in paragraph (*e*)(v)(4).

(B) For tankers of 8,000 tonnes deadweight and upwards constructed on or after 1 January 2016, when carrying cargoes described in Regulation 1(*f*)(i) or 1(*f*)(ii), the protection of the cargo tanks must be achieved by a fixed inert gas system in accordance with the requirements of the Fire Safety Systems Code, except that the Director may accept other equivalent systems or arrangements as described in paragraph (*e*)(v)(4).

(C) Tankers operating with a cargo tank cleaning procedure using crude oil washing must be fitted with an inert gas system complying with the Fire Safety Systems Code and with fixed tank washing machines, but inert gas systems fitted on tankers constructed on or after 1 July 2002 but before 1 January 2016 must comply with the Fire Safety Systems Code.

(D) Tankers required to be fitted with inert gas systems must comply with the following provisions:

(I) double-hull spaces must 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 must be provided to prevent hydrocarbon gases from the cargo tanks entering the double-hull spaces through the system;

(III) where such spaces are not permanently connected to an inert gas distribution system, appropriate means must be provided to allow connection to the inert gas main.

(2)
Inert gas systems of chemical tankers and gas carriers

(A) The requirements for inert gas systems contained in the Fire Safety Systems Code need not be applied to all chemical tankers constructed before 1 January 2016, including those constructed before 1 July 2012, and all gas carriers —

(I) when carrying cargoes described in Regulation 1(*f*)(i), provided that such chemical tankers or gas carriers comply with the requirements for inert gas systems on chemical tankers established by the Director, based on the guidelines developed by the Organisation*; or

(II) 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 the carriage of the flammable cargoes does not exceed 3,000 m^3, 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.

* Refer to the Regulation for Inert Gas Systems on Chemical Tankers, adopted by the Organisation by resolution A.567(14), and Corr.1.

(3)
General requirements for inert gas systems

(A) The inert gas system must be capable of inerting, purging and gas-freeing empty tanks and maintaining the atmosphere in cargo tanks with the required oxygen content.

(B) Tankers fitted with a fixed inert gas system must be provided with a closed ullage system.

(4)
Requirements for equivalent systems

(A) The Director may, after having given consideration to the ship's arrangement and equipment, accept other fixed installations, in accordance with Regulation 5 of Chapter I and paragraph (*e*)(v)(4)(C).

(B) For tankers of 8,000 tonnes deadweight and upwards but less than 20,000 tonnes deadweight constructed on or after 1 January 2016, in lieu of fixed installations as required by paragraph (*e*)(v)(4)(A), the Director may accept other

equivalent arrangements or means of protection in accordance with Regulation 5 of Chapter I and paragraph (*e*)(v)(4)(C).

(C) Equivalent systems or arrangements must —

(I) 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

(II) be so designed as to minimise the risk of ignition from the generation of static electricity by the system itself.

[S 802/2015 wef 01/01/2016]

(vi) Inerting, purging and gas-freeing

(1) Arrangements for purging and/or gas-freeing shall be such as to minimize the hazards due to dispersal of flammable vapours in the atmosphere and to flammable mixtures in a cargo tank.

(2) The procedure for cargo tank purging and/or gas-freeing shall be carried out in accordance with Regulation 16(*c*)(ii).

(3) The arrangements for inerting, purging or gas-freeing of empty tanks as required in paragraph (*e*)(v)(3)(A) 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 minimized and that:

(A) on individual cargo tanks, the gas outlet pipe, if fitted, shall be positioned as far as practicable from the inert gas/air inlet and in accordance with paragraph (*e*)(iii) and Regulation 11(*f*). The inlet of such outlet pipes may be located either at deck level or at not more than 1 m above the bottom of the tank;

(B) the cross-sectional area of such gas outlet pipe referred to in paragraph (*e*)(vi)(3)(A) shall be such that an exit velocity of at least 20 m/s can be maintained when any three tanks are being simultaneously supplied with inert gas. Their outlets shall extend not less than 2 m above deck level; and

(C) each gas outlet referred to in paragraph (*e*)(vi)(3)(B) shall be fitted with suitable blanking arrangements.

(vii) Gas measurement and detection

(1) Portable instrument

Tankers shall be equipped with at least one portable instrument for measuring oxygen and one for measuring flammable vapour concentrations, together with a sufficient set of spares. Suitable means shall be provided for the calibration of such instruments.

(2) Arrangements for gas measurement in double-hull spaces and double-bottom spaces

(A) Suitable portable instruments for measuring oxygen and flammable vapour concentrations in double-hull spaces and double-bottom spaces 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 paragraph (*e*)(vii)(2)(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 dimensions of gas sampling lines shall be such as to prevent restriction. Where plastic materials are used, they shall be electrically conductive.

(3) Arrangements for fixed hydrocarbon gas detection systems in double-hull and double-bottom spaces of oil tankers

(A) In addition to the requirements in paragraphs (*e*)(vii)(1) and (*e*)(vii)(2), oil tankers of 20,000 tonnes deadweight and above, constructed on or after 1st January 2012, shall be provided with a fixed hydrocarbon gas detection system complying with the Fire Safety Systems Code for measuring hydrocarbon gas concentrations in all ballast tanks and void spaces of double-hull and double-bottom spaces adjacent to the cargo tanks, including the forepeak tank and any other tanks and spaces under the bulkhead deck adjacent to cargo tanks.

(B) Oil tankers provided with constant operative inerting systems for such spaces need not be equipped with fixed hydrocarbon gas detection equipment.

(C) Notwithstanding the above, cargo pump-rooms subject to the provisions of paragraph (*e*)(x) need not comply with the requirements of this paragraph.

[S 622/2011 wef 01/01/2012]

(viii) Air supply to double hull and double bottom spaces

Double hull and double bottom spaces shall be fitted with suitable connections for the supply of air.

(ix) Protection of cargo area

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.

(x) Protection of cargo pump-rooms

(1) In tankers:

(A) 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;

(B) 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;

(C) 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

(D) all pump-rooms shall be provided with bilge level monitoring devices together with appropriately located alarms.

[S 314/2002 wef 01/07/2002]

Regulation 5

Fire Growth Potential

(*a*) *Purpose*

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:

(i) means of control for the air supply to the space shall be provided;

(ii) means of control for flammable liquids in the space shall be provided; and

(iii) the use of combustible materials shall be restricted.

(*b*) *Control of air supply and flammable liquid to the space*

(i) Closing appliances and stopping devices of ventilation

(1) 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.

(2) 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.

(3) 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 Regulation 8(*b*), shall be fitted with controls so grouped that all fans may be stopped from either of two 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.

(ii) Means of control in machinery spaces

(1) 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.

(2) 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 two 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.

(3) 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). However, paragraphs (*b*)(ii)(4) and (*b*)(ii)(5) need not apply to oily water separators.

(4) The controls required in paragraphs (*b*)(ii)(1) to (3) and in Regulation 4(*b*)(ii)(3)(D) shall be located outside the space concerned so they will not be cut off in the event of fire in the space they serve.

(5) In passenger ships, the controls required in paragraphs (*b*)(ii)(1) to (4) and in Regulations 8(*c*)(iii) and 9(*e*)(ii)(3) 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.

(iii) Additional requirements for means of control in periodically unattended machinery spaces

(1) For periodically unattended machinery spaces, the Director shall give special consideration to maintaining the fire integrity of the machinery spaces, the location and centralization of the fire-extinguishing system controls, the required shutdown arrangements (e.g. ventilation, fuel pumps, etc.) and that additional fire-extinguishing appliances and other fire-fighting equipment and breathing apparatus may be required.

(2) In passenger ships, these requirements shall be at least equivalent to those of machinery spaces normally attended.

(*c*) *Fire protection materials*

(i) Use of non-combustible materials

(1) Insulating materials

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.

(2) Ceilings and linings

(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.

(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 Regulation 9(*b*)(iii)(1); and

(II) in corridors and stairway enclosures serving accommodation and service spaces and control stations for ships where Method IIC and IIIC are specified as referred to in Regulation 9(*b*)(iii)(1).

(3) Partial bulkheads and decks on passenger ships

(A) Partial bulkheads or decks used to subdivide a space for utility or artistic treatment shall be of non-combustible materials.

(B) Linings, ceilings and partial bulkheads or decks used to screen or to separate adjacent cabin balconies shall be of non-combustible materials. Cabin balconies on passenger ships constructed before 1st July 2008 shall comply with the requirements of this paragraph by the first survey after 1st July 2008.

[S 339/2008 wef 01/07/2008]

(ii) Use of combustible materials

(1) General

(A) In passenger ships, "A", "B" or "C" class divisions in accommodation and services spaces and cabin balconies which are faced with combustible materials, facings, mouldings, decorations and veneers shall comply with the provisions of paragraphs (*c*)(ii)(2) to (4) and Regulation 6. However, 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 paragraphs (*c*)(ii)(2) and (3). However, the provisions of paragraph (*c*)(ii)(3) need not be applied to cabin balconies.

[S 339/2008 wef 01/07/2008]

(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 the provisions of paragraphs (*c*)(ii)(2) to (4) and Regulation 6.

(2) Maximum calorific value of combustible materials

Combustible materials used on the surfaces and linings specified in paragraph (*c*)(ii)(1) shall have a calorific value* not exceeding 45 MJ/m^2 of the area for the thickness used. The requirements of this paragraph are not applicable to the surfaces of furniture fixed to linings or bulkheads.

(3) Total volume of combustible materials

Where combustible materials are used in accordance with paragraph (*c*)(ii)(1), 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 mm 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 Organization for Standardization, in particular, Publication ISO 1716:1973 on 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 above volume may include some combustible material used for erection of "C" class divisions.

(4) Low flame-spread characteristics of exposed surfaces

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;

(II) surfaces and grounds in concealed or inaccessible spaces in accommodation and service spaces and control stations; and

(III) exposed surfaces of cabin balconies, except for natural hard wood decking systems.

[S 339/2008 wef 01/07/2008]

(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.

(iii) Furniture in stairway enclosures of passenger ships

Furniture in stairway enclosures shall be limited to seating. It shall be fixed, limited to six 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 to the above, 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.

(iv) Furniture and furnishings on cabin balconies of passenger ships

On passenger ships, furniture and furnishings on cabin balconies shall comply with Regulations 3(*nn*)(i), 3(*nn*)(ii), 3(*nn*)(iii), 3(*nn*)(vi) and 3(*nn*)(vii) unless such balconies are protected by a fixed pressure water-spraying and fixed fire detection and fire alarm systems complying with Regulations 7(*j*) and 10(*f*)(i)(3). Passenger ships constructed before 1st July 2008 shall comply with the requirements of this paragraph by the first survey after 1st July 2008.

[S 314/2002 wef 01/07/2002]

[S 339/2008 wef 01/07/2008]

Regulation 6

Smoke Generation Potential and Toxicity

(*a*) *Purpose*

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.

(*b*)(i) *Paints, varnishes and other finishes*

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.

(ii) On passenger ships constructed on or after 1st July 2008, paints, varnishes and other finishes used on exposed surfaces of cabin balconies, excluding natural hard wood decking systems, shall not be capable of producing excessive quantities of smoke and toxic products, this being determined in accordance with the Fire Test Procedures Code.

[S 339/2008 wef 01/07/2008]

(*c*)(i) *Primary deck coverings*

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.

(ii) On passenger ships constructed on or after 1st July 2008, primary deck coverings on cabin balconies shall not give rise to smoke, toxic or explosive hazards at elevated temperatures, this being determined in accordance with the Fire Test Procedures Code.

[S 314/2002 wef 01/07/2002]

[S 339/2008 wef 01/07/2008]

PART C — SUPPRESSION OF FIRE

Regulation 7

Detection and Alarm

(*a*) *Purpose*

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:

(i) 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;

(ii) manually operated call points shall be placed effectively to ensure a readily accessible means of notification; and

(iii) fire patrols shall provide an effective means of detecting and locating fires and alerting the navigation bridge and fire teams.

(*b*) *General requirements*

(i) A fixed fire detection and fire alarm system shall be provided in accordance with the provisions of this Regulation.

(ii) A fixed fire detection and fire alarm system and a sample extraction smoke detection system required in this Regulation and other Regulations in this part shall be of an approved type and comply with the Fire Safety Systems Code.

(iii) Where a fixed fire detection and fire alarm system is required for the protection of spaces other than those specified in paragraph (*e*)(i), at least one detector complying with the Fire Safety Systems Code shall be installed in each such space.

(iv) A fixed fire detection and fire alarm system for passenger ships shall be capable of remotely and individually identifying each detector and manually operated call point.

[S 366/2010 wef 01/07/2010]

(*c*) *Initial and periodical tests*

(i) The function of fixed fire detection and fire alarm systems required by the relevant Regulations of this Chapter shall be tested under varying conditions of ventilation after installation.

(ii) 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 or particle size, or other phenomena associated with incipient fires to which the detector is designed to respond.

(*d*) *Protection of machinery spaces*

(i) Installation

A fixed fire detection and fire alarm system shall be installed in:

(1) periodically unattended machinery spaces;

(2) 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 sources of 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; and

(3) enclosed spaces containing incinerators.

[S 284/2012 wef 01/07/2012]

(ii) Design

The fixed fire detection and fire alarm system required in paragraph (*d*)(i)(1) 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 navigating bridge and by a responsible engineer officer. When the navigating bridge is unmanned the alarm shall sound in a place where a responsible member of the crew is on duty.

(*e*) *Protection of accommodation and service spaces and control stations*

(i) Smoke detectors in accommodation spaces

Smoke detectors shall be installed in all stairways, corridors and escape routes within accommodation spaces as provided in paragraphs (*e*)(ii), (iii) and (iv). Consideration shall be given to the installation of special purpose smoke detectors within ventilation ducting.

(ii) Requirements for passenger ships carrying more than 36 passengers

A fixed fire detection and fire alarm system shall be 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. Detectors fitted in cabins, when activated, shall also be capable of emitting, or causing to be emitted, an audible alarm within the space where they are located.

(iii) Requirements for passenger ships carrying not more than 36 passengers

(1) 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 —

(A) a fixed fire detection and fire alarm system, so installed and arranged as to detect the presence of fire in such spaces and provide smoke detection in corridors, stairways and escape routes within accommodation spaces; or

(B) 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, so installed and arranged as to provide smoke detection in

corridors, stairways and escape routes within accommodation spaces.

(2) Detectors fitted in cabins, when activated, shall also be capable of emitting, or causing to be emitted, an audible alarm within the space where they are located.

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(iv) Protection of atriums in passenger ships

The entire main vertical zone containing the atrium shall be protected throughout with a smoke detection system.

(v) Cargo ships

Accommodation and service spaces and control stations of cargo ships shall be protected by a fixed fire detection and fire alarm system and/or an automatic sprinkler, fire detection and fire alarm system as follows depending on a protection method adopted in accordance with Regulation 9(*b*)(iii)(1).

(1) 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.

(2) Method IIC

An automatic sprinkler, fire detection and fire alarm system of an approved type complying with the relevant requirements of the Fire Safety Systems Code shall be 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.

(3) 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.

(*f*) *Protection of cargo spaces in passenger sh*ips

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.

(*g*) *Manually operated call points*

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 m from a manually operated call point.

(*h*) *Fire patrols in passenger ships*

(i) Fire patrols

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.

(ii) Inspection hatches

The construction of ceiling 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.

(iii) Two-way portable radiotelephone apparatus

Each member of the fire patrol shall be provided with a two-way portable radiotelephone apparatus.

(*i*) *Fire alarm signalling systems in passenger ships**

(i) 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.

(ii) The control panel of fixed fire detection and fire alarm systems shall be designed on the fail-safe principle (e.g. an open detector circuit shall cause an alarm condition).

* Refer to the Code of Alarms and Indicators adopted by the Organization by Resolution A.830(19).

(iii) Passenger ships carrying more than 36 passengers shall have the fire detection alarms for the systems required by paragraph (*e*)(ii) centralized 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 centralized 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 shall 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 42 of Chapter II-1 unless other arrangements are permitted by the Regulations, as applicable.

(iv) 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.

(*j*) *Protection of cabin balconies on passenger ships*

A fixed fire detection and fire alarm system complying with the provisions of the Fire Safety Systems Code shall be installed on cabin balconies of ships to which Regulation 5(*c*)(iv) applies, where furniture and furnishings on such balconies are not as defined in Regulations 3(*nn*)(i), 3(*nn*)(ii), 3(*nn*)(iii), 3(*nn*)(vi) and 3(*nn*)(vii).

[S 314/2002 wef 01/07/2002]

[S 339/2008 wef 01/07/2008]

Regulation 8

Control of Smoke Spread

(*a*) *Purpose*

The purpose of this Regulation is to control the spread of smoke in order to minimize the hazards from smoke. For this purpose, means for controlling smoke in atriums, control stations, machinery spaces and concealed spaces shall be provided.

(*b*) *Protection of control stations outside machinery spaces*

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 two sources of supply shall be so disposed that the risk of both inlets drawing in smoke simultaneously is minimized. At the discretion of the Director, such requirements need not apply to control stations situated on, and opening on to, an open deck or where local closing arrangements would be equally effective. The ventilation system serving safety centres may be derived from the ventilation system serving the navigation bridge, unless located in an adjacent main vertical zone.

[S 366/2010 wef 01/07/2010]

(*c*) *Release of smoke from machinery spaces*

(i) The provisions of this paragraph shall apply to machinery spaces of category A and, where the Director considers desirable, to other machinery spaces.

(ii) Suitable arrangements shall be made to permit the release of smoke, in the event of fire, from the space to be protected, subject to the provisions of Regulation 9(*e*)(ii)(1). The normal ventilation systems may be acceptable for this purpose.

(iii) Means of control shall be provided for permitting the release of smoke and such controls shall be located outside the space concerned so that, in the event of fire, they will not be cut off from the space they serve.

(iv) In passenger ships, the controls required by paragraph (*c*)(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 a safe access from the open deck.

(*d*) *Draught stops*

Air spaces enclosed behind ceilings, panelling or linings shall be divided by close-fitting draught stops spaced not more than 14 m apart. In the vertical direction, such enclosed air spaces, including those behind linings of stairways, trunks, etc., shall be closed at each deck.

(*e*) *Smoke extraction systems in atriums of passenger ships*

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 space can be exhausted in 10 min or less.

Regulation 9

Containment of Fire

(*a*) *Purpose*

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:

(i) the ship shall be subdivided by thermal and structural boundaries;

(ii) thermal insulation of boundaries shall have due regard to the fire risk of the space and adjacent spaces; and

(iii) the fire integrity of the divisions shall be maintained at openings and penetrations.

(*b*) *Thermal and structural boundaries*

(i) Thermal and structural subdivision

Ships of all types shall be subdivided into spaces by thermal and structural divisions having regard to the fire risks of the space.

(ii) Passenger ships

(1) Main vertical zones and horizontal zones

(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 paragraph (*b*)(ii)(3)(B)(II) is on one side or where fuel oil tanks are on both sides of the division the standard may be reduced to "A-0".

(A)(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 in paragraph (*b*)(ii)(4).

(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 m 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 9.4.

(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.

(E)(II) However, in a ship with special category spaces, such spaces shall comply with the applicable provisions of Regulation 20 and where such compliance would be inconsistent with other requirements for passenger ships specified in this Chapter, the requirements of Regulation 20 shall prevail.

(2) Bulkheads within a main vertical zone

(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 in paragraph (*b*)(ii)(3).

(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 in paragraph (*b*)(ii)(4). 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 paragraph (*b*)(ii)(4). 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 paragraph (*b*)(ii)(2)(B), shall extend from deck to deck and to the shell or other boundaries. However, 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.

(3) Fire integrity of bulkheads and decks in ships carrying more than 36 passengers

(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 9.1 and 9.2. 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 divisions, such values shall be determined to the satisfaction of the Director.

(B) The following requirements shall govern application of the tables:

(I) Table 9.1 shall apply to bulkheads not bounding either main vertical zones or horizontal zones. Table 9.2 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 two 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 9.1 and 9.2. 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 waterline 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 as in category (6) above 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 storerooms in accommodation spaces having areas less than 4 m^2 (in which flammable liquids are not stowed).

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 m2 or more.

Barber shops and beauty parlours.

Saunas.

Sale shops.

(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;

stabilizer 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;

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) *Storerooms, 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 storerooms 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.

Storerooms 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 two spaces, that value shall apply in all cases;

(IV) Notwithstanding the provisions of paragraph (*b*)(ii)(2) there are no special requirements for material or integrity of boundaries where only a dash appears in the tables; and

(V) The Director shall determine in respect of category (5) spaces whether the insulation values in table 9.1 shall apply to ends of deckhouses and superstructures, and whether the insulation values

in table 9.2 shall apply to weather decks. In no case shall the requirements of category (5) of tables 9.1 or 9.2 necessitate enclosure of spaces which in the opinion of the Director need not be enclosed.

TABLE 9.1 — 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
Storerooms, workshops, pantries, etc.	(13)													A-0[a]	A-0

Other spaces in which flammable liquids are stowed (14)													A-30

See notes following table 9.2

TABLE 9.2 — DECKS NOT FORMING STEPS IN MAIN VERTICAL ZONES NOR BOUNDING HORIZONTAL ZONES

Spaces below ↓ *Spaces 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-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 (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

other similar spaces of moderate fire risk																	
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-0	A-30	A-30[a]	A-0	A-60
Storerooms, workshops, pantries, etc.	(13)	A-60	A-30	A-15	A-60	A-0	—	A-30	A-30	A-0	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	A-0

Notes: To be applied to tables 9.1 and 9.2.

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 waterline 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.

(C) Continuous "B" class ceiling 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) Construction and arrangement of saunas

(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 mm. The distance from the hot surfaces to combustible materials shall be at least 500 mm or the combustible materials shall be protected (e.g. non-combustible plate with an air gap of at least 30 mm).

(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.

(4) Fire integrity of bulkheads and decks in ships carrying not more than 36 passengers

(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 9.3 and 9.4.

(B) The following requirements govern application of the tables:

(I) Tables 9.3 and 9.4 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 two 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 9.3 and 9.4. 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 centralized fire alarm equipment.

(2) *Corridors*

Passenger and crew corridors and lobbies.

(3) *Accommodation spaces*

Spaces as defined in Regulation 3(*a*) 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 storerooms 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 3(*ee*).

(7) *Other machinery spaces*

Electrical equipment rooms (auto-telephone exchange, air-conditioning duct spaces).

Spaces as defined in Regulation 3(*dd*) 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 and lamp rooms, lockers and storerooms 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 should have no significant fire risk, meaning that furnishing should be restricted to deck furniture. In addition, such spaces should 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 Regulations 3(*oo*) and 3(*tt*);

(III) In determining the applicable fire integrity standard of a boundary between two 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 two values given in the tables shall apply; and

(IV) In determining the applicable fire integrity standard of a boundary between two 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 two 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 two 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 Regulation 11(*b*) 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 paragraph (*b*)(ii)(3)(D).

TABLE 9.3 — 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-30[g]
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-30[g]
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-30[g]

TABLE 9.4 — 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-60[g]
Corridors	(2)	A-0	*	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30[g]
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-30[g]
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-30[g]	A-30 A-0[d]	A-30[g]	A-0	A-60[g]	A-0	A-0	A-30	A-0	A-30[g]

Notes: To be applied to both tables 9.3 and 9.4 as appropriate.

a For clarification as to which applies, see paragraphs (*b*)(ii)(2) and (*b*)(ii)(5).

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, (e.g. 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 Bulkhead separating the wheelhouse and chartroom from each other may have a "B-0" rating. No fire rating is required for those partitions separating the navigation bridge and the safety centre when the latter is within the navigation bridge.

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d See paragraphs (*b*)(ii)(4)(B)(III) and (*b*)(ii)(4)(B)(IV).

e For the application of paragraph (*b*)(ii)(1)(A)(II), "B-0" and "C", where appearing in table 9.3, 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.

g Ships constructed before 1st July 2014 shall comply, as a minimum, with the previous requirements applicable at the time the ship was constructed, as specified in Regulation 1(*b*).

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*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 should 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-fighting system is fitted.

For the application of paragraph (*b*)(ii)(1)(A)(II), an asterisk, where appearing in table 9.4, except for categories (8) and (10), shall be read as "A-0".

(5) Protection of stairways and lifts in accommodation area

(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 two decks need not be enclosed, provided the integrity of the deck is maintained by proper bulkheads or self-closing doors in one 'tween-deck space. When a stairway is closed in one 'tween-deck space, the stairway enclosure shall be protected in accordance with the

tables for decks in paragraphs (*b*)(ii)(3) or (*b*)(ii)(4); 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 'tween-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.

(6) Arrangement of cabin balconies

On passenger ships constructed on or after 1st July 2008, non-load bearing partial bulkheads which separate adjacent cabin balconies shall be capable of being opened by the crew from each side for the purpose of fighting fires.

[S 339/2008 wef 01/07/2008]

(7) Protection of atriums

(A) Atriums shall be within enclosures formed of "A" class divisions having a fire rating determined in accordance with table 9.2 or 9.4, as applicable.

(B) Decks separating spaces within atriums shall have a fire rating determined in accordance with table 9.2 or 9.4, as applicable.

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(iii) Cargo ships except tankers

(1) Methods of protection in accommodation area

(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 systtem in

the accommodation and service spaces, except as required by Regulation 7(*e*)(5)(A); or

(II) *Method IIC*

The fitting of an automatic sprinkler, fire detection and fire alarm system as required by Regulation 7(*e*)(5)(B) 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 Regulation 7(*e*)(5)(C), 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 must the area of any accommodation space or spaces 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 three methods outlined in paragraph (*b*)(iii)(A)(I).

(2) Bulkheads within accommodation area

(A) Bulkheads required to be "B" class divisions shall extend from deck to deck and to the shell or other boundaries. However, 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 divisions except in individual cases where "C" class bulkheads are required in accordance with table 9.5.

(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 or spaces bounded by a continuous "A" or "B" class division must in no case exceed 50 m^2, except in individual cases where "C" class bulkheads are required in accordance with table 9.5. Consideration may be given by the Director to increasing this area for public spaces.

(3) Fire integrity of bulkheads and decks

(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 9.5 and 9.6.

(B) The following requirements shall govern application of the tables:

(I) Tables 9.5 and 9.6 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 two 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 9.5 and 9.6. 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 centralized fire alarm equipment.

(2) *Corridors*

Corridors and lobbies.

(3) *Accommodation spaces*

Spaces as defined in Regulation 3(*a*), excluding corridors.

(4) *Stairways*

Interior stairway, 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 storerooms 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 3(*ee*).

(7) *Other machinery spaces*

Electrical equipment rooms (auto-telephone exchange, air-conditioning duct spaces).

Spaces as defined in Regulation 3(*dd*) 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 storerooms 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 3(*oo*).

Vehicle spaces as defined in Regulation 3 *(ww*).

TABLE 9.5 — FIRE INTEGRITY OF BULKHEADS SEPARATING ADJACENT SPACES

Spaces		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations	(1)	A-0[e]	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*	A-60
Corridors	(2)		C	B-0	A-0[c] B-0	B-0	A-60	A-0	A-0	A-0	*	A-30
Accommodation spaces	(3)			C[a,b]	A-0[c] B-0	B-0	A-60	A-0	A-0	A-0	*	A-30
Stairways	(4)				A-0[c] B-0	A-0[c] B-0	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)											A-30[j]

TABLE 9.6 — 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)	*	*	*	*	*	*	*	*	*	—	A-0[j]
Ro-ro and vehicle spaces	(11)	A-60	A-30	A-30	A-30	A-0	A-60	A-0	A-0	A-30	A-0[j]	A-30[j]

Notes: To be applied to tables 9.5 and 9.6 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 paragraphs (*b*)(iii)(2) and (*b*)(iii)(4).

d Where spaces are of the same numerical category and superscript d appear, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose (e.g. 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 m horizontally from such a bulkhead.

g For cargo spaces in which dangerous goods are intended to be carried, Regulation 19(*c*)(viii) applies.

h Deleted by S 432/2014 wef 01/07/2014.

i Fire insulation need not be fitted if the machinery in category (7), in the opinion of the Director, it has little or no fire risk.

j Ships constructed before 1st July 2014 shall comply, as a minimum, with the previous requirements applicable at the time the ship was constructed, as specified in Regulation 1(*b*).

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*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 an open deck, is penetrated for the passage of electric cables, pipes and vent ducts, such penetrations should be made tight to prevent the passage of flame and smoke. Divisons between control stations (emergency generators) and open decks may have air intake openings without means for closure, unless a fixed gas fire-fighting system is fitted.

(C) Continuous "B" class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or part, to the required insulation and integrity of a division.

(D) External boundaries which are required in Regulation 11(*b*) 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 paragraph (*b*)(ii)(3)(D).

(4) Protection of stairways and lift trunks in accommodation spaces, service spaces an/d control stations

(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 two escape routes direct to the open deck at every accommodation level, the "A-0" requirements of paragraph (*b*)(iii)(4)(A) may be reduced to "B-0".

(iv) Tankers

(1) Application

For tankers, only Method IC as defined in paragraph (*b*)(iii)(1)(A) shall be used.

(2) Fire integrity of bulkheads and decks

(A) In lieu of paragraph (*b*)(iii) 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 9.7 and 9.8.

(B) The following requirements shall govern application of the tables:

(I) Tables 9.7 and 9.8 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 two 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 9.7 and 9.8. 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 centralized fire alarm equipment.

(2) *Corridors*

Corridors and lobbies.

(3) *Accommodation spaces*

Spaces as defined in Regulation 3(*a*), 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 storerooms 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 3(*ee*).

(7) *Other machinery spaces*

Electrical equipment rooms (auto-telephone exchange and air-conditioning duct spaces).

Spaces as defined in Regulation 3(*dd*) 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 storerooms 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 ceiling 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 Regulation 11(*b*) 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 overhanging 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 m from the end boundary facing the cargo area. The distance of 3 m 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 paragraph (*b*)(ii)(3)(D).

TABLE 9.7 — 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)										—

TABLE 9.8 — 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 9.7 and 9.8 as appropriate.

a For clarification as to which applies, see paragraphs (*b*)(iii)(2) and (*b*)(iii)(4).

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 purposes (e.g. 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 gas tight 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 if the machinery space in category (7), in the opinion of the Director, it has little or no fire risk.

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*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. However, where a deck, except an open deck, is penetrated for the passage of electric cables, pipes and vent ducts, such penetrations should 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-fighting system is fitted.

(*c*) *Penetration in fire-resisting divisions and prevention of heat transmission*

(i) Where "A" class divisions are penetrated, such penetrations shall be tested in accordance with the Fire Test Procedures Code, subject to the provisions of paragraph (*d*)(i)(1)(E). In the case of ventilation ducts, paragraphs (*g*)(i)(2) and (*g*)(iii)(1) apply. However, where a pipe penetration is made of steel or equivalent material having a thickness of 3 mm or greater and a length of not less than 900 mm (preferably 450 mm on each side of the division), and no openings, testing is not required. Such penetrations shall be suitably insulated by extension of the insulation at the same level of the division.

(ii) 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 the provisions of paragraph (*g*)(iii)(2). Pipes other than steel or copper that penetrate "B" class divisions shall be protected by either:

(1) a fire tested penetration device, suitable for the fire resistance of the division pierced and the type of pipe used; or

(2) a steel sleeve, having a thickness of not less than 1.8 mm and a length of not less than 900 mm for pipe diameters of 150 mm or more and not less than 600 mm for pipe diameters of less than 150 mm (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 mm; or any clearance between pipe and sleeve shall be made tight by means of non-combustible or other suitable material.

(iii) Uninsulated metallic pipes penetrating "A" or "B" class divisions shall be of materials having a melting temperature which exceeds 950ºC for "A-0" and 850ºC for "B-0" class divisions.

(iv) 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 mm 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 mm.

(*d*) *Protection of openings in fire-resisting divisions*

(i) Openings in bulkheads and decks in passenger ships

(1) Opening in "A" class divisions

(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. Doors which are approved without the

sill being part of the frame, and which are installed on or after 1st July 2010, shall be installed such that the gap under the door does not exceed 12 mm. A non-combustible sill shall be installed under the door such that floor coverings do not extend beneath the closed door.

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(C) Watertight doors need not be insulated.

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(D) It shall be possible for each door to be opened and closed from each side of the bulkhead by one person only.

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(E) 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 3.5º opposing closure;

(II) the approximate time of closure for hinged fire doors shall be no more than 40 s and no less than 10 s 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 ship 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 must 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 after disruption of the control system or central power supply at least ten times (fully opened and closed) 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 s but no more than 10 s after the door being 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 1 m 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 paragraphs (*d*)(i)(1)(D)(III) and (*d*)(i)(1)(D)(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:

(1) the control system shall be able to operate the door at the temperature of at least 200°C for at least 60 min, served by the power supply;

(2) the power supply for all other doors not subject to fire shall not be impaired; and

(3) 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.

(F) In ships carrying not more than 36 passengers, where a space is protected by an automatic sprinkler fire detection and 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.

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(G) 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 paragraph (*d*)(i)(3)(C). 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 lifesaving appliances, embarkation and external assembly station areas, external stairs and open decks used for escape routes. Stairway enclosure doors need not meet this requirement.

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(H) Except for watertight doors, weathertight doors (semi-watertight doors), doors leading to the open deck and doors which need to be reasonably gas tight, 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 of material, construction and fire resistence which is equivalent to the door into which it is

fitted, and shall be a 150 mm 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.

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(I) 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 (*c*)(i). 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.

(2) Openings in "B" class divisions

(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 or openings 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 grille made of non-combustible material. Doors shall be non-combustible. Doors approved without the sill being part of the frame, which are installed on or after 1st July 2010, shall be installed such that the gap under the door does not exceed 25 mm.

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(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 the provisions of paragraph (*b*)(ii)(2).

(3) Windows and sidescuttles

(A) Windows and sidescuttles in bulkheads within accommodation and service spaces and control stations other than those to which the provisions of paragraph (*d*)(i)(1)(F) and of paragraph (*d*)(i)(2)(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 9.1 to 9.4, windows and sidescuttles in bulkheads separating accommodation and service spaces and control stations from the 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 9.1. Where automatic dedicated sprinkler heads are provided for windows, "A-0" windows may be accepted as equivalent. To be considered under this paragraph, the sprinkler heads must either be:

(I) dedicated heads located above the windows, and installed in addition to the conventional ceiling sprinklers;

(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; or

(III) water-mist nozzles that have been tested and approved in accordance with the guidelines approved by the Organisation*.

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Windows located in the ship's side below the lifeboat embarkation area shall have fire integrity at least equal to "A-0" class.

(ii) Doors in fire-resisting divisions in cargo ships

(1) 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 approved as "A" class without the sill being part of the frame, which are installed on or after 1st July 2010, shall be installed such that the gap under the door does not exceed 12 mm and a non-combustible sill shall be installed under the door such that floor coverings do not extend beneath the closed door. Doors approved as "B" class without the sill being part of the frame, which are installed on or after 1st July 2010, shall be installed such that the gap under the door does not exceed 25 mm. 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 gas tight 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.

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(2) Doors required to be self-closing shall not be fitted with hold-back hooks. However, hold-back arrangements fitted with remote release devices of the fail-safe type may be utilized.

*Refer to the Revised Guidelines for Approval of Sprinkler Systems Equivalent to that Referred to in SOLAS Regulation II-2/12 (resolution A.800(19)).

(3) 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 storerooms. 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 or openings 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 grille made of non-combustible material.

(4) Watertight doors need not be insulated.

(*e*) *Protection of openings in machinery spaces boundaries*

(i) Application

(1) The provision of this paragraph shall apply to machinery spaces of Category A and, where the Director considers it desirable, to other machinery spaces.

(ii) Protection of openings in machinery space boundaries

(1) 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.

(2) Skylights shall be of steel and shall not contain glass panels.

(3) Means of control shall be provided for closing power-operated doors or actuating release mechanisms on doors other than power-operated watertight doors. The control shall be located outside the space concerned, where they will not be cut off in the event of fire in the space it serves.

(4) In passenger ships, the means of control required in paragraph (*e*)(ii)(3) 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.

(5) In passenger ships, doors other than power-operated watertight 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.

(6) Windows shall not be fitted in machinery space boundaries. However, this does not preclude the use of glass in control rooms within the machinery spaces.

(*f*) *Protection of cargo space boundaries*

(i) 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. However, where a category (5), (9) or (10) space, as defined in paragraph (*b*)(ii)(3), 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.

(ii) In passenger ships, indicators shall be provided on the navigating bridge which shall indicate when any fire door leading to or from the special category spaces is closed.

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(iii) 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.

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(*g*) *Ventilation systems*

(This paragraph applies to ships constructed on or after 1 January 2016)

(i) General

(1) Ventilation ducts, including single and double wall ducts, must be of steel or equivalent material, except flexible bellows of short length not exceeding 600 mm used for connecting fans to the ducting in air-conditioning rooms. Unless expressly provided otherwise in paragraph (*g*)(i)(6), any other material used in the construction of ducts, including insulation, must also be non-combustible. However, short ducts, not generally exceeding 2 m in length and with a free cross-sectional area* not exceeding 0.02 m^2, need not be of steel or equivalent material, subject to the following conditions:

(A) the ducts must be made of non-combustible material, which may be faced internally and externally with membranes having low flame-spread characteristics and, in each case, a calorific value** not exceeding 45 MJ/m^2 of the ducts' surface area for the thickness used;

(B) the ducts are only used at the end of the ventilation device;

(C) the ducts must be situated at least 600 mm, measured along the duct, from an opening in an "A" or "B" class division, including continuous "B" class ceiling.

* The term "free cross-sectional area" means, even in the case of a pre-insulated duct, the area calculated on the basis of the inner dimensions of the duct itself and not the insulation.

** Refer to the recommendations published by the International Organization for Standardization, in particular publication ISO 1716:2002, Reaction to the Fire Tests for Building Products – Determination of the Heat of Combustion.

(2) The following arrangements must be tested in accordance with the Fire Test Procedures Code:

(A) Fire dampers, including their relevant means of operation. However, the testing is not required for fire dampers located at the lower end of the duct in exhaust ducts for galley ranges (which must be of steel and capable of stopping the draught in the duct).

(B) Duct penetrations through "A" class divisions. However, the test is not required where steel sleeves are directly joined to ventilation ducts by means of riveted or screwed connections or by welding.

(3) Fire dampers must be easily accessible. Where they are placed behind ceilings or linings, these ceilings or linings must be provided with an inspection hatch on which the identification number of the fire damper is marked. The fire damper identification number must also be marked on any remote controls provided.

(4) Ventilation ducts must be provided with hatches for inspection and cleaning. The hatches must be located near the fire dampers.

(5) The main inlets and outlets of ventilation systems must be capable of being closed from outside the spaces being

ventilated. The means of closing must be easily accessible as well as prominently and permanently marked and must indicate the operating position of the closing device.

(6) Combustible gaskets in flanged ventilation duct connections are not permitted within 600 mm of openings in "A" or "B" class divisions and in ducts required to be of "A" class construction.

(7) Ventilation openings or air balance ducts between two enclosed spaces must not be provided except as permitted by paragraphs (*d*)(i)(2)(A) and (*d*)(ii)(3).

(ii) Arrangement of ducts

(1) The ventilation systems for machinery spaces of category A, vehicle spaces, ro-ro spaces, galleys, special category spaces and cargo spaces must, in general, be separated from each other and from the ventilation systems serving other spaces. However, the galley ventilation systems on cargo ships of less than 4,000 gross tonnage and in passenger ships carrying not more than 36 passengers need not be completely separated from other ventilation systems, but may be served by separate ducts from a ventilation unit serving other spaces. In such a case, an automatic fire damper must be fitted in the galley ventilation duct near the ventilation unit.

(2) Ducts provided for the ventilation of machinery spaces of category A, galleys, vehicle spaces, ro-ro spaces or special category spaces must not pass through accommodation spaces, service spaces, or control stations, unless they comply with paragraph (*g*)(ii)(4).

(3) Ducts provided for the ventilation of accommodation spaces, service spaces or control stations must not pass through machinery spaces of category A, galleys, vehicle spaces, ro-ro spaces or special category spaces, unless they comply with paragraph (*g*)(ii)(4).

(4) As permitted by paragraphs (*g*)(ii)(2) and (*g*)(ii)(3), ducts must be either —

(A) (I) constructed of steel having a thickness of at least 3 mm for ducts with a free cross-sectional area of less than 0.075 m^2, at least 4 mm for ducts with a free cross-sectional area of between 0.075 m^2 and 0.45 m^2, and at least 5 mm for ducts with a free cross-sectional area of over 0.45 m^2;

(A) (II) suitably supported and stiffened;

(A) (III) fitted with automatic fire dampers close to the boundaries penetrated; and

(A) (IV) insulated to "A-60" class standard from the boundaries of the spaces they serve to a point at least 5 m beyond each fire damper;

or —

(B) (I) constructed of steel in accordance with paragraphs (*g*)(ii)(4)(A)(I) and (*g*)(ii)(4)(A)(II); and

(B) (II) insulated to "A-60" class standard throughout the spaces they pass through, except for ducts that pass through spaces of category (9) or (10) as defined in paragraph (*b*)(ii)(3)(B)(II).

(5) For the purposes of paragraphs (*g*)(ii)(4)(A)(IV) and (*g*)(ii)(4)(B)(II), ducts must be insulated over their entire cross-sectional external surface. Ducts that are outside but adjacent to the specified space, and share one or more surfaces with the space, are considered to pass through the specified space and must be insulated over the surface they share with the space for a distance of 450 mm past the duct*.

(6) Where it is necessary that a ventilation duct passes through a main vertical zone division, an automatic fire damper must be fitted adjacent to the division. The damper must also be capable of being manually closed from each side of the division. The control location must be readily accessible and be clearly and prominently marked. The duct between the division and the damper must be constructed of steel in accordance with paragraphs (*g*)(ii)(4)(A)(I) and (*g*)(ii)(4)(A)(II) and insulated to at least the same fire integrity as the division penetrated. The damper must be fitted on at least one side of the division with a visible indicator showing the operating position of the damper.

* Sketches of such arrangements are contained in the Unified Interpretations of SOLAS Chapter II-2 (MSC.1/Circ.1276).

(iii) Details of fire dampers and duct penetrations

(1) Ducts passing through "A" class divisions must meet the following requirements:

(A) Where a thin plated duct with a free cross-sectional area equal to, or less than, 0.02 m^2 passes through "A" class divisions, the opening must be fitted with a steel sheet sleeve having a thickness of at least 3 mm and a length of

at least 200 mm, divided preferably into 100 mm on each side of a bulkhead or, in the case of a deck, wholly laid on the lower side of the decks penetrated.

(B) Where ventilation ducts with a free cross-sectional area exceeding 0.02 m^2, but not more than 0.075 m^2, pass through "A" class divisions, the openings must be lined with steel sheet sleeves. The ducts and sleeves must have a thickness of at least 3 mm and a length of at least 900 mm. When passing through bulkheads, this length must be divided preferably into 450 mm on each side of the bulkhead. These ducts, or sleeves lining such ducts, must be provided with fire insulation. The insulation must have at least the same fire integrity as the division through which the duct passes.

(C) Automatic fire dampers must be fitted in all ducts with a free cross-sectional area exceeding 0.075 m^2 that pass through "A" class divisions. Each damper must be fitted close to the division penetrated and the duct between the damper and the division penetrated must be constructed of steel in accordance with paragraphs (*g*)(ii)(4)(B)(I) and (*g*)(ii)(4)(B)(II). The fire damper must operate automatically, but must also be capable of being closed manually from both sides of the division. The damper must be fitted with a visible indicator which shows the operating position of the damper. Fire dampers are not required, however, 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 penetrate. A duct of cross-sectional area exceeding 0.075 m^2 must not be divided into smaller ducts at the penetration of an "A" class division and then recombined into the original duct once through the division to avoid installing the damper required by this provision.

(2) Ventilation ducts with a free cross-sectional area exceeding 0.02 m^2 passing through "B" class bulkheads must be lined with steel sheet sleeves of 900 mm in length, divided preferably into 450 mm on each side of the bulkheads, unless the duct is of steel for this length.

(3) All fire dampers must be capable of manual operation. The dampers must have a direct mechanical means of release or,

alternatively, be closed by electrical, hydraulic or pneumatic operation. All dampers must be manually operable from both sides of the division. Automatic fire dampers, including those capable of remote operation, must have a failsafe mechanism that will close the damper in a fire even upon loss of electrical power or hydraulic or pneumatic pressure loss. Remotely operated fire dampers must be capable of being reopened manually at the damper.

(iv) Ventilation systems for passenger ships carrying more than 36 passengers

(1) In addition to the requirements in paragraphs (*g*)(i), (*g*)(ii) and (*g*)(iii), the ventilation system of a passenger ship carrying more than 36 passengers must also meet the following requirements.

(2) In general, the ventilation fans must be so arranged that the ducts reaching the various spaces remain within a main vertical zone.

(3) Stairway enclosures must be served by an independent ventilation fan and duct system (exhaust and supply) which must not serve any other spaces in the ventilation system.

(4) A duct, irrespective of its cross-section, serving more than one 'tween-deck accommodation space, service space or control station, must be fitted, near the penetration of each deck of such spaces, with an automatic smoke damper that must also be capable of being closed manually from the protected deck above the damper. Where a fan serves more than one 'tween-deck space through separate ducts within a main vertical zone, each duct must be dedicated to a single 'tween-deck space and each duct must be provided with a manually operated smoke damper fitted close to the fan.

(5) Vertical ducts must, if necessary, be insulated as required by Tables 9.1 and 9.2. Ducts must be insulated as required for decks between the space they serve and the space being considered, as applicable.

(v) Exhaust ducts from galley ranges

(1) Requirements for passenger ships carrying more than 36 passengers

(A) In addition to the requirements in paragraphs (*g*)(i), (*g*)(ii) and (*g*)(iii), exhaust ducts from galley ranges must be

constructed in accordance with paragraphs (*g*)(ii)(4)(B)(I) and (*g*)(ii)(4)(B)(II) and insulated to "A-60" class standard throughout accommodation spaces, service spaces, or control stations they pass through. They must also be fitted with —

(I) a grease trap readily removable for cleaning, unless an alternative approved grease removal system is fitted;

(II) a fire damper located in the lower end of the duct at the junction between the duct and the galley range hood which is automatically and remotely operated and, in addition, a remotely operated fire damper located in the upper end of the duct close to the outlet of the duct;

(III) a fixed means for extinguishing a fire within the duct*;

* Refer to the recommendations published by the International Organization for Standardization, in particular publication ISO 15371:2009, Ships and Marine Technology – Fire-extinguishing Systems for Protection of Galley Cooking Equipment.

(IV) remote-control arrangements for shutting off the exhaust fans and supply fans, for operating the fire dampers mentioned in paragraph (*g*)(v)(1)(A)(II) and for operating the fire-extinguishing system, which must be placed in a position outside the galley close to the entrance to the galley. Where a multi-branch system is installed, a remote means located with the above controls must be provided to close all branches exhausting through the same main duct before an extinguishing medium is released into the system; and

(V) suitably located hatches for inspection and cleaning, including one provided close to the exhaust fan and one fitted in the lower end where grease accumulates.

(B) Exhaust ducts from ranges for cooking equipment installed on open decks must conform to paragraph (*g*)(v)(1)(A), as applicable, when passing

through accommodation spaces or spaces containing combustible materials.

(2) Requirements for cargo ships and passenger ships carrying not more than 36 passengers

When passing through accommodation spaces or spaces containing combustible materials, the exhaust ducts from galley ranges must be constructed in accordance with paragraphs (*g*)(ii)(4)(A)(I) and (*g*)(ii)(4)(A)(II). Each exhaust duct must be fitted with —

(A) a grease trap readily removable for cleaning;

(B) an automatically and remotely operated fire damper located in the lower end of the duct at the junction between the duct and the galley range hood and, in addition, a remotely operated fire damper in the upper end of the duct close to the outlet of the duct;

(C) arrangements, operable from within the galley, for shutting off the exhaust and supply fans; and

(D) fixed means for extinguishing a fire within the duct.*

* Refer to the recommendations published by the International Organization for Standardization, in particular publication ISO 15371:2009, Ships and Marine Technology – Fire-extinguishing Systems for Protection of Galley Cooking Equipment.

(vi) Ventilation rooms serving machinery spaces of category "A" containing internal combustion machinery

(1) Where a ventilation room serves only an adjacent machinery space of category "A" containing internal combustion machinery and there is no fire division between the ventilation room and the machinery space, the means for closing the ventilation duct serving the machinery space must be located outside of the ventilation room and machinery space.

(2) Where a ventilation room serves a machinery space of category "A" containing internal combustion machinery, as well as other spaces, and is separated from the machinery space by a "A-0" class division, including penetrations, the means for closing the ventilation duct for the machinery space can be located in the ventilation room.

(vii) Ventilation systems for laundries in passenger ships carrying more than 36 passengers

Exhaust ducts from laundries and drying rooms of category (13) spaces as defined in paragraph (*b*)(ii)(3)(B)(II) must be fitted with —

(1) filters readily removable for cleaning purposes;

(2) a fire damper located in the lower end of the duct which is automatically and remotely operated;

(3) remote-control arrangements for shutting off the exhaust fans and supply fans from within the space and for operating the fire damper mentioned in paragraph (*g*)(vii)(2); and

(4) suitably located hatches for inspection and cleaning.

[S 802/2015 wef 01/01/2016]

Regulation 10

Fire Fighting

(*a*) *Purpose*

(i) The purpose of this Regulation is to suppress and swiftly extinguish a fire in the space of origin, except for paragraph (*a*)(ii). For this purpose, the following functional requirements must be met:

(1) fixed fire-extinguishing systems must be installed having due regard to the fire growth potential of the protected spaces;

(2) fire-extinguishing appliances must be readily available.

(ii) For open-top container holds* and on-deck container stowage areas on ships designed to carry containers on or above the weather deck, constructed on or after 1 January 2016, fire protection arrangements must be provided for the purpose of containing a fire in the space or area of origin and cooling adjacent areas to prevent the spread of fire and structural damage.

* For a definition of this term, refer to the Interim Guidelines for Open-top Containerships (MSC/Circ.608/Rev.1).

[S 802/2015 wef 01/01/2016]

(*b*) *Water supply systems*

Ships shall be provided with fire pumps, fire mains, hydrants and hoses complying with the applicable requirements of this Regulation.

(i) Fire mains and hydrants

(1) General

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.

(2) Ready availability of water supply

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 54 of Chapter II-1, the Director shall determine provisions for fixed water fire-extinguishing arrangement 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 navigating bridge and fire control station, if any, or permanent pressurization 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.

(3) Diameter of fire mains

The diameter of the fire main and water service pipes shall be sufficient for the effective distribution of the maximum required discharge from two fire pumps operating simultaneously, except that in the case of cargo ships, other than those included in paragraph (*g*)(iii)(2), the diameter need only be sufficient for the discharge of 140 m^3/h.

[S 802/2015 wef 01/01/2016]

(4) Isolating valves and relief valves

(A) Isolating valves to separate the section of the fire main within the machinery space containing the main fire pump or pumps 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 mm, 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 poop front in a protected position and on the tank deck at intervals of not more than 40 m to preserve the integrity of the fire main system in case of fire or explosion.

(5) Number and position of hydrants

(A) The number and position of hydrants shall be such that at least two 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 two 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 paragraph (*b*)(i)(5)(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 paragraph (*b*)(i)(5)(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, two 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 two 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.

(6) Pressure at hydrants

With the two pumps simultaneously delivering water through the nozzles specified in paragraph (*b*)(iii)(3), with the quantity of water as specified in paragraph (*b*)(i)(3), 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.

(7) International shore connection

(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.

(ii) Fire pumps

(1) Pumps accepted as fire pumps

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.

(2) Number of fire pumps

Ships shall be provided with independently driven fire pumps as follows:

(A) in passenger ships of:

4,000 tons and upwards	at least three
less than 4,000 tons	at least two

(B) in cargo ships of:

1,000 tons and upwards	at least two
less than 1,000 tons	at least two power driven pumps, one of which shall be independently driven.

(3) Arrangement of fire pumps and fire mains

(A) Fire pumps

The arrangement of sea connections, fire pumps and their sources of power shall be as to ensure that:

(I) in passenger ships of l,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.

(B) Requirements for the space containing the emergency fire pump

(I) Location of the space

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 two spaces shall be insulated to a standard of structural fire

protection equivalent to that required for a control station in Regulation 9(*b*)(iii)(3).

(II) Access to the emergency fire pump

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 gas tight, 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 cases, a second means of access to the space containing the emergency fire pump and its source of power shall be provided.

(III) Ventilation of the emergency fire pump space

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.

(C) Additional pumps for cargo ships

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 paragraphs (*b*)(i)(6)(B) and (*b*)(ii)(4)(B), is capable of providing water to the fire main.

(4) Capacity of fire pumps

(A) Total capacity of required fire pumps

The required fire pumps shall be capable of delivering for fire-fighting purposes a quantity of water, at the pressure specified in paragraph (*b*)(i)(6), 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 35-1 of Chapter II-1 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, other than those included in paragraph (*g*)(iii)(2), need the total required capacity of the fire pumps exceed 180 m^3/h.

[S 686/2008 wef 01/01/2008]

[S 802/2015 wef 01/01/2016]

(B) Capacity of each fire pump

Each of the required fire pumps (other than any emergency pump required in paragraph (*b*)(ii)(3)(A)(II) 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 two 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 two jets of water required in paragraph (*b*)(i)(5)(A).

(iii) Fire hoses and nozzles

(1) General specifications

(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 m, but not more than:

(I) 15 m in machinery spaces;

(II) 20 m in other spaces and open decks; and

(III) 25 m for open decks on ships with a maximum breadth in excess of 30 m.

(B) Unless one hose and nozzle is provided for each hydrant in the ship, there shall be complete interchangeability of hose couplings and nozzles.

(2) Number and diameter of fire hoses

(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 paragraph (*b*)(i)(5) 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 m length of the ship and one spare but in no case less than five in all. This number does not include any hoses required in any engine 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 19 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 the provisions of paragraph (*b*)(iii)(2)(C)(I). However, the number of hoses shall in no case be less than three.

(3) Size and types of nozzles

(A) For the purposes of this Chapter, standard nozzle sizes shall be 12 mm, 16 mm and 19 mm or as near thereto as possible. Larger diameter nozzles may be permitted at the discretion of the Director.

(B) For accommodation and service spaces, a nozzle size greater than 12 mm 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 two jets at the pressure mentioned in paragraph (*b*)(i)(6) from the smallest pump, provided that a nozzle size greater than 19 mm need not be used.

(D) Nozzles shall be of an approved dual-purpose type (i.e., spray/jet type) incorporating a shutoff.

(*c*) *Portable fire extinguishers*

(i) Type and design

Portable fire extinguishers shall comply with the requirements of the Fire Safety Systems Code.

(ii) Arrangement of fire extinguishers

(1) 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 five portable fire extinguishers.

(2) One of the portable fire extinguishers intended for use in any space shall be stowed near the entrance to that space.

(3) 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 should be provided whose extinguishing media are neither electrically conductive nor harmful to the equipment and appliances.

(4) 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.

(iii) Spare charges

(1) 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.

(2) For fire extinguishers which cannot be recharged on board, additional portable fire extinguishers of the same quantity, type, capacity and number as determined in paragraph (*c*)(iii)(1) above shall be provided in lieu of spare charges.

(*d*) *Fixed fire-extinguishing systems*

(i) Types of fixed fire-extinguishing systems

(1) A fixed fire-extinguishing system required by paragraph (*e*) below 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.

(2) 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.

(3) Fire-extinguishing systems using Halon 1211, 1301 and 2402 and perfluorocarbons shall be prohibited.

(4) 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.

(5) By the first scheduled dry-docking after 1st January 2010, fixed carbon dioxide fire-extinguishing systems for the protection of machinery spaces and cargo pump-rooms on ships constructed before 1st July 2002 shall comply with the provisions of paragraph 2.2.2 of Chapter 5 of the Fire Safety Systems Code.

[S 664/2009 wef 01/01/2010]

(ii) Closing appliances for fixed gas fire-extinguishing systems

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.

(iii) Storage rooms of fire-extinguishing medium

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 gas tight. For the purpose of the application of tables 9.1 to 9.8, such storage rooms shall be treated as fire control stations.

(iv) Water pumps for other fire-extinguishing systems

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 or spaces protected by such systems and shall be so arranged that a fire

in the space or spaces protected will not put any such system out of action.

(*e*) *Fire-extinguishing arrangements in machinery spaces*

(i) Machinery spaces containing oil-fired boilers or oil fuel units

(1) Fixed fire-extinguishing systems

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 (*d*)(i). In each case, if the engine and boiler rooms 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.

(2) Additional fire-extinguishing arrangements

(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 two 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.

(ii) Machinery spaces of category A containing internal combustion machinery

(1) Fixed fire-extinguishing systems

Machinery spaces of category A containing internal combustion machinery shall be provided with one of the fixed fire-extinguishing systems in paragraph (*d*)(i).

(2) Additional fire-extinguishing arrangements

(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 on to 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 m walking distance from an extinguisher and that there are at least two such extinguishers in each such space. For smaller spaces of cargo ships the Director may consider relaxing this requirement.

[S 277/2016 wef 01/07/2016]

(iii) Machinery spaces containing steam turbines or enclosed steam engines

(1) Fixed fire-extinguishing systems

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 (*d*)(i) shall be provided if such spaces are periodically unattended.

(2) Additional fire-extinguishing arrangements

(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, or to any part of the casings enclosing pressure lubricated parts of the turbines, engines or associated gearing, and any other fire hazards. However, such extinguishers shall not be required if protection, at least equivalent to that required by this sub-paragraph, is provided in such spaces by a fixed fire-extinguishing system fitted in compliance with paragraph (*d*)(i).

(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 m walking distance from an extinguisher and that there are at least two such

extinguishers in each such space, except that such extinguishers shall not be required in addition to any provided in compliance with paragraph (*e*)(i)(2)(B).

(iv) Other machinery spaces

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 (*e*)(i), (ii) and (iii), 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.

(v) Additional requirements for passenger ships

*In passenger ships carrying more than 36 passengers, each machinery space of category A shall be provided with at least two suitable water fog applicators.

(vi) Fixed local application fire-fighting systems

(1) Paragraph (*e*)(vi) shall apply to passenger ships of 500 tons and above and cargo ships of 2,000 tons and above.

(2) Machinery spaces of category A above 500 m^3 in volume shall, in addition to the fixed fire-extinguishing system required in paragraph (*e*)(i)(1), be protected by an approved type of fixed water-based or equivalent local application fire-fighting system, based on the guidelines developed by the Organization.* In the case of periodically unattended machinery spaces, the fire-fighting system shall have both automatic and manual release capabilities. In the case of continuously manned machinery spaces, the fire-fighting system is only required to have a manual release capability.

(3) Fixed local application fire-fighting 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 or, for ships constructed before 1st July 2014, the fire hazard portions of internal combustion machinery used for the ship's main propulsion and power generation;

*A water fog applicator might consist of a metal L-shaped pipe, the long limb being about 2 m in length capable of being fitted to a fire hose and the short limb being about 250 mm in length fitted with a fixed water fog nozzle or capable of being fitted with a water spray nozzle.

*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).

(B) boiler fronts;

(C) the fire hazard portions of incinerators; and

(D) purifiers for heated fuel oil.

[S 432/2014 wef 01/07/2014]

(4) 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.

(*f*) *Fire-extinguishing arrangements in control stations, accommodation and service spaces*

(i) Sprinkler and water spray systems in passenger ships

(1) 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.

[S 339/2008 wef 01/07/2008]

(2) 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 Regulation 7(*e*)(iii)(2).

(3) A fixed pressure water-spraying fire-extinguishing system complying with the provisions of the Fire Safety Systems Code shall be installed on cabin balconies of ships to which Regulation 5(*c*)(iv) applies, where furniture and furnishings on such balconies are not as defined in Regulations 3(*nn*)(i), 3(*nn*)(ii), 3(*nn*)(iii), 3(*nn*)(vi) and 3(*nn*)(vii).

[S 339/2008 wef 01/07/2008]

(ii) Sprinkler systems for cargo ships

In cargo ships in which Method IIC specified in Regulation 9(*b*)(iii)(1)(A)(II) is adopted, an automatic sprinkler, fire detection and fire alarm system shall be fitted in accordance with the requirements in Regulation 7(*e*)(v)(2).

(iii) Spaces containing flammable liquid

(1) 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 any case, the system shall be operable from outside the protected space.

(2) Flammable liquid lockers shall be protected by an appropriate fire-extinguishing arrangement approved by the Director.

(3) For lockers of a deck area of less than 4 m^2, which do not give access to accommodation spaces, a carbon dioxide portable 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.

(iv) Deep-fat cooking equipment

Deep-fat cooking equipment installed in enclosed spaces or on open decks shall be fitted with the following:

(1) an automatic or manual extinguishing system tested to an international standard acceptable to the Director*;

*Refer to the recommendations by the International Organization for Standardization, in particular, Publication ISO 15371:2000 on Fire-extinguishing systems for protection of galley deep-fat cooking equipment.

(2) a primary and backup thermostat with an alarm to alert the operator in the event of failure of either thermostat;

(3) arrangements for automatically shutting off the electrical power upon activation of the extinguishing system;

(4) an alarm for indicating operation of the extinguishing system in the galley where the equipment is installed; and

(5) controls for manual operation of the extinguishing system which are clearly labelled for ready use by the crew.

[S 366/2010 wef 01/07/2010]

(*g*) *Fire-extinguishing arrangements in cargo spaces*

(i) Fixed gas fire-extinguishing systems for general cargo

(1) Except as provided for in paragraph (*g*)(ii), 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.

(2) 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 paragraph (*g*)(i)(1) 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.

(3) 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.

(4) The Director may exempt from the requirements of paragraphs (*g*)(i)(3) and (*g*)(ii), 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 ventilators and

*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).

other openings leading to the cargo spaces. When such exemptions are granted, the Director shall issue an Exemption Certificate, irrespective of the date of construction of the ship concerned, in accordance with Regulation 12(*a*)(vii) of Chapter I, and shall ensure that the list of cargoes the ship is permitted to carry is attached to the Exemption Certificate.

[S 432/2014 wef 01/07/2014]

(ii) Fixed gas fire-extinguishing systems for dangerous goods

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.

(iii) Firefighting for ships constructed on or after 1 January 2016 designed to carry containers on or above the weather deck

(1) Ships must carry, in addition to the equipment and arrangements required by sub-paragraphs (i) and (ii), at least one water mist lance.

(A) The water mist lance must consist of a tube with a piercing nozzle which is capable of penetrating a container wall and producing water mist inside a confined space (container, etc.) when connected to the fire main.

(2) Ships designed to carry 5 or more tiers of containers on or above the weather deck must carry, in addition to the requirements of paragraph (*g*)(iii)(1), mobile water monitors* as follows:

(I) ships with breadth less than 30 m: at least 2 mobile water monitors; or

(II) ships with breadth of 30 m or more: at least 4 mobile water monitors.

* Refer to the Guidelines for the design, performance, testing and approval of mobile water monitors used for the protection of on-deck cargo areas of ships designed and constructed to carry five or more tiers of containers on or above the weather deck (MSC.1/Circ.1472).

(A) The mobile water monitors, all necessary hoses, fittings and required fixing hardware must be kept ready for use in a location outside the cargo space area not likely to be cut-off in the event of a fire in the cargo spaces.

(B) A sufficient number of fire hydrants must be provided such that —

(I) all provided mobile water monitors can be operated simultaneously for creating effective water barriers forward and aft of each container bay;

(II) the 2 jets of water required by paragraph (*b*)(i)(5)(A) can be supplied at the pressure required by paragraph (*b*)(i)(6); and

(III) each of the required mobile water monitors can be supplied by separate hydrants at the pressure necessary to reach the top tier of containers on deck.

(C) The mobile water monitors may be supplied by the fire main, provided the capacity of fire pumps and fire main diameter are adequate to simultaneously operate the mobile water monitors and 2 jets of water from fire hoses at the required pressure values. If carrying dangerous goods, the capacity of fire pumps and fire main diameter must also comply with Regulation 19(*c*)(i)(5), as far as applicable to on-deck cargo areas.

(D) The operational performance of each mobile water monitor must be tested during initial survey on board the ship to the satisfaction of the Director. The test must verify that —

(I) the mobile water monitor can be securely fixed to the ship structure ensuring safe and effective operation; and

(II) the mobile water monitor jet reaches the top tier of containers with all required monitors and water jets from fire hoses operated simultaneously.

[S 802/2015 wef 01/01/2016]

(*h*) *Cargo tank protection*

(i) Fixed deck foam systems

(1) For tankers of 20,000 tonnes deadweight and upwards, a fixed deck foam system shall be provided 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 5 of Chapter I. The requirements for alternative fixed installations shall comply with the requirements in paragraph (*h*)(i)(2).

(2) In accordance with paragraph (*h*)(i)(1), where the Director accepts an equivalent fixed installation in lieu of the fixed deck foam system, the installation shall:

(A) be capable of extinguishing spill fires and also preclude ignition of spilled oil not yet ignited; and

(B) be capable of combating fires in ruptured tanks.

(3) Tankers of less than 20,000 tonnes deadweight shall be provided with a deck foam system complying with the requirements of the Fire Safety Systems Code.

(*i*) *Protection of cargo pump rooms in tankers*

(i) Fixed fire-extinguishing systems

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.

(1) A carbon dioxide 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/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.

(2) A high-expansion foam 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.

(3) A fixed pressure water-spraying system complying with the provisions of the Fire Safety Systems Code.

(ii) Quantity of fire-extinguishing medium

Where the 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.

(*j*) *Fire-fighter's outfits*

(i) Types of fire-fighter's outfits

(1) Fire-fighter's outfits shall comply with the Fire Safety Systems Code.

(2) Self-contained compressed air breathing apparatus of fire-fighter's outfits shall comply with paragraph 2.1.2.2 of chapter 3 of the Fire Safety Systems Code by 1st July 2019.

[S 432/2014 wef 01/07/2014]

(ii) Number of fire-fighter's outfits

(1) Ships shall carry at least two fire-fighter's outfits.

(2) In addition, in passenger ships there shall be provided:

(A) for every 80 m, 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, two fire-fighter's outfits and, in addition, two sets of personal equipment, each set comprising the items stipulated in the Fire Safety Systems Code. In passenger ships carrying more than 36 passengers, two additional fire-fighter's outfits shall be provided for each main vertical zone. However, 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 Regulation 9(*b*)(ii)(3), no additional fire-fighter's outfits are required; and

(B) ships carrying more than 36 passengers, for each pair of breathing apparatus there shall be provided one water fog applicator which shall be stored adjacent to such apparatus.

(3) In addition, in tankers, two fire-fighter's outfits shall be provided.

(4) The Director may require additional sets of personal equipment and breathing apparatus, having due regard to the size and type of the ship.

(5) Two 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 two spare charges for each breathing apparatus shall be provided.

(6) Passenger ships carrying more than 36 passengers, which are constructed on or after 1st July 2010, shall be fitted with a suitably located means for fully recharging, free from contamination, breathing air cylinders. The means for recharging shall be either —

(A) breathing air compressors which are supplied from the main and emergency switchboard, or are independently driven, with a minimum capacity of 60 *l*/min, not to exceed 420 *l*/min, per required breathing apparatus; or

(B) self-contained high-pressure storage systems of suitable pressure to recharge the breathing apparatus used on board, with a capacity of at least 1,200 *l*, not to exceed 50,000 *l*, of free air per required breathing apparatus.

[S 366/2010 wef 01/07/2010]

(iii) Storage of fire-fighter's outfits

(1) The fire-fighter'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 fire-fighter's outfit or more than one set of personal equipment is carried, they shall be stored in widely separated positions.

(2) In passenger ships, at least two fire-fighter's outfits and, in addition, one set of personal equipment shall be available at any one position. At least two fire-fighter's outfits shall be stored in each main vertical zone.

(iv) Fire-fighter's communication

For ships constructed on or after 1st July 2014, a minimum of 2 two-way portable radiotelephone apparatus for each fire party for fire-fighter's communication shall be carried on board. Those two-way portable radiotelephone apparatus shall be of an explosion-proof type or intrinsically safe. Ships constructed before 1st July 2014 shall comply with the requirements of this sub-paragraph not later than the first survey after 1st July 2018.

[S 314/2002 wef 01/07/2002]

[S 432/2014 wef 01/07/2014]

Regulation 11

Structural Integrity

(*a*) *Purpose*

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 ships' structure shall ensure that the structural integrity is not degraded due to fire.

(*b*) *Material of hull, superstructures, structural bulkheads, decks and deckhouses*

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 3(*qq*) the "applicable fire exposure" shall be according to the integrity and insulation standards given in tables 9.1 to 9.4. 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.

(*c*) *Structure of aluminium alloy*

Unless otherwise specified in paragraph (*b*), in cases where any part of the structure is of aluminium alloy, the following shall apply:

(i) 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

(ii) 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:

(1) that for such members supporting lifeboat and liferaft areas and "A" class divisions, the temperature rise limitation specified in paragraph (*c*)(i) shall apply at the end of one hour; and

(2) that for such members required to support "B" class divisions, the temperature rise limitation specified in paragraph (*c*)(i) shall apply at the end of half an hour.

(*d*) *Machinery spaces of Category A*

(i) Crowns and casings

Crowns and casings of machinery spaces of category A shall be of steel construction and shall be insulated as required by tables 9.5 and 9.7, as appropriate.

(ii) Floor plating

The floor plating of normal passageways in machinery spaces of Category A shall be made of steel.

(*e*) *Materials of overboard fittings*

Materials readily rendered ineffective by heat shall not be used for overboard scuppers, sanitary discharges, and other outlets which are close to the waterline and where the failure of the material in the event of fire would give rise to danger of flooding.

(*f*) *Protection of cargo tank structure against pressure or vacuum in tankers*

(i) General

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:

(1) 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/vacuum valves; and

(2) the passage of large volumes of vapour, air or inert gas mixtures during cargo loading and ballasting, or during discharging.

(ii) Openings for small flow by thermal variations

Openings for pressure release required by paragraph (*f*)(i)(1) must —

(1) 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 m above the cargo tank deck; and

(2) be arranged at the furthest distance practicable but not less than 5 m 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.

For tankers constructed on or after 1 January 2017, the openings must be arranged in accordance with Regulation 4(*e*)(iii)(4)(A).

[S 669/2016 wef 01/01/2017]

(iii) Safety measures in cargo tanks

(1) Preventive measures against liquid rising in the venting system

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.

(2) Secondary means for pressure/vacuum relief

A secondary means of allowing full flow relief of vapour, air or inert gas mixtures to prevent over-pressure or under-pressure in the event of failure of the arrangements in paragraph (*f*)(i)(2). In addition, for tankers constructed on or after 1 January 2017, the secondary means must be capable of preventing over-pressure or under-pressure in the event of damage to, or inadvertent closing of, the means of isolation required in Regulation 4(*e*)(iii)(2)(B). Alternatively, pressure sensors may be fitted in each tank protected by the arrangement required in paragraph (*f*)(i)(2), 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 over-pressure or under-pressure conditions within a tank.

[S 669/2016 wef 01/01/2017]

(3) Bypasses in vent mains

Pressure/vacuum valves required by paragraph (*f*)(i)(1) 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.

(4) Pressure/vacuum-breaking devices

One or more pressure/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 mm water gauge if 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 Regulation 4(*e*)(iii)(1) or on individual cargo tanks. The

location and design of the devices shall be in accordance with Regulation 4(*e*)(iii) and paragraph (*f*).

(iv) Size of vent outlets

Vent outlets for cargo loading, discharging and ballasting required by paragraph (*f*)(i)(2) 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.

[S 314/2002 wef 01/07/2002]

PART D — ESCAPE

Regulation 12

Notification of Crew and Passengers

(*a*) *Purpose*

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.

(*b*) *General emergency alarm system*

A general emergency alarm system required by Regulation 6(*d*)(ii) of Chapter III shall be used for notifying crew and passengers of a fire.

(*c*) Public address systems in passenger ships

A public address system or other effective means of communication complying with the requirements of Regulation 6(*e*) of Chapter III shall be available throughout the accommodation and service spaces and control stations and open decks.

[S 314/2002 wef 01/07/2002]

Regulation 13

Means of Escape

(*a*) *Purpose*

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:

(i) safe escape routes shall be provided;

(ii) escape routes shall be maintained in a safe condition, clear of obstacles; and

(iii) additional aids for escape shall be provided as necessary to ensure accessibility, clear marking and adequate design for emergency situations.

(*b*) *General requirements*

(i) Unless expressly provided otherwise in this Regulation, at least two widely separated and ready means of escape shall be provided from all spaces or group of spaces.

(ii) Lifts shall not be considered as forming one of the means of escape as required by this Regulation.

(*c*) *Means of escape from control stations, accommodation and service spaces*

(i) General requirements

(1) 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.

(2) 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. Also, a part of a corridor that has a depth not exceeding its width is considered a recess or local extension and is permitted.

(3) 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.

(4) If a radiotelegraph station has no direct access to the open deck, two 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.

(5) 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.

(ii) Means of escape in passenger ships

(1) Escape from spaces below the bulkhead deck

(A) Below the bulkhead deck two 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 the provisions of paragraph (*c*)(ii)(1)(A), this sole means of escape shall provide safe escape. However, stairways shall not be less than 800 mm in clear width with handrails on both sides.

(2) Escape from spaces above the bulkhead deck

Above the bulkhead deck there shall be at least two 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.

(3) Direct access to stairway enclosures

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 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 paragraph (*c*)(ii)(4) and external areas are permitted to have direct access to these stairway enclosures. Public spaces may also have direct access to stairway enclosures except for the backstage of a theatre. 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 mm and contain a fire hose station.

[S 366/2010 wef 01/07/2010]

(4) Details of means of escape

(A) At least one of the means of escape required by paragraphs (*c*)(ii)(1)(A) and (*c*)(ii)(2) 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 Regulation 11(*e*) of Chapter III 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 9.1 to 9.4, 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 9.1 to 9.4, 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 two means of escape, one of which shall give direct access to an enclosed vertical means of escape meeting the requirements of paragraph (*c*)(ii)(4)(A).

(E) The widths, number and continuity of escapes shall be in accordance with the requirements in the Fire Safety Systems Code.

(5) Marking of escape routes

(A) In addition to the emergency lighting required by Regulations 42 of Chapter II-1 and 11(*e*) of Chapter III, the means of escape, including stairways and exits, shall be marked by lighting or photoluminescent strip indicators placed not more than 300 mm 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, either of which complies with the Fire Safety Systems Code.

(B) In passenger ships carrying more than 36 passengers, the requirements of paragraph (*c*)(ii)(5)(A) shall also apply to the crew accommodation areas.

(C) In lieu of the escape route lighting system required by sub-paragraph (A), alternative evacuation guidance systems may be accepted if approved by the Director based on the guidelines developed by the Organisation*.

[S 366/2010 wef 01/07/2010]

(6) Normally locked doors that form part of an escape route

(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

*Refer to the Functional Requirements and Performance Standards for the Assessment of Evacuation Guidance Systems (MSC/Circ.1167) and the Interim Guidelines for the Testing, Approval and Maintenance of Evacuation Guidance Systems Used as an Alternative to Low-location Lighting Systems (MSC/Circ.1168).

the door leaf, at least 760 mm and not more than 1,120 mm 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.

(iii) Means of escape in cargo ships

(1) General

At all levels of accommodation there shall be provided at least two widely separated means of escape from each restricted space or group of spaces.

(2) Escape from spaces below the lowest open deck

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.

(3) Escape from spaces above the lowest open deck

Above the lowest open deck the means of escape shall be stairways or doors to an open deck or a combination thereof.

(4) Dead-end corridors

No dead-end corridors having a length of more than 7 m shall be accepted.

(5) Width and continuity of escape routes

The width, number and continuity of escape routes shall be in accordance with the requirements in the Fire Safety Systems Code.

(6) Dispensation from two means of escape

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.

(iv) Emergency escape breathing devices*

(1) Emergency escape breathing devices shall comply with the Fire Safety Systems Code. Spare emergency escape breathing devices shall be kept onboard.

*Refer to the Guidelines for the performance, location, use and care of emergency escape breathing devices (MSC/Circ.849).

(2) All ships shall carry at least two emergency escape breathing devices within accommodation spaces.

(3) In passenger ships, at least two emergency escape breathing devices shall be carried in each main vertical zone.

(4) In passenger ships carrying more than 36 passengers, two emergency escape breathing devices, in addition to those required in paragraph (*c*)(iv)(3) above, shall be carried in each main vertical zone.

(5) However, paragraphs (*c*)(iv)(3) and (*c*)(iv)(4) do not apply to 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 Regulation 9(*b*)(ii)(3).

(*d*) *Means of escape from machinery spaces*

(i) Means of escape on passenger ships

Means of escape from each machinery space in passenger ships shall comply with the following provisions.

(1) Escape from spaces below the bulkhead deck

Where the space is below the bulkhead deck the two means of escape shall consist of either:

(A) two 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 Regulation 9(*b*)(ii)(3), category (2), or Regulation 9(*b*)(ii)(4), category (4), 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 mm x 800 mm, 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.

(2) Escape from spaces above the bulkhead deck

Where the space is above the bulkhead deck, the two 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.

(3) Dispensation from two means of escape

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.

(4) Escape from machinery control rooms

Two 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.

(5) Inclined ladders and stairways

For ships constructed on or after 1 January 2016, all inclined ladders or stairways fitted to comply with paragraph (*d*)(i)(1) with open treads in machinery spaces being part of or providing access to escape routes but not located within a protected enclosure must be made of steel. Such ladders or stairways must be fitted with steel shields attached to the undersides of the ladders or stairways, such as to provide escaping personnel protection against heat and flame from beneath.

[S 802/2015 wef 01/01/2016]

(6) Escape from main workshops within machinery spaces

For ships constructed on or after 1 January 2016, two means of escape must be provided from the main workshop within a machinery space. At least one of these escape routes must provide a continuous fire shelter to a safe position outside the machinery space.

[S 802/2015 wef 01/01/2016]

(ii) Means of escape on cargo ships

Means of escape from each machinery space in cargo ships shall comply with the following provisions.

(1) Escape from machinery spaces of Category A

Except as provided in paragraph (*d*)(ii)(2), two 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) two 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 Regulation 9(*b*)(iii)(3), category (4), 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 mm x 800 mm, 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.

(2) Dispensation from two means of escape

In a ship of less than 1,000 tons, the Director may dispense with one of the means of escape required under paragraph (*d*)(ii)(1), 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

paragraph (*d*)(ii)(1)(A). 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.

(3) Escape from machinery spaces other than those of Category A

From machinery spaces other than those of Category A, two 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 m or less.

(4) Inclined ladders and stairways

For ships constructed on or after 1 January 2016, all inclined ladders or stairways fitted to comply with paragraph (*d*)(ii)(1) with open treads in machinery spaces being part of or providing access to escape routes but not located within a protected enclosure must be made of steel. Such ladders or stairways must be fitted with steel shields attached to the undersides of the ladders or stairways, such as to provide escaping personnel protection against heat and flame from beneath.

[S 802/2015 wef 01/01/2016]

(5) Escape from machinery control rooms in machinery spaces of category "A"

For ships constructed on or after 1 January 2016, two means of escape must be provided from the machinery control room located within a machinery space. At least one of these escape routes must provide a continuous fire shelter to a safe position outside the machinery space.

[S 802/2015 wef 01/01/2016]

(6) Escape from main workshops in machinery spaces of category "A"

For ships constructed on or after 1 January 2016, two means of escape must be provided from the main workshop within a machinery space. At least one of these escape routes must provide a continuous fire shelter to a safe position outside the machinery space.

[S 802/2015 wef 01/01/2016]

(iii) Emergency escape breathing devices

(1) 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 escape breathing devices shall take into account the layout of the machinery space and the number of persons normally working in the spaces.*

(2) The number and location of these devices shall be indicated in the fire control plan required in Regulation 15(*b*)(iv).

(3) Emergency escape breathing devices shall comply with the Fire Safety Systems Code.

(*e*) *Means of escape on passenger ships from special category and open ro-ro spaces to which any passengers carried can have access*

(i) 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 paragraphs (*c*)(ii)(1)(A), (*c*)(ii)(2), (*c*)(ii)(4)(A) and (*c*)(ii)(4)(B). Such spaces shall be provided with designated walkways to the means of escape with a breadth of at least 600 mm. The parking arrangements for the vehicles shall maintain the walkways clear at all times.

(ii) One of the escape routes from the machinery spaces where the crew is normally employed shall avoid direct access to any special category space.

(*f*) *Means of escape from ro-ro spaces*

At least two 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.

(*g*) *Additional requirements for ro-ro passenger ships*

(i) General

(1) 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 Organization.**

*Refer to the Guidelines for the performance, location, use and care of emergency escape breathing devices (MSC/Circ.849).

*Refer to the Indication of the "assembly stations" in passenger ships (MSC/Circ.777).

**Refer to the Symbols related to life-saving appliances and arrangements adopted by the Organization by resolution A.760(18).

(2) 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 two decks up or down in order to reach an assembly station or open deck from any passenger space.

(3) External routes shall be provided from open decks, as referred to in paragraph (*g*)(i)(2), to the survival craft embarkation stations.

(4) 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.

(5) 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.

(ii) Instruction for safe escape

(1) 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.

(2) 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.

(iii) Strength of handrails and corridors

(1) 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 m in width and transverse corridors more than 1 m 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 two loads need not be applied simultaneously.

(2) The lowest 0.5 m 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.

(iv) Evacuation analysis*

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 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.

[S 314/2002 wef 01/07/2002]

PART E — OPERATIONAL REQUIREMENTS

Regulation 14

Operational Readiness and Maintenance

(*a*) *Purpose*

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:

(i) fire protection systems and fire-fighting systems and appliances shall be maintained ready for use; and

(ii) fire protection systems and fire-fighting systems and appliances shall be properly tested and inspected.

(*b*) *General requirements*

*Refer to the Interim Guidelines for a simplified evacuation analysis of ro-ro passenger ships (MSC/Circ.909).

At all times while the ship is in service, the requirements of paragraph (*a*)(i) shall be complied with. A ship is not in service when:

(1) it is in for repairs or lay-up (either at anchor or in port) or in dry-dock;

(2) it is declared not in service by the owner or the owner's representative; and

(3) in the case of passenger ships, there are no passengers on board.

(i) Operational readiness

(1) The following fire protection systems shall be kept in good order so as to ensure their required performance if a fire occurs:

(A) structural fire protection including fire resisting divisions, and protection of openings and penetrations in these divisions;

(B) fire detection and fire alarm systems; and

(C) means of escape systems and appliances.

(2) 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.

(ii) Maintenance, testing and inspections

(1) Maintenance, testing and inspections shall be carried out based on the guidelines developed by the Organization* and in a manner having due regard to ensuring the reliability of fire-fighting systems and appliances.

(2) The maintenance plan shall be kept on board the ship and shall be available for inspection whenever required by the Director.

(3) The maintenance plan shall include at least the following fire protection systems and fire-fighting systems and appliances, where installed:

(A) fire mains, fire pumps and hydrants including hoses, nozzles and international shore connections;

(B) fixed fire detection and fire alarm systems;

*Refer to the Guidelines on maintenance and inspection of fire protection systems and appliances (MSC/Circ.850).

(C) fixed fire-extinguishing systems and other fire-extinguishing appliances;

(D) automatic sprinkler, fire detection and fire alarm systems;

(E) ventilation systems including fire and smoke dampers, fans and their controls;

(F) emergency shut down of fuel supply;

(G) fire doors including their controls;

(H) general emergency alarm systems;

(I) emergency escape breathing devices;

(J) portable fire extinguishers including spare charges; and

(K) fire-fighter's outfits.

(4) The maintenance programme may be computer-based.

(*c*) *Additional requirements for passenger ships*

In addition to the fire protection systems and appliances listed in paragraph (*b*)(ii)(3), ships carrying more than 36 passengers shall develop a maintenance plan for low-location lighting and public address systems.

(*d*) *Additional requirements for tankers*

In addition to the fire protection systems and appliances listed in paragraph (*b*)(ii)(3), tankers shall develop a maintenance plan for:

(i) inert gas systems;

(ii) deck foam systems;

(iii) fire safety arrangements in cargo pump-rooms; and

(iv) flammable gas detectors.

[S 314/2002 wef 01/07/2002]

Regulation 15

Instructions, On board Training and Drills

(*a*) *Purpose*

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.

(*b*) *General requirements*

(i) Instructions, duties and organization

(1) Crew members shall receive instruction on fire safety on board the ship.

(2) Crew members shall receive instructions on their assigned duties.

(3) Parties responsible for fire-extinguishing shall be organized. These parties shall have the capability to complete their duties at all times while the ship is in service.

(ii) On board training and drills

(1) 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.

(2) Training in the use of the emergency escape breathing devices shall be considered as part of on board training.

(3) 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 organization.

(4) On board training in the use of the ship's fire-extinguishing systems and appliances shall be planned and conducted in accordance with the provisions of Regulation 19(*d*)(i) of Chapter III.

(5) Fire drills shall be conducted and recorded in accordance with the provisions of Regulations 19(*c*) and (*e*) of Chapter III.

(6) An onboard means of recharging breathing apparatus cylinders used during drills shall be provided, or a suitable number of spare cylinders shall be carried on board to replace those used.

[S 432/2014 wef 01/07/2014]

(iii) Training manuals

(1) A training manual shall be provided in each crew mess room and recreation room or in each crew cabin.

(2) The training manual shall be written in the working language of the ship.

(3) The training manual, which may comprise several volumes, shall contain the instructions and information required in paragraph (*b*)(iii)(4) in easily understood terms and illustrated wherever possible. Any part of such information may be provided in the form of audio-visual aides in lieu of the manual.

(4) 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.

(iv) Fire control plans*

(1) 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, the aforementioned 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; any alterations thereto shall be recorded as soon as practicable. Description in such plans and booklets shall be in the language or languages required by the Director. If the language is neither English nor French, a translation into one of those languages shall be included.

*Refer to the Graphical symbols for fire control plans, adopted by the Organization by resolution A.654(16).

(2) 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.*

(*c*) *Additional requirements for passenger ships*

(i) Fire drills

In addition to the requirement of paragraph (*b*)(ii)(3), fire drills shall be conducted in accordance with the provisions of Regulation 30 of Chapter III having due regard to notification of passengers and movement of passengers to assembly stations and embarkation decks.

(ii) Fire control plans

**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 issued by the Organization.

[S 314/2002 wef 01/07/2002]

Regulation 16

Operations

(*a*) *Purpose*

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:

(i) fire safety operational booklets shall be provided on board; and

(ii) flammable vapour releases from cargo tank venting shall be controlled.

(*b*) *Fire safety operational booklets*

(i) 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

*Refer to the Guidance concerning the location of fire control plans for assistance of shoreside fire-fighting personnel (MSC/Circ.451).

**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 Organization by resolution A.756(18).

provide reference to the pertinent fire-fighting and emergency cargo handling instructions contained in the International Maritime Solid Bulk Cargoes (IMSBC) Code, the International Bulk Chemical Code, the International Gas Carrier Code and the International Maritime Dangerous Goods Code, as appropriate.

[S 793/2010 wef 01/01/2011]

(ii) The fire safety operational booklet shall be provided in each crew mess room and recreation room or in each crew cabin.

(iii) The fire safety operational booklet shall be written in the working language of the ship.

(iv) The fire safety operational booklet may be combined with the training manuals required in Regulation 15(*b*)(3).

(*c*) *Additional requirements for tankers*

(i) General

The fire safety operational booklet referred to in paragraph (*b*) 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 and/or gas-freeing taking into account the provisions in paragraph (*c*)(ii).

(ii) Procedures for cargo tank purging and/or gas-freeing

(1) When the ship is provided with an inert gas system, the cargo tanks shall first be purged in accordance with the provisions of Regulation 4(*e*)(vi) 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.

(2) 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 Regulation 4(*e*)(iii)(4);

(B) outlets at least 2 m 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 m 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.

(3) The above outlets shall be located not less than 10 m 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.

(4) 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.

[S 314/2002 wef 01/07/2002]

(iii) Operation of inert gas system

(1) The inert gas system for tankers required in accordance with Regulation 4(*e*)(v)(1) must be so operated as to render and maintain the atmosphere of the cargo tanks non-flammable, except when such tanks are required to be gas-free.

(2) Despite the above, for chemical tankers, the application of inert gas may take place after the cargo tank has been loaded, but before commencement of unloading, and must continue to be applied until that cargo tank has been purged of all flammable vapours before gas-freeing. Only nitrogen is acceptable as inert gas under this provision.

(3) Despite Regulation 1(*b*)(ii)(2), the provisions of this paragraph must only apply to tankers constructed on or after 1 January 2016. If the oxygen content of the inert gas exceeds 5% by volume, immediate action must be taken to improve the gas quality. Unless the quality of the gas improves, all operations in those cargo tanks to which inert gas is being supplied must be suspended so as to avoid air being drawn into the cargo tanks, the gas regulating valve, if fitted, must be closed and the off-specification gas must be vented to atmosphere.

(4) In the event that the inert gas system is unable to meet the requirement in paragraph (*c*)(iii)(1) and it has been assessed that it is impractical to effect a repair, then cargo discharge and cleaning of those cargo tanks requiring inerting must only be resumed when suitable emergency procedures have been followed, taking into account guidelines developed by the Organisation*.

* Refer to the Clarification of Inert Gas System Requirements under the Convention (MSC/Circ.485) and to the Revised Guidelines for Inert Gas Systems (MSC/Circ.353), as amended by MSC/Circ.387.

[S 802/2015 wef 01/01/2016]

PART F — ALTERNATIVE DESIGN AND ARRANGEMENTS

Regulation 17

Alternative Design and Arrangements

(*a*) *Purpose*

The purpose of this Regulation is to provide a methodology for alternative design and arrangements for fire safety.

(*b*) *General*

(i) 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.

(ii) When fire safety design or 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.

(*c*) *Engineering analysis*

The engineering analysis shall be prepared and submitted to the Director, based on the guidelines developed by the Organization* and shall include, as a minimum, the following elements:

(i) determination of the ship type and space(s) concerned;

(ii) identification of prescriptive requirement(s) with which the ship or the space(s) will not comply;

(iii) identification of the fire and explosion hazards of the ship or the space(s) concerned;

(1) identification of the possible ignition sources;

(2) identification of the fire growth potential of each space concerned;

(3) identification of the smoke and toxic effluent generation potential for each space concerned;

(4) identification of the potential for the spread of fire, smoke or of toxic effluents from the space(s) concerned to other spaces;

(iv) determination of the required fire safety performance criteria for the ships or the space(s) concerned addressed by the prescriptive requirement(s);

(1) performance criteria shall be based on the fire safety objectives and on the functional requirements of this Chapter;

* Refer to the Guidelines to be developed by the Organization.

(2) performance criteria shall provide a degree of safety not less than that achieved by using the prescriptive requirements; and

(3) performance criteria shall be quantifiable and measurable;

(v) 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

(vi) technical justification demonstrating that the alternative design and arrangements meet the required fire safety performance criteria.

(*d*) *Evaluation of the alternative design and arrangements*

(i) The engineering analysis required in paragraph (*c*) shall be evaluated and approved by the Director taking into account the guidelines developed by the Organization.*

(ii) 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.

(*e*) *Exchange of information*

The Director shall communicate to the Organization pertinent information concerning alternative design and arrangements approved by them for circulation to all Contracting States.

(*f*) *Re-evaluation due to change of conditions*

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.

[S 314/2002 wef 01/07/2002]

PART G — SPECIAL REQUIREMENTS

Regulation 18

Helicopter Facilities

(*a*) *Purpose*

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:

*Refer to the Guidelines to be developed by the Organization.

(i) helideck structure must be adequate to protect the ship from the fire hazards associated with helicopter operations;

(ii) fire-fighting appliances shall be provided to adequately protect the ship from the fire hazards associated with helicopter operations;

(iii) refuelling and hangar facilities and operations shall provide the necessary measures to protect the ship from the fire hazards associated with helicopter operations; and

(iv) operation manuals and training shall be provided.

(*b*) *Application*

(i) 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 requirements of this Regulation.

(ii) 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.

(iii) Notwithstanding the requirements of paragraph (*b*)(ii) above, ro-ro passenger ships without helidecks shall comply with Regulation 28 of Chapter III.

(*c*) *Structure*

(i) Construction of steel or other equivalent material

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.

(ii) Construction of aluminium or other low melting point metals

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:

(1) 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

(2) 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.

(*d*) *Means of escape*

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.

(*e*) *Fire-fighting appliances*

(i) In close proximity to the helideck, the following fire-fighting appliances shall be provided and stored near the means of access to that helideck:

(1) at least two dry powder extinguishers having a total capacity of not less than 45 kg;

(2) carbon dioxide extinguishers of a total capacity of not less than 18 kg or equivalent;

(3) 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 table 18.1 for at least five minutes;

Table 18.1 — Foam discharge rate

Category	*Helicopter overall length*	*Discharge rate foam solution (litres/min)*
H1	up to but not including 15 m	250
H2	from 15 m up to but not including 24 m	500
H3	from 24 m up to but not including 35 m	800

(4) the principal agent shall be suitable for use with salt water and conform to performance standards not inferior to those acceptable to the Organization;*

(5) at least two nozzles of an approved dual-purpose type (jet/spray) and hoses sufficient to reach any part of the helideck;

(6) in addition to the requirements of Regulation 10(*j*), two sets of fire-fighter's outfits; and

(7) at least the following equipment shall be stored in a manner that provides for immediate use and protection from the elements:

— adjustable wrench;

— blanket, fire resistant;

— cutters, bolt 60 cm;

— hook, grab or salving;

— hacksaw, heavy duty complete with 6 spare blades;

— ladder;

— lift line 5 mm diameter x 15 m in length;

— pliers, side cutting;

— set of assorted screwdrivers; and

— harness knife complete with sheath.

(*f*) *Drainage facilities*

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.

(*g*) *Helicopter refuelling and hangar facilities*

Where the ship has helicopter refuelling and hangar facilities, the following requirements shall be complied with:

(i) a designated area shall be provided for the storage of fuel tanks which shall be:

(1) as remote as is practicable from accommodation spaces, escape routes and embarkation stations; and

(2) isolated from areas containing a source of vapour ignition;

*Refer to the International Civil Aviation Organization 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'.

(ii) the fuel storage area shall be provided with arrangements whereby fuel spillage may be collected and drained to a safe location;

(iii) tanks and associated equipment shall be protected against physical damage and from a fire in an adjacent space or area;

(iv) where portable fuel storage tanks are used, special attention shall be given to:

(1) design of the tank for its intended purpose;

(2) mounting and securing arrangements;

(3) electric bonding; and

(4) inspection procedures;

(v) 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;

(vi) 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;

(vii) electrical fuel pumping units and associated control equipment shall be of a type suitable for the location and potential hazards;

(viii) fuel pumping units shall incorporate a device which will prevent over-pressurization of the delivery or filling hose;

(ix) equipment used in refuelling operations shall be electrically bonded;

(x) "NO SMOKING" signs shall be displayed at appropriate locations;

(xi) hangar, refuelling and maintenance facilities shall be treated as machinery spaces of category A with regard to structural fire protection, fixed fire-extinguishing and detection system requirements;

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(xii) enclosed hangar facilities or enclosed spaces containing refuelling installations shall be provided with mechanical ventilation, as required by Regulation 20(*c*) for closed ro-ro spaces of cargo ships. Ventilation fans shall be of non-sparking type; and

(xiii) electric equipment and wiring in enclosed hangar or enclosed spaces containing refuelling installations shall comply with Regulations 20(*c*)(ii), (iii) and (iv).

(*h*) *Operations manual and fire-fighting service*

(i) Each helicopter facility shall have an operations 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.

(ii) The procedures and precautions to be followed during refuelling operations shall be in accordance with recognized safe practices and contained in the operations manual.

(iii) Fire-fighting personnel consisting of at least two persons trained for rescue and fire-fighting duties and fire-fighting equipment shall be immediately available at all times when helicopter operations are expected.

(iv) Fire-fighting personnel shall be present during refuelling operations. However, the fire-fighting personnel shall not be involved with refuelling activities.

(v) 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.

Regulation 19

Carriage of Dangerous Goods[*]

[*] Refer to the Interim guidelines for open-top containerships (MSC/Circ.608/Rev.1).

(*a*) *Purpose*

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:

(i) fire protection systems shall be provided to protect the ship from the added fire hazards associated with carriage of dangerous goods;

(ii) dangerous goods shall be adequately separated from ignition sources; and

(iii) appropriate personnel protective equipment shall be provided for the hazards associated with the carriage of dangerous goods.

(*b*) *General requirements*

(i) In addition to complying with the requirements of Regulations in parts B, C, D, E and Regulations 18 and 20*, as appropriate, ship types and cargo spaces, referred to in paragraph (*b*)(ii), intended for the carriage

*Refer to part 7 of the International Maritime Dangerous Goods Code.

of dangerous goods shall comply with the requirements of this Regulation, as appropriate, except when carrying dangerous goods in limited quantities** and excepted 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*)(ii) and in table 19.1. 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 paragraph (*d*).

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(ii) The following ship types and cargo spaces shall govern the application of tables 19.1 and 19.2:

(1) 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;

(2) purpose-built container ships and cargo spaces intended for the carriage of dangerous goods in freight containers and portable tanks;

(3) ro-ro ships and ro-ro spaces intended for the carriage of dangerous goods;

(4) ships and cargo spaces intended for the carriage of solid dangerous goods in bulk; and

(5) ships and cargo spaces intended for carriage of dangerous goods other than liquids and gases in bulk in shipborne barges.

(*c*) *Special requirements*

Unless otherwise specified, the following requirements shall govern the application of tables 19.1, 19.2 and 19.3 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.

(i) Water supplies

(1) Arrangements shall be made to ensure immediate availability of a supply of water from the fire main at the required pressure either by permanent pressurization or by suitably placed remote arrangements for the fire pumps.

**Refer to Chapter 3.4 of the International Maritime Dangerous Goods Code.

***Refer to chapter 3.5 of the IMDG Code (as defined in Regulation 1 of Chapter VII).

(2) The quantity of water delivered shall be capable of supplying four nozzles of a size and at pressures as specified in Regulation 10(*b*), 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.

(3) Means shall be provided for effectively cooling the designated underdeck cargo space by at least 5 litres/min per square metre of the horizontal area of cargo spaces, either by a fixed arrangement of spraying nozzles or 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. However, 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 m 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.*

(4) Provision to flood a designated under-deck cargo space with suitable specified media may be substituted for the requirements in paragraph (*c*)(i)(3).

(5) The total required capacity of the water supply shall satisfy paragraphs (*c*)(i)(2) and (*c*)(i)(3), if applicable, simultaneously calculated for the largest designated cargo space. The capacity requirements of paragraph (*c*)(i)(2) shall be met by the total capacity of the main fire pump(s) not including the capacity of the emergency fire pump, if fitted. If a drencher system is used to satisfy paragraph (*c*)(i)(3), the drencher pump shall also be taken into account in this total capacity calculation.

(ii) Sources of ignition

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. However, if electrical equipment is fitted in

*Refer to the Recommendation on fixed fire-extinguishing systems for special cargo spaces adopted by the Organization by resolution A.123(V).

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 (e.g. 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.

(iii) Detection system

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 made 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.

(iv) Ventilation arrangement

(1) Adequate power ventilation shall be provided in enclosed cargo spaces. The arrangement shall be such as to provide for at least six 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.

(2) The fans shall be such as to avoid the possibility of ignition of flammable gas air mixtures. Suitable wire mesh guards shall be fitted over inlet and outlet ventilation openings.

(3) 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.

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(v) Bilge pumping

(1) 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

** Refer to the recommendations of the International Electrotechnical Commission, in particular, publication IEC 60092 on Electrical installations in ships.

of such liquids are carried, consideration shall be given to the provision of additional means of draining those cargo spaces.

(2) 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.

(3) 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.

(4) Enclosed spaces outside machinery spaces containing bilge pumps serving cargo spaces intended for carriage of flammable or toxic liquids should 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.

(5) 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.

(vi) Personnel protection

(1) Four sets of full protective clothing resistant to chemical attack shall be provided in addition to the fire-fighter's outfits required by Regulation 10(*j*) and shall be selected taking into account the hazards associated with the chemicals being transported and the standards developed by the Organisation according to the class and physical state*. The protective clothing shall cover all skin, so that no part of the body is unprotected.

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(2) At least two self-contained breathing apparatuses additional to those required by Regulation 10 shall be provided. Two 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

*For solid bulk cargoes, the protective clothing should satisfy the equipment provisions specified in the respective schedules of the IMSBC Code for the individual substances. For packaged goods, the protective clothing should satisfy the equipment provisions specified in emergency procedures (EmS) of the Supplement to the IMDG Code (as defined in Regulation 1 of Chapter VII) for the individual substances.

with suitably located means for fully recharging the air cylinders free from contamination, need carry only one spare charge for each required apparatus.

(vii) Portable fire extinguishers

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.

(viii) Insulation of machinery space boundaries

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 m horizontally away from such bulkheads. Other boundaries between such spaces shall be insulated to "A-60" class standard.

(ix) Water spray system

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. However, 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 m 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.*

(x) Separation of ro-ro spaces

(1) 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 minimize the passage of

* Refer to the Recommendation on fixed fire-extinguishing systems for special cargo spaces adopted by the Organization by resolution A.123(V).

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 shall fully comply with the relevant special requirements of this Regulation.

(2) 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 minimize 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 deck.

(*d*) *Document of compliance*[*]

An appropriate document issued by the Director or an authorised organisation as evidence of compliance of construction and equipment with the requirements of this Regulation shall be carried on board. Certification for dangerous goods, except solid dangerous goods in bulk, is not required for those cargoes specified as class 6.2 and 7 and dangerous goods in limited quantities and excepted quantities.

[*] 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).

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TABLE 19.1 — APPLICATION OF THE REQUIREMENTS TO DIFFERENT MODES OF CARRIAGE OF DANGEROUS GOODS IN SHIPS AND CARGO SPACES

Where X appears in table 19.1 it means this requirement is applicable to all classes of dangerous goods as given in the appropriate line of table 19.3, except as indicated by the notes.

Regulation 19.2.2		.1	.2	.3		.4	.5
	Weather decks	*Not specifically designed*	*Container cargo spaces*	*Closed ro-ro spaces*[5]	*Open ro-ro spaces*	*Solid dangerous goods in bulk*	*Shipborne barges*
Regulation 19	*.1 to .5 inclusive*						
(*c*)(i)(1)	X	X	X	X	X	For application of requirements of Regulation 19 to different classes of dangerous goods, see Table 19.2	X
(*c*)(i)(2)	X	X	X	X	X		—
(*c*)(i)(3)	—	X	X	X	X		X
(*c*)(i)(4)	—	X	X	X	X		X
(*c*)(ii)	—	X	X	X	X		X[4]
(*c*)(iii)	—	X	X	X	—		X[4]
(*c*)(iv)(1)	—	X	X[1]	X	—		X[4]
(*c*)(iv)(2)	—	X	X[1]	X	—		X[4]
(*c*)(v)	—	X	X	X	—		—
(*c*)(vi)(1)	X	X	X	X	X		—
(*c*)(vi)(2)	X	X	X	X	X		—

(*c*)(vii)	X	X	—	—	X			—
(*c*)(viii)	X	X	X[2]	X	X			
(*c*)(ix)	—	—	—	X[3]	X			—
(*c*)(x)(1)	—	—	—	X	—			—
(*c*)(x)(2)	—	—	—	X	—			—

Notes:

1 For classes 4 and 5.1 solids 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 two air changes per hour.

For classes 4 and 5.1 liquids when carried in closed freight containers, the ventilation rate may be reduced to not less than two air changes per hour.

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 19.2 — APPLICATION OF THE REQUIREMENTS TO DIFFERENT CLASSES OF DANGEROUS GOODS FOR SHIPS AND CARGO SPACES CARRYING SOLID DANGEROUS GOODS IN BULK

Class	4.1	4.2	4.3[6]	5.1	6.1	8	9
Regulation 19							
(*c*)(i)(1)	X	X	—	X	—	—	X
(*c*)(i)(2)	X	X	—	X	—	—	X
(*c*)(ii)	X	X[7]	X	X[8]	—	—	X[8]
(*c*)(iv)(1)	—	X[7]	X	—	—	—	—
(*c*)(iv)(2)	X[9]	X[7]	X	X[7,9]	—	—	X[7,9]
(*c*)(iv)(3)	X	X	X	X	X	X	X
(*c*)(vi)	X	X	X	X	X	X	X
(*c*)(viii)	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 must 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 fertilizers.

8 Only applicable to Ammonium nitrate and to Ammonium nitrate fertilizers. 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 International Maritime Solid Bulk Cargoes (IMSBC) Code, as amended, are sufficient.

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TABLE 19.3 — APPLICATION OF THE REQUIREMENTS TO DIFFERENT CLASSES OF DANGEROUS GOODS EXCEPT SOLID DANGEROUS GOODS IN BULK

Class → / Regulation 19↓	1.1 to 1.6	1.4S	2.1	2.2	2.3 flammable[20]	2.3 non-flammable	3 FP[15] < 23°C	3 FP[15] ≥ 23°C to ≤ 60°C	4.1	4.2	4.3 liquids[21]	4.3 solids	5.1	5.2[16]	6.1 liquids FP[15] < 23°C	6.1 liquids FP[15] ≥ 23°C to ≤ 60°C	6.1 liquids	6.1 solids	8 liquids FP[15] < 23°C	8 liquids FP[15] ≥ 23°C to ≤ 60°C	8 liquids	8 solids	9
(*c*)(i)(1)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
(*c*)(i)(2)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
(*c*)(i)(3)	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
(*c*)(i)(4)	X	–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
(*c*)(ii)	X	—	X	—	X	—	X	—	—	—	X[18]	—	—	—	X	—	—	—	X	—	—	—	X[17]
(*c*)(iii)	X	X	X	X	—	X	X	X	X	X	X	X	X	—	X	X	X	X	X	X	X	X	—
(*c*)(iv)(1)	—	—	X	—	—	X	X	—	X[11]	X[11]	X	X	X[11]	—	X	X	—	X[11]	X	X	—	—	X[11]
(*c*)(iv)(2)	—	—	X	—	—	—	X	—	—	—	—	—	—	—	X	—	—	—	X	—	—	—	X[17]
(*c*)(v)	—	—	–	—	—	—	X	—	—	—	—	—	—	—	X	X	X	—	X	X[19]	X[19]	—	—
(*c*)(vi)	—	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X[14]
(*c*)(vii)	—	—	—	—	—	—	X	X	X	X	X	X	X	—	X	X	—	—	X	X	—	—	—
(*c*)(viii)	X[12]	—	X	X	X	X	X	X	X	X	X	X	X[13]	X	X	X	—	—	X	X	—	—	—

Class → / Regulation 16↓	(*c*)(ix)	(*c*)(x)(1)	(*c*)(x)(2)
1.1 to 1.6	X	X	X
1.4S	X	X	X
2.1	X	X	X
2.2	X	X	X
2.3 flammable[20]	X	X	X
2.3 non-flammable	X	X	X
3 FP^{15} < 23°C	X	X	X
3 FP^{15} ≥ 23°C to ≤ 60°C	X	X	X
4.1	X	X	X
4.2	X	X	X
4.3 liquids[21]	X	X	X
4.3 solids	X	X	X
5.1	X	X	X
5.2[16]	X	X	X
6.1 liquids FP^{15} < 23°C	X	X	X
6.1 liquids FP^{15} ≥ 23°C to ≤ 60°C	X	X	X
6.1 liquids	X	X	X
6.1 solids	X	X	X
8 liquids FP^{15} < 23°C	X	X	X
8 liquids FP^{15} ≥ 23°C to ≤ 60°C	X	X	X
8 liquids	X	X	X
8 solids	X	X	X
9	X	X	X

Notes

11 When "mechanically-ventilated spaces" are required by the IMDG Code (as defined in Regulation 1 of Chapter VII).

12 Stow 3 metres horizontally away from the machinery space boundaries in all cases.

13 Refer to the IMDG Code (as defined in Regulation 1 of Chapter VII).

14 As appropriate for the goods to be carried.

15 FP means flashpoint.

16 Under the provisions of the IMDG Code (as defined in Regulation 1 of Chapter VII), stowage of class 5.2 dangerous goods under deck or in enclosed ro-ro spaces is prohibited.

17 Only applicable to dangerous goods evolving flammable vapour listed in the IMDG Code (as defined in Regulation 1 of Chapter VII).

18 Only applicable to dangerous goods having a flashpoint less than 23ºC listed in the IMDG Code (as defined in Regulation 1 of Chapter VII).

19 Only applicable to dangerous goods having a subsidiary risk class 6.1.

20 Under the provisions of the IMDG Code (as defined in Regulation 1 of Chapter VII), stowage of class 2.3 having subsidiary risk class 2.1 under deck or in enclosed ro-ro spaces is prohibited.

21 Under the provisions of the IMDG Code (as defined in Regulation 1 of Chapter VII), stowage of class 4.3 liquids having a flashpoint less than 23ºC under deck or in enclosed ro-ro spaces is prohibited.

[S 314/2002 wef 01/07/2002]

[S 793/2010 wef 01/01/2011]

Regulation 20

Protection of Vehicle, Special Category and Ro-ro spaces

(*a*) *Purpose*

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:

(i) fire protection systems shall be provided to adequately protect the ship from the fire hazards associated with vehicle, special category and ro-ro spaces;

(ii) ignition sources shall be separated from vehicle, special category and ro-ro spaces; and

(iii) vehicle, special category and ro-ro spaces shall be adequately ventilated.

(*b*) *General requirements*

(i) Application

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.

(ii) Basic principles for passenger ships

(1) The basic principle underlying the provisions of this Regulation is that the main vertical zoning required by Regulation 9(*b*) 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 m.

(2) The basic principle underlying the provisions of paragraph (*b*)(ii)(1) are also applicable to ro-ro spaces.

(3) The requirements of ventilation systems, openings in "A" class divisions and penetrations in "A" class divisions for maintaining the integrity of vetical 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.

(*c*) *Precaution against ignition of flammable vapours in closed vehicle spaces, closed ro-ro spaces and special category spaces*

(i) Ventilation systems

(1) Capacity of ventilation systems

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.

(2) Performance of ventilation systems

(A) In passenger ships, the power ventilation system must be separate from other ventilation systems. The power ventilation system must be operated to give at least the number of air changes required in paragraph (*c*)(i)(1) at all times when vehicles are in such spaces, except where an air quality control system in accordance with paragraph (*c*)(i)(2)(D) is provided. Ventilation ducts serving such cargo spaces capable of being effectively sealed must be separated for each such space. The system must be capable of being controlled from a position outside such spaces.

(B) In cargo ships, the ventilation fans must normally be run continuously and give at least the number of air changes required in paragraph (*c*)(i)(1) whenever vehicles are on board, except where an air quality control system in accordance with paragraph (*c*)(i)(2)(D) is provided. Where this is impracticable, they must 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 must be proved gas-free. One or more portable combustible gas detecting instruments must be carried for this purpose. The system must be entirely separate from other ventilation systems. Ventilation ducts serving ro-ro or vehicle spaces must be capable of being effectively sealed for each cargo space. The system must be capable of being controlled from a position outside such spaces.

(C) The ventilation system must be such as to prevent air stratification and the formation of air pockets.

(D) For all ships, where an air quality control system is provided based on the guidelines developed by the Organization*, the ventilation system may be operated at a decreased number of air changes or a decreased amount of ventilation or both. This relaxation does not apply to spaces to which at least 10 air changes per hour is required by paragraph (*c*)(ii)(2) and spaces subject to Regulations 19(*c*)(iv)(1) and 20-1.

[S 669/2016 wef 01/01/2017]

(3) Indication of ventilation systems

Means shall be provided on the navigation bridge to indicate any loss of the required ventilating capacity.

(4) Closing appliances and ducts

(A) Arrangements shall be provided to permit a rapid shutdown 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 Regulation 9(*g*)(ii)(4)(A)(I) and (II).

[S 802/2015 wef 01/01/2016]

(5) Permanent openings

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.

(ii) Electrical equipment and wiring

(1) Except as provided in paragraph (*c*)(ii)(2), electrical equipment and wiring shall be of a type suitable for use in an explosive petrol and air mixture.*

* Refer to the Revised Design Guidelines and Operational Recommendations for Ventilation Systems in Ro-ro Cargo Spaces (MSC/Circ.1515).

*Refer to the recommendations of the International Electrotechnical Commission, in particular publication 60079.

(2) In case of other than special category spaces below the bulkhead deck, notwithstanding the provisions in paragraph (*c*)(ii)(1), above a height of 450 mm 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 ten air changes per hour whenever vehicles are on board.

(iii) Electrical equipment and wiring in exhaust ventilation ducts

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.

(iv) Other ignition sources

Other equipment which may constitute a source of ignition of flammable vapours shall not be permitted.

(v) Scuppers and discharges

Scuppers shall not be led to machinery or other spaces where sources of ignition may be present.

(*d*) *Detection and alarm*

(i) Fixed fire detection and fire alarm systems

Except as provided in paragraph (*d*)(iii)(1), 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.

(ii) Sample extraction smoke detection systems

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 of the fixed fire detection and fire alarm system required in paragraph (*d*)(i).

(iii) Special category spaces

(1) An efficient fire patrol system shall be maintained in special category spaces. However, 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 systems is not required.

(2) Manually operated call points shall be spaced so that no part of the space is more than 20 m from a manually operated call point, and one shall be placed close to each exit from such spaces.

(*e*) *Structural protection*

Notwithstanding the provisions of Regulation 9(*b*)(ii), 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. However, where a category (5), (9) or (10) space, as defined in Regulation 9(*b*)(ii)(3), 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.

(*f*) *Fire-extinction*

(i) Fixed fire-extinguishing systems

The requirements of sub-paragraphs (1) and (2) shall apply to ships constructed on or after 1st July 2014. Ships constructed before 1st July 2014 shall comply with the requirements of sub-paragraphs (1) and (2) immediately in force before 1st July 2014.

[S 432/2014 wef 01/07/2014]

(1) 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 one of the following fixed fire-extinguishing 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; or

(C) a fixed water-based fire-fighting system for ro-ro spaces and special category spaces complying with the provisions of the Fire Safety Systems Code and paragraph (*f*)(i)(2)(A) to (D).

[S 432/2014 wef 01/07/2014]

(2) Vehicle spaces and ro-ro spaces not capable of being sealed, and special category spaces, shall be fitted with a fixed water-based fire-fighting system for ro-ro spaces and special category spaces complying with the provisions of the Fire Safety Systems Code. The fixed water-based fire-fighting system for ro-ro spaces and special category spaces shall protect all parts of any deck and vehicle platform in such spaces and shall have —

(A) a pressure gauge on the valve manifold;

(B) a clear marking on each manifold valve indicating the spaces served;

(C) instructions for maintenance and operation, located in the valve room; and

(D) a sufficient number of drainage valves to ensure complete drainage of the system.

[S 432/2014 wef 01/07/2014]

(3) The Director may permit the use of any other fixed fire-extinguishing system* that has been shown that it is not less effective by a full-scale test in conditions simulating a flowing petrol fire in a vehicle space or a ro-ro space in controlling fires likely to occur in such a space.

(4) The requirement of this sub-paragraph shall apply to ships constructed on or after 1st January 2010. Ships constructed on or after 1st July 2002 and before 1st January 2010 shall comply with the requirements of paragraph (*f*)(i)(4) of this regulation which was in force immediately prior to 1st January 2010. When fixed pressure water-spraying systems are fitted, 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 fixed pressure 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, taking into account the guidelines developed by the Organisation*;

*Refer to the Guidelines when approving alternative fixed water-based fire-fighting systems for use in special category spaces (MSC/Circ.914).

*Refer to the Guidelines for the drainage of fire-fighting water from closed vehicle and ro-ro spaces and special category spaces of passenger and cargo ships set out in circular MSC.1/Circ.1320 issued by the Organisation.

(II)(1) 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;

(II)(2) any operation of valves referred to in paragraph (*f*)(i)(4)(A)(II)(1) shall be recorded in the official log-book;

(III) in the spaces below the bulkhead deck, the Director may require pumping and drainage facilities to be provided in addition to the requirements of Regulation 35-1 of Chapter II-1. 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, taking into account the guidelines developed by the Organisation*. 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 m 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, taking into account the guidelines developed by the Organisation*. 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 m 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

*Refer to the Guidelines for the drainage of fire-fighting water from closed vehicle and ro-ro spaces and special category spaces of passenger and cargo ships set out in circular MSC.1/Circ.1320 issued by the Organisation.

by the Director in his approval of the stability information**. Such information shall be included in the stability information supplied to the master as required by Regulation 5-1 of Chapter II-1.

[S 664/2009 wef 01/01/2010]

(5) On all ships, for closed vehicles and ro-ro spaces and special category spaces, where fixed pressure water-spraying systems are fitted, means shall be provided to prevent the blockage of drainage arrangements, taking into account the guidelines developed by the Organisation*. Ships constructed before 1st January 2010 shall comply with the requirements of this paragraph by the first survey after 1st January 2010.

[S 664/2009 wef 01/01/2010]

(ii) Portable fire extinguishers

(1) Portable extinguishers shall be provided at each deck level in each hold or compartment where vehicles are carried, spaced not more than 20 m apart on both sides of the space. At least one portable fire extinguisher shall be located at each access to such a cargo space.

(2) In addition to the provision of paragraph (*f*)(ii)(1), 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 three water-fog applicators; and

(B) one portable foam applicator unit complying with the provisions of the Fire Safety Systems Code, provided that at least two such units are available in the ship for use in such ro-ro spaces.

[S 314/2002 wef 01/07/2002]

Regulation 20-1

Requirements for Vehicle Carriers Carrying Motor Vehicles with Compressed Hydrogen or Natural Gas in the Motor Vehicles' Tanks for their own Propulsion as Cargo

(*a*) *Purpose*

**Refer to the Recommendation on fixed fire-extinguishing systems for special category spaces, adopted by the Organisation by resolution A.123(V).

*Refer to the Guidelines for the drainage of fire-fighting water form closed vehicle and ro-ro spaces and special category spaces of passenger and cargo ships set out in circular MSC.1/Circ.1320 issued by the Organisation.

The purpose of this Regulation is to provide additional safety measures in order to address the fire safety objectives of this chapter for vehicle carriers with vehicle and ro-ro spaces intended for carriage of motor vehicles with compressed hydrogen or compressed natural gas in the motor vehicles' tanks for their own propulsion as cargo.

(*b*) *Application*

(i) In addition to complying with the requirements of Regulation 20, as appropriate, vehicle spaces of vehicle carriers constructed on or after 1 January 2016 intended for the carriage of motor vehicles with compressed hydrogen or compressed natural gas in the motor vehicles' tanks for their own propulsion as cargo must comply with the requirements in paragraphs (*c*) to (*e*) of this Regulation.

(ii) In addition to complying with the requirements of Regulation 20, as appropriate, vehicle carriers constructed before 1 January 2016, including those constructed before 1 July 2012*, must comply with the requirements in paragraph (*e*) of this Regulation.

* Refer to the Recommendation on Safety Measures for Existing Vehicle Carriers Carrying Motor Vehicles with Compressed Hydrogen or Natural Gas in their Tanks for their own Propulsion as Cargo (MSC.1/Circ.1471).

(*c*) *Requirements for spaces intended for carriage of motor vehicles with compressed natural gas in the motor vehicles' tanks for their own propulsion as cargo*

(i) Electrical equipment and wiring

All electrical equipment and wiring must be of a certified safe type for use in an explosive methane and air mixture*.

* Refer to the recommendations of the International Electrotechnical Commission, in particular, publication IEC 60079.

(ii) Ventilation arrangement

(1) Electrical equipment and wiring, if installed in any ventilation duct, must be of a certified safe type for use in explosive methane and air mixtures.

(2) The fans must be designed such as to avoid the possibility of ignition of methane and air mixtures. Suitable wire mesh guards must be fitted over inlet and outlet ventilation openings.

(iii) Other ignition sources

Other equipment which may constitute a source of ignition of methane and air mixtures are not permitted.

(*d*) *Requirements for spaces intended for carriage of motor vehicles with compressed hydrogen in the motor vehicles' tanks for their own propulsion as cargo*

(i) Electrical equipment and wiring

All electrical equipment and wiring must be of a certified safe type for use in an explosive hydrogen and air mixture*.

* Refer to the recommendations of the International Electrotechnical Commission, in particular, publication IEC 60079.

(ii) Ventilation arrangement

(1) Electrical equipment and wiring, if installed in any ventilation duct, must be of a certified safe type for use in explosive hydrogen and air mixtures and the outlet from any exhaust duct must be sited in a safe position, having regard to other possible sources of ignition.

(2) The fans must be designed such as to avoid the possibility of ignition of hydrogen and air mixtures. Suitable wire mesh guards must be fitted over inlet and outlet ventilation openings.

(iii) Other ignition sources

Other equipment which may constitute a source of ignition of hydrogen and air mixtures are not permitted.

(*e*) *Detection*

When a vehicle carrier carries as cargo one or more motor vehicles with either compressed hydrogen or compressed natural gas in the motor vehicles' tanks for their own propulsion, at least 2 portable gas detectors must be provided. Such detectors must be suitable for the detection of the gas fuel and be of a certified safe type for use in the explosive gas and air mixture.

[S 802/2015 wef 01/01/2016]

Regulation 21

Casualty Threshold, Safe Return to Port and Safe Areas

(*a*) *Application*

Passenger ships constructed on or after 1st July 2010, having length, as defined in Regulation 2(*e*) of Chapter II-1, of 120 metres and upwards, or having 3 or more main vertical zones, shall comply with the provisions of this Regulation.

(*b*) *Purpose*

The purpose of this Regulation is to establish design criteria for a ship's safe return to port under its own propulsion after a casualty that does not exceed the casualty threshold stipulated in paragraph (*c*), and to provide functional requirements and performance standards for safe areas.

(*c*) *Casualty threshold*

The casualty threshold, in the context of a fire, includes —

(i) loss of the space of origin up to the nearest "A" class boundaries, which may be a part of the space of origin, if the space of origin is protected by a fixed fire-extinguishing system; or

(ii) loss of the space of origin and adjacent spaces up to the nearest "A" class boundaries, which are not part of the space of origin.

(*d*) *Safe return to port**

When fire damage does not exceed the casualty threshold as defined in paragraph (*c*), the ship shall be capable of returning to port while providing a safe area as defined in Regulation 3. To be deemed capable of returning to port, the following systems shall remain operational in the remaining part of the ship not affected by fire:

(i) propulsion systems;

(ii) steering systems and steering-control systems;

(iii) navigational systems;

(iv) systems for fill, transfer and service of fuel oil;

(v) internal communication systems between the bridge, engineering spaces, safety centre, fire-fighting and damage control teams, and as required for passenger and crew notification and mustering;

(vi) means of external communication;

(vii) fire main system;

(viii) fixed fire-extinguishing systems;

(ix) fire and smoke detection system;

*Refer to the Performance Standards for the Systems and Services to Remain Operational on Passenger Ships for Safe Return to Port and Orderly Evacuation and Abandonment After a Casualty (MSC.1/Circ.1214).

(x) bilge and ballast systems;

(xi) power-operated watertight and semi-watertight doors;

(xii) systems intended to support "safe areas" as indicated in paragraph (*e*)(i)(2);

(xiii) flooding detection systems; and

(xiv) other systems determined by the Director to be vital to damage control efforts.

(*e*) *Safe areas*

(i) Functional requirements

(1) A safe area shall generally be an internal space. However, the use of an external space as a safe area may be allowed by the Director, taking into account any restriction due to the area of operation and relevant expected environmental conditions.

(2) The safe area shall provide all occupants with the following basic services* to ensure that the health of the passengers and crew is maintained:

(A) sanitation;

(B) water;

(C) food;

(D) alternate space for medical care;

(E) shelter from the weather;

(F) means of preventing heat stress and hypothermia;

(G) light; and

(H) ventilation.

(3) Ventilation design shall reduce the risk that smoke and hot gases could affect the use of the safe area.

(4) Means of access to life-saving appliances shall be provided from each area identified or used as a safe area, taking into account that a main vertical zone may not be available for internal transit.

(ii) Alternate space for medical care

*Refer to the Performance Standards for the Systems and Services to Remain Operational on Passenger Ships for Safe Return to Port and Orderly Evacuation and Abandonment After a Casualty (MSC.1/Circ.1214).

Alternate space for medical care shall conform to a standard acceptable to the Director.*

[S 366/2010 wef 01/07/2010]

Regulation 22

Design Criteria for Systems to Remain Operational After a Fire Casualty

(*a*) *Application*

Passenger ships constructed on or after 1st July 2010, having length, as defined in Regulation 2(*b*) of Chapter II-1, of 120 metres and upwards, or having three or more main vertical zones, shall comply with the provision of this Regulation.

(*b*) *Purpose*

The purpose of this Regulation is to provide design criteria for systems required to remain operational for supporting the orderly evacuation and abandonment of a ship, if the casualty threshold, as defined in Regulation 21(*c*), is exceeded.

(*c*) *Systems**

(i) In case any main vertical zone is unserviceable due to fire, the following systems shall be so arranged and segregated as to remain operation:

(1) fire main system;

(2) internal communication system (in support of fire-fighting as required for passenger and crew notification and evacuation);

(3) means of external communication;

(4) bilge systems for removal of fire-fighting water;

(5) lighting along escape routes, at assembly stations and at embarkation station of life-saving appliances; and

(6) guidance systems for evacuation.

(ii) The above systems shall be capable of operation for at least 3 hours based on the assumption that there is no damage outside the unserviceable main vertical zone. These systems are not required to remain operational within the unserviceable main vertical zones.

(iii) Cabling and piping within a trunk constructed to an "A-60" standard shall be deemed to remain intact and serviceable while passing through the unserviceable main vertical zone for the purposes of

* Refer to the Guidance on the Establishment of Medical and Sanitation Related Programmes for Passenger Ships (MSC/Circ.1129).

*Refer to the Performance Standards for the Systems and Services to Remain Operational on Passenger Ships for Safe Return to Port and Orderly Evacuation and Abandonment After a Casualty (MSC.1/Circ.1214).

sub-paragraph (i). An equivalent degree of protection for cabling and piping may be approved by the Director.

[S 366/2010 wef 01/07/2010]

Regulation 23

Safety Centre on Passenger Ships

(*a*) *Application*

Passenger ships constructed on or after 1st July 2010 shall have on board a safety centre that complies with the requirements of this Regulation.

(*b*) *Purpose*

The purpose of this Regulation is to provide a space to assist with the management of emergency situations.

(*c*) *Location and arrangement*

The safety centre shall either be a part of the navigation bridge or be located in a separate space adjacent to and having direct access to the navigation bridge, so that the management of emergencies can be performed without distracting watch officers from their navigational duties.

(*d*) *Layout and ergonomic design*

*The layout and ergonomic design of the safety centre shall take into account the guidelines developed by the Organisation, as appropriate.

(*e*) *Communications*

Means of communication between the safety centre, the central control station, the navigation bridge, the engine control room, the storage rooms for fire-extinguishing systems and fire equipment lockers shall be provided.

(*f*) *Control and monitoring of safety systems*

Notwithstanding the requirements set out elsewhere in these Regulations, the full functionality (operation, control, monitoring or any combination thereof, as required) of the safety systems listed below shall be available from the safety centre:

(i) all powered ventilation systems;

(ii) fire doors;

(iii) general emergency alarm system;

(iv) public address system;

(v) electrically-powered evacuation guidance systems;

*Refer to the guidelines to be developed by the Organisation.

(vi) watertight and semi-watertight doors;

(vii) indicator for shell doors, loading doors and other closing appliances;

(viii) water leakage of inner or outer bow doors, stern doors and any other shell door;

(ix) television surveillance system;

(x) fire detection and alarm system;

(xi) fixed fire-fighting local application system;

(xii) sprinkler and equivalent systems;

(xiii) water-based systems for machinery spaces;

(xiv) alarm to summon the crew;

(xv) atrium smoke extraction system;

(xvi) flooding detection systems; and

(xvii) fire pumps and emergency fire pumps.

[S 366/2010 wef 01/07/2010]

CHAPTER III

LIFE-SAVING APPLIANCES AND ARRANGEMENTS

PART A — GENERAL

Regulation 1

Application

(*a*) 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.

(*b*) For the purpose of this Chapter, the term "a 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 —

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

(ii) the expression "all ships" means ships constructed before, on or after 1st July 1998; the expressions "all passenger ships" and "all cargo ships" shall be construed accordingly;

(iii) 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.

(*d*) Ships constructed before 1st July 1998 shall —

(i) subject to the provisions of sub-paragraph (ii), 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

(ii) 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. However, 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.

(*e*) Notwithstanding paragraph (*d*)(ii), any lifeboat on-load release mechanism on any ship that does not comply with paragraphs 4.4.7.6.4 to 4.4.7.6.6 of the Code shall be replaced with equipment that complies with the Code* not later than at the first scheduled dry-docking** of the ship after 1st July 2014 but on or before 1st July 2019.

[S 621/2012 wef 01/01/2013]

Regulation 2

Exemptions

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.

Regulation 3

*Refer to the Guidelines for evaluation and replacement of lifeboat release and retrieval systems (MSC.1/Circ.1392).

**Refer to the Clarification of the term "first scheduled dry-docking" as contained in SOLAS regulation III/1.5, as amended by resolution MSC.317(89) (MSC.1/Circ.1445).

Definitions

For the purpose of this Chapter, unless expressly provided otherwise —

"Anti-exposure suit" is a protective suit designed for use by rescue boat crews and marine evacuation system parties;

"Certificated person" is 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" is the determination of the location of survivors or survival craft;

"Embarkation ladder" is the ladder provided at survival craft embarkation stations to permit safe access to survival craft after launching;

"Float-free launching" is that method of launching a survival craft whereby the craft is automatically released from a sinking ship and is ready for use;

"Free-fall launching" is that 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" is a protective suit which reduces the body heat loss of a person wearing it in cold water;

"Inflatable appliance" is an appliance which depends upon non-rigid, gas-filled chambers for buoyancy and which is normally kept uninflated until ready for use;

"Inflated appliance" is 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 as "the Code" in this Chapter) 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" is 96% of the total length on a waterline 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 waterline, if that be greater. In ships designed with a rake of keel the waterline on which this is measured shall be parallel to the designed waterline;

"Lightest sea-going condition" is 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" is an appliance for the rapid transfer of persons from the embarkation deck of a ship to a floating survival craft;

"Moulded depth"

(*a*) the moulded depth is the vertical distance measured from the top of the keel to the top of the freeboard deck beam at side. 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 shell 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" is 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" is the ability of a craft to return to its original position after the removal of a heeling moment;

"Recovery time" for a rescue boat is the time required to raise the boat to a position where persons on board can disembark to the deck of the ship. Recovery time 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" is a boat designed to rescue persons in distress and to marshal survival craft;

"Retrieval" is 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 3 of Chapter II-2;

"Short international voyage" is 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" is a craft capable of sustaining the lives of persons in distress from the time of abandoning the ship;

"Thermal protective aid" is a bag or suit made of waterproof material with low thermal conductance.

Regulation 4

Evaluation, Testing and Approval of Life-Saving Appliances and Arrangements

(*a*) Except as provided in paragraphs (*e*) and (*f*), life-saving appliances and arrangements required by this Chapter shall be approved by the Director.

(*b*) Before giving approval to life-saving appliances and arrangements, the Director will require that such life-saving appliances and arrangements:

(i) 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

(ii) have successfully undergone, to the satisfaction of the Director, tests which are substantially equivalent to those specified in those recommendations.

(*c*) Before giving approval to novel life-saving appliances or arrangements, the Director shall ensure that:

*Refer to the Recommendation on Testing of Life-Saving Appliances adopted by the Organisation by resolution A.689(17), as it may be amended.

(i) such appliances provide safety standards at least equivalent to the requirements of this Chapter and the Code and have been evaluated and tested based on the guidelines developed by the Organisation*; or

(ii) such arrangements have successfully undergone an engineering analysis, evaluation and approval in accordance with Regulation 38.

[S 366/2010 wef 01/07/2010]

(*d*) An approval granted by the Director may be subjected to any conditions as determined by the Director, the contravention of which would result in the withdrawal of such approval.

(*e*) 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.

(*f*) 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.

Regulation 5

Production Tests

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

Regulation 6

Communications

(*a*) Paragraph (*b*) applies to all passenger ships and to all cargo ships of 300 tons and upwards.

*Refer to the guidelines to be developed by the Organisation.

(*b*) *Radio life-saving appliances*

(i) Two-way VHF radiotelephone apparatus

(1) At least three two-way VHF radiotelephone apparatus shall be provided on every passenger ship and on every cargo ship of 500 tons and upwards. At least two 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 Organisation*.

(2) 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.

(ii) Search and rescue locating devices

At least one search and rescue locating device shall be carried on each side of every passenger ship and of every cargo ship of 500 tons and upwards. At least one search and rescue locating device shall be carried on every cargo ship of 300 tons and upwards but less than 500 tons. Such search and rescue locating devices shall conform to the applicable performance standards not inferior to those adopted by the Organisation.* The search and rescue locating devices** shall be stowed in such locations that they can be rapidly placed in any survival craft other than the liferaft or liferafts required by Regulation 31(*a*)(iv). Alternatively, one search and rescue locating device shall be stowed in each survival craft other than those required by Regulation 31(*a*)(iv). On ships carrying at least two search and rescue locating devices and equipped with free-fall lifeboats, one of the search and rescue

*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 Recommendation on performance standards for survival craft radar transponders for use in search and rescue operations, adopted by the Organisation by resolution MSC.247(83) (A.802(19), as amended) and the Recommendation on performance standards for survival craft AIS Search and Rescue transmitter (AIS SART), adopted by the Organisation by resolution MSC.246(83).

** One of these search and rescue locating devices may be the search and rescue locating device required by Regulation 7(*a*)(iii) of Chapter IV.

locating devices 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.

[S 664/2009 wef 01/01/2010]

(*c*) *Distress flares*

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.

(*d*) *On-board communications and alarm systems*

(i) 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.

(ii) 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.

(iii) The general emergency alarm system shall be audible throughout all the accommodation and normal crew working spaces. On passenger ships, the system shall also be audible on all open decks.

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(iv) On ships fitted with a marine evacuation system communication between the embarkation station and the platform or the survival craft shall be ensured.

(*e*) *Public address systems on passenger ships*

(i) In addition to the requirements of Regulation 40(*e*) or 41-2 (*d*)(ix) of Chapter II-2, as appropriate, and of paragraph (*d*)(ii), all passenger ships shall be fitted with a public address system. With respect to passenger ships constructed before 1st July 1997 the requirements of sub-paragraphs (ii) and (iv), subject to the

provisions of sub-paragraph (v), shall apply not later than the date of the first periodical survey after 1st July 1997.

(ii) 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.

(iii) On passenger ships constructed on or after 1st July 1997 —

(1) the public address system shall have at least two loops which shall be sufficiently separated throughout their length and have two separate and independent amplifiers; and

(2) the public address system and its performance standards shall be approved by the Director having regard to the recommendations adopted by the Organisation* **.

(iv) The public address system shall be connected to the emergency source of electrical power required by Regulation 42(*b*)(ii) of Chapter II-1.

(v) 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 sub-paragraphs (ii) and (iv) and paragraph 7.2.2.1 of the Code are not required to change their system.

Regulation 7

Personal Life-Saving Appliances

(*a*) *Lifebuoys*

(i) Lifebuoys complying with the requirements of paragraph 2.1.1 of the Code shall be —

(1) 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

(2) so stowed as to be capable of being rapidly cast loose, and not permanently secured in any way.

*Refer to the Code on Alarms and Indicators, 1995, adopted by the Organisation by resolution A.830(19).

**Refer to performance standards for public address systems, to be developed by the Organisation.

(ii) At least one lifebuoy on each side of the ship shall be fitted with a buoyant lifeline 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 waterline in the lightest seagoing condition, or 30 m, whichever is the greater.

(iii) 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 two 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 lifelines in compliance with the requirements of sub-paragraph (ii).

(iv) 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.

(*b*) *Lifejackets*

(i) A lifejacket 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 —

(1) for passenger ships on voyages less than 24 hours in duration, a number of infant lifejackets equal to at least 2.5% of the number of passengers on board shall be provided;

(2) for passenger ships on voyages 24 hours or more in duration, infant lifejackets shall be provided for each infant on board;

(3) a number of lifejackets 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 lifejacket for each child;

(4) lifejackets 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 lifejackets
More than 16 crew members	not less than 25% of crew members
Up to 16 crew members	not less than 4

These lifejackets should be stowed on the bridge, in the engine control room and at any other manned watch station; and

(5) if the adult lifejackets provided are not designed to fit persons weighing up to 140 kg and with a chest girth of up to 1,750 mm, a sufficient number of suitable accessories shall be available on board to allow them to be secured to such persons.

[S 366/2010 wef 01/07/2010]

(ii) Lifejackets 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 lifejackets provided in compliance with the requirements of sub-paragraph (i) may become inaccessible, alternative provisions shall be made to the satisfaction of the Director which may include an increase in the number of lifejackets to be carried.

(iii) The lifejackets 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.

(iv) Lifejackets 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.

(*c*) *Immersion suits and anti-exposure suits*

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.

Regulation 8

Muster List and Emergency Instructions

(*a*) This Regulation applies to all ships.

(*b*) 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.

(*c*) Muster lists and emergency instructions complying with the requirements of Regulation 37 shall be exhibited in conspicuous places throughout the ship including the navigation bridge, engine-room and crew accommodation spaces.

(*d*) 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 —

(i) their muster station;

(ii) the essential actions they must take in an emergency; and

(iii) the method of donning lifejackets.

Regulation 9

Operating Instructions

(*a*) This Regulation applies to all ships.

(*b*) Posters or signs shall be provided on or in the vicinity of survival craft and their launching controls and shall —

(i) illustrate the purpose of controls and the procedures for operating the appliance and give relevant instructions or warnings;

(ii) be easily seen under emergency lighting conditions; and

(iii) use symbols in accordance with the recommendations of the Organisation*.

Regulation 10

Manning of Survival Craft and Supervision

(*a*) This Regulation applies to all ships.

(*b*) There shall be a sufficient number of trained persons on board for mustering and assisting untrained persons.

(*c*) 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.

(*d*) A deck officer or certificated person shall be placed in charge of each survival craft to be used. However, 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.

*Refer to the Symbols Related to Life-Saving Appliances and Arrangements, adopted by the Organisation by resolution A.760(18).

(*e*) 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.

(*f*) Every motorised survival craft shall have a person assigned who is capable of operating the engine and carrying out minor adjustments.

(*g*) The master shall ensure the equitable distribution of persons referred to in paragraphs (*b*), (*c*) and (*d*) among the ship's survival craft.

Regulation 11

Survival Craft Muster and Embarkation Arrangements

(*a*) Lifeboats and liferafts for which approved launching appliances are required shall be stowed as close to accommodation and service spaces as possible.

(*b*) 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.

(*c*) Muster and embarkation stations shall be readily accessible from accommodation and work areas.

(*d*) Muster and embarkation stations shall be adequately illuminated by lighting supplied from the emergency source of electrical power required by Regulation 42 or 43 of Chapter II-1, as appropriate.

(*e*) 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 42 or 43 of Chapter II-1, as appropriate. In addition to and as part of the markings required under Regulation 28(*a*)(x) of Chapter II-2, routes to muster stations shall be indicated with the muster station symbol, intended for that purpose, in accordance with the recommendations of the Organisation*.

(*f*) 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.

(*g*) 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 waterline in the lightest seagoing condition under all 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 two adjacent embarkation stations for survival craft launched down the side of the

*Refer to the Symbols Related to Life-Saving Appliances and Arrangements and 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.

ship. However, 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 Regulation 31(*a*)(iv).

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(*h*) 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.

Regulation 12

Launching Stations

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.

Regulation 13

Stowage of Survival Craft

(*a*) Each survival craft shall be stowed —

(i) 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;

(ii) 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 over board launching, in such a position that the survival craft in the embarkation position is not less than 2 m above the waterline 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;

(iii) in a state of continuous readiness so that two crew members can carry out preparations for embarkation and launching in less than 5 minutes;

(iv) fully equipped as required by this Chapter and the Code; and

(v) 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 Regulation 31(*a*)(iv), shall not be stowed on or above a cargo tank, slop tank, or other tank containing explosive or hazardous cargoes.

(*b*) Lifeboats for lowering down the ship's side shall be stowed as far forward of the propeller as practicable. On cargo ships of 80 m in length and upwards but less than 120 m 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 m in length and upwards and passenger ships of 80 m 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.

(*c*) Lifeboats shall be stowed attached to launching appliances.

(*d*) (i) Every liferaft shall be stowed with its painter permanently attached to the ship.

(ii) 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.

(iii) Liferafts shall be so stowed as to permit manual release of one raft or container at a time from their securing arrangements.

(iv) Sub-paragraphs (i) and (ii) do not apply to liferafts required by Regulation 31(*a*)(iv).

(*e*) 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 (*a*)(ii) or by ship motion or power failure.

(*f*) 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 Regulation 31(*a*) to be capable of being launched on either side, are stowed on each side of the ship.

Regulation 14

Stowage of Rescue Boats

Rescue boats shall be stowed —

(i) in a state of continuous readiness for launching in not more than 5 minutes, and if the inflated type, in a fully inflated condition at all times;

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(ii) in a position suitable for launching and recovery;

(iii) 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

(iv) if it is also a lifeboat, in compliance with the requirements of Regulation 13.

Regulation 15

Stowage of Marine Evacuation Systems

(*a*) The ship's side shall not have any openings between the embarkation station of the marine evacuation system and the waterline in the lightest seagoing condition and means shall be provided to protect the system from any projections.

(*b*) 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 far as practicable, the system can be launched down the straight side of the ship.

(*c*) 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.

(*d*) Where appropriate, the ship shall be so arranged that the marine evacuation systems in their stowed positions are protected from damage by heavy seas.

Regulation 16

Survival Craft Launching and Recovery Arrangements

(*a*) 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 —

(i) boarded from a position on deck less than 4.5 m above the waterline in the lightest seagoing condition and which have a mass of not more than 185 kg;

(ii) boarded from a position on deck less than 4.5 m above the waterline in the lightest seagoing condition and which are stowed for launching directly from the stowed position under unfavourable conditions of trim of up to 10º and list of up to 20º either way;

(iii) 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;

(iv) 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 20º either way; or

(v) 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 10º and list of up to 20º either way.

(*b*) 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.

(*c*) 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.

(*d*) Only one type of release mechanism shall be used for similar survival craft carried on board the ship.

(*e*) 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.

(*f*) 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 10º and list of up to 20º either way.

(*g*) 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 42 or 43 of Chapter II-1, as appropriate.

(*h*) Means shall be available to prevent any discharge of water onto survival craft during abandonment.

(*i*) 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.

(*j*) 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 two lifelines 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 20º either way.

Regulation 17

Rescue Boat Embarkation, Launching and Recovery Arrangements

(*a*) The rescue boat embarkation and launching arrangements shall be such that the rescue boat can be boarded and launched in the shortest possible time.

(*b*) 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 11 and 12.

(*c*) Launching arrangements shall comply with the requirements of Regulation 16. However, 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.

(*d*) 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.

(*e*) 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.

Regulation 17-1

Recovery of Persons from the Water

(*a*) All ships shall have ship-specific plans and procedures for recovery of persons from the water, taking into account the guidelines developed by the Organisation.* The plans and procedures shall identify the equipment intended to be used for recovery purposes and measures to be taken to minimise the risk to shipboard personnel involved in recovery operations. Ships constructed before 1st July 2014 shall comply with this requirement by the first periodical or renewal safety equipment survey of the ship to be carried out after 1st July 2014, whichever comes first.

*Refer to the Guidelines for the Development of Plans and Procedures for Recovery of Persons from the Water (MSC.1/Circ. 1447).

(*b*) Ro-ro passenger ships which comply with Regulation 26(*d*) shall be deemed to comply with this Regulation.

[S 432/2014 wef 11/07/2014]

Regulation 18

Line-Throwing Appliances

A line-throwing appliance complying with the requirements of section 7.1 of the Code shall be provided.

Regulation 19

Emergency Training and Drills

(*a*) This regulation applies to all ships.

(*b*) *Familiarity with safety installations and practice musters*

(i) Every crew member with assigned emergency duties shall be familiar with these duties before the voyage begins.

(ii) On a ship engaged on a voyage where passengers are scheduled to be on board for more than 24 hours, musters of newly-embarked passengers shall take place prior to or immediately upon departure. Passengers shall be instructed in the use of the lifejackets and the action to take in an emergency.

[S 866/2014 wef 01/01/2015]

(iii) Whenever new passengers embark, a passenger safety briefing shall be given immediately before departure, or immediately after departure. The briefing shall include the instructions required by Regulation 8(*b*) and (*d*), 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 sub-paragraph (ii). 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.

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(*c*) *Drills*

(i) Drills shall, as far as practicable, be conducted as if there were an actual emergency.

(ii) 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.

(iii) Crew members with enclosed space entry or rescue responsibilities shall participate in an enclosed space entry and rescue drill to be held on board the ship at least once every 2 months.

[S 866/2014 wef 01/01/2015]

(iv) Abandon ship drill

(1) Each abandon ship drill shall include —

(A) summoning of passengers and crew to muster stations with the alarm required by Regulation 6(*d*)(ii) 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 lifejackets 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.

(2) Different lifeboats shall, as far as practicable, be lowered in compliance with the requirements of sub-paragraph (1)(E) at successive drills.

(3) Except as provided in sub-paragraphs (4) and (5), each lifeboat shall be launched, and manoeuvred in the water by its assigned operating crew, at least once every 3 months during an abandon ship drill.

[S 282/2006 wef 01/07/2006]

(4) In the case of a lifeboat arranged for free-fall launching, at least once every three months during an abandon ship drill the crew shall board the lifeboat, properly secure themselves in their seats and commence launch procedures up to but not including the actual release of the lifeboat (i.e., the release hook shall not be

released). The lifeboat shall then either be free-fall launched with only the required operating crew on board, or lowered into the water by means of the secondary means of launching with or without the operating crew on board. In both cases the lifeboat shall thereafter be manoeuvred in the water by the operating crew. At intervals of not more than six months, the lifeboat shall either be launched by free-fall with only the operating crew on board, or simulated launching shall be carried out in accordance with the guidelines developed by the Organization†.

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(5) 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. However, all such lifeboats shall be lowered at least once every 3 months and launched at least annually.

(6) 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.

(7) 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*.

(8) 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 Regulation 35(*d*). Additionally every system party member shall, as far as practicable, be further trained by participation in a full deployment of a similar system into 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 Regulation 20(*h*)(ii).

†Refer to Measures to prevent accidents with lifeboats (MSC.1/Circ.1206).

*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).

(9) Emergency lighting for mustering and abandonment shall be tested at each abandon ship drill.

[S 866/2014 wef 01/01/2015]

(v) Fire drills

(1) 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.

(2) Each fire drill shall include —

(A) reporting to stations and preparing for the duties described in the muster list required by Regulation 8;

(B) starting of a fire pump, using at least the two 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.

(3) 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.

[S 866/2014 wef 01/01/2015]

(vi) Enclosed space entry and rescue drills

(1) Enclosed space entry and rescue drills should be planned and conducted in a safe manner, taking into account, as appropriate, the guidance provided in the recommendations developed by the Organisation*.

(2) Each enclosed space entry and rescue drill shall include —

(A) checking and use of personal protective equipment required for entry;

(B) checking and use of communication equipment and procedures;

*Refer to the Revised Recommendations for Entering Enclosed Spaces Aboard Ships, adopted by the Organisation by resolution A.1050(27).

(C) checking and use of instruments for measuring the atmosphere in enclosed spaces;

(D) checking and use of rescue equipment and procedures; and

(E) instructions in first-aid and resuscitation techniques.

[S 866/2014 wef 01/01/2015]

(*d*) *On-board training and instructions*

(i) 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. However, 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.

(ii) Every crew member shall be given instructions which shall include but not necessarily be limited to —

(1) operation and use of the ship's inflatable liferafts;

(2) problems of hypothermia, first-aid treatment for hypothermia and other appropriate first-aid procedures;

(3) special instructions necessary for use of the ship's life-saving appliances in severe weather and severe sea conditions;

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(4) operation and use of fire-extinguishing appliances; and

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(5) risks associated with enclosed spaces, and onboard procedures, which should take into account, as appropriate, the guidance provided in recommendations developed by the Organisation*, for safe entry into such spaces.

[S 866/2014 wef 01/01/2015]

(iii) 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

*Refer to the Revised Recommendations for Entering Enclosed Spaces Aboard Ships, adopted by the Organisation by resolution A.1050(27).

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.

(*e*) *Records*

The date when musters are held, details of abandon ship drills and fire drills, enclosed space entry and rescue 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.

[S 866/2014 wef 01/01/2015]

Regulation 20

Operational Readiness, Maintenance and Inspections

(*a*) This Regulation applies to all ships. The requirements of paragraphs (*c*)(ii), (*c*)(iii) and (*f*)(ii) shall be complied with, as far as is practicable, on ships constructed before 1st July 1986.

[S 282/2006 wef 01/07/2006]

(*b*) *Operational readiness*

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.

(*c*) *Maintenance*

(i) Maintenance, testing and inspections of life-saving appliances shall be carried out based on the guidelines developed by the Organization* and in a manner having due regard to ensuring reliability of such appliances.

(ii) Instructions for on-board maintenance of life-saving appliances complying with Regulation 36 shall be provided and maintenance shall be carried out accordingly.

(iii) The Director may accept, in compliance with the requirements of sub-paragraph (ii), a shipboard planned maintenance programme, which includes the requirements of Regulation 36.

[S 282/2006 wef 01/07/2006]

(*d*) *Maintenance of falls*

* Refer to the Guidelines for periodic servicing and maintenance of lifeboats, launching appliances and on-load release gear (MSC/Circ.1093).

Falls used in launching shall be inspected periodically* with special regard for areas passing through sheaves, and renewed when necessary due to deterioration of the falls or at intervals of not more than 5 years, whichever is the earlier.

[S 339/2008 wef 01/07/2008]

(*e*) *Spares and repair equipment*

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.

(*f*) *Weekly inspection*

The following tests and inspections shall be carried out weekly and a report of the inspection shall be entered in the official log-book:

(i) all survival craft, rescue boats and launching appliances shall be visually inspected to ensure that they are ready for use. The inspection shall include, but is not limited to, the condition of hooks, their attachment to the lifeboat and the on-load release gear being properly and completely reset;

(ii) 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, a suitable water supply may be provided. In special cases, the Director may waive this requirement for ships constructed before 1st July 1986;

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(iii) lifeboats, except free-fall lifeboats, on cargo ships shall be moved from their stowed position, without any persons on board, to the extent necessary to demonstrate satisfactory operation of launching appliances, if weather and sea conditions so allow; and

(iv) the general emergency alarm shall be tested.

[S 282/2006 wef 01/07/2006]

(*g*) *Monthly inspections*

(i) All lifeboats, except free-fall lifeboats, shall be turned out from their stowed position, without any persons on board if weather and sea conditions so allow.

* Refer to Measures to prevent accidents with lifeboats (MSC.1/Circ.1206).

(ii) Inspection of the life-saving appliances, including lifeboat equipment, shall be carried out monthly using the checklist required by Regulation 36 (i) to ensure that they are complete and in good order. A report of the inspection shall be entered in the official log-book.

[S 282/2006 wef 01/07/2006]

(*h*) *Servicing of inflatable liferafts, inflatable lifejackets and marine evacuation systems and maintenance and repair of inflated rescue boats*

[S 339/2008 wef 01/07/2008]

(i) Every inflatable liferaft, inflatable lifejacket, and marine evacuation systems shall be serviced —

(1) at intervals not exceeding 12 months, provided where in any case this is impracticable, the Director may extend this period to 17 months; and

(2) at an approved servicing station which is competent to service them, maintains proper servicing facilities and uses only properly trained personnel*.

(ii) Rotational deployment of marine evacuation systems

In addition to or in conjunction with the servicing intervals of marine evacuation systems required by sub-paragraph (i), 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 six years.

(iii) New and novel inflatable liferaft arrangements approved by the Director pursuant to Regulation 4 may be allowed extended service intervals on the following conditions:

(1) The new and novel liferaft arrangement has proved to maintain the same standard, as required by testing procedures, during extended service intervals.

(2) The liferaft system shall be checked on board by certified personnel according to sub-paragraph (i)(1).

(3) Service at intervals not exceeding 5 years shall be carried out in accordance with the recommendations of the Organisation*.

(iv) 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; however, permanent repairs shall be effected at an approved servicing station.

*Refer to the Recommendation on Conditions for the Approval of Servicing Stations for Inflatable Liferafts adopted by the Organisation by resolution A.761(18).

(*i*) *Periodic servicing of hydrostatic release units*

Hydrostatic release units, other than disposable hydrostatic release units, 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 a servicing station which is competent to service them, maintains proper servicing facilities and uses only properly trained personnel.

(*j*) *Marking of stowage locations*

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.

(*k*) *Periodic servicing of launching appliances and on-load release gear*

(i) Launching appliances shall be —

(1) maintained in accordance with instructions for on-board maintenance as required by Regulation 36;

(2) subject to a thorough examination at the annual surveys required by Regulation 7 or 8 of Chapter I, as applicable; and

(3) upon completion of the examination referred to in sub-paragraph (2) subjected to a dynamic test of the winch brake at maximum lowering speed. The load to be applied shall be the mass of the survival craft or rescue boat without persons on board, except that, at intervals not exceeding five years, the test shall be carried out with a proof load equal to 1.1 times the weight of the survival craft or rescue boat and its full complement of persons and equipment.

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(ii) Lifeboat or rescue boat on-load release gear, including free-fall lifeboat release systems, shall be —

(1) maintained in accordance with instructions for on-board maintenance as required by Regulation 36;

*Refer to the symbols Related to Life-Saving Appliances and Arrangements, adopted by the Organisation by resolution A.760(18).

(2) subject to a thorough examination and operational test during the annual surveys required by Regulations 7 and 8 of Chapter I by properly trained personnel familiar with the system;

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(3) operationally tested under a load of 1.1 times the total mass of the boat when loaded with its full complement of persons and equipment whenever the release gear is overhauled. Such over-hauling and test shall be carried out at least once every 5 years; and*

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(4) in the case of free-fall lifeboat release systems, operationally tested either by a free-fall launch with only the operating crew on board or by a simulated launching carried out based on guidelines developed by the Organisation**, notwithstanding sub-paragraph (3).

[S 847/2013 wef 01/01/2014]

(iii) Davit-launched liferaft automatic release hooks shall be —

(1) maintained in accordance with instructions for on-board maintenance as required by Regulation 36;

(2) subject to a thorough examination and operational test during the annual surveys required by Regulations 7 and 8 of Chapter I by properly trained personnel familiar with the system; and

(3) operationally tested under a load of 1.1 times the total mass of the liferaft when loaded with its full complement of persons and equipment whenever the automatic release hook is overhauled. Such over-hauling and test shall be carried out at least once every five years.*

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SECTION II — PASSENGER SHIPS (ADDITIONAL REQUIREMENTS)

Regulation 21

Survival Craft and Rescue Boats

*Refer to the Recommendation on testing of life-saving appliances, adopted by the Organization 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 Organization by resolution MSC.81(70).

** Refer to Measures to Prevent Accidents with Lifeboats (MSC.1/Circ.1206/Rev.1).

(*a*) *Survival craft*

(i) Passenger ships engaged on international voyages which are not short international voyages shall carry —

(1) 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

(2) 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 (1) or equivalent approved appliances capable of being used on both sides. However, stowage of these liferafts need not comply with the requirements of Regulation 13(*e*).

(ii) Passenger ships engaged on short international voyages shall carry —

(1) 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

(2) 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 (1) or

equivalent approved appliances capable of being used on both sides. However, stowage of these liferafts need not comply with the requirements of Regulation 13(*e*).

(iii) 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 after all persons have been assembled, with lifejackets donned.

[S 339/2008 wef 01/07/2008]

(iv) In lieu of meeting the requirements of sub-paragraph (i) or (ii), passenger ships of less than 500 tons where the total number of persons on board is less than 200, may comply with the following:

(1) 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;

(2) unless the liferafts required by sub-paragraph (1) 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;

(3) if the rescue boat required by paragraph (*b*)(ii) 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 (1), 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

(4) 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.

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(v) A marine evacuation system or systems complying with section 6.2 of the Code may be substituted for the equivalent capacity of liferafts and launching appliances required by sub-paragraph (i)(1) or (ii)(1).

[S 339/2008 wef 01/07/2008]

(*b*) *Rescue boats*

(i) 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.

(ii) 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.

(iii) A lifeboat may be accepted as a rescue boat provided that it and its launching and recovery arrangements also comply with the requirements for a rescue boat.

[S 339/2008 wef 01/07/2008]

(*c*) *Marshalling of liferafts*

(i) 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 six liferafts need be marshalled by each lifeboat or rescue boat.

(ii) The number of lifeboats and rescue boats that are carried on passenger ships engaged on short international voyages shall be sufficient to ensure that in providing for abandonment by the total number of persons on board not more than nine liferafts need be marshalled by each lifeboat or rescue boat.

[S 339/2008 wef 01/07/2008]

Regulation 22

Personal Life-Saving Appliances

(*a*) *Lifebuoys*

(i) A passenger ship shall carry not less than the number of lifebuoys complying with the requirements of Regulation 7(*a*) 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

(ii) Notwithstanding Regulation 7(*a*)(iii), passenger ships of under 60 m in length shall carry not less than six lifebuoys provided with self-igniting lights.

(*b*) *Lifejackets*

(i) In addition to the lifejackets required by Regulation 7(*b*), every passenger ship shall carry lifejackets for not less than 5% of the total number of persons on board. These lifejackets shall be stowed in conspicuous places on deck or at muster stations.

(ii) Where lifejackets for passengers are stowed in staterooms which are located remotely from direct routes between public spaces and muster stations, the additional lifejackets for these passengers required under Regulation 7(*b*)(ii), shall be stowed either in the public spaces, the muster stations, or on direct routes between them. The lifejackets shall be stowed so that their distribution and donning does not impede orderly movement to muster stations and survival craft embarkation stations.

(*c*) *Lifejacket lights*

(i) On all passenger ships each lifejacket shall be fitted with a light complying with the requirements of paragraph 2.2.3 of the Code.

(ii) Lights fitted on lifejackets 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 lifejacket light would normally be replaced or until the first periodical survey after 1st July 2002, whichever is the earliest.

(*d*) *Immersion suits and thermal protective aids*

(i) All passenger ships shall carry for each lifeboat on the ship at least three 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:

(1) for persons to be accommodated in totally or partially enclosed lifeboats; or

(2) if the ship is constantly engaged on voyages in warm climates where, in the opinion of the Director, they are unnecessary.

(ii) The provisions of sub-paragraph (i)(1) 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.

Regulation 23

Survival Craft and Rescue Boat Embarkation Arrangements

(*a*) On passenger ships, survival craft embarkation arrangements shall be designed for —

(i) all lifeboats to be boarded and launched either directly from the stowed position or from an embarkation deck but not both; and

(ii) 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 Regulation 13(*e*), the liferaft is transferred prior to launching.

(*b*) 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*)(i), 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.

Regulation 24

Stowage of survival craft

The stowage height of a survival craft on a passenger ship shall take into account the requirements of Regulation 13(*a*)(ii), the escape provisions of Regulation 28 of Chapter II-2, 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 m to the waterline when the ship is in its lightest seagoing condition.

Regulation 25

Muster Stations

Every passenger ship shall, in addition to complying with the requirements of Regulation 11, have passenger muster stations which shall —

(i) be in the vicinity of, and permit ready access for the passengers to, the embarkation stations unless in the same locations; and

(ii) have ample room for marshalling and instruction of the passengers, but at least 0.35 m^2 per passenger.

Regulation 26

Additional Requirements for Ro-ro Passenger Ships

(*a*) This Regulation applies to all ro-ro passenger ships. Ro-ro passenger ships constructed —

(i) on or after 1st July 1998 shall comply with the requirements of paragraphs (*b*)(iii), (*b*)(iv), (*c*)(i), (*c*)(ii), (*c*)(iii), (*d*) and (*e*);

(ii) on or after 1st July 1986 and before 1st July 1998 shall comply with the requirements of paragraph (*e*) not later than the first periodical survey after 1st July 1998 and with the requirements of paragraphs (*b*)(iii), (*b*)(iv), (*c*) and (*d*) not later than the first periodical survey after 1st July 2000;

[S 217/2004 wef 01/07/2004]

(iii) before 1st July 1986 shall comply with the requirements of paragraph (*e*) not later than the first periodical survey after 1st July 1998 and with the requirements of paragraphs (*b*)(i), (*b*)(ii), (*b*)(iii), (*b*)(iv), (*c*) and (*d*) not later than the first periodical survey after 1st July 2000; and

[S 217/2004 wef 01/07/2004]

(iv) before 1st July 2004 shall comply with the requirements of paragraph (*b*)(v) not later than the first survey on or after 1st July 2004.

[S 217/2004 wef 01/07/2004]

(*b*) *Liferafts*

(i) 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.

(ii) Every liferaft on ro-ro passenger ships shall be provided with float-free stowage arrangements complying with the requirements of Regulation 13(*d*).

(iii) 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.

(iv) 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*.

(v) Liferafts carried on ro-ro passenger ships shall be fitted with a search and rescue locating device in the ratio of one search and rescue locating device for every four liferafts. The search and rescue locating device shall be mounted inside the liferaft so its antenna is more than one metre above the sea level when the liferaft is deployed, except that for canopied reversible liferafts the search and rescue locating device shall be so arranged as to be readily accessed and erected by survivors. Each search and rescue locating device shall be arranged to be manually erected when the liferaft is deployed. Containers of liferafts fitted with search and rescue locating devices shall be clearly marked.

[S 664/2009 wef 01/01/2010]

(*c*) *Fast rescue boats*

(i) At least one of the rescue boats on a ro-ro passenger ship shall be a fast rescue boat complying with section 5.1.4 of the Code.

[S 339/2008 wef 01/07/2008]

(ii) Each fast rescue boat shall be served by a suitable launching appliance complying with section 6.1.7 of the Code.

[S 339/2008 wef 01/07/2008]

(iii) At least two 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.

(iv) 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 sub-paragraph (i), the fast rescue boat

*Refer to the requirements for automatically self-righting liferafts and canopied reversible liferafts, to be developed by the Organisation.

***Refer to the recommendation on training requirements for crews of fast rescue boats, adopted by the Organisation by resolution A.771(18) and section A-VI/2, table A-VI/2-2 "Specification of the minimum standard of competence in fast rescue boats" of the Seafarers' Training, Certification and Watchkeeping (STCW) Code.

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:

(1) the fast rescue boat installed is served by a launching appliance complying with the provisions of sub-paragraph (ii);

(2) 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

(3) such liferafts are served by the existing launching appliances or marine evacuation systems.

(*d*) *Means of rescue*

(i) 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.

(ii) 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.

(iii) 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.

(*e*) *Lifejackets*

(i) Notwithstanding the requirements of Regulations 7(*b*) and 22(*b*), a sufficient number of lifejackets shall be stowed in the vicinity of the muster stations so that passengers do not have to return to their cabins to collect their lifejackets.

(ii) In ro-ro passenger ships, each lifejacket shall be fitted with a light complying with the requirements of paragraph 2.2.3 of the Code.

Regulation 27

Information on Passengers

(*a*) All persons on board all passenger ships shall be counted prior to departure.

(*b*) 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.

(*c*) 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.

(*d*) The information required by paragraphs (*a*), (*b*) and (*c*) shall be kept ashore and made readily available to search and rescue services when needed.

(*e*) The Director may exempt passenger ships from the requirements of paragraph (*c*), if the scheduled voyages of such ships render it impracticable for them to prepare such records.

Regulation 28

Helicopter Landing and Pick-Up Areas

(*a*) 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*.

(*b*) Ro-ro passenger ships of 130 m 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**.

[S 533/2001 wef 01/01/2008]

Regulation 29

Decision Support System for Masters of Passenger Ships

(*a*) 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.

(*b*) In all passenger ships, a decision support system for emergency management shall be provided on the navigation bridge.

(*c*) 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:

(i) fire;

(ii) damage to ship;

*Refer to the Merchant Ship Search and Rescue Manual (MERSAR), adopted by the Organisation by resolution A.229 (VII), as amended and as it may be amended.

**Refer to recommendations to be developed by the Organisation.

*Refer to the International Safety Management (ISM) Code, Chapter 8 and the guidelines for a structure of an integrated system for shipboard emergency plans.

(iii) pollution;

(iv) unlawful acts threatening the safety of the ship and the security of its passengers and crew;

(v) personnel accidents;

(vi) cargo-related accidents; and

(vii) emergency assistance to other ships.

(viii) Notwithstanding the requirements of sub-paragraph (i), bulk carriers as defined in Regulation 1 of Chapter IX constructed on or after 1st July 2006 shall comply with the requirements of sub-paragraph (ii).

[S 282/2006 wef 01/07/2006]

(*d*) The emergency procedures established in the emergency plan or plans shall provide decision support to masters for handling any combination of emergency situations.

(*e*) 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.

(*f*) 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.

Regulation 30

Drills

(*a*) This Regulation applies to all passenger ships.

(*b*) 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 Regulation 19(*c*)(ii). Passengers shall be strongly encouraged to attend these drills.

SECTION III — CARGO SHIPS
(ADDITIONAL REQUIREMENTS)

Regulation 31

Survival Craft and Rescue Boats

(*a*) *Survival craft*

(i) Cargo ships shall carry —

(1) 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

(2) in addition, one or more inflatable or rigid liferafts, complying with the requirements of section 4.2 or 4.3 of the Code, of a mass of less than 185 kg and, 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 of a mass of less than 185 kg and 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.

[S 339/2008 wef 01/07/2008]

(ii) In lieu of meeting the requirements of sub-paragraph (i), cargo ships may carry —

(1) 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

(2) 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.

(iii) In lieu of meeting the requirements of sub-paragraph (i) or (ii), cargo ships of less than 85 m in length other than oil tankers, chemical tankers and gas carriers, may comply with the following:

(1) 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;

(2) unless the liferafts required by sub-paragraph (1) are of a mass of less than 185 kg and 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;

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(3) if the rescue boat required by paragraph (*b*) 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 (1), 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

(4) 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 of a mass of less than 185 kg and 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.

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(iv) 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 m shall carry, in addition to the liferafts required by sub-paragraphs (i)(2) and (ii)(2), 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.

(v) With the exception of the survival craft referred to in Regulation 16(*a*)(i), 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.

(vi) 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.

(vii) Oil tankers, chemical tankers and gas carriers carrying cargoes having a flashpoint not exceeding 60°C (closed cup test) shall carry, in lieu of

*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) and in Chapter 19 of the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code), adopted by the Maritime Safety Committee by resolution MSC.5(48).

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.

(viii) Notwithstanding the requirements of sub-paragraph (i), bulk carriers as defined in Regulation 1 of Chapter IX constructed on or after 1st July 2006 shall comply with the requirements of sub-paragraph (ii).

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(*b*) *Rescue boats*

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 and its launching and recovery arrangements also comply with the requirements for a rescue boat.

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(*c*) In addition to their lifeboats, all cargo ships constructed before 1st July 1986 shall carry —

(i) 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

(ii) 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 m, in addition to the liferafts required by sub-paragraph (i), 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 sub-paragraph (i), such liferaft or liferafts may be securely fastened so as to permit manual release.

Regulation 32

Personal Life-Saving Appliances

(*a*) *Lifebuoys*

(i) Cargo ships shall carry not less than the number of lifebuoys complying with the requirements of Regulation 7(*a*) 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

(ii) Self-igniting lights for lifebuoys on tankers required by Regulation 7(*a*)(iii) shall be of an electric battery type.

(*b*) *Lifejacket lights*

(i) This paragraph applies to all cargo ships.

(ii) On cargo ships, each lifejacket shall be fitted with a lifejacket light complying with the requirements of paragraph 2.2.3 of the Code.

(iii) Lights fitted on lifejackets 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 lifejacket light would normally be replaced or until the first periodical survey after 1st July 2001, whichever is the earliest.

(*c*) *Immersion suits*

(i) This paragraph applies to all cargo ships. However, with respect to cargo ships constructed before 1st July 2006, sub-paragraphs (ii) to (v) shall be complied with not later than the first safety equipment survey on or after 1st July 2006.

(ii) An immersion suit of an appropriate size, complying with the requirements of section 2.3 of the Code shall be provided for every person on board the ship. However, for ships other than bulk carriers, as defined in Regulation 1 of Chapter IX, these immersion suits need not be required if the ship is constantly engaged on voyages in warm climates* where, in the opinion of the Director, immersion suits are unnecessary.

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(iii) If a ship has any watch or work stations which are located remotely from the place or places where immersion suits are normally stowed, including remotely located survival craft carried in accordance with paragraph (*a*)(iv) of Regulation 31**, additional immersion suits of an appropriate size shall be provided at these locations for the number of persons normally on watch or working at those locations at any time.

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(iv) Immersion suits shall be so placed as to be readily accessible and their position shall be plainly indicated.

*Refer to the Guidelines for assessment of thermal protection (MSC/Circ.1046).

**Reference is made to MSC.1/Circ.1243 (Unified Interpretationof SOLAS Chapter III).

(v) The immersion suits required by this Regulation may be used to comply with the requirements of Regulation 7(*c*).

[S 282/2006 wef 01/07/2006]

Regulation 33

Survival Craft Embarkation and Launching Arrangements

(*a*) 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 Regulation 13(*e*).

(*b*) 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

Regulation 34

Compliance with the LSA Code

All life-saving appliances and arrangements shall comply with the applicable requirements of the Code.

SECTION V — MISCELLANEOUS

Regulation 35

Training Manual and On-Board Training Aids

(*a*) This Regulation applies to all ships.

(*b*) A training manual complying with the requirements of paragraph (*c*) shall be provided in each crew mess room and recreation room or in each crew cabin.

(*c*) 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:

(i) donning of lifejackets, immersion suits and anti-exposure suits, as appropriate;

(ii) muster at the assigned stations;

(iii) boarding, launching, and clearing the survival craft and rescue boats, including, where applicable, use of marine evacuation systems;

(iv) method of launching from within the survival craft;

(v) release from launching appliances;

(vi) methods and use of devices for protection in launching areas, where appropriate;

(vii) illumination in launching areas;

(viii) use of all survival equipment;

(ix) use of all detection equipment;

(x) with the assistance of illustrations, the use of radio life-saving appliances;

(xi) use of drogues;

(xii) use of engine and accessories;

(xiii) recovery of survival craft and rescue boats including stowage and securing;

(xiv) hazards of exposure and the need for warm clothing;

(xv) best use of the survival craft facilities in order to survive;

(xvi) 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;

(xvii) all other functions contained in the muster list and emergency instructions; and

(xviii) instructions for emergency repair of the life-saving appliances.

(*d*) Every ship fitted with a marine evacuation system shall be provided with on-board training aids in the use of the system.

(*e*) The training manual shall be written in the working language of the ship.

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Regulation 36

Instructions for On-Board Maintenance

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:

(i) a checklist for use when carrying out the inspections required by Regulation 20(*g*);

(ii) maintenance and repair instructions;

(iii) schedule of periodic maintenance;

(iv) diagram of lubrication points with the recommended lubricants;

(v) list of replaceable parts;

(vi) list of sources of spare parts; and

(vii) log for records of inspections and maintenance.

Regulation 37

Muster List and Emergency Instructions

(*a*) 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.

(*b*) Each passenger ship shall have procedures in place for locating and rescuing passengers trapped in their staterooms.

(*c*) The muster list shall show the duties assigned to the different members of the crew including —

(i) closing of the watertight doors, fire doors, valves, scuppers, sidescuttles, skylights, portholes and other similar openings in the ship;

(ii) equipping of the survival craft and other life-saving appliances;

(iii) preparation and launching of survival craft;

(iv) general preparations of other life-saving appliances;

(v) muster of passengers;

(vi) use of communication equipment;

(vii) manning of fire parties assigned to deal with fire; and

(viii) special duties assigned with respect to the use of fire-fighting equipment and installations.

(*d*) 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.

(*e*) The muster list shall specify substitutes for key persons who may become disabled, taking into account that different emergencies may call for different actions.

(*f*) 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 —

(i) warning the passengers;

(ii) seeing that they are suitably clad and have donned their lifejackets correctly;

(iii) assembling passengers at muster stations;

(iv) keeping order in the passageways and on the stairways and generally controlling the movements of the passengers; and

(v) ensuring that a supply of blankets is taken to the survival craft.

(*g*) 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.

(*h*) The format of the muster list used on passenger ships shall be approved.

PART C — ALTERNATIVE DESIGN AND ARRANGEMENTS

Regulation 38

Alternative Design and Arrangements

(*a*) *Purpose*

The purpose of this Regulation is to provide a methodology for alternative design and arrangements for life-saving appliances and arrangements.

(*b*) *General*

(i) Life-saving appliances and arrangements may deviate from the requirements set out in Part B, provided that the alternative design and arrangements meet the intent of the requirements concerned and provide an equivalent level of safety to this Chapter.

(ii) When alternative design and arrangements deviate from the prescriptive requirements of Part B, an engineering analysis,

evaluation and approval of the design and arrangements shall be carried out in accordance with this Regulation.

(*c*) *Engineering analysis*

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:

(i) determination of the ship type and the life-saving appliance and arrangments concerned;

(ii) identification of the prescriptive requirements with which the life-saving appliance and arrangements will not comply;

(iii) identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognised engineering or industry standards;

(iv) determination of the performance criteria for the ship and the life-saving appliance and arrangements concerned addressed by all of the following relevant prescriptive requirements:

(1) the performance criteria shall provide a level of the safety not inferior to the relevant prescriptive requirements contained in Part B; and

(2) the performance criteria shall be quantifiable and measureable;

(v) a 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;

(vi) technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and

(vii) risk assessment based on identification of the potential faults and hazards associated with the proposal.

(*d*) *Evaluation of the alternative design and arrangements*

(i) The engineering analysis required in paragraph (*c*) shall be evaluated and approved by the Director, taking into account the guidelines developed by the Organisation*.

(ii) 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 on Alternative Design and Arrangements for SOLAS Chapters II-1 and III (MSC.1/Circ.1212).

*Refer to the Guidelines on Alternative Design and Arrangements for SOLAS Chapters II-1 and III (MSC.1/Circ.1212).

(*e*) *Exchange of information*

The Director shall communicate to the Organisation pertinent information concerning the approved alternative design and arrangements for circulation to all Contracting Governments.

(*f*) *Re-evaluation due to change of conditions*

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.

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CHAPTER IV

RADIOCOMMUNICATIONS

PART A — GENERAL

Regulation 1

Application

(*a*) Unless expressly provided otherwise, this Chapter applies to all ships to which these Regulations apply and to cargo ships of 300 tons and upwards.

(*b*) 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*.

(*c*) [*Deleted by S 645/2003 wef 01/01/2004*]

(*d*) 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.

Regulation 2

Terms and Definitions

(*a*) For the purpose of this Chapter, the following terms shall have the meanings defined below —

(i) "Bridge-to-bridge communications" means safety communications between ships from the position from which the ships are normally navigated;

*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) "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;

(iii) "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);

(iv) "Direct-printing telegraphy" means automated telegraphy techniques which comply with the relevant recommendations of the International Radio Consultative Committee (CCIR);

(v) "General radiocommunications" means operational and public correspondence traffic, other than distress, urgency and safety messages, conducted by radio;

(vi) "INMARSAT" means the Organisation established by the Convention on the International Maritime Satellite Organisation (INMARSAT) adopted on 3rd September 1976;

(vii) "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*;

(viii) "Locating" means the finding of ships, aircraft, units or persons in distress;

(ix) "Maritime safety information" means navigational and meteorological warnings, meteorological forecasts and other urgent safety related messages broadcast to ships;

(x) "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;

(xi) "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;

(xii) "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*;

*Reference is made to the NAVTEX manual approved by the Organisation.

(xiii) "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*;

(xiv) "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;

(xv) "Sea area A4" means an area outside sea areas A1, A2 and A3.

(xvi) "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.

[S 314/2002 wef 01/07/2002]

(*b*) 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.

[S 314/2002 wef 01/07/2002]

Regulation 3

Exemptions

(*a*) The Director may grant partial or conditional exemptions to individual ships from the requirements of Regulations 7 to 11 provided such ships comply with the functional requirements of Regulation 4.

(*b*) An exemption may be granted under paragraph (*a*) only —

(i) if the conditions affecting safety are such as to render the full application of Regulations 7 to 11 unreasonable or unnecessary; or

[S 645/2003 wef 01/01/2004]

(ii) in exceptional circumstances, for a single voyage outside the sea area or sea areas for which the ship is equipped.

[S 645/2003 wef 01/01/2004]

(iii) [*Deleted by S 645/2003 wef 01/01/2004*]

Regulation 4

Functional Requirements

*Reference is made to the recommendation on the provision of radiocommnication services for the global maritime distress and safety system, to be developed by the Organisation (see MSC 55/25, annex 3).

Every ship, while at sea, shall be capable —

(i) except as provided in sub-paragraphs (*a*)(i) of Regulation 8 and (*a*)(iv)(3) of Regulation 10, of transmitting ship-to-shore distress alerts by at least two separate and independent means, each using a different radiocommunication service;

(ii) of receiving shore-to-ship distress alerts;

(iii) of transmitting and receiving ship-to-ship distress alerts;

(iv) of transmitting and receiving search and rescue co-ordinating communications;

(v) of transmitting and receiving on-scene communications;

(vi) of transmitting and, as required by sub-paragraph (2) of paragraph (*b*)(iii) of Regulation 19 of Chapter V, receiving signals for locating*;

[S 645/2003 wef 01/01/2004]

(vii) of transmitting and receiving** maritime safety information;

(viii) of transmitting and receiving general radio-communications to and from shore-based radio systems or networks subject to paragraph (*h*) of Regulation 15; and

(ix) of transmitting and receiving bridge-to-bridge communications.

PART B — RESPONSIBILITY OF THE MASTER

Regulation 5

Voyages to be kept within the appropriate Sea Areas

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.

Regulation 5-1

Global Maritime Distress and Safety System Identities

(*a*) This Regulation applies to all ships on all voyages.

*Reference is made to resolution A.614(15) on carriage of radar operating in the frequency band 9,300-9,500 MHz adopted by the fifteenth Assembly.

**It should be noted that ships may have a need for reception of certain maritime safety information while in port.

(*b*) The master or owner of every ship shall register their Global Maritime Distress and Safety System (GMDSS) identities with the Director.

[S 314/2002 wef 01/07/2002]

PART C — SHIP REQUIREMENTS

Regulation 6

Radio Installations

(*a*) Every ship shall be provided with radio installations capable of complying with the functional requirements prescribed by Regulation 4 throughout its intended voyage and, unless exempted under Regulation 3, complying with the requirements of Regulation 7 and, as appropriate for the sea area or areas through which it will pass during its intended voyage, the requirements of either Regulation 8, 9, 10 or 11.

(*b*) Every radio installation shall —

(i) 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;

(ii) be so located as to ensure the greatest possible degree of safety and operational availability;

(iii) be protected against harmful effects of water, extremes of temperature and other adverse environmental conditions;

(iv) 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

(v) be clearly marked with the call sign, the ship station identity and other codes as applicable for the use of the radio installation.

(*c*) Control of the VHF radiotelephone channels, required for navigational safety, shall be immediately available on the navigating bridge convenient to the conning position and, where necessary, facilities should be available to permit radio-communications from the wings of the navigating bridge. Portable VHF equipment may be used to meet the latter provision.

(*d*) 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 or buttons have been pressed. Means shall be provided to prevent inadvertent activation of the button or buttons. 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.

(*e*) 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 or buttons on the distress panel is pressed.

(*f*) 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 or alerts received on board and shall also indicate through which radio-communication service the distress alerts have been received.

Regulation 7

Radio Equipment — General

(*a*) Every ship shall be provided with:

(i) a VHF radio installation capable of transmitting and receiving —

(1) 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

(2) radiotelephony on the frequencies 156.300 MHz (channel 6), 156.650 MHz (channel 13) and 156.800 MHz (channel 16);

(ii) 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 sub-paragraph (i)(1)***;

(iii) a search and rescue locating device capable of operating either in the 9 GHz band or on frequencies dedicated for AIS, which —

(1) shall be so stowed that it can be easily utilized; and

*Digital selective calling (DSC) for all ships and HF direct-printing telegraphy (NBDP) carriage requirements for ships of 300 tons and over but less than 1,600 tons are subject to review in accordance with resolution A.606 (15) — Review and evaluation of the GMDSS. Unless otherwise specified this footnote applies to all DSC and NBDP requirements prescribed in the Convention.

**Certain ships may be exempted from this requirement (see paragraph (*d*) of Regulation 9, (*d*) of Regulation 10 and (*b*) of Regulation 11).

***Certain ships may be exempted from this requirement (see paragraph (*d*) of Regulation 9, (*d*) of Regulation 10 and (*b*) of Regulation 11).

(2) may be one of those required by sub-paragraph (*b*)(ii) of Regulation 6 of Chapter III for a survival craft;

[S 664/2009 wef 01/01/2010]

(iv) 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;

(v) 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. However, 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 exempt from this requirement**.

(vi) subject to the provisions of paragraph (*c*) of Regulation 8, a satellite emergency position-indicating radio beacon (satellite EPIRB) which shall be —

(1) capable of transmitting a distress alert through the polar orbiting satellite service in the 406 MHz band;

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(2) installed in an easily accessible position;

(3) ready to be manually released and capable of being carried by one person into a survival craft;

(4) capable of floating free if the ship sinks and of being automatically activated when afloat; and

(5) capable of being activated manually.

(*b*) [*Deleted by S 645/2003 wef 01/01/2004*]

(*c*) [*Deleted by S 645/2003 wef 01/01/2004*]

(*d*) [*Deleted by S 645/2003 wef 01/01/2004*]

(*e*) 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.

*Digital selective calling (DSC) for all ships and HF direct-printing telegraphy (NBDP) carriage requirements for ships of 300 tons and over but less than 1,600 tons are subject to review in accordance with resolution A.606 (15) — Review and evaluation of the GMDSS. Unless otherwise specified this footnote applies to all DSC and NBDP requirements prescribed in the Convention.

**Reference is made to the recommendation on promulgation of maritime safety information, to be developed by the Organisation (see MSC 55/25, annex 8).

Regulation 8

Radio Equipment — Sea Area A1

(*a*) In addition to meeting the requirements of Regulation 7, 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 —

(i) on VHF using DSC; this requirement may be fulfilled by the EPIRB prescribed by paragraph (*c*), either by installing the EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; or

(ii) through the polar orbiting satellite service on 406 MHz; this requirement may be fulfilled by the satellite EPIRB, required by sub-paragraph (*a*)(vi) of Regulation 7, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; or

(iii) if the ship is engaged on voyages within coverage of MF coast stations equipped with DSC, on MF using DSC; or

(iv) on HF using DSC; or

(v) through the INMARSAT geostationary satellite service; this requirement may be fulfilled by —

(1) an INMARSAT ship earth station*; or

(2) the satellite EPIRB, required by sub-paragraph (*a*)(vi) of Regulation 7, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated.

(*b*) The VHF radio installation, required by sub-paragraph (*a*)(i) of Regulation 7, shall also be capable of transmitting and receiving general radio-communications using radiotelephony.

(*c*) Ships engaged on voyages exclusively in sea area A1 may carry, in lieu of the satellite EPIRB required by sub-paragraph (*a*)(vi) of Regulation 7, an EPIRB which shall be —

(i) 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;

*This requirement can be met by INMARSAT ship earth stations capable of two-way communications, such as Standard-A or Standard-C ship earth stations. Unless otherwise specified, this footnote applies to all requirements for an INMARSAT ship earth station prescribed by this Chapter.

(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 being automatically activated when afloat; and

(v) capable of being activated manually.

Regulation 9

Radio Equipment — Sea Areas A1 and A2

(*a*) In addition to meeting the requirements of Regulation 7, every ship engaged on voyages beyond sea area A1, but remaining within sea area A2, shall be provided with:

(i) an MF radio installation capable of transmitting and receiving, for distress and safety purposes, on the frequencies —

(1) 2,187.5 kHz using DSC; and

(2) 2,182 kHz using radiotelephony;

(ii) 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)(1); and

(iii) means of initiating the transmission of ship-to-shore distress alerts by a radio service other than MF operating either —

(1) through the polar orbiting satellite service on 406 MHz; this requirement may be fulfilled by the satellite EPIRB, required by sub-paragraph (*a*)(vi) of Regulation 7, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; or

(2) on HF using DSC; or

(3) through the INMARSAT geostationary satellite service by a ship earth station.

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(*b*) It shall be possible to initiate transmission of distress alerts by the radio installations specified in sub-paragraphs (*a*)(i) and (*a*)(iii) from the position from which the ship is normally navigated.

(*c*) The ship shall, in addition, be capable of transmitting and receiving general radio-communications using radiotelephony or direct-printing telegraphy by either —

(i) 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 sub-paragraph (*a*)(i); or

(ii) an INMARSAT ship earth station.

(*d*) The Director may exempt ships constructed before 1st February 1997, which are engaged exclusively on voyages within sea area A2, from the requirements of sub-paragraphs (*a*)(i)(1) and (*a*)(ii) of Regulation 7 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.

Regulation 10

Radio Equipment — Sea Areas A1, A2 and A3

(*a*) In addition to meeting the requirements of Regulation 7, 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 paragraph (*b*), be provided with:

(i) an INMARSAT ship earth station capable of —

(1) transmitting and receiving distress and safety communications using direct-printing telegraphy;

(2) initiating and receiving distress priority calls;

(3) maintaining watch for shore-to-ship distress alerts, including those directed to specifically defined geographical areas;

(4) transmitting and receiving general radio-communications, using either radiotelephony or direct-printing telegraphy; and

(ii) an MF radio installation capable of transmitting and receiving, for distress and safety purposes, on the frequencies —

(1) 2,187.5 kHz using DSC; and

(2) 2,182 kHz using radiotelephony; and

(iii) 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 (ii)(1); and

(iv) means of initiating the transmission of ship-to-shore distress alerts by a radio service operating either —

(1) through the polar orbiting satellite service on 406 MHz; this requirement may be fulfilled by the satellite EPIRB, required by sub-paragraph (*a*)(vi) of Regulation 7, either by installing the

satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; or

(2) on HF using DSC; or

(3) through the INMARSAT geostationary satellite service by an additional ship earth station.

[S 366/2010 wef 01/07/2010]

(*b*) In addition to meeting the requirements of Regulation 7, 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 paragraph (*a*), be provided with:

(i) 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 —

(1) using DSC;

(2) using radiotelephony; and

(3) using direct-printing telegraphy; and

(ii) 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 sub-paragraph (i); and

(iii) means of initiating the transmission of ship-to-shore distress alerts by a radio-communication service other than HF operating either —

(1) through the polar orbiting satellite service on 406 MHz; this requirement may be fulfilled by the satellite EPIRB, required by sub-paragraph (*a*)(vi) of Regulation 7, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; or

(2) through the INMARSAT geostationary satellite service by a ship earth station; and

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(iv) 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 sub-paragraph (i).

(*c*) It shall be possible to initiate transmission of distress alerts by the radio installations specified in sub-paragraphs (*a*)(i), (*a*)(ii), (*a*)(iv), (*b*)(i) and (*b*)(iii) from the position from which the ship is normally navigated.

(*d*) 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 sub-paragraphs (*a*)(i)(1) and (*a*)(ii) of Regulation 7, 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.

Regulation 11

Radio Equipment — Sea Areas A1, A2, A3 and A4

(*a*) In addition to meeting the requirements of Regulation 7, ships engaged on voyages in all sea areas shall be provided with the radio installations and equipment required by paragraph (*b*) of Regulation 10, except that the equipment required by sub-paragraph (*b*)(iii)(2) of Regulation 10 shall not be accepted as an alternative to that required by sub-paragraph (*b*)(iii)(1) of Regulation 10, which shall always be provided. In addition, ships engaged on voyages in all sea areas shall comply with the requirements of paragraph (*c*) of Regulation 10.

(*b*) 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 sub-paragraphs (*a*)(i)(1) and (*a*)(ii) of Regulation 7, 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.

Regulation 12

Watches

(*a*) Every ship, while at sea, shall maintain a continuous watch —

(i) on VHF DSC channel 70, if the ship, in accordance with the requirements of sub-paragraph (*a*)(ii) of Regulation 7, is fitted with a VHF radio installation;

(ii) on the distress and safety DSC frequency 2,187.5 kHz, if the ship, in accordance with the requirements of sub-paragraph (*a*)(ii) of Regulation 9 or (*a*)(iii) of Regulation 10, is fitted with an MF radio installation;

(iii) 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 sub-paragraph (*b*)(ii) of Regulation 10 or paragraph (*a*) of Regulation 11, is fitted with an MF/HF radio installation. This watch may be kept by means of a scanning receiver;

(iv) for satellite shore-to-ship distress alerts, if the ship, in accordance with the requirements of sub-paragraph (*a*)(i) of Regulation 10, is fitted with an INMARSAT ship earth station.

(*b*) 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.

(*c*) 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.

(*d*) [*Deleted by S 645/2003 wef 01/01/2004*]

Regulation 13

Sources of Energy

(*a*) 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.

(*b*) 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 sub-paragraph (*a*)(i) of Regulation 7 and, as appropriate for the sea area or sea areas for which the ship is equipped, either the MF radio installation required by sub-paragraph (*a*)(i) of Regulation 9, the MF/HF radio installation required by sub-paragraph (*b*)(i) of Regulation 10 or paragraph (*a*) of Regulation 11, or the INMARSAT ship earth station required by sub-paragraph (*a*)(i) of Regulation 10 and any of the additional loads mentioned in paragraphs (*d*), (*e*) and (*h*) for a period of at least —

(i) 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 42 or 43 of Chapter II-1, including the supply of such power to the radio installations; and

(ii) six hours on ships not provided with an emergency source of electrical power complying fully with all relevant provisions of Regulation 42 or 43 of Chapter II-1, 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.

(*c*) The reserve source or sources of energy shall be independent of the propelling power of the ship and the ship's electrical system.

(*d*) Where, in addition to the VHF radio installation, two or more of the other radio installations, referred to in paragraph (*b*), 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 paragraph (*b*)(i) or (*b*)(ii), the VHF radio installation and —

(i) all other radio installations which can be connected to the reserve source or sources of energy at the same time; or

(ii) 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.

(*e*) The reserve source or sources of energy may be used to supply the electrical lighting required by sub-paragraph (*b*)(iv) of Regulation 6.

(*f*) Where a reserve source of energy consists of a rechargeable accumulator battery or batteries —

(i) 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

(ii) 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.

(*g*) The siting and installation of accumulator batteries which provide a reserve source of energy shall be such as to ensure —

*For guidance, the following formula is recommended for determining the electrical load to be supplied by the reserved 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 + current consumption of any additional loads.

*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 charge condition can be made at any time, but it should be done without significant discharge of the battery when the ship is at sea.

(i) the highest degree of service;

(ii) a reasonable lifetime;

(iii) reasonable safety;

(iv) that battery temperatures remain within the manufacturer's specifications whether under charge or idle; and

(v) that when fully charged, the batteries will provide at least the minimum required hours of operation under all weather conditions.

(*h*) 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 18, 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.

[S 314/2002 wef 01/07/2002]

Regulation 14

Performance Standards

(*a*) All equipment to which this Chapter applies shall be of a type approved by the Director. Such equipment shall conform to appropriate performance standards not inferior to those adopted by the Organisation*.

[S 645/2003 wef 01/01/2004]

(*b*) [*Deleted by S 645/2003 wef 01/01/2004*]

Regulation 15

Maintenance Requirements

(*a*) Equipment shall be so designed that the main units can be replaced readily, without elaborate recalibration or readjustment.

(*b*) Where applicable, equipment shall be so constructed and installed that it is readily accessible for inspection and on-board maintenance purposes.

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*Reference is made to the following performance standards adopted by the Organisation by the resolutions indicated or to be developed by the Organisation:

1. Narrow-band direct-printing equipment for the reception of navigational and meteorological warnings and urgent information to ships (Assembly resolution A.525 (13)).
2. General requirements for shipborned radio equipment forming part of the future global maritime distress and safety system (Assembly resolution A.569 (14)).
3. Ship earth stations capable of two-way communications (Assembly resolution A.608 (15)).
4. VHF radio installations capable of voice communications and digital selective calling (Assembly resolution A.609 (15)).
5. Shipborne MF radio installations capable of voice communications and digital selective calling (Assembly resolution A.610 (15)).
6. Shipborne MF/HF radio installations capable of voice communication, narrow-bank direct-printing and digital selective calling (Assembly resolution A.613 (15)).
7. Float-free satellite emergency position-indicating radio beacons operating on 406 MHz (Assembly resolution A.611 (15)).
8. Survival craft radar transponder for use in search and rescue operations (Assembly resolution A.604 (15)).
9. Float-free VHF emergency position-indicating radio beacons (Assembly resolution A.612 (15)).
10. INMARSAT Standard-C ship earth stations capable of transmitting and receiving direct-printing communication (MSC 55/25, annex 4).
11. Enhanced group call equipment (MSC 55/25, annex 5).
12. Float-free satellite emergency position-indicating radio beacons operating through the geostationery INMARSAT satellite system on 1.6 GHz (MSC 55/25, annex 7).
13. Float-free release and activation arrangements for emergency radio equipment (MSC 55/25, annex 6).

(*c*) Adequate information shall be provided to enable the equipment to be properly operated and maintained, taking into account the recommendations of the Organisation*.

(*d*) Adequate tools and spares shall be provided to enable the equipment to be maintained.

(*e*) Radio equipment required by this Chapter shall be maintained to provide the availability of the functional requirements specified in Regulation 4 and to meet the recommended performance standards of such equipment.

(*f*) 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.

(*g*) On ships engaged on voyages in sea areas A3 and A4, the availability shall be ensured by using a combination of at least two methods such as duplication of equipment, shore-based maintenance or at-sea electronic maintenance capability, as may be approved by the Director.

(*h*) 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 4, malfunction of the equipment for providing the general radio-communications required by Regulation 4(viii) 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.

(*i*) Satellite EPIRBs shall be —

(i) annually tested for all aspects of operational efficiency, with special emphasis on checking the emission on operational frequencies, coding and registration, at intervals as specified below:

(1) on passenger ships, within 3 months before the expiry date of the Passenger Ship Safety Certificate; and

(2) on cargo ships, within 3 months before the expiry date, or 3 months before or after the anniversary date, of the Cargo Ship Safety Radio Certificate.

The test may be conducted on board the ship or at an approved testing station; and

*Reference is made to the recommendation on general requirements for shipborne radio equipment forming part of the future global maritime distress and safety system (Assembly resolution A.569 (14)).

(ii) subject to maintenance at intervals not exceeding 5 years, to be performed at an approved shore-based maintenance facility.

[S 282/2006 wef 01/07/2006]

Regulation 16

Radio Personnel

(*a*) 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.

(*b*) In passenger ships, at least one person qualified in accordance with paragraph (*a*) shall be assigned to perform only radio-communication duties during distress incidents.

Regulation 17

Radio Records

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.

Regulation 18

Position-updating

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 four hours, while the ship is underway, so that it is always ready for transmission by the equipment.

[S 314/2002 wef 01/07/2002]

CHAPTER V

SAFETY OF NAVIGATION

Regulation 1

Application

(*a*) Unless expressly provided otherwise, this Chapter shall apply to all ships on all voyages, except:

(i) warships, naval auxiliaries and other ships owned or operated by a Contracting State and used only on government non-commercial service; and

(ii) 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.

However, 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.

(*b*) 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.

(*c*) 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.

(*d*) The Director shall determine to what extent the provisions of Regulations 15 to 28 do not apply to the following categories of ships:

(i) ships below 150 tons engaged on any voyage; and

(ii) ships below 500 tons not engaged on international voyages.

[S 314/2002 wef 01/07/2002]

Regulation 2

Definitions

For the purpose of this Chapter:

(*a*) Constructed in respect of a ship means a stage of construction where:

(i) the keel is laid; or

(ii) construction identifiable with a specific ship begins; or

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

(*b*) "Nautical chart" or "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, authorized Hydrographic Office or other relevant government institution and is designed to meet the requirements of marine navigation.*

(*c*) All ships means any ship, vessel or craft irrespective of type and purpose.

(*d*) Length of a ship means its length overall.

[S 282/2006 wef 01/07/2006]

(*e*) Search and Rescue Service

The performance of distress monitoring, communication, co-ordination and search and rescue functions, including provision of medical advice, initial medical assistance, or medical evacuation, through the use of public and private resources including co-operating aircraft, ships, vessels and other craft and installations.

[S 282/2006 wef 01/07/2006]

(*f*) High-speed craft means a craft as defined in Regulation 1 of Chapter X.

[S 339/2008 wef 01/07/2008]

(*g*) Mobile offshore drilling unit means a mobile offshore drilling unit as defined in Regulation 1(*a*) of Chapter XI-2.

[S 339/2008 wef 01/07/2008]

Regulation 3

Exemptions and Equivalents

(*a*) The Director may grant general exemptions to ships without mechanical means of propulsion from the requirements of Regulations 15, 17, 18, 19 (except 19 (*b*)(i) (7)), 20, 22 and 24 to 28.

(*b*) 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

*Refer to appropriate resolutions and recommendations of the International Hydrographic Organization concerning the authority and responsibilities of coastal States in the provision of charting in accordance with Regulation 9.

that the Director has taken into account the effect such exemptions and equivalents may have upon the safety of all other ships.

[S 314/2002 wef 01/07/2002]

Regulation 4

Navigational Warnings

Masters and officers of a navigational watch shall monitor NAVTEX, SafetyNET and other relevant navigational safety broadcast for navigational and meteorological warnings and shall act upon them appropriately as and when necessary.

[S 314/2002 wef 01/07/2002]

Regulation 5

Meteorological Services and Warnings

The Director may require Singapore ships to submit meteorological data and may arrange for selected ships to be equipped with suitable instruments for use in this service.

[S 314/2002 wef 01/07/2002]

Regulation 6

Ice Patrol Service

(*a*) The Director may require Singapore ships when navigating in the south-eastern, eastern and south-western limits of icebergs in the vicinity of the Grand Banks of Newfoundland during the ice season to use or provide such service as he may require.

(*b*) The Director may require the owner of a Singapore ship who makes use of the ice patrol service to contribute annually to the expense of maintaining and operating these services the sum of which shall be determined by the Director.

[S 314/2002 wef 01/07/2002]

Regulation 7

Search and Rescue Services

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 1 of Chapter IX 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 Organization.

[S 314/2002 wef 01/07/2002]

Regulation 8

Life-Saving Signals

Life-saving signals* shall be used by life-saving stations, maritime rescue units and aircraft engaged in search and rescue operations when communicating with ships or persons in distress or to direct ships, and by ships or persons in distress when communicating with life-saving stations, maritime rescue units and aircraft engaged in search and rescue operations. An illustrated table describing the life-saving signals shall be readily available to the officers of the watch of every ship to which this Chapter applies.

[S 314/2002 wef 01/07/2002]

Regulation 9

Hydrographic Services

The Director may provide such nautical and hydrographic services as he deems necessary for the purposes of aiding navigation.

[S 314/2002 wef 01/07/2002]

Regulation 10

Ships' Routeing

A ship shall use a mandatory ships' routeing system adopted by the Organization 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' official log book.

[S 314/2002 wef 01/07/2002]

Regulation 11

*Ship Reporting Systems**

(*a*) Ship reporting systems contribute to safety of life at sea, safety and efficiency of navigation and/or protection of the marine environment. A

*Such life-saving signals are described in the Merchant Ship Search and Rescue Manual (MERSAR) (Assembly resolution A.299(VII), as amended), the IMO Search and Rescue Manual (IMOSAR) (Assembly resolution A.439(XI), as amended) and illustrated in the International Code of Signals, as amended.

* 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.

ship reporting system, when adopted and implemented in accordance with the guidelines and criteria developed by the Organization** 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.

(*b*) 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.

(*c*) The participation of ships in accordance with the provisions of adopted ship reporting systems shall be free of charge to the ships concerned.

[S 314/2002 wef 01/07/2002]

Regulation 12

Vessel Traffic Services

(*a*) Vessel traffic services (VTS) contribute to the safety of life at sea, safety and efficiency of navigation and the protection of the marine environment, adjacent shore areas, work sites and offshore installations from possible adverse effects of maritime traffic.

(*b*) The master of a Singapore ship shall participate in and comply with the provisions of VTS, if any, while the ship is in the waters of a Contracting State.

[S 314/2002 wef 01/07/2002]

Regulation 13

Deck and Engine Log Books

All ships shall carry deck and engine log books in which, or other means by which, the performance of the ship, her machinery, boilers and other daily events including such data as the ship's position, speed, course, weather conditions, fuel consumption, tank soundings, machinery operating pressures and temperatures and any incidents which may appear to be of importance to safety of life at sea, prevention of pollution to the marine environment, etc., shall be recorded indelibly in English. Such logs when entered by hand shall be signed daily by the officers of the watch and countersigned by the master or chief engineer as appropriate. Such

**Refer to the guidelines and criteria adopted by the Maritime Safety Committee of the Organization 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/or marine pollutants, adopted by the Organizaton by resolution A.851(20).

logs or copies thereof shall be made available to the Director as and when required.

[S 314/2002 wef 01/07/2002]

Regulation 14

Ships' Manning

(*a*) All ships shall be sufficiently and efficiently manned for the purpose of ensuring safety of life at sea and in accordance with the Regulations made under the Act*.

(*b*) For every ship to which Chapter I applies, the Director shall —

(i) establish appropriate minimum safe manning following a transparent procedure, taking into account the relevant guidance adopted by the Organisation*; and

(ii) issue an appropriate minimum safe manning document or equivalent as evidence of the minimum safe manning considered necessary to comply with the provisions of paragraph (*a*).

[S 847/2013 wef 01/01/2014]

(*c*) On all ships, to ensure effective crew performance in safety matters, a working language shall be established and recorded in the ship's official log book. The company, as defined in Regulation 1 of Chapter IX, 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 English, all plans and lists required to be posted shall include a translation into the working language.

(*d*) 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.

[S 314/2002 wef 01/07/2002]

Regulation 15

*Refer to the Principles of Safe Manning adopted by the Organization by resolution A.890(21).

* Refer to the Principles of Minimum Safe Manning, adopted by the Organisation by resolution A.1047(27).

*The IMO Standard Marine Communications Phrases (SMCPs) (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

All decisions which are made for the purpose of applying the requirements of Regulations 19, 22, 24, 25, 27 and 28 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 standardized symbols and coding systems for controls and displays;

(*d*) indicating the operational status of automated functions and integrated components, systems and/or sub-systems;

(*e*) allowing for expeditious, continuous and effective information processing and decision-making by the bridge team and the pilot;

(*f*) preventing or minimizing excessive or unnecessary work and any conditions or distractions on the bridge which may cause fatigue or interfere with the vigilance of the bridge team and the pilot; and

(*g*) minimizing 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.

[S 314/2002 wef 01/07/2002]

Regulation 16

Maintenance of Equipment

(*a*) Instructions for on board maintenance of the equipment required by this Chapter shall be provided and maintenance shall be carried out accordingly.

(*b*) Except as provided in Regulation 7(*b*)(ii), Regulations 8 and 9 of Chapter I, while all reasonable steps shall be taken to maintain the equipment required by this Chapter in efficient working order,

**Refer to Guidelines on ergonomic criteria for bridge equipment and layout (MSC/Circ.982). Performance standards for IBS (resolution MSC.64(67); annex 1); and for INS (resolution MSC.86(70); annex 3).

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.

[S 314/2002 wef 01/07/2002]

Regulation 17

Electromagnetic Compatibility

(*a*) All electrical and electronic equipment installed on the bridge or in the vicinity of the bridge, on ships constructed on or after 1st July 2002,

shall be tested for electromagnetic compatibility taking into account the recommendations developed by the Organization.*

(*b*) Electrical and electronic equipment shall be so installed that electromagnetic interference does not affect the proper function of navigational systems and equipment.

(*c*) Portable electrical and electronic equipment shall not be operated on the bridge if it may affect the proper function of navigational systems and equipment.

[S 314/2002 wef 01/07/2002]

Regulation 18

*Refer to the General requirements for Electromagnetic Compability for all Electrical and Electronic Ship's Equipment adopted by the Organization by resolution A.813(19).

Approval, Surveys and Performance Standards of Navigational Systems and Equipment and Voyage Data Recorder

(*a*) Systems and equipment required to meet the requirements of Regulations 19 and 20 shall be approved by the Director.

(*b*) Systems and equipment, including associated back-up arrangements, where applicable, installed on or after 1st July 2002 to perform the functional requirements of Regulations 19 and 20 shall conform to appropriate performance standards not inferior to those adopted by the Organization.*

[S 793/2010 wef 01/01/2011]

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*Refer to the following recommendations adopted by the Organization 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));
Recommendation on Performance Standards for Electronic Chart Display and Information Systems (ECDIS) (resolution A.817(19)), as amended by resolutions 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)); and
Performance standards for a bridge navigational watch alarm system (BNWAS) (resolution MSC.128(75)).

(*c*) 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 paragraph (*b*).

(*d*) Systems and equipment installed prior to the adoption of performance standards by the Organization 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 Organization. However, for an electronic chart display and information system (ECDIS) to be accepted as satisfying the chart carriage requirement of Regulation 19(*b*)(i)(4), that system shall conform to the relevant performance standards not inferior to those adopted by the Organization in effect on the date of installation, or, for systems installed before 1st January 1999, not inferior to the performance standards adopted by the Organization by Assembly Resolution A.817 (19) on 23rd November 1995.

(*e*) The Director will require that 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.

(*f*) Before giving approval to systems or equipment embodying new features not covered by this Chapter, the Director will require that such features support functions at least as effective as those required by this Chapter.

(*g*) When equipment, for which performance standards have been developed by the Organization, is carried on ships in addition to those items of equipment required by Regulations 19 and 20, such equipment shall be subject to approval and shall as far as practicable comply with performance standards not inferior to those adopted by the Organization.

(*h*) 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.

[S 314/2002 wef 01/07/2002]

(*i*) The automatic identification system (AIS) shall be subjected to an annual test. The test shall be conducted by an approved surveyor or an approved testing or servicing facility. The test shall verify the correct programming of the ship static information, correct data exchange with connected sensors as well as verifying the radio performance by radio frequency measurement and on-air test using, e.g., a Vessel Traffic Service (VTS). A copy of the test report shall be retained on board the ship.

[S 284/2012 wef 01/07/2012]

Regulation 19

Carriage Requirements for Shipborne Navigational Systems and Equipment

(*a*) *Application and requirements*

Subject to the provisions of Regulation 1(*d*):

(i) Ships constructed on or after 1st July 2002 shall be fitted with navigational systems and equipment which will fulfil the requirements prescribed in paragraphs (*b*)(i) to (*b*)(ix).

(ii) Ships constructed before 1st July 2002 shall:

(1) subject to the provisions of paragraphs (*a*)(ii)(2), (*a*)(ii)(3) and (*a*)(ii)(4), unless they comply fully with this Regulation, continue to be fitted with equipment which fulfils the requirements prescribed in Regulations 11, 12 and 20 of the of Chapter V of the Merchant Shipping (Safety Convention) Regulations in force prior to 1st July 2002;

[S 866/2014 wef 01/01/2015]

(2) be fitted with the equipment or systems required in paragraph (*b*)(i)(6) not later than the first survey after 1st July 2002 at which time the radio direction-finding apparatus referred to in Regulation 12(*p*) of Chapter V of the Merchant Shipping (Safety Convention) Regulations in force prior to 1st July 2002 shall no longer be required;

[S 866/2014 wef 01/01/2015]

(3) be fitted with the system required in paragraph (*b*)(iv) not later than the dates specified in paragraphs (*b*)(iv)(2) and (*b*)(iv)(3); and

[S 866/2014 wef 01/01/2015]

(4) be fitted with a bridge navigational watch alarm system (BNWAS), as follows:

(A) passenger ships irrespective of size, not later than the first survey* after 1 January 2016;

(B) cargo ships of 3,000 gross tonnage and upwards, not later than the first survey* after 1 January 2016;

(C) cargo ships of 500 gross tonnage and upwards but less than 3,000 gross tonnage, not later than the first survey* after 1 January 2017; and

(D) cargo ships of 150 gross tonnage and upwards but less than 500 gross tonnage, not later than the first survey* after 1 January 2018.

The bridge navigational watch alarm system shall be in operation whenever the ship is underway at sea.

The provisions of paragraph (*b*)(ii)(4) shall also apply to ships constructed before 1 July 2002.

[S 866/2014 wef 01/01/2015]

(iii) The Director may exempt any ship from the application of the requirement of sub paragraph (ii)(4), if the ship will be taken permanently out of service within 2 years after the implementation date specified in sub-paragraph (ii)(4)(A), (B), (C) or (D).

[S 866/2014 wef 01/01/2015]

(*b*) *Shipborne navigational equipment and systems*

(i) All ships irrespective of size shall have:

(1) 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;

(2) 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°;

*Refer to the Unified Interpretation of the Term "First Survey" Referred to in SOLAS Regulations (MSC.1/Circ.1290).

(3) means of correcting heading and bearings to true at all times;

(4) 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) is also accepted as meeting the chart carriage requirements of this sub-paragraph; ships to which paragraph (*b*)(x) applies shall comply with the carriage requirements for ECDIS detailed therein;

[S 793/2010 wef 01/01/2011]

(5) back-up arrangements to meet the functional requirements of sub-paragraph (4), if this function is partly or fully fulfilled by electronic means;*

(6) a receiver for a global navigation satellite system or a terrestrial radionavigation 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;

(7) 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;

(8) 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;

(9) a telephone, or other means, to communicate heading information to the emergency steering position, if provided.

(ii) All ships of 150 tons and upwards and passenger ships irrespective of size shall, in addition to the requirements of paragraph (*b*)(i), be fitted with:

(1) a spare magnetic compass interchangeable with the magnetic compass, as referred to in paragraph (*b*)(i)(1), or other means to perform the function referred to in paragraph (*b*)(i)(1) by means of replacement or duplicate equipment;

*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).

(2) 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;

(3) a bridge navigational watch alarm system (BNWAS), as follows:

(A) cargo ships of 150 tons and upwards and passenger ships irrespective of size constructed on or after 1st July 2011;

(B) passenger ships irrespective of size constructed before 1st July 2011, not later than the first survey* after 1st July 2012;

(C) cargo ships of 3,000 tons and upwards constructed before 1st July 2011, not later than the first survey* after 1st July 2012;

(D) cargo ships of 500 tons and upwards but less than 3,000 tons constructed before 1st July 2011, not later than the first survey* after 1st July 2013; and

(E) cargo ships of 150 tons and upwards but less than 500 tons constructed before 1st July 2011, not later than the first survey* after 1st July 2014.

The bridge navigational watch alarm system shall be in operation whenever the ship is underway at sea;

[S 793/2010 wef 01/01/2011]

(4) a bridge navigational watch alarm system (BNWAS) installed prior to 1st July 2011 may subsequently be exempted from full compliance with the standards adopted by the Organisation*, at the discretion of the Director.

[S 793/2010 wef 01/01/2011]

(iii) All ships of 300 tons and upwards and passenger ships irrespective of size shall, in addition to meeting the requirements of paragraph (*b*)(ii), be fitted with:

(1) an echo sounding device, or other electronic means, to measure and display the available depth of water;

*Refer to the Unified interpretation of the term "first survey" referred to in SOLAS regulations (MSC.1/Circ.1290).

*Recommendation on performance standards for a bridge navigational watch alarm system (BNWAS) (resolution MSC.128(75)).

(2) 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;

(3) an electronic plotting aid, or other means, to plot electronically the range and bearing of targets to determine collision risk;

(4) speed and distance measuring device, or other means, to indicate speed and distance through the water;

(5) a properly adjusted transmitting heading device, or other means to transmit heading information for input to the equipment referred to in paragraphs (*b*)(iii)(2), (*b*)(iii)(3) and (*b*)(iv).

(iv) 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:

(1) ships constructed on or after 1st July 2002;

(2) 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;

(D) in the case of ships, other than passenger ships and tankers, of 300 tons and upwards but less than 50,000 tons, not later than the first safety equipment survey* after 1st July 2004 or by 31st December 2004, whichever occurs earlier; and

[S 217/2004 wef 01/07/2004]

(E) [*Deleted by S 217/2004 wef 01/07/2004*]

*Refer to Regulation I/8.

*Except in the case of a ship under construction, "first safety equipment survey" means the first annual survey, the first periodical survey or the first renewal survey for safety equipment, whichever is due first after 1st July 2004. In the case of a ship under construction, "first safety equipment survey" means the initial survey.

(F) [*Deleted by S 217/2004 wef 01/07/2004*]

(3) ships not engaged on international voyages constructed before 1st July 2002, not later than 1st July 2008;

(4) 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 two years after the implementation date specified in sub-paragraphs (2) and (3);

(5) 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;

(6) the requirements of paragraph (*b*)(iv)(5) shall not be applied to cases where international agreements, rules or standards provide for the protection of navigational information;

[S 217/2004 wef 01/07/2004]

(7) AIS shall be operated taking into account the guidelines adopted by the Organization*; and

[S 217/2004 wef 01/07/2004]

(8) every ship fitted with AIS shall maintain AIS in operation at all times, except where international agreements, rules or standards provide for the protection of navigational information.

[S 217/2004 wef 01/07/2004]

(v) All ships of 500 tons and upwards shall, in addition to meeting the requirements of paragraph (*b*)(iii) with the exception of paragraphs (*b*)(iii)(3) and (*b*)(iii)(5), and the requirements of paragraph (*b*)(iv), have:

(1) a gyro compass, or other means, to determine and display their heading by shipborne non-magnetic means, being

*Refer to the Guidelines on the operation of AIS on ships to be developed by the Organization.

clearly readable by the helmsman at the main steering position. These means shall also transmit heading information for input to the equipment referred in paragraphs (*b*)(iii)(2), (*b*)(iv) and (*b*)(v)(5);

[S 282/2006 wef 01/07/2006]

(2) a gyro-compass heading repeater, or other means, to supply heading information visually at the emergency steering position if provided;

(3) a gyro-compass bearing repeater, or other means, to take bearings, over an arc of the horizon of 360º, using the gyro-compass or other means referred to in sub-paragraph (1). However ships less than 1,600 tons shall be fitted with such means as far as possible;

(4) 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

(5) an automatic tracking aid, or other means, to plot automatically the range and bearing of other targets to determine collision risk.

(vi) 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 paragraphs (*b*)(i)(1), (*b*)(i)(2) and (*b*)(i)(4).

(vii) All ships of 3,000 tons and upwards shall, in addition to meeting the requirements of paragraph (*b*)(v), have:

(1) 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 paragraph (*b*)(iii)(2); and

(2) 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 paragraph (*b*)(v)(5).

(viii) All ships of 10,000 tons and upwards shall, in addition to meeting the requirements of paragraph (*b*)(vii) with the exception of paragraph (*b*)(vii)(2), have:

(1) 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

(2) a heading or track control system, or other means, to automatically control and keep to a heading and/or straight track.

(ix) All ships of 50,000 tons and upwards shall, in addition to meeting the requirements of paragraph (*b*)(viii), have:

(1) a rate of turn indicator, or other means, to determine and display the rate of turn; and

(2) a speed and distance measuring device, or other means, to indicate speed and distance over the ground in the forward and athwartships direction.

(x) Ships engaged on international voyages shall be fitted with an Electronic Chart Display and Information System (ECDIS) as follows:

(1) passenger ships of 500 tons and upwards constructed on or after 1st July 2012;

(2) tankers of 3,000 tons and upwards constructed on or after 1st July 2012;

(3) cargo ships, other than tankers, of 10,000 tons and upwards constructed on or after 1st July 2013;

(4) cargo ships, other than tankers, of 3,000 tons and upwards but less than 10,000 tons constructed on or after 1st July 2014;

(5) passenger ships of 500 tons and upwards constructed before 1st July 2012, not later than the first survey* on or after 1st July 2014;

(6) tankers of 3,000 tons and upwards constructed before 1st July 2012, not later than the first survey* on or after 1st July 2015;

*Refer to the Unified interpretation of the term "first survey" referred to in SOLAS regulations (MSC.1/Circ.1290).

(7) cargo ships, other than tankers, of 50,000 tons and upwards constructed before 1st July 2013, not later than the first survey* on or after 1st July 2016;

(8) cargo ships, other than tankers, of 20,000 tons and upwards but less than 50,000 tons constructed before 1st July 2013, not later than the first survey* on or after 1st July 2017; and

(9) cargo ships, other than tankers, of 10,000 tons and upwards but less than 20,000 tons constructed before 1st July 2013, not later than the first survey* on or after 1st July 2018.

[S 793/2010 wef 01/01/2011]

(xi) The Director may exempt ships from the application of the requirements of sub-paragraph (x) when such ships will be taken permanently out of service within 2 years after the implementation date specified in sub-paragraphs (5) to (9) of sub-paragraph (x).

[S 793/2010 wef 01/01/2011]

(*c*) When "other means" are permitted under this Regulation, such means must be approved by the Director in accordance with Regulation 18.

(*d*) The navigational equipment and systems referred to in this Regulation shall be so installed, tested and maintained as to minimize malfunction.

(*e*) Navigational equipment and systems offering alternative modes of operation shall indicate the actual mode of use.

(*f*) Integrated bridge systems* shall be so arranged that failure of one sub-system is brought to 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.

[S 314/2002 wef 01/07/2002]

Regulation 19-1

Long-range Identification and Tracking of Ships

(*a*) Subject to the provisions of paragraphs (*d*)(i) and (*d*)(ii), this Regulation shall apply to the following types of ships engaged on international voyages:

*Refer to the Unified interpretation of the term "first survey" referred to in SOLAS regulations (MSC.1/Circ.1290).

*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.

(i) passenger ships, including high-speed passenger craft;

(ii) cargo ships, including high-speed craft, of 300 tons* and upwards; and

(iii) mobile offshore drilling units.

(*b*) The term "ship", when used in paragraphs (*c*) to (*h*), includes the passenger and cargo ships, the high-speed craft and the mobile offshore drilling units which are subject to the provisions of this Regulation.

(*c*) This Regulation establishes provisions to enable the Director to undertake the long-range identification and tracking of ships.

(*d*) (i) Ships shall be fitted with a system to automatically transmit the information specified in paragraph (*e*) as follows:

(1) ships constructed on or after 31st December 2008;

(2) ships constructed before 31st December 2008 and certified for operations:

(A) in sea areas A1 and A2, as defined in Regulations 2(*a*)(xii) and 2(*a*)(xiii) of Chapter IV; or

(B) in sea areas Al, A2 and A3, as defined in Regulations 2(*a*)(xii), 2(*a*)(xiii) and 2(*a*)(xiv) of Chapter IV,

not later than the first survey of the radio installation after 31st December 2008;

(3) ships constructed before 31st December 2008 and certified for operations in sea areas Al, A2, A3 and A4, as defined in Regulations 2(*a*)(xii), 2(*a*)(xiii), 2(*a*)(xiv) and 2(*a*)(xv) of Chapter IV, not later than the first survey of the radio installation after 1st July 2009. However, these ships shall comply with the provisions of sub-paragraph (2) whilst they operate within sea areas A1, A2 and A3.

(*d*) (ii) Ships, irrespective of the date of construction, fitted with an automatic identification system (AIS), as defined in Regulation 19(*b*)(iv), and operated exclusively within sea area A1, as defined in Regulation 2(*a*)(xii) of Chapter IV, shall not be required to comply with the provisions of this Regulation.

(*e*) Subject to the provisions of paragraph (*d*)(i), ships shall automatically transmit the following long-range identification and tracking information:

(i) the identity of the ship;

(ii) the position of the ship (latitude and longitude); and

*The tons to be used for determining whether a cargo ship or high-speed craft is required to comply with the provisions of this Regulation shall be that determined under the provisions of the International Convention on Tonnage Measurement of Ships, 1969 irrespective of the date on which the ship or high-speed craft has been or is being constructed.

(iii) the date and time of the position provided.

(*f*) Systems and equipment used to meet the requirements of this Regulation shall conform to performance standards and functional requirements* not inferior to those adopted by the Organization. Any shipboard equipment shall be of a type approved by the Director.

(*g*) Systems and equipment used to meet the requirements of this Regulation shall be capable of being switched off on board or be capable of ceasing the distribution of long-range identification and tracking information:

(i) where international agreements, rules or standards provide for the protection of navigational information; or

(ii) in exceptional circumstances and for the shortest duration possible where the operation is considered by the master to compromise the safety or security of the ship. In such a case, the master shall inform the Director without undue delay and make an entry in the record of navigational activities and incidents maintained in accordance with Regulation 28 setting out the reasons for the decision and indicating the period during which the system or equipment was switched off.

(*h*) The Director shall be entitled to receive long-range identification and tracking information about ships, for security and other purposes, as follows:

(i) the Director shall be entitled to receive such information about Singapore ships irrespective of where such ships may be located;

(ii) the Director shall be entitled to receive such information about ships which have indicated their intention to enter a port facility in Singapore or a place under the jurisdiction of Singapore, irrespective of where such ships may be located provided they are not located within the waters landward of the baselines, established in accordance with international law, of another Contracting State; and

(iii) the Director shall be entitled to receive such information about ships entitled to fly the flag of another Contracting State, not intending to enter a port facility in Singapore or a place under the jurisdiction of Singapore, navigating within a distance not exceeding 1,000 nautical miles from the coast of Singapore provided such ships are not located within the waters landward of the baselines, established in accordance with international law, of another Contracting State.

[S 339/2008 wef 01/07/2008]

Regulation 20

Voyage Data Recorders

*Refer to the Performance standards and functional requirements for the long-range identification and tracking of ships, adopted by the Maritime Safety Committee of the Organization by resolution MSC.210(81).

(*a*) To assist in casualty investigations, ships, when engaged on international voyages, subject to the provisions of Regulation 1(*d*), shall be fitted with a voyage data recorder (VDR) as follows:

(i) passenger ships constructed on or after 1st July 2002;

(ii) ro-ro passenger ships constructed before 1st July 2002 not later than the first survey on or after 1st July 2002;

(iii) passenger ships other than ro-ro passenger ships constructed before 1st July 2002 not later than 1st January 2004; and

(iv) ships, other than passenger ships, of 3,000 tons and upwards constructed on or after 1st July 2002.

[S 314/2002 wef 01/07/2002]

(*b*) To assist in casualty investigations, cargo ships, when engaged on international voyages, shall be fitted with a VDR which may be a simplified voyage data recorder (S-VDR)** as follows:

(i) in the case of cargo ships of 20,000 tons and upwards constructed before 1st July 2002, at the first scheduled dry-docking after 1st July 2006 but not later than 1st July 2009;

(ii) in the case of cargo ships of 3,000 tons and upwards but less than 20,000 tons constructed before 1st July 2002, at the first scheduled dry-docking after 1st July 2007 but not later than 1st July 2010; and

(iii) the Director may exempt cargo ships from the application of the requirements of sub-paragraphs (i) and (ii) when such ships will be taken permanently out of service within 2 years after the implementation date specified in sub-paragraphs (i) and (ii).

[S 282/2006 wef 01/07/2006]

(*c*) 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.

[S 314/2002 wef 01/07/2002]

[S 282/2006 wef 01/07/2006]

Regulation 21

International Code of Signals and IAMSAR Manual

**Refer to resolution MSC.163(78). Performance standards for shipborne simplified voyage data recorders (S-VDRs).

(*a*) 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 Organization. The Code shall also be carried by any other ship which, in the opinion of the Director, has a need to use it.

[S 645/2003 wef 01/01/2004]

(*b*) All ships shall carry an up-to-date copy of Volume III of the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual.

[S 314/2002 wef 01/07/2002]

[S 645/2003 wef 01/01/2004]

Regulation 22

Navigational Bridge Visibility

(*a*) Ships of not less than 55 m in length, as defined in Regulation 2(*d*), constructed on or after 1st July 1998, shall meet the following requirements:

(i) The view of the sea surface from the conning position shall not be obscured by more than two ship lengths, or 500 m, whichever is the less, forward of the bow to 10° on either side under all conditions of draught, trim and deck cargo;

(ii) 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°. However, in the view described in (i), each individual blind sector shall not exceed 5°;

(iii) 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;

(iv) From each bridge wing the horizontal field of vision shall extend over an arc 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;

(v) 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;

(vi) The ship's side shall be visible from the bridge wing;

(vii) 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;

(viii) 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 mm above the bridge deck at the conning position, when the ship is pitching in heavy seas. The Director, if satisfied that a 1,800 mm height of eye is unreasonable and impractical, may allow reduction of the height of eye but not less than 1,600 mm;

(ix) Windows shall meet the following requirements:

(1) 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°.

(2) Framing between navigation bridge windows shall be kept to a minimum and not be installed immediately forward of any work station.

(3) Polarized and tinted windows shall not be fitted.

(4) A clear view through at least two 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.

[S 314/2002 wef 01/07/2002]

[S 282/2006 wef 01/07/2006]

(*b*) Ships constructed before 1st July 1998 shall, where practicable, meet the requirements of paragraphs (*a*)(i) and (*a*)(ii). However, structural alterations or additional equipment need not be required.

[S 314/2002 wef 01/07/2002]

(*c*) 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.

[S 314/2002 wef 01/07/2002]

(*d*) Notwithstanding the requirements of paragraphs (*a*)(i), (*a*)(iii), (*a*)(iv) and (*a*)(v), ballast water exchange may be undertaken provided that:

(i) the master has determined that it is safe to do so, and takes into consideration any increased blind sectors or reduced horizontal

fields of vision, resulting from the operation, to ensure that a proper lookout is maintained at all times;

(ii) the operation is conducted in accordance with the ship's ballast water management plan, taking into account the recommendations on ballast water exchange adopted by the Organisation; and

(iii) the commencement and termination of the operation are recorded in the ship's record of navigational activities pursuant to Regulation 28.

[S 366/2010 wef 01/07/2010]

Regulation 23

Pilot Transfer Arrangements

(*a*) *Application*

(i) Ships engaged on voyages in the course of which pilots may be employed shall be provided with pilot transfer arrangements.

(ii) Equipment and arrangements for pilot transfer which are installed[1] on or after 1st July 2012 shall comply with the requirements of this Regulation, and due regard shall be paid to the standards adopted by the Organisation[2].

(iii) Except as provided otherwise, equipment and arrangements for pilot transfer which are provided on ships before 1st July 2012 shall at least comply with the requirements of Regulation 17[3] or 23, as applicable, of Chapter V of these Regulations in force prior to that date, and due regard shall be paid to the standards adopted by the Organisation prior to that date.

(iv) Equipment and arrangements installed on or after 1st July 2012, which are a replacement of equipment and arrangements provided on ships before 1st July 2012, shall, in so far as is reasonable and practicable, comply with the requirements of this Regulation.

(v) With respect to ships constructed before 1st January 1994, paragraph (*e*) shall apply not later than the first survey[4] on or after 1st July 2012.

[1]Refer to the Unified interpretation of SOLAS regulation V/23 (MSC.1/Circ.1375).

[2]Refer to the Assembly resolution on Pilot Transfer Arrangements, to be adopted by the Organisation.

[3]Refer to resolution MSC.99(73), renumbering previous Regulation 17 as Regulation 23, which entered into force on 1st July 2002.

[4]Refer to the Unified interpretation of the term "first survey" referred to in SOLAS regulations (MSC.1/Circ.1290).

(vi) Paragraph (*f*) applies to all ships.

(*b*) *General*

(i) All arrangements used for pilot transfer shall efficiently fulfil 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.

(ii) 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 and who shall also 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.

(iii) A pilot ladder shall be certified by the manufacturer as complying with this Regulation or with an international standard acceptable to the Organisation[5]. Ladders shall be inspected in accordance with Regulations 6, 7 and 8 of Chapter I.

(iv) All pilot ladders used for pilot transfer shall be clearly identified with tags or other permanent marking so as to enable identification of each appliance for the purposes of survey, inspection and record keeping. A record shall be kept on the ship as to the date the identified ladder is placed into service and any repairs effected.

(v) Reference in this Regulation to an accommodation ladder includes a sloping ladder used as part of the pilot transfer arrangements.

(*c*) *Transfer arrangements*

(i) Arrangements shall be provided to enable the pilot to embark and disembark safely on either side of the ship.

(ii) In all ships, where the distance from sea level to the point of access to, or egress from, the ship exceeds 9 m, and when it is intended to embark and disembark pilots by means of the accommodation ladder[6], 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.

[5]Refer to the recommendations by the International Organisation for Standardization, in particular publication ISO 799:2004, Ships and marine technology — *Pilot ladders*.

[6]Refer to Regulation 3-9 of Chapter II-1 on Means of Embarkation on and Disembarkation from ships, adopted by resolution MSC.256(84), together with the associated Guidelines (MSC.1/Circ.1331).

(iii) Safe and convenient access to, and egress from, the ship shall be provided by either:

(1) a pilot ladder requiring a climb of not less than 1.5 m and not more than 9 m 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; or

(2) an accommodation ladder in conjunction with the pilot ladder (i.e. a combination arrangement), 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 m. The accommodation ladder shall be sited leading aft. When in use, means shall be provided to secure the lower platform of the accommodation ladder to the ship's side, so as to ensure that the lower end of the accommodation ladder and the lower platform are held 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.

(A) When a combination arrangement is used for pilot access, means shall be provided to secure the pilot ladder and man-ropes to the ship's side at a point of nominally 1.5 m above the bottom platform of the accommodation ladder. In the case of a combination arrangement using an accommodation ladder with a trapdoor in the bottom platform (i.e. embarkation platform), the pilot ladder and man-ropes shall be rigged through the trapdoor extending above the platform to the height of the handrail.

(*d*) *Access to the ship's deck*

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:

(i) a gateway in the rails or bulwark, adequate handholds shall be provided;

(ii) a bulwark ladder, two 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.

(*e*) *Shipside doors*

Shipside doors used for pilot transfer shall not open outwards.

(*f*) *Mechanical pilot hoists*

Mechanical pilot hoists shall not be used.

(*g*) *Associated equipment*

(i) The following associated equipment shall be kept at hand ready for immediate use when persons are being transferred:

(1) two man-ropes of not less than 28 mm and not more than 32 mm in diameter properly secured to the ship if required by the pilot; man-ropes shall be fixed at the rope end to the ring plate fixed on deck and shall be ready for use when the pilot disembarks, or upon request from a pilot approaching to board (the man-ropes shall reach the height of the stanchions or bulwarks at the point of access to the deck before terminating at the ring plate on deck);

(2) a lifebuoy equipped with a self-igniting light;

(3) a heaving line.

(ii) When required by paragraph (*d*) above, stanchions and bulwark ladders shall be provided.

(*h*) *Lighting*

Adequate lighting shall be provided to illuminate the transfer arrangements overside and the position on deck where a person embarks or disembarks.

[S 284/2012 wef 01/07/2012]

Regulation 24

Use of Heading and/or Track Control Systems

(*a*) In areas of high traffic density, in conditions of restricted visibility and in all other hazardous navigational situations where heading and/or track control systems are in use, it shall be possible to establish manual control of the ship's steering immediately.

(*b*) In circumstances as above, 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.

(*c*) The change-over from automatic to manual steering and vice versa shall be made by or under the supervision of a responsible officer.

(*d*) The manual steering shall be tested after prolonged use of heading and/or track control systems, and before entering areas where navigation demands special caution.

[S 314/2002 wef 01/07/2002]

Regulation 25

Operation of Main Source of Electrical Power and Steering Gear

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.

[S 314/2002 wef 01/07/2002]

Regulation 26

Steering Gear: Testing and Drills

(*a*) 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:

(i) the main steering gear;

(ii) the auxiliary steering gear;

(iii) the remote steering gear control systems;

(iv) the steering positions located on the navigation bridge;

(v) the emergency power supply;

(vi) the rudder angle indicators in relation to the actual position of the rudder;

(vii) the remote steering gear control system power failure alarms;

(viii) the steering gear power unit failure alarms; and

(ix) automatic isolating arrangements and other automatic equipment.

(*b*) The checks and tests shall include:

(i) the full movement of the rudder according to the required capabilities of the steering gear;

(ii) a visual inspection for the steering gear and its connecting linkage; and

(iii) the operation of the means of communication between the navigation bridge and steering gear compartment.

(*c*) (i) 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.

(*c*) (ii) All ships' officers concerned with the operation and/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.

(*d*) In addition to the routine checks and tests prescribed in paragraphs (*a*) and (*b*), emergency steering drills shall take place at least once every three months in order to practise 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.

(*e*) The Director may waive the requirements to carry out the checks and tests prescribed in paragraphs (*a*) and (*b*) for ships which regularly engage on voyages of short duration. Such ships shall carry out these checks and tests at least once every week.

(*f*) The date upon which the checks and tests prescribed in paragraphs (*a*) and (*b*) are carried out and the date and details of emergency steering drills carried out under paragraph (*d*), shall be recorded.

[S 314/2002 wef 01/07/2002]

Regulation 27

Nautical Charts and Nautical Publications

Nautical charts and nautical publications, such as sailing directions, 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.

[S 314/2002 wef 01/07/2002]

Regulation 28

Records of Navigational Activities and Daily Reporting

[S 282/2006 wef 01/07/2006]

(*a*) 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 Organization.* When such information is not maintained in the ship's official log book, it shall be maintained in another form approved by the Director.

[S 314/2002 wef 01/07/2002]

[S 282/2006 wef 01/07/2006]

(*b*) Each ship of 500 tons and above, engaged on international voyages exceeding 48 hours, shall submit a daily report to its company, as defined in Regulation 1 of Chapter IX, which shall retain it and all subsequent daily reports for the duration of the voyage. Daily reports may be transmitted by any means, provided that they are transmitted to the company as soon as practicable after determination of the position named in the report. Automated reporting systems may be used, provided that they include a recording function of their transmission and that those functions and interfaces with position-fixing equipment are subjected to regular verification by the ship's master. The report shall contain the following:

(i) ship's position;

(ii) ship's course and speed; and

(iii) details of any external or internal conditions that are affecting the ship's voyage or the normal safe operation of the ship.

[S 282/2006 wef 01/07/2006]

Regulation 29

Life-Saving Signals to be used by Ships, Aircraft or Persons in Distress

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

*Refer to the Guidelines for recording events related to navigation to be developed by the Organization.

**Such life-saving signals are described in the International Aeronautical and Maritime Search and Rescue Manual (IAMSAR) Vol.III, Mobile Facilities and illustrated in the International Code of Signals, as amended pursuant to resolution A.80(IV).

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.

[S 314/2002 wef 01/07/2002]

Regulation 30

Operational Limitations

(*a*) This Regulation applies to all passenger ships to which Chapter I applies.

(*b*) 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, the list shall be provided in English.

[S 314/2002 wef 01/07/2002]

Regulation 31

Danger Messages

(*a*) 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.

(*b*) All radio messages issued under paragraph (*a*) shall be preceded by the safety signal, using the procedure as prescribed by the Radio Regulations as defined in Regulation 2 of Chapter IV.

[S 314/2002 wef 01/07/2002]

Regulation 32

Information required in danger messages

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 danger last observed.

[S 314/2002 wef 01/07/2002]

(*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) 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:

— barometric pressure**, preferably corrected (stating millibars, millimetres, or inches, and whether corrected or uncorrected);

— barometric tendency (the change in barometric pressure during the past three hours);

— true wind direction;

— wind force (Beaufort scale);

— state of the sea (smooth, moderate, rough, high);

— 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;

— true course and speed of ship.

[S 314/2002 wef 01/07/2002]

(*c*) *Subsequent observations*

*The term tropical cyclone is the generic term used by national meteorological services of the World Meteorological Organization. The term 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).

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.

[S 314/2002 wef 01/07/2002]

(*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 the paragraph but excluding the details concerning sea and swell.

[S 314/2002 wef 01/07/2002]

(*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.

[S 314/2002 wef 01/07/2002]

Examples

Ice

TTT ICE. LARGE BERG SIGHTED IN 4506 N, 4410W, 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 EXPERIENCING SEVERE ICING. 1400 UTC. MARCH 2. 69 N, 10 W. AIR TEMPERATURE 18°F (-7.8°C). SEA TEMPERATURE 29°F (-1.7°C). WIND NE, FORCE 8.

[S 314/2002 wef 01/07/2002]

Regulation 33

Distress Situations: Obligations and Procedures

[S 282/2006 wef 01/07/2006]

(*a*) The master of a ship at sea which is in a position to be able to provide assistance on receiving information 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. This obligation to provide assistance applies regardless of the nationality or status of such persons or the circumstances in which they are found. 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 official log book the reason for failing to proceed to the assistance of the persons in distress, taking into account the recommendation of the

Organization*, to inform the appropriate search and rescue service accordingly.

[S 282/2006 wef 01/07/2006]

(*a*) -1 The master of a ship providing assistance by embarking persons in distress at sea may seek the co-operation of Contracting States to release him from his obligation under this Regulation with minimum further deviation from the ship's intended voyage, provided that such release does not further endanger the safety of life at sea.

[S 282/2006 wef 01/07/2006]

(*b*) 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 considers 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.

[S 314/2002 wef 01/07/2002]

(*c*) Masters of ships shall be released from the obligation imposed by paragraph (*a*) 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.

[S 314/2002 wef 01/07/2002]

(*d*) The master of a ship shall be released from the obligation imposed by paragraph (*a*) and, if his ship has been requisitioned, from the obligation imposed by paragraph (*b*) 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.

[S 314/2002 wef 01/07/2002]

(*e*) The provisions of 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

*Refer to the immediate action to be taken by each ship on receipt of a distress message in the MERSAR Manual, as it may be amended.

obligation to render assistance imposed by article 11 of that Convention.**

[S 314/2002 wef 01/07/2002]

(*f*) Masters of ships who have embarked persons in distress at sea shall treat them with humanity, within the capabilities and limitations of the ship.

[S 282/2006 wef 01/07/2006]

Regulation 34

Safe Navigation and Avoidance of Dangerous Situations

(*a*) 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 Organization*.

(*b*) The voyage plan shall identify a route which:

(i) takes into account any relevant ships' routeing systems;

(ii) ensures sufficient sea room for the safe passage of the ship throughout the voyage;

(iii) anticipates all known navigational hazards and adverse weather conditions; and

(iv) 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.

(*c*) [*Deleted by S 282/2006 wef 01/07/2006*]

[S 314/2002 wef 01/07/2002]

Regulation 34-1

Master's Discretion

The owner, the charterer, the company operating the ship as defined in Regulation 1 of Chapter IX, 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

**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 Organization by resolution A.893(21)

professional judgment, is necessary for safety of life at sea and protection of the marine environment.

[S 282/2006 wef 01/07/2006]

Regulation 35

Misuse of Distress Signals

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.

[S 314/2002 wef 01/07/2002]

Regulation 36

Basic Principles to be Observed in Keeping Navigational and Engineering Watches

All ships shall maintain navigational and engineering watches. Masters, chief engineers and watchkeeping personnel shall observe the basic principles in watchkeeping outlined in Chapter VIII of the Regulations annexed to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended on 7th July 1995 and any amendment thereto which has come into force and has been accepted by the Government.

[S 314/2002 wef 01/07/2002]

CHAPTER VI

CARRIAGE OF CARGOES AND OIL FUELS

[S 793/2010 wef 01/01/2011]

PART A — GENERAL PROVISIONS

Regulation 1

Application

(*a*) Unless expressly provided otherwise, 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. However, 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.

[S 793/2010 wef 01/01/2011]

(*b*) For the purposes of this Part and Part B, the following Codes shall be complied with wherever applicable:

(i) the Code of Safe Practice for Cargo Stowage and Securing adopted by the Organisation;

(ii) the Code of Safe Practice for Ships Carrying Timber Deck Cargoes adopted by the Organisation.

[S 793/2010 wef 01/01/2011]

Regulation 1-1

Definitions

For the purpose of this Chapter, unless expressly provided otherwise, the following definitions shall apply:

(*a*) "IMSBC Code" means the International Maritime Solid Bulk Cargoes (IMSBC) Code adopted by the Maritime Safety Committee of the Organisation by resolution MSC.268(85), 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.

(*b*) "Solid bulk cargo" means any cargo, 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.

[S 793/2010 wef 01/01/2011]

Regulation 1-2

Requirements for carriage of solid bulk cargoes other than grain

The carriage of solid bulk cargoes other than grain shall be in compliance with the relevant provisions of the IMSBC Code.

[S 793/2010 wef 01/01/2011]

Regulation 2

Cargo Information

(*a*) 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.

(*b*) The cargo information shall include:

(i) 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; and

(ii) in the case of solid bulk cargo, information as required by section 4 of the IMSBC Code.

[S 793/2010 wef 01/01/2011]

(*c*) 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.

(*d*) In the case of cargo carried in a container*, except for containers carried on a chassis or a trailer when such containers are driven on or off a ro-ro ship engaged in short international voyages as defined in Regulation 3 of Chapter III, the gross mass according to paragraph (*b*)(i) of this Regulation must be verified by the shipper, either:

(i) by weighing the packed container using calibrated and certified equipment; or

(ii) by weighing all packages and cargo items, including the mass of pallets, dunnage and other securing material to be packed in the container and adding the tare mass of the container to the sum of the single masses, using a certified method approved by the competent authority of the State in which packing of the container was completed.

[S 277/2016 wef 01/07/2016]

(*e*) The shipper of a container must ensure that the verified gross mass† is stated in the shipping document. The shipping document must be:

*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.

*The term "container" should be considered as having the same meaning as defined and applied in the International Convention for Safe Containers (CSC), 1972, as amended, taking into account the Guidelines for the approval of offshore containers handled in open seas (MSC/Circ.860) and the Revised recommendations on harmonized interpretation and implementation of the International Convention for Safe Containers, 1972, as amended (CSC.1/Circ.138/Rev.1).

†Refer to the Guidelines regarding the verified gross mass of a container carrying cargo (MSC.1/Circ.1475).

(i) signed by a person duly authorised by the shipper; and

(ii) submitted to the master (or the master's representative) and to the terminal representative sufficiently in advance, as required by the master (or the master's representative), to be used in the preparation of the ship stowage plan‡.

[S 277/2016 wef 01/07/2016]

(*f*) If the shipping document, with regard to a packed container, does not provide the verified gross mass and the master (or the master's representative) and the terminal representative have not obtained the verified gross mass of the packed container, the packed container must not be loaded on to the ship.

[S 277/2016 wef 01/07/2016]

Regulation 3

Oxygen Analysis and Gas Detection Equipment

(*a*) When transporting a solid 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.

[S 793/2010 wef 01/01/2011]

(*b*) Masters of ships in which such instruments are provided shall ensure that the crew are trained in the use of such instruments.

Regulation 4

*The Use of Pesticides in Ships**

Appropriate precautions shall be taken in the use of pesticides in ships, in particular for the purposes of fumigation.

Regulation 5

Stowage and Securing

‡This document may be presented by means of EDP or EDI transmission techniques. The signature may be an electronic signature or may be replaced by the name, in capitals, of the person authorized to sign.

* Reference is made to the IMO Recommendation on the Safe Use of Pesticides in Ships, as amended.

(*a*) Cargo, cargo units* and cargo transport 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.

[S 645/2003 wef 01/01/2004]

(*b*) Cargo, cargo units and cargo transport units shall be so packed and secured as to prevent, throughout the voyage, damage or hazard to the ship and the persons on board.

[S 645/2003 wef 01/01/2004]

(*c*) 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.

(*d*) Appropriate precautions shall be taken during loading and transport of cargo units and cargo transport units on board ro/ro ships, especially with regard to the securing arrangements on board such ships and on the cargo units and cargo transport units and with regard to the strength of the securing points and lashings.

[S 645/2003 wef 01/01/2004]

(*e*) Freight 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), as amended.

[S 645/2003 wef 01/01/2004]

(*f*) All cargoes, other than solid and liquid bulk cargoes, cargo units and cargo transport units shall be loaded, stowed and secured throughout the voyage in accordance with the Cargo Securing Manual approved by the Director. In ships with ro-ro spaces, as defined in paragraph (*oo*) of Regulation 3 of Chapter II-2, all securing of such cargoes, cargo units and cargo transport units, in accordance with the Cargo Securing Manual, shall be completed before the ship leaves the berth. The Cargo Securing Manual shall be drawn up to a standard at least equivalent to relevant guidelines developed by the Organisation‡.

[S 645/2003 wef 01/01/2004]

Regulation 5-1

Material Safety Data Sheets

*Refer to the Code of Safe Practice for Cargo Stowage and Securing, adopted by the Organisation by resolution A.714(17), as amended.

†Refer to the International Maritime Dangerous Goods (IMDG) Code, adopted by the Organisation by resolution MSC.122(75).

‡Refer to the Guidelines on the preparation of the cargo securing manual (MSC/Circ.745).

Ships carrying oil or oil fuel, as defined in Regulation 1 of Annex 1 of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, shall be provided with material safety data sheets, based on the recommendations developed by the Organisation*, prior to the loading of such oil as cargo in bulk or bunkering of oil fuel.

[S 793/2010 wef 01/01/2011]

Regulation 5-2

Prohibition of the Blending of Bulk Liquid Cargoes and Production Processes During Sea Voyages

(*a*) The physical blending of bulk liquid cargoes during sea voyages is prohibited. Physical blending refers to the process whereby the ship's cargo pumps and pipelines are used to internally circulate 2 or more different cargoes with the intent to achieve a cargo with a new product designation. This prohibition does not preclude the master from undertaking cargo transfers for the safety of the ship or protection of the marine environment.

(*b*) The prohibition in paragraph (*a*) does not apply to the blending of products for use in the search and exploitation of seabed mineral resources on board ships used to facilitate such operations.

(*c*) Any production process on board a ship during sea voyages is prohibited. Production processes refer to any deliberate operations whereby a chemical reaction between a ship's cargo and any other substance or cargo takes place.

(*d*) The prohibition in paragraph (*c*) does not apply to the production processes of cargoes for use in the search and exploitation of seabed mineral resources on board ships used to facilitate such operations*.

[S 847/2013 wef 01/01/2014]

PART B — SPECIAL PROVISIONS FOR BULK CARGOES

Regulation 6

Acceptability for Shipment

(*a*) Prior to loading a solid bulk cargo, the master shall be in possession of comprehensive information on the ship's stability and on the distribution of cargo

*Refer to the Recommendations for material safety data sheets (MSDS) for MARPOL Annex I oil cargo and oil fuel, adopted by the Organisation by resolution MSC.286(86), as may be amended.

* Refer to the Guidelines for the Transport and Handling of Limited Amounts of Hazardous and Noxious Liquid Substances in Bulk in Offshore Support Vessels (resolution A.673(16), as amended).

for the standard loading conditions. The method of providing such information shall be to the satisfaction of the Director*.

[S 793/2010 wef 01/01/2011]

(*b*) [*Deleted by S 793/2010 wef 01/01/2011*]

(*c*) [*Deleted by S 793/2010 wef 01/01/2011*]

Regulation 7

*Loading, Unloading and Stowage of Solid Bulk Cargoes**

* Refer to the Code of Practice for the Safe Loading and Unloading of Bulk Carriers to be developed for adoption by the twentieth session of the Assembly of the Organisation.

[S 793/2010 wef 01/01/2011]

(*a*) 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.

(*b*) 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 —

(i) stability data, as required by Regulation 5–1 of Chapter II-1;

[S 686/2008 wef 01/01/2009]

(ii) ballasting and deballasting rates and capacities;

(iii) maximum allowable load per unit surface area of the tank top plating;

(iv) maximum allowable load per hold;

(v) 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;

*Reference is made 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 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).

(vi) any special restrictions such as limitations on the most adverse operating conditions imposed by the Director or authorised organisation; and

(vii) where strength calculations are required, maximum permissible forces and moments on the ship's hull during loading, unloading and the voyage.

(*c*) 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.

(*d*) The master and terminal representative shall ensure that loading and unloading operations are conducted in accordance with the agreed plan.

[S 793/2010 wef 01/01/2011]

(*e*) If during loading or unloading any of the limits of the ship referred to in paragraph (*b*) 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.

[S 793/2010 wef 01/01/2011]

(*f*) 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.

[S 793/2010 wef 01/01/2011]

PART C — CARRIAGE OF GRAIN

Regulation 8

Definitions

*Refer to the Code of Practice for the Safe Loading and Unloading of Bulk Carriers to be developed for adoption by the twentieth session of the Assembly of the Organisation.

For the purposes of this Part, unless expressly provided otherwise —

(*a*) "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.

(*b*) The term "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.

Regulation 9

Requirements for Cargo Ships carrying Grain

(*a*) 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.

(*b*) A ship without such a document shall not load grain until the master satisfies the Director, or the Contracting Government 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

Regulation 1

Definitions

For the purpose of this Chapter, unless expressly provided otherwise —

"dangerous goods" means the substances, materials and articles covered by the IMDG Code;

"IMDG Code" means the International Maritime Dangerous Goods (IMDG) Code adopted by the Maritime Safety Committee of the Organisation by resolution MSC.122(75), as may be amended by the Organisation,

provided that such amendments are adopted and brought into force and take effect in accordance with the provisions of article VIII of the Convention concerning the amendment procedures applicable to the Annex other than Chapter I;

"packaged form" means the form of containment specified in the IMDG Code.

[S 645/2003 wef 01/01/2004]

Regulation 2

Application[*]

[*] Refer to part D which contains special requirements for the carriage of INF cargo; and Regulation II-2/19 which contains special requirements for ships carrying dangerous goods.

(*a*) Unless expressly provided otherwise, this Part applies to the carriage of dangerous goods in packaged form in all ships to which these Regulations apply and in cargo ships of less than 500 tons.

(*b*) The provisions of this Part do not apply to ships' stores and equipment.

(*c*) The carriage of dangerous goods in packaged form is prohibited except in accordance with the provisions of this Chapter.

(*d*) To supplement the provisions of this Part, the Emergency Response Procedures for Ships Carrying Dangerous Goods (EmS Guide) and the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG) published by the Organisation shall be complied with.

[S 645/2003 wef 01/01/2004]

Regulation 3

Requirements for carriage of dangerous goods

The carriage of dangerous goods in packaged form shall be in compliance with the relevant provisions of the IMDG Code.

[S 645/2003 wef 01/01/2004]

Regulation 4

Documents

(*a*) Transport information relating to the carriage of dangerous goods in packaged form, and the container or vehicle packing certificate, shall be in accordance with the relevant provisions of the IMDG Code and shall be made available to the person or organisation designated by the port State authority.

[S 847/2013 wef 01/01/2014]

(*b*) Each ship carrying dangerous goods in packaged form shall have a special list, manifest or stowage plan setting forth, in accordance with the relevant provisions of the IMDG Code, the dangerous goods on board and the location thereof. A copy of one of these documents shall be made available before departure of the ship to the person or organisation designated by the port State authority.

[S 847/2013 wef 01/01/2014]

Regulation 5

Cargo Securing Manual

Cargo, cargo units* and cargo transport units, shall be loaded, stowed and secured throughout the voyage in accordance with the Cargo Securing Manual approved by the Director. The Cargo Securing Manual shall be drawn up to a standard at least equivalent to the guidelines developed by the Organisation†.

[S 645/2003 wef 01/01/2004]

Regulation 6

Reporting of Incidents involving Dangerous Goods

(*a*) When an incident takes place involving the loss or likely loss overboard of dangerous goods in packaged form 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 drawn up based on general principles and guidelines developed by the Organisation†.

(*b*) If the ship referred to in paragraph (*a*) is abandoned, or if a report from the ship under paragraph (*a*) is incomplete or cannot be obtained, the company, as defined in Regulation 1 of Chapter IX, shall, to the fullest extent possible, assume the obligations placed upon the master by this Regulation.

[S 645/2003 wef 01/01/2004]

PART A-1 — CARRIAGE OF DANGEROUS GOODS IN SOLID FORM IN BULK

Regulation 7

Definition

*As defined in the Code of Safe Practice for Cargo Stowage and Securing, adopted by the Organisation by resolution A.715(17), as amended.

†Refer to the Guidelines for the preparation of the cargo securing manual MSC/Circ.745).

†Refer to the General principles for ship reporting systems and ship reporting requirements, including Guidelines for reporting incidents involving dangerous goods, harmful substances and/or marine pollutants, adopted by the Organisation by resolution A.851(20).

"Dangerous goods in solid form in bulk" 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 covered by the IMDG Code and is loaded directly into the cargo spaces of a ship without any intermediate form of containment, and includes any such material loaded in a barge on a barge-carrying ship.

[S 645/2003 wef 01/01/2004]

Regulation 7-1

*Application**

(*a*) Unless expressly provided otherwise, this Part applies to the carriage of dangerous goods in solid form in bulk in all ships to which these Regulations apply and in cargo ships of less than 500 tons.

(*b*) The carriage of dangerous goods in solid form in bulk is prohibited except in accordance with the provisions of this Part.

(*c*) In addition to the provisions of this Part, the Medical First Aid Guide for Use in Accidents involving Dangerous Goods (MFAG)* shall be complied with.

[S 645/2003 wef 01/01/2004]

[S 793/2010 wef 01/01/2011]

Regulation 7-2

Documents

(*a*) In all documents relating to the carriage of dangerous goods in solid form in bulk by sea, the bulk cargo shipping name of the goods shall be used (trade names alone shall not be used).

(*b*) Each ship carrying dangerous goods in solid form in bulk shall have a special list or manifest setting forth 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.

[S 645/2003 wef 01/01/2004]

[S 847/2013 wef 01/01/2014]

Regulation 7-3

Stowage and Segregation Requirements

* Refer to Regulation II-2/19, which contains special requirements for ships carrying dangerous goods.

(*a*) Dangerous goods in solid form in bulk shall be loaded and stowed safely and appropriately in accordance with the nature of the goods. Incompatible goods shall be segregated from one another.

(*b*) Dangerous goods in solid form in bulk 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.

(*c*) Dangerous goods in solid form in bulk which give off dangerous vapours shall be stowed in a well-ventilated cargo space.

[S 645/2003 wef 01/01/2004]

Regulation 7-4

Reporting of Incidents involving Dangerous Goods

(*a*) When an incident takes place involving the loss or likely loss overboard of dangerous goods in solid form in bulk 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 drawn up based on general principles and guidelines developed by the Organisation*.

(*b*) If the ship referred to in paragraph (*a*) is abandoned, or if a report from the ship under paragraph (*a*) is incomplete or cannot be obtained, the company, as defined in Regulation 1 of Chapter IX, shall, to the fullest extent possible, assume the obligations placed upon the master by this Regulation.

[S 645/2003 wef 01/01/2004]

Regulation 7-5

Requirements for Carriage of Dangerous Goods in Solid Form in Bulk

The carriage of dangerous goods in solid form in bulk shall be in compliance with the relevant provisions of the IMSBC Code, as defined in paragraph (*a*) of Regulation 1-1 of Chapter VI.

[S 793/2010 wef 01/01/2011]

PART B — CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS LIQUID CHEMICALS IN BULK

Regulation 8

*Refer to the General Principles for Ship Reporting Systems and Ship Reporting Requirements, including guidelines for reporting incidents involving dangerous goods, harmful subtances and/or marine pollutants adopted by the Organisation by resolution A.851(20).

Definitions

For the purpose of this Part, unless expressly provided otherwise —

(*a*) "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.

(*b*) "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.

(*c*) For the purpose of Regulation 9, "ship constructed" means a ship the keel of which is laid or which is at a similar stage of construction.

(*d*) "At a 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.

Regulation 9

Application to Chemical Tankers

(*a*) 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.

(*b*) 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.

(*c*) 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.

Regulation 10

Requirements for Chemical Tankers

(*a*) A chemical tanker shall comply with the requirements of the IBC Code as applicable and shall, in addition to the requirements of Regulations 8, 9 and 10 of Chapter I as applicable, be surveyed and certified as provided for in that Code.

[S 282/2006 wef 01/07/2006]

(*b*) A chemical tanker holding a certificate issued pursuant to the provisions of paragraph (*a*) shall be subject to the control established in Regulation 19 of Chapter I. For this purpose such certificate shall be treated as a certificate issued under Regulations 12 and 13 of Chapter I.

(*c*) Chemical tankers, other than those defined in Regulation 8(*b*), 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.

(*d*) For chemical tankers, other than those defined in Regulation 8(*b*), 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.

(*e*) 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 MSC7 (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."

(*f*) 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

Regulation 11

Definitions

For the purpose of this Part, unless expressly provided otherwise:

(*a*) "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.

(*b*) "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.

(*c*) For the purpose of Regulation 12, "ship constructed" means a ship the keel of which is laid or which is at a similar stage of construction.

(*d*) "At a 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.

Regulation 12

Application to Gas Carriers

(*a*) 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.

(*b*) 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.

(*c*) 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.

Regulation 13

Requirements for Gas Carriers

(*a*) A gas carrier shall comply with the requirements of the IGC Code as applicable and shall, in addition to the requirements of Regulations 8, 9 and 10 of Chapter I 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.

(*b*) A gas carrier holding a certificate issued pursuant to the provisions of paragraph (*a*) shall be subject to the control established in Regulation 19 of Chapter I. For this purpose such certificate shall be treated as a certificate issued under Regulations 12 and 13 of Chapter I.

(*c*) Gas carriers, other than those defined in Regulation 11(*b*), 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.

(*d*) For gas carriers, other than those defined in Regulation 11(*b*) of this Part, 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.

(*e*) 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 MSC7 (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."

(*f*) 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 THE CARRIAGE OF PACKAGED IRRADIATED NUCLEAR FUEL, PLUTONIUM AND HIGH-LEVEL RADIOACTIVE WASTES ON BOARD SHIPS

Regulation 14

Definitions

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;

[*Deleted by S 645/2003 wef 01/01/2004*]

"INF cargo" means packaged irradiated nuclear fuel, plutonium and high-level radioactive wastes carried as cargo in accordance with Class 7 of the IMDG Code;

[S 613/2002 wef 01/01/2003]

[S 645/2003 wef 01/01/2004]

"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 VIII of the present Convention concerning the amendment procedures applicable to the annex other than Chapter I;

"irradiated nuclear fuel" means material containing uranium, thorium and/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 reprocessing.

[S 511/2000 wef 01/01/2001]

Regulation 15

Application to ships carrying INF cargo

(*a*) Except as provided for in paragraph (*b*), 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.

(*b*) This Part and the INF Code do not apply to warships, naval auxiliary or other vessels owned or operated by a Contracting Government and used, for the time being, only on government non-commercial service; however, such ships carrying INF cargo shall act in a manner consistent, so far as reasonable and practicable, with this Part and the INF Code.

(*c*) Nothing in this Part or the INF Code shall prejudice the rights and duties of the governments under international law and any action taken to enforce compliance shall be consistent with international law.

[S 511/2000 wef 01/01/2001]

Regulation 16

Requirements for ships carrying INF cargo

(*a*) 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.

(*b*) A ship holding a certificate issued pursuant to the provisions of paragraph (*a*) shall be subject to the control established in Regulation 19 of Chapter I and Regulation 4 of Chapter XI-1. For this purpose, such certificate shall be treated as a certificate issued under Regulation 12 or 13 of Chapter I.

[S 511/2000 wef 01/01/2001]

[S 217/2004 wef 01/07/2004]

CHAPTER VIII

NUCLEAR SHIPS

Regulation 1

Application

This Chapter applies to all nuclear ships except ships of war.

Regulation 2

Application of other Chapters

The Regulations contained in the other Chapters apply to nuclear ships except as modified by this Chapter*.

Regulation 3

Exemptions

A nuclear ship shall not, in any circumstances, be exempted from compliance with any requirements of these Regulations.

Regulation 4

Approval of Reactor Installation

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.

*Reference is made to the Code of Safety for Nuclear Merchant Ships (resolution A 491 (XII)) which supplements the requirements of this Chapter.

Regulation 5

Suitability of Reactor Installation

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.

Regulation 6

Radiation Safety

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.

Regulation 7

Safety Assessment

(*a*) 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.

(*b*) 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.

Regulation 8

Operating Manual

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.

Regulation 9

Surveys

Survey of nuclear ships shall include the applicable requirements of Regulation 7 of Chapter I, or of Regulations 8, 9 and 10 of Chapter I, 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 8 and 10 of Chapter I, be carried out not less frequently than once a year.

Regulation 10

Certificates

(*a*) Regulation 12(*a*) of Chapter I and Regulation 14 of Chapter I shall not apply to nuclear ships.

(*b*) 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 VIII, and any other relevant requirements of these Regulations.

(*c*) 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 10 of Chapter I, and complies with the requirements of Chapters II-1, II-2, III, IV and VIII and any other relevant requirements of these Regulations.

(*d*) Nuclear Passenger Ship Safety Certificates and Nuclear Cargo Ship Safety Certificates shall state — "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".

(*e*) Nuclear Passenger Ship Safety Certificates and Nuclear Cargo Ship Safety Certificates shall be valid for a period of not more than one year.

(*f*) 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.

Regulation 11

Special Control[*]

[*] Reference is made to the IMO/IAEA Safety Recommendation on the Use of Ports by Nuclear Merchant Ships.

In additional to the control established by Regulation 19 of Chapter I, nuclear ships shall be subject to special control before entering and while in Singapore, 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.

Regulation 12

Casualties

In the event of any accident likely to lead to an environmental hazard —

(*a*) the Master of a Singapore 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 Singapore in a damaged condition shall immediately inform the Director.

CHAPTER IX

MANAGEMENT FOR THE SAFE OPERATION OF SHIPS

Regulation 1

Definitions

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 chemical tanker as defined in Regulation 8(*b*) of Chapter VII;

"Company" means the owner of the ship or any other organisation or person such as the manager, or the bare-boat 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 gas carrier as defined in Regulation 11(*b*) of Chapter VII;

"High speed craft" means a craft as defined in Regulation 1 of Chapter X;

"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 sea-bed such as liquid or gaseous hydrocarbons, sulphur or salt;

"Oil tanker" means an oil tanker as defined in Regulation 2(*v*) of Chapter II-1.

[S 686/2008 wef 01/01/2009]

Regulation 2

Application

(*a*) This Chapter applies to ships, regardless of the date of construction, as follows:

(i) passenger ships including passenger high speed craft, not later than 1st July 1998;

(ii) 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

(iii) other cargo ships and mobile offshore drilling units of 500 tons and upwards, not later than 1st July 2002.

(*b*) This Chapter does not apply to government-operated ships used for non-commercial purposes.

Regulation 3

Safety Management Requirements

(*a*) 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.

[S 314/2002 wef 01/07/2002]

(*b*) The ship shall be operated by a company holding a Document of Compliance referred to in Regulation 4.

Regulation 4

Certification

(*a*) 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.

(*b*) 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.

(*c*) A Certificate, called 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.

Regulation 5

Maintenance of Conditions

The safety management system shall be maintained in accordance with the provisions of the International Safety Management Code.

Regulation 6

Verification and Control

(*a*) 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.

(*b*) A ship required to hold a certificate issued pursuant to the provision of Regulation 4(*c*) shall be subject to control in accordance with the provisions of Regulation 4 of Chapter XI-1. For this purpose, such certificate shall be treated as a certificate issued under Regulation 12 or 13 of Chapter I.

[S 314/2002 wef 01/07/2002]

[S 217/2004 wef 01/07/2004]

(*c*) [*Deleted by S 314/2002 wef 01/07/2002*]

CHAPTER X

SAFETY MEASURES FOR HIGH SPEED CRAFT

Regulation 1

Definitions

For the purpose of this Chapter —

"High speed craft" is a craft capable of a maximum speed in metres per second (m/s) equal to or exceeding —

$$3.7\,\nabla^{0.1667}$$

where ∇ = volume of displacement corresponding to the design waterline (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.

[S 314/2002 wef 01/07/2002]

"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.

[S 314/2002 wef 01/07/2002]

"High-Speed Craft Code, 2000 (2000 HSC Code)" means the International Code of Safety for High-Speed Craft, 2000 adopted by the Maritime Safety Committee of the Organization by resolution MSC.97 (73), as may be amended by the Organization, 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.

[S 314/2002 wef 01/07/2002]

"Craft constructed" means a craft the keel of which is laid or which is at a similar stage of construction.

"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.

[S 314/2002 wef 01/07/2002]

Regulation 2

Application

(*a*) This Chapter applies to high speed craft constructed on or after 1st January 1996, as follows:

(i) 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

(ii) 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.

(*b*) 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.

[S 314/2002 wef 01/07/2002]

Regulation 3

Requirements for High Speed Craft

(*a*) Notwithstanding the provisions of Chapters I to IV and Regulations 18, 19 and 20 of Chapter V:

(i) 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 in that Code shall be deemed to have complied with the requirements of Chapters I to IV and Regulations 18, 19 and 20 of Chapter V. For the purpose of this Regulation, the requirements of that Code shall be treated as mandatory.

(ii) 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 that Code shall be deemed to have complied with the requirements of Chapters I to IV and Regulations 18, 19 and 20 of Chapter V.

[S 314/2002 wef 01/07/2002]

(*b*) 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-1

SPECIAL MEASURES TO ENHANCE MARITIME SAFETY

[S 217/2004 wef 01/07/2004]

Regulation 1

Authorisation of Authorised Organisations

(*a*) The Director shall authorise organisations, including classification societies, for the survey or inspection of Singapore ships and the issue of any certificate under Part V of the Act in accordance with the provisions of the Convention and with parts 1 and 2 of the Code for Recognized Organizations (RO Code), as adopted by the Organisation by resolution MSC.349(92), taking into account the guidance provided in part 3 of the RO Code.

(*b*) An authorised organisation shall comply with such provisions in part 2 of the RO Code as may be applicable to it.

(*c*) The Director and any authorised organisation shall be bound by any amendments to part 1 or 2 of the RO Code, and the Director shall be guided by any amendments to part 3 of the RO Code, provided that —

(i) the amendments to part 1 or 2 of the RO Code are adopted, brought into force and take effect in accordance with the provisions of article VII of the Convention;

(ii) the amendments to part 3 of the RO Code are adopted by the Maritime Safety Committee in accordance with its Rules of Procedure; and

(iii) the amendments adopted by the Maritime Safety Committee and the Marine Environment Protection Committee are identical and come into force or take effect at the same time, as appropriate.

[S 866/2014 wef 01/01/2015]

Regulation 2

Enhanced Surveys

Bulk carriers as defined in Regulation 1 of Chapter IX and oil tankers as defined in Regulation 2(*v*) of Chapter II-1 shall be subject to an enhanced programme of inspections in accordance with the International Code on the Enhanced Programme of Inspections during Surveys of Bulk Carriers and Oil Tankers, 2011 (2011 ESP Code), adopted by the Assembly of the Organisation by resolution A.1049(27), 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.

[S 686/2008 wef 01/01/2009]

[S 847/2013 wef 01/01/2014]

Regulation 3

Ship Identification Number

(*a*) This Regulation applies to all passenger ships of 100 tons and upwards and to all cargo ships of 300 tons and upwards.

(*b*) Every ship shall be provided with an identification number which conforms to the IMO ship identification number scheme adopted by the Organisation*.

(*c*) The ship's identification number shall be inserted on the certificates and certified copies thereof issued under Regulation 12 or 13 of Chapter I.

(*d*) The ship's identification number shall be permanently marked —

(i) in a visible place —

(1) on the stern of the ship or on either side of the hull, amidships port and starboard, above the deepest assigned load line;

(2) on either side of the superstructure, port and starboard;

(3) on the front of the superstructure; or

(4) in the case of a passenger ship, on a horizontal surface visible from the air; and

(ii) in an easily accessible place —

(1) on one of the end transverse bulkheads of the machinery spaces, as defined in Regulation 3(*dd*) of Chapter II-2;

(2) on one of the hatchways;

(3) in the case of a tanker, in the pump-room; or

(4) in the case of a ship with ro-ro spaces, as defined in Regulation 3(*oo*) of Chapter II-2, on one of the end transverse bulkheads of the ro-ro spaces.

[S 217/2004 wef 01/07/2004]

(*e*) A permanent marking of a ship's identification number shall bear the following characteristics:

(i) the permanent marking shall be plainly visible, clear of any other marking on the hull, and shall be painted in a contrasting colour.

(ii) the permanent marking referred to in paragraph (*d*)(i) shall be not less than 200 mm in height, and the width of the marking shall be proportionate to the height of the marking.

(iii) the permanent marking referred to in paragraph (*d*)(ii) shall not be less than 100 mm in height, and the width of the marking shall be proportionate to the height of the marking.

*Refer to the IMO Ship Identification Number Scheme, adopted by the Organisation by resolution A. 600 (15).

(iv) the permanent marking may be made by raised lettering, by cutting it in, by centre punching it or by any other equivalent method of making a marking which ensures that the marking is not easily expunged.

(v) in the case of a ship constructed of any material other than steel or metal, the permanent marking shall be made by a method which the Director approves of.

[S 217/2004 wef 01/07/2004]

(*f*) In the case of a ship constructed before 1st July 2004, the requirements of paragraphs (*d*) and (*e*) shall be complied with not later than during the first scheduled dry-docking of the ship after 1st July 2004.

[S 217/2004 wef 01/07/2004]

Regulation 3-1

Company and Registered Owner Identification Number

(*a*) This Regulation applies to Companies and registered owners of ships to which Chapter I applies.

(*b*) For the purpose of this Regulation, registered owner shall be as specified by the Director and Company as defined in Regulation 1 of Chapter IX.

(*c*) Every Company and registered owner shall be provided with an identification number which conforms to the IMO Unique Company and Registered Owner Identification Number Scheme adopted by the Organization*.

(*d*) The Company identification number shall be inserted on the certificates and certified copies thereof issued under Regulation 4 of Chapter IX and Section 19.2 or 19.4 of Part A of the ISPS Code.

(*e*) This Regulation shall take effect when the certificates referred to in paragraph (*d*) are issued or renewed on or after 1st January 2009.

[S 686/2008 wef 01/01/2009]

Regulation 4

*Port State Control on Operational Requirements***

(*a*) 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

*Refer to resolution MSC.160(78) entitled "Adoption of the IMO Unique Company and Registered Owner Identification Number Scheme".

** Refer to the Procedures for Control of Operational Requirements Related to the Safety of Ships and Pollution Prevention. Adopted by the Organisation by resolution A. 742 (18).

believing that the master or crew are not familiar with essential shipboard procedures relating to the safety of ships.

(*b*) In the circumstances defined in paragraph (*a*), 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.

(*c*) Procedures relating to the port State control prescribed in Regulation 19 of Chapter I shall apply to this Regulation.

(*d*) 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.

Regulation 5

Continuous Synopsis Record

(*a*) Every ship to which Chapter I applies shall be issued with a Continuous Synopsis Record.

[S 217/2004 wef 01/07/2004]

(*b*) The Continuous Synopsis Record —

(i) is intended to provide an on-board record of the history of the ship with respect to the information recorded therein; and

(ii) for ships constructed before 1st July 2004, shall provide at least the history of the ship from 1st July 2004.

[S 217/2004 wef 01/07/2004]

(*c*) A Continuous Synopsis Record shall be issued by the Director to each ship, and the Continuous Synopsis Record shall contain at least the following information (The Continuous Synopsis Record shall contain the information in paragraphs (*c*)(vii) and (*c*)(x) when it is issued or updated on or after 1st January 2009):

(i) the name of the State whose flag the ship is entitled to fly;

(ii) the date on which the ship was registered with that State;

(iii) the ship's identification number in accordance with Regulation 3;

(iv) the name of the ship;

(v) the port at which the ship is registered;

(vi) the name and registered address of the registered owner or, where there is more than one registered owner, each registered owner;

(vii) the registered owner identification number;

[S 686/2008 wef 01/01/2009]

(viii) the name and registered address of the registered bareboat charterer or, where there is more than one registered bareboat charterer, each registered bareboat charterer, if applicable;

[S 686/2008 wef 01/01/2009]

(ix) the name and registered address of the Company, as defined in Regulation 1 of Chapter IX, and the address or addresses of the places from which the Company carries out the safety management activities;

[S 686/2008 wef 01/01/2009]

(x) the Company identification number;

[S 686/2008 wef 01/01/2009]

(xi) the name of every classification society with which the ship is classed;

[S 686/2008 wef 01/01/2009]

(xii) the name of the authorised organisation or Contracting State which issued the Document of Compliance (or Interim Document of Compliance) specified in the International Safety Management (ISM) Code, as defined in Regulation 1 of Chapter IX, to the Company operating the ship and, where the body which carried out the audit on the basis of which the Document of Compliance (or Interim Document of Compliance) was issued is not that authorised organisation or Contracting State, the name of that body;

[S 686/2008 wef 01/01/2009]

(xiii) the name of the authorised organisation or Contracting State which issued the Safety Management Certificate (or Interim Safety Management Certificate) specified in the International Safety Management (ISM) Code, as defined in Regulation 1 of Chapter IX, to the ship and, where the body which carried out the audit on the basis of which the Safety Management Certificate (or Interim Safety Management Certificate) was issued is not that authorised organisation or Contracting State, the name of that body;

[S 686/2008 wef 01/01/2009]

(xiv) the name of the authorised organisation or Contracting State which issued the International Ship Security Certificate (or Interim International Ship Security Certificate) specified in part A of the ISPS Code, as defined in Regulation 1 of Chapter XI-1, to the ship and, where the body which carried out the verification on the basis of which the International Ship Security Certificate (or Interim International Ship

Security Certificate) was issued is not that authorised organisation or Contracting State, the name of that body;

[S 686/2008 wef 01/01/2009]

(xv) the date on which the ship ceased to be registered with that State.

[S 686/2008 wef 01/01/2009]

(*d*) Where there is any change in relation to any entry referred to in paragraph (*c*)(iv) to (xii) —

(i) the change shall be recorded in the Continuous Synopsis Record so as to provide updated and current information as well as a history of the changes to the entry;

(ii) the Director shall, as soon as is practicable but, in any event, not later than three months from the date of the change, issue to the ship either a revised and updated version of the Continuous Synopsis Record or appropriate amendments to the Continuous Synopsis Record; and

(iii) pending the issue of a revised and updated version of the Continuous Synopsis Record —

(1) the Director shall authorise and require either the Company, as defined in Regulation 1 of Chapter IX, or the master of the ship to amend the Continuous Synopsis Record to reflect the change; and

(2) after the Continuous Synopsis Record has been amended, the Company shall, without delay, inform the Director accordingly.

[S 217/2004 wef 01/07/2004]

(*e*) The Continuous Synopsis Record shall —

(i) be in the English language;

(ii) be in the format developed by the Organisation; and

(iii) be maintained in accordance with guidelines developed by the Organisation.

[S 217/2004 wef 01/07/2004]

(*f*) No earlier entry in the Continuous Synopsis Record shall be modified, deleted or in any way erased or defaced.

[S 217/2004 wef 01/07/2004]

(*g*) The Continuous Synopsis Record shall be left on board a ship whenever —

(i) the ship is transferred to the flag of another State;

(ii) the ship is sold to another owner;

(iii) the ship is taken over by another bareboat charterer; or

(iv) another Company assumes the responsibility for the operation of the ship.

[S 217/2004 wef 01/07/2004]

(*h*) When a ship is to be transferred to the flag of another State, the Company shall notify the Director of the name of that State, so as to enable the Director to forward to that State a copy of the Continuous Synopsis Record covering the period during which the ship was under the Singapore flag.

[S 217/2004 wef 01/07/2004]

(*i*) When a ship is transferred to the flag of another Contracting State, the Director shall, as soon as possible after the transfer has taken place, transmit to that Contracting State a copy each of —

(i) the Continuous Synopsis Record covering the period during which the ship was under the Singapore flag; and

(ii) any Continuous Synopsis Record previously issued to the ship by any other State.

[S 217/2004 wef 01/07/2004]

(*j*) When a ship is transferred from the flag of another State, any Continuous Synopsis Record previously issued to the ship shall be appended to the Continuous Synopsis Records to be issued to the ship by the Director, so as to provide the continuous record of the history of the ship intended by this Regulation.

[S 217/2004 wef 01/07/2004]

(*k*) The Continuous Synopsis Record shall be kept on board the ship and shall be available for inspection at all times.

[S 217/2004 wef 01/07/2004]

Regulation 6

Additional Requirements for the Investigation of Marine Casualties and Incidents

Taking into account Regulation 21 of Chapter I, the Director shall conduct investigations of marine casualties and incidents in accordance with these Regulations, as supplemented by the Code of the International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident (Casualty Investigation Code) adopted by the Organisation by resolution MSC.255(84), and any amendment thereto which has come into force and has been accepted by the Government.

[S 664/2009 wef 01/01/2010]

Regulation 7

Atmosphere Testing Instrument for Enclosed Spaces

Every ship to which Chapter I applies shall carry an appropriate portable atmosphere testing instrument or instruments*. As a minimum, these shall be capable of measuring concentrations of oxygen, flammable gases or vapours, hydrogen sulphide and carbon monoxide prior to entry into enclosed spaces**. Instruments carried under other requirements may satisfy this Regulation. Suitable means shall be provided for the calibration of all such instruments.

[S 375/2015 wef 01/07/2015]

CHAPTER XI-2

SPECIAL MEASURES TO ENHANCE MARITIME SECURITY

Regulation 1

Definitions

(*a*) For the purpose of this Chapter, unless expressly provided otherwise —

"bulk carrier" means a bulk carrier as defined in Regulation 1 of Chapter IX;

"chemical tanker" means a chemical tanker as defined in Regulation 8(*b*) of Chapter VII;

"Company" means a Company as defined in Regulation 1 of Chapter IX;

"Contracting State", when used in Regulations 3, 4, 7 and 10 to 13, includes a reference to the Designated Authority;

"Designated Authority" means the Authority, which shall be responsible for ensuring the implementation of the provisions of Part XVA of the Port Regulations;

"gas carrier" means a gas carrier as defined in Regulation 11(*b*) of Chapter VII;

"high speed craft" means a high speed craft as defined in Regulation 1 of Chapter X;

"International Ship and Port Facility Security Code" or "ISPS Code" means the International Code for the Security of Ships and of Port Facilities consisting of Part A (the provisions of which shall be treated as mandatory) and Part B (the provisions of which shall be treated as

* Refer to the Guidelines to Facilitate the Selection of Portable Atmosphere Testing Instruments for Enclosed Spaces as Required by SOLAS Regulation XI-1/7 (MSC.1/Circ.1477).

** Refer to the Revised Recommendations for Entering Enclosed Spaces Aboard Ships (resolution A.1050(27)).

recommendations), as adopted on 12th December 2002 by resolution 2 of the Conference of Contracting Governments to the International Convention for the Safety of Life at Sea 1974, and as may be amended by —

(*a*) amendments made by the Organisation to Part A of the ISPS Code that are adopted and brought into force, and that take effect, in accordance with article VIII of the Convention concerning the amendment procedures applicable to the Annex other than Chapter I; and

(*b*) amendments made by the Organisation to Part B of the ISPS Code that are adopted by the Maritime Safety Committee in accordance with its Rules of Procedure;

"mobile offshore drilling unit" means a mechanically propelled mobile offshore drilling unit, as defined in Regulation 1 of Chapter IX, that is not on location;

"oil tanker" means an oil tanker as defined in Regulation 2(*v*) of Chapter II-1;

[S 686/2008 wef 01/01/2009]

"port facility" means a location, as determined by the Designated Authority, where the ship/port interface takes place, and includes, where appropriate, an area such as an anchorage, a waiting berth or an approach from seaward;

"Port Regulations" means the Maritime and Port Authority of Singapore (Port) Regulations (Cap. 170A, Rg 7);

"recognised security organisation" means an organisation with appropriate expertise in security matters and appropriate knowledge of ship and port operations that is authorised by the Authority to carry out an assessment, a verification, or an approval or certification activity required by this Chapter or by Part A of the ISPS Code;

"security incident" means any suspicious act or circumstance threatening the security of —

(*a*) a ship (including a mobile offshore drilling unit or a high speed craft);

(*b*) a port facility; or

(*c*) any ship/port interface or ship to ship activity;

"security level" means the level of risk that a security incident will be attempted or will occur;

"ship", when used in Regulations 3 to 13, includes a mobile offshore drilling unit or a high speed craft;

"ship to ship activity" means any activity not related to a port facility that involves the transfer of persons or goods from one ship to another;

"ship/port interface" means the interactions that occur when a ship is directly and immediately affected by actions involving the movement of persons or goods to or from the ship, or the provision of port services to the ship.

[S 217/2004 wef 01/07/2004]

(*b*) In the ISPS Code, "declaration of security" means an agreement between a ship and a port facility or another ship with which it interfaces specifying the security measures that each will implement.

[S 217/2004 wef 01/07/2004]

Regulation 2

Application

(*a*) This Chapter applies to —

(i) the following types of ships engaged on international voyages:

(1) passenger ships, including high speed passenger craft;

(2) cargo ships, including high speed craft, of not less than 500 tons; and

(3) mobile offshore drilling units; and

(ii) port facilities serving such ships engaged on international voyages.

(*b*) *Application to port facility used primarily by ships not engaged on international voyages*

(i) Notwithstanding paragraph (*a*)(ii), the Designated Authority shall decide the extent to which this Chapter and the relevant sections of Part A of the ISPS Code shall apply to any port facility in Singapore which, although used primarily by ships not engaged on international voyages, is required occasionally to serve ships arriving or departing on an international voyage.

(ii) In making a decision under sub-paragraph (i), the Designated Authority shall rely on a port facility security assessment carried out in accordance with the provisions of Part A of the ISPS Code.

(iii) Any decision made by the Designated Authority under sub-paragraph (i) shall not compromise the level of security intended to be achieved by this Chapter or by Part A of the ISPS Code.

(*c*) This Chapter does not apply to any warship, naval auxiliary or other ship owned or operated by a Contracting State and used only on Government non-commercial service.

(*d*) Nothing in this Chapter shall prejudice the rights or obligations of any Contracting State under international law.

[S 217/2004 wef 01/07/2004]

Regulation 3

Obligations of Contracting State with respect to Security

(*a*) The Director shall —

(i) set the security levels for, and ensure the provision of security level information to, Singapore ships; and

(ii) when changes in the security level occur, ensure that the security level information is updated as the circumstances dictate.

(*b*) The Designated Authority shall —

(i) set security levels for, and ensure the provision of security level information to, port facilities within Singapore and ships prior to entering, or while in, a port in Singapore; and

(ii) when changes in the security level occur, ensure that the security level information is updated as the circumstances dictate.

[S 217/2004 wef 01/07/2004]

Regulation 4

Requirements for Company and Ship

(*a*) Every Company shall comply with the relevant requirements of this Chapter and of Part A of the ISPS Code, taking into account the guidance given in Part B of the ISPS Code.

(*b*) Every ship shall comply with the relevant requirements of this Chapter and of Part A of the ISPS Code, taking into account the guidance given in Part B of the ISPS Code, and such compliance shall be verified and certified as provided for in Part A of the ISPS Code.

(*c*) Prior to entering, or while in, a port within the territory of a Contracting State, a ship shall comply with the requirements for the security level set by that Contracting State, if that security level is higher than the security level set by the Director for that ship.

(*d*) Every ship shall respond without undue delay to any change to a higher security level.

(*e*) Where a ship —

(i) is not in compliance with the requirements of this Chapter or of Part A of the ISPS Code; or

(ii) cannot comply with the requirements of the security level set by the Director or by another Contracting State that are applicable to that ship,

the ship shall notify the appropriate competent authority of the non-compliance or inability to comply prior to conducting any ship/port interface or prior to entry into port, whichever occurs earlier.

[S 217/2004 wef 01/07/2004]

Regulation 5

Specific Responsibility of Company

The Company shall ensure that the master of the ship has available on board, at all times, information through which officers duly authorised by a Contracting State can establish —

(i) who is responsible for appointing the members of the crew or other persons currently employed or engaged on board the ship in any capacity in the business of that ship;

(ii) who is responsible for deciding the employment of the ship; and

(iii) in a case where the ship is employed under the terms of one or more charterparties, who the parties to each charterparty are.

[S 217/2004 wef 01/07/2004]

Regulation 6

Ship Security Alert System

(*a*) Every ship shall be provided with a ship security alert system as follows:

(i) any ship that is constructed on or after 1st July 2004 shall be provided with a ship security alert system when constructed;

(ii) any passenger ship, including any high speed passenger craft, that is constructed before 1st July 2004 shall be provided with a ship security alert system not later than the first survey of its radio installation after 1st July 2004;

(iii) any oil tanker, chemical tanker, gas carrier, bulk carrier or cargo high speed craft —

(1) that is of not less than 500 tons; and

(2) that is constructed before 1st July 2004,

shall be provided with a ship security alert system not later than the first survey of its radio installation after 1st July 2004;

(iv) any —

(1) other cargo ship of not less than 500 tons; or

(2) mobile offshore drilling unit,

that is constructed before 1st July 2004 shall be provided with a ship security alert system not later than the first survey of its radio installation after 1st July 2006.

(*b*) The ship security alert system, when activated, shall —

(i) initiate and transmit a ship-to-shore security alert —

(1) identifying the ship and its location; and

(2) indicating that the security of the ship is under threat or has been compromised,

to a competent authority designated by the Director, which may, in the circumstances, include the Company;

(ii) not send the security alert to any other ships;

(iii) not raise any alarm on board the ship; and

(iv) continue the security alert until deactivated or reset.

(*c*) The ship security alert system shall —

(i) be capable of being activated from the navigation bridge and at least one other location; and

(ii) conform to performance standards not inferior to those adopted by the Organisation.

(*d*) The ship security alert system activation points shall be designed so as to prevent the inadvertent initiation of the security alert.

(*e*) The requirement for a ship security alert system may be complied with by using the radio installation fitted for compliance with the requirements of Chapter IV, provided all requirements of this Regulation are complied with.

[S 217/2004 wef 01/07/2004]

Regulation 7

Threats to Ship

(*a*) The Director shall set the security levels for, and ensure the provision of security level information to, any ship that is operating in, or that has communicated an intention to enter, Singapore or its territorial sea.

(*b*) The Director shall provide a point of contact through which any ship referred to in paragraph (*a*) can request advice or assistance, and to which any such ship can report any security concerns about any other ship, movement or communication.

(*c*) Where a risk of attack has been identified, the Director shall advise each ship concerned, and the Contracting State whose flag that ship is entitled to fly, of —

(i) the current security level;

(ii) any security measure that should be put in place by the ship concerned to protect it from attack, in accordance with the provisions of Part A of the ISPS Code; and

(iii) any appropriate security measure that the coastal State has decided to put in place.

[S 217/2004 wef 01/07/2004]

Regulation 8

Master's Discretion for Ship Safety and Security

(*a*) The master of a ship shall not be constrained by the Company, the charterer or any other person from taking or executing any measure which, in the professional judgment of the master, is necessary to maintain the safety and security of the ship, including —

(i) the denial of access to any person (except any person identified as duly authorised by a Contracting State) or his effects; or

(ii) the refusal to load any cargo, including any container or other closed cargo transport unit.

(*b*) If, in the professional judgement of the master, a conflict arises during the operations of a ship between any safety requirement and any security requirement applicable to the ship, the master shall give effect to the requirement necessary to maintain the safety of the ship. In such a case, the master —

(i) may implement temporary security measures, which shall, to the highest possible degree, be commensurate with the prevailing security level; and

(ii) shall forthwith inform the Director and, if appropriate, the Contracting State whose port the ship is operating in or intends to enter.

(*c*) When any case referred to in paragraph (*b*) is identified, the Director shall ensure that —

(i) the conflict is resolved; and

(ii) the possibility of the conflict recurring is minimised.

[S 217/2004 wef 01/07/2004]

Regulation 9

Control and Compliance Measures

(*a*) *Control of ship in port*

(i) For the purposes of this Chapter, every ship to which this Chapter applies shall be subject to control, when in a port of another Contracting State, by officers duly authorised by that Contracting State, who may be the same officers as those carrying out the functions of Regulation 19 of Chapter I. Such control shall be limited to verifying whether there is, on board the ship —

(1) a valid International Ship Security Certificate; or

(2) a valid Interim International Ship Security Certificate,

issued under the provisions of Part A of the ISPS Code (referred to in this Regulation as a Certificate). If the Certificate is valid, it shall be accepted, unless there are clear grounds for believing that the ship is not in compliance with the requirements of this Chapter or Part A of the ISPS Code.

(ii) Where —

(1) there are clear grounds for believing that a ship is not in compliance with the requirements of this Chapter or Part A of the ISPS Code; or

(2) no valid Certificate is produced in respect of a ship when required,

the officers duly authorised by the Contracting State may impose, in relation to that ship, any control measure referred to in sub-paragraph (iii), or any combination of such control measures, that is proportionate, taking into account the guidance given in Part B of the ISPS Code.

(iii) For the purposes of sub-paragraph (ii), the control measures are as follows:

(1) inspection, delaying or detention of the ship;

(2) restriction of the ship's operations, including movement, within the port;

(3) expulsion of the ship from the port;

(4) any lesser administrative or corrective measure.

(*b*) *Ship intending to enter Singapore*

(i) For the purposes of this Chapter, the Director may require any ship intending to enter Singapore to provide, prior to entry into the port, the following information to officers duly authorised by the Director to ensure compliance with this Chapter, so as to avoid the need to impose control measures or steps:

(1) that the ship possesses a valid Certificate and the name of the issuing authority of the Certificate;

(2) the security level at which the ship is currently operating;

(3) the security level at which the ship operated in any port where it had previously conducted a ship/port interface within the timeframe specified in sub-paragraph (iii);

(4) any special or additional security measure that was taken by the ship in any port where it had previously conducted a ship/port interface within the timeframe specified in sub-paragraph (iii);

(5) that the appropriate ship security procedures were maintained during any ship to ship activity within the timeframe specified in sub-paragraph (iii);

(6) other practical security-related information (but not the details of the ship security plan), taking into account the guidance given in Part B of the ISPS Code.

If requested by the Director, the ship or the Company shall provide confirmation, in a form acceptable to the Director, of such information.

(ii) Every ship to which this Chapter applies that intends to enter the port of another Contracting State shall, at the request of any officer duly authorised by that Contracting State, provide the information described in sub-paragraph (i). The failure to provide such information may result in the ship being denied entry into the port.

(iii) A ship shall keep records of the information referred to in sub-paragraph (i) for its last 10 calls at port facilities.

(iv) If, after receiving the information referred to in sub-paragraph (i), the officers duly authorised by the Director have clear grounds for believing that a ship has not complied with the requirements of this Chapter or Part A of the ISPS Code, the officers shall attempt to establish communication with and between the ship and the Contracting State whose flag the ship is entitled to fly in order to rectify the non-compliance. If such communication does not result in the rectification

of the non-compliance, or if the officers have other clear grounds for believing that the ship has not complied with the requirements of this Chapter or Part A of the ISPS Code, the officers may take the steps referred to in sub-paragraph (v) in relation to that ship. Any such step that is taken must be proportionate, taking into account the guidance given in Part B of the ISPS Code.

(v) For the purposes of sub-paragraph (iv), the steps are as follows:

(1) requiring the rectification of the non-compliance;

(2) requiring the ship to proceed to a location within Singapore specified by the Director;

(3) inspecting the ship, if the ship is in the territorial sea of Singapore;

(4) denying the ship entry into the port.

Prior to initiating any such step, the Director shall inform the ship of his intentions. If, upon being informed by the Director, the master withdraws the intention to enter the port, no such step shall be taken against the ship.

(*c*) *Additional provisions*

(i) In the event that —

(1) any control measure referred to in paragraph (*a*)(iii), other than any lesser administrative or corrective measure, is imposed; or

(2) any step referred to in paragraph (*b*)(v) is taken,

in relation to a ship, an officer duly authorised by the Director shall forthwith inform in writing the Contracting State whose flag that ship is entitled to fly of every control measure imposed and step taken, and the reasons therefor. The Director shall also notify the recognised security organisation which issued the Certificate relating to that ship and the Organisation when any such control measure has been imposed or any such step has been taken.

(ii) When a ship is denied entry into the port or is expelled from the port, the Director shall communicate the relevant facts to the authorities of the State of the next port of call, if known, and any other appropriate coastal States, taking into account guidelines to be developed by the Organisation. The confidentiality and security of any such communication shall be ensured.

(iii) A ship shall be denied entry into the port under paragraph (*b*)(iv) and (v), or expelled from the port under paragraph (*a*)(ii) and (iii), only if the officers duly authorised by the Director have clear grounds to believe that —

(1) the ship poses an immediate threat to the security or safety of persons, ships or other property; and

(2) there are no other appropriate means for removing that threat.

(iv) Where —

(1) any control measure referred to in paragraph (*a*)(iii) has been imposed; or

(2) any step referred to in paragraph (*b*)(v) has been taken,

in respect of any failure by a ship to comply with the requirements of this Chapter or Part A of the ISPS Code, the control measure or step shall cease once the failure to comply has been corrected to the satisfaction of the Director, taking into account the actions proposed by the ship or the Contracting State whose flag the ship is entitled to fly, if any.

(v) Where the Director exercises control under paragraph (*a*) or takes any step under paragraph (*b*) —

(1) all possible efforts shall be made to avoid a ship being unduly detained or delayed;

(2) if a ship is thereby unduly detained or delayed, the ship shall be entitled to compensation for any loss or damage suffered; and

(3) necessary access to the ship for emergency or humanitarian reasons, or for security purposes, shall not be prevented.

[S 217/2004 wef 01/07/2004]

Regulation 10

Requirements for Port Facilities

The security requirements in respect of port facilities are as set out in Part XVA of the Port Regulations.

[S 217/2004 wef 01/07/2004]

Regulation 11

Alternative Security Agreements

(*a*) The Director may, when implementing this Chapter and Part A of the ISPS Code, conclude in writing a bilateral or multilateral agreement with any other Contracting State on alternative security arrangements for short international voyages on fixed routes between a Singapore port facility and a port facility located within the territory of that Contracting State.

(*b*) Any such agreement shall not compromise the level of security of other ships or port facilities not covered by the agreement.

(*c*) No ship covered by such an agreement shall conduct any ship-to-ship activity with any ship not covered by the agreement.

(*d*) Each such agreement shall be reviewed periodically, taking into account the experience gained as well as any change in the particular circumstances, or the assessed threats to the security, of the ships, port facilities or routes covered by the agreement.

[S 217/2004 wef 01/07/2004]

Regulation 12

Equivalent Security Arrangements

(*a*) The Director may allow any particular Singapore ship or group of Singapore ships to implement other security measures equivalent to those prescribed in this Chapter or in Part A of the ISPS Code, if such security measures are at least as effective as those prescribed in this Chapter or Part A of the ISPS Code. If the Director allows the implementation of such security measures, he shall communicate to the Organisation the particulars thereof.

(*b*) When implementing this Chapter and Part A of the ISPS Code, the Director may allow any particular port facility or group of port facilities in Singapore, other than any port facility covered under an agreement concluded under Regulation 11, to implement security measures equivalent to those prescribed in this Chapter or in Part A of the ISPS Code, if such security measures are at least as effective as those prescribed in this Chapter or Part A of the ISPS Code. If the Director allows the implementation of such security measures, he shall communicate to the Organisation the particulars thereof.

[S 217/2004 wef 01/07/2004]

Regulation 13

Communication of Information

The Director shall make available for the information of every Company and ship —

(i) the names and contact details of their national authorities responsible for ship and port facility security;

(ii) the locations in Singapore covered by the approved port facility security plans;

(iii) the names and contact details of the persons who have been designated to be available at all times to receive and act on the ship-to-shore security alerts referred to in Regulation 6(*b*)(i);

(iv) the names and contact details of the persons who have been designated to be available at all times to receive and act on any communication from any Contracting State relating to the exercise of any control measure or step referred to in Regulation 9(*c*)(i); and

(v) the names and contact details of the persons who have been designated to be available at all times to provide advice or assistance to ships, and to whom any ship can report any security concern, referred to in Regulation 7(*b*).

[S 217/2004 wef 01/07/2004]

CHAPTER XII

ADDITIONAL SAFETY MEASURES FOR BULK CARRIERS

Regulation 1

Definitions

For the purpose of this Chapter —

(*a*) "Bulk carrier" means a ship which is intended primarily to carry dry cargo in bulk, including such types as ore carriers and combination carriers*.

(*b*) "Bulk carrier of single-side skin construction" means a bulk carrier as defined in paragraph (*a*), in which —

(i) any part of a cargo hold is bounded by the side shell; or

(ii) where one or more cargo holds are bounded by a double-side skin, the width of which is less than 760 mm in bulk carriers constructed before 1st January 2000 and less than 1,000 mm in bulk carriers constructed on or after 1st January 2000 but before

*Reference is made to:
1.
For ships constructed before 1st July 2006, resolution 6, Interpretation of the definition of "bulk carrier", as given in chapter IX of SOLAS 1974, as amended in 1994, adopted by the 1997 SOLAS Conference.
2.
The Interpretation of the provisions of SOLAS chapter XII on Additional safety measures for bulk carriers, adopted by the Maritime Safety Committee of the Organization by resolution MSC.79(70).
3.
The application provisions of Annex 1 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 Organization by resolution MSC.89(71).

1st July 2006, the distance being measured perpendicular to the side shell.

Such ships include combination carriers in which any part of a cargo hold is bounded by the side shell.

(*c*) "Bulk carrier of double-side skin construction" means a bulk carrier as defined in paragraph (*a*), in which all cargo holds are bounded by a double-side skin, other than as defined in paragraph (*b*)(ii).

(*d*) "Double-side skin" means a configuration where each ship side is constructed by the side shell and a longitudinal bulkhead connecting the double bottom and the deck. Hopper side tanks and top-side tanks may, where fitted, be integral parts of the double-side skin configuration.

(*e*) "Length" of a bulk carrier means the length as defined in the International Convention on Load Lines in force.

(*f*) "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.

(*g*) "Bulk Carrier Bulkhead And Double Bottom Strength Standards" means "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 Governments to the International Convention for the Safety of Life at Sea, 1974 on 27th November 1997, as may be amended by the Organization, 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.

(*h*) "Bulk carriers constructed" means bulk carriers the keels of which are laid or which are at a similar stage of construction.

(*i*) "A 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 one per cent of the estimated mass of all structural material, whichever is the less.

(*j*) "Breadth (B)" of a bulk carrier means the breadth as defined in the International Convention on Load Lines in force.

[S 282/2006 wef 01/07/2006]

Regulation 2

Application

Bulk carriers shall comply with the requirements of this Chapter in addition to the applicable requirements of other Chapters.

[S 282/2006 wef 01/07/2006]

Regulation 3

Implementation schedule

Bulk carriers constructed before 1st July 1999 to which Regulation 4 or 6 apply shall comply with the provisions of such Regulations according to the following schedule, with reference to the enhanced programme of inspections required by Regulation 2 of Chapter XI-1:

(i) 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;

(ii) 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

(iii) 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.

[S 282/2006 wef 01/07/2006]

Regulation 4

Damage Stability Requirements applicable to Bulk Carriers

(*a*) Bulk carriers of 150 m 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 the 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 paragraph (*d*).

(*b*) Bulk carriers of 150 m in length and upwards of double-side skin construction in which any part of longitudinal bulkhead is located within B/5 or 11.5 m, whichever is the less, inboard from the ship's side at right angle to the centreline at the assigned summer load line, designed to carry solid bulk cargoes having a density of 1,000 kg/m^3 and above, constructed on or after 1st July 2006

shall, when loaded to the 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 paragraph (*d*).

(*c*) Bulk carriers of 150 m in length and upwards of single-side skin construction, carrying solid bulk cargoes having a density of 1,780 kg/m^3 and above, constructed before 1st July 1999 shall, when loaded to the 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 paragraph (*d*). This requirement shall be complied with in accordance with the implementation schedule specified in Regulation 3.

(*d*) Subject to the provisions of paragraph (*g*), 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 to the water level outside the ship in that flooded condition. 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.

(*e*) 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 paragraph (*c*) of this Regulation.

(*f*) 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 paragraph (*a*) or (*b*), as appropriate.

(*g*) On bulk carriers which have been assigned reduced freeboard in compliance with the provisions of Regulation 27(8) of 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.

[S 282/2006 wef 01/07/2006]

Regulation 5

Structural Strength of Bulk Carriers

(*a*) Bulk carriers of 150 m 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 have sufficient

strength to withstand flooding of any one cargo hold to the water level outside the ship in that flooded condition 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 Organization.*

(*b*) Bulk carriers of 150 m in length and upwards of double-side skin construction, in which any part of longitudinal bulkhead is located within B/5 or 11.5 m, whichever is the less, inboard from the ship's side at right angle to the centreline at the assigned summer load line, designed to carry bulk cargoes having a density of 1,000 kg/m^3 and above constructed on or after 1st July 2006, shall comply with the structural strength provisions of paragraph (*a*).

[S 282/2006 wef 01/07/2006]

Regulation 6

Structural and Other Requirements for Bulk Carriers

(*a*) Bulk carriers of 150 m in length and upwards of single-side skin construction, carrying solid bulk cargoes having a density of 1,780 kg/m^3 and above, constructed before 1st July 1999, shall comply with the following requirements in accordance with the implementation schedule specified in Regulation 3:

(i) 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.

(ii) In considering the need for, and the extent of, strengthening of the transverse watertight bulkhead or double bottom to meet the requirements of sub-paragraph (i), the following restrictions may be taken into account:

(1) restrictions on the distribution of the total cargo weight between the cargo holds; and

(2) restrictions on the maximum deadweight.

(iii) For bulk carriers using either of, or both, the restrictions given in sub-paragraph (ii)(1) and (2) for the purpose of fulfilling the requirements of sub-paragraph (i), these restrictions shall be

*Refer to resolution 3, Recommendation on compliance with SOLAS Regulation XII/5, adopted by the 1997 SOLAS Conference.

complied with whenever solid bulk cargoes having a density of 1,780 kg/m^3 and above are carried.

(*b*) Bulk carriers of 150 m in length and upwards constructed on or after 1st July 2006, in all areas with double-side skin construction shall comply with the following requirements:

(i) Primary stiffening structures of the double-side skin shall not be placed inside the cargo hold space.

(ii) Subject to the provisions below, the distance between the outer shell and the inner shell at any transverse section shall not be less than 1,000 mm measured perpendicular to the side shell. The double-side skin construction shall be such as to allow access for inspection as provided in Regulation 3-6 of Chapter II-1 and the Technical Provisions referring thereto.

(1) The clearances below need not be maintained in way of cross ties, upper and lower end brackets of transverse framing or end brackets of longitudinal framing.

(2) The minimum width of the clear passage through the double-side skin space in way of obstructions such as piping or vertical ladders shall not be less than 600 mm.

(3) Where the inner and/or outer skins are transversely framed, the minimum clearance between the inner surfaces of the frames shall not be less than 600 mm.

(4) Where the inner and outer skins are longitudinally framed, the minimum clearance between the inner surfaces of the frames shall not be less than 800 mm. Outside the parallel part of the cargo hold length, this clearance may be reduced where necessitated by the structural configuration, but, in no case, shall be less than 600 mm.

(5) The minimum clearance referred to above shall be the shortest distance measured between assumed lines connecting the inner surfaces of the frames on the inner and outer skins.

(*c*) The double-side skin spaces, with the exception of top-side wing tanks, if fitted, shall not be used for the carriage of cargo.

[S 339/2008 wef 01/07/2008]

(*d*) In bulk carriers of 150 m in length and upwards, carrying solid bulk cargoes having a density of 1,000 kg/m^3 and above, constructed on or after 1st July 2006:

(i) the structure of cargo holds shall be such that all contemplated cargoes can be loaded and discharged by standard loading/discharge equipment

and procedures without damage which may compromise the safety of the structure;

(ii) effective continuity between the side shell structure and the rest of the hull structure shall be assured; and

(iii) the structure of cargo areas shall be such that single failure of one stiffening structural member will not lead to immediate consequential failure of other structural items potentially leading to the collapse of the entire stiffened panels.

[S 282/2006 wef 01/07/2006]

[S 339/2008 wef 01/07/2008]

Regulation 7

Survey and Maintenance of Bulk Carriers

(*a*) Bulk carriers of 150 m in length and upwards of single-side skin construction, constructed before 1st July 1999, 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 they have satisfactorily undergone either:

(i) a periodical survey, in accordance with the enhanced programme of inspections during surveys required by Regulation 2 of Chapter XI-1; or

(ii) a survey of all cargo holds to the same extent as required for periodical surveys in the enhanced programme of inspections during surveys required by Regulation 2 of Chapter XI-1.

(*b*) Bulk carriers shall comply with the maintenance requirements provided in Regulation 3-1 of Chapter II-1 and the Standards for Owners' Inspection and Maintenance of Bulk Carrier Hatch Covers, adopted by the Organization by resolution MSC.169 (79), as may be amended by the Organization, 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.

[S 282/2006 wef 01/07/2006]

Regulation 8

Information on Compliance with Requirements for Bulk Carriers

(*a*) The booklet required by Regulation 7(*b*) of Chapter VI shall be endorsed by the Director or on his behalf, to indicate that Regulations 4, 5, 6 and 7, as appropriate, are complied with.

(*b*) 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 Regulations 6 and 14 shall be identified and recorded in the booklet referred to in paragraph (*a*).

(*c*) A bulk carrier to which paragraph (*b*) applies shall be permanently marked on the side shell at midships, port and starboard, with a solid equilateral triangle having sides of 500 mm and its apex 300 mm below the deck line, and painted a contrasting colour to that of the hull.

[S 282/2006 wef 01/07/2006]

Regulation 9

Requirements for Bulk Carriers not being capable of Complying with Regulation 4(c) due to the Design Configuration of their Cargo Holds

For bulk carriers constructed before 1st July 1999 being within the application limits of Regulation 4(*c*), 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 Regulations 4(*c*) and 6 on condition that they shall comply with the following requirements:

(i) for the foremost cargo hold, the inspections prescribed for the annual survey in the enhanced programme of inspections during surveys required by Regulation 2 of Chapter XI-1 shall be replaced by the inspections prescribed therein for the intermediate survey of cargo holds;

(ii) are provided with bilge well high water 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 an organization recognized by it in accordance with the provisions of Regulation 1 of Chapter XI-1; and

(iii) 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.

[S 282/2006 wef 01/07/2006]

Regulation 10

Solid Bulk Cargo Density Declaration

(*a*) Prior to loading bulk cargo on bulk carriers of 150 m in length and upwards, the shipper shall declare the density of the cargo, in addition to providing the cargo information required by Regulation 2 of Chapter VI.

(*b*) For bulk carriers to which Regulation 6 applies, unless such bulk carriers comply with all 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 organization.*

[S 282/2006 wef 01/07/2006]

Regulation 11

Loading Instrument

(Unless provided otherwise, this Regulation applies to bulk carriers regardless of their date of construction)

(*a*) Bulk carriers of 150 m 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 Organization.**

(*b*) Bulk carriers of 150 m in length and upwards constructed before 1st July 1999 shall comply with the requirements of paragraph (*a*) not later than the date of the first intermediate or periodical survey of the ship to be carried out after 1st July 1999.

(*c*) Bulk carriers of less than 150 m in length constructed on or after 1st July 2006 shall be fitted with a loading instrument capable of providing information on the ship's stability in the intact condition. The computer software shall be approved for stability calculations by the Director or on his behalf and shall be provided with standard conditions for testing purposes relating to the approved stability information.***

[S 282/2006 wef 01/07/2006]

Regulation 12

Hold, Ballast and Dry Space Water Ingress Alarms

*In verifying the density of solid bulk cargoes, reference should be made to the Uniform method of measurement of the density of bulk cargoes (MSC/Circ.908).

**Refer to the Recommendation on loading instruments, adopted by resolution 5 of the 1997 SOLAS Conference.

***Refer to the relevant parts of the appendix to the Guidelines for the on-board use and application of computers (MSC/Circ.891).

(This Regulation applies to bulk carriers regardless of their date of construction)

(*a*) Bulk carriers shall be fitted with water level detectors:

(i) in each cargo hold, giving audible and visual alarms, one when the water level above the inner bottom in any hold reaches a height of 0.5 m and another at a height not less than 15% of the depth of the cargo hold but not more than 2 m. On bulk carriers to which sub-paragraph (ii) of Regulation 9 applies, detectors with only the latter alarm need be installed. The water level detectors shall be fitted in the aft end of the cargo holds. For cargo holds which are used for water ballast, an alarm overriding device may be installed. The visual alarms shall clearly discriminate between the 2 different water levels detected in each hold;

(ii) in any ballast tank forward of the collision bulkhead required by Regulation 12 of Chapter II-1, giving an audible and visual alarm when the liquid in the tank reaches a level not exceeding 10% of the tank capacity. An alarm overriding device may be installed to be activated when the tank is in use; and

[S 686/2008 wef 01/01/2009]

(iii) in any dry or void space other than a chain cable locker, any part of which extends forward of the foremost cargo hold, giving an audible and visual alarm at a water level of 0.1 m above the deck. Such alarms need not be provided in enclosed spaces the volume of which does not exceed 0.1% of the ship's maximum displacement volume.

(*b*) The audible and visual alarms specified in paragraph (*a*) shall be located on the navigation bridge.

(*c*) Bulk carriers constructed before 1st July 2004 shall comply with the requirements of this Regulation not later than the date of the annual, intermediate or renewal survey of the ship to be carried out after 1st July 2004, whichever comes first.

[S 282/2006 wef 01/07/2006]

Regulation 13

Availability of Pumping Systems[*]

[*] Refer to the Interpretation of SOLAS Regulation XII/13 (MSC/Circ.1069).

(This Regulation applies to bulk carriers regardless of their date of construction)

(*a*) On bulk carriers, the means for draining and pumping ballast tanks forward of the collision bulkhead and bilges of dry spaces any part of which extends

forward of the foremost cargo hold shall be capable of being brought into operation from a readily accessible enclosed space, the location of which is accessible from the navigation bridge or propulsion machinery control position without traversing exposed freeboard or superstructure decks. Where pipes serving such tanks or bilges pierce the collision bulkhead, valve operation by means of remotely operated actuators may be accepted, as an alternative to the valve control specified in Regulation 12 of Chapter II-1, provided that the location of such valve controls complies with this Regulation.

[S 686/2008 wef 01/01/2009]

(*b*) Bulk carriers constructed before 1st July 2004 shall comply with the requirements of this Regulation not later than the date of the first intermediate or renewal survey of the ship to be carried out after 1st July 2004, but, in no case, later than 1st July 2007.

[S 282/2006 wef 01/07/2006]

Regulation 14

Restrictions from Sailing with any Hold Empty

Bulk carriers of 150 m in length and upwards of single-side skin construction, carrying cargoes having a density of 1,780 kg/m^3 and above, if not meeting the requirements for withstanding flooding of any one cargo hold as specified in paragraph (*a*) of Regulation 5 and the Standards and Criteria for Side Structures of Bulk Carriers of Single-Side Skin Construction, adopted by the Organization by resolution MSC.168 (79), as may be amended by the Organization, 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, shall not sail with any hold loaded to less than 10% of the hold's maximum allowable cargo weight when in the full load condition, after reaching 10 years of age. The applicable full load condition for this Regulation is a load equal to or greater than 90% of the ship's deadweight at the relevant assigned freeboard.

[S 282/2006 wef 01/07/2006]

Chapter XIII

[*Deleted by S 669/2016 wef 01/01/2017*]

CHAPTER XIV

SAFETY MEASURES FOR SHIPS OPERATING IN POLAR WATERS

Regulation 1

Definitions

For the purpose of this Chapter:

(*a*) "Polar Code" means the International Code for Ships Operating in Polar Waters, consisting of an introduction and parts I-A and II-A and parts I-B and II-B, as adopted by resolutions MSC.385(94) and of the Marine Environment Protection Committee*, as may be amended, provided that —

(i) amendments to the safety-related provisions of the introduction and part I-A of the Polar Code 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 to the Convention other than Chapter I; and

(ii) amendments to part I-B of the Polar Code are adopted by the Maritime Safety Committee in accordance with its Rules of Procedure.

(*b*) "Antarctic area" means the sea area south of latitude 60º S.

(*c*) "Arctic waters" means those waters which are located north of a line from the latitude 58º00′.0 N and longitude 042º00′.0 W to latitude 64º37′.0 N, longitude 035º27′.0 W and thence by a rhumb line to latitude 67º03′.9 N, longitude 026º33′.4 W and thence by a rhumb line to the latitude 70º49′.56 N and longitude 008º59′.61 W (Sørkapp, Jan Mayen) and by the southern shore of Jan Mayen to 73º31′.6 N and 019º01′.0 E by the Island of Bjørnøya, and thence by a great circle line to the latitude 68º38′.29 N and longitude 043º23′.08 E (Cap Kanin Nos) and thence by the northern shore of the Asian Continent eastward to the Bering Strait and thence from the Bering Strait westward to latitude 60º N as far as Il'pyrskiy and following the 60th North parallel eastward as far as and including Etolin Strait and thence by the northern shore of the North American continent as far south as latitude 60º N and thence eastward along parallel of latitude 60º N, to longitude 056º37′.1 W and thence to the latitude 58º00′.0 N, longitude 042º00′.0 W.

(*d*) "Polar waters" means Arctic waters and/or the Antarctic area.

(*e*) "Ship constructed" means a ship the keel of which is laid or which is at a similar stage of construction.

*Refer to the resolution of adoption of the International Code for Ships Operating in Polar Waters, by the Marine Environment Protection Committee.

(*f*) "At a 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.

[S 669/2016 wef 01/01/2017]

Regulation 2

Application

(*a*) Unless expressly provided otherwise, this Chapter applies to ships operating in polar waters, certified in accordance with Chapter I.

(*b*) Ships constructed before 1 January 2017 must meet the relevant requirements of the Polar Code by the first intermediate or renewal survey, whichever occurs first, after 1 January 2018.

(*c*) In applying part I-A of the Polar Code, consideration should be given to the additional guidance in part I-B of the Polar Code.

(*d*) This Chapter does not apply to ships owned or operated by a Contracting Government and used, for the time being, only in Government non-commercial service. However, ships owned or operated by a Contracting Government and used, for the time being, only in Government non-commercial service are encouraged to act in a manner consistent, so far as reasonable and practicable, with this Chapter.

(*e*) Nothing in this Chapter prejudices the rights or obligations of States under international law.

[S 669/2016 wef 01/01/2017]

Regulation 3

Requirements for Ships to which this Chapter Applies

(*a*) Ships to which this Chapter applies must comply with the requirements of the safety-related provision of the introduction, and with part I-A, of the Polar Code and must, in addition to the requirements of Regulations 7, 8, 9 and 10 of Chapter I, as applicable, be surveyed and certified, as provided for in that Code.

(*b*) Ships to which this Chapter applies holding a certificate issued pursuant to the provisions of paragraph (*a*) must be subject to the control established in Regulation 19 of Chapter I and Regulation 4 of Chapter XI-1. For this purpose, such a certificate must be treated as a certificate issued under Regulation 12 or 13 of Chapter I.

[S 669/2016 wef 01/01/2017]

Regulation 4

Alternative Design and Arrangement

(*a*) The goal of this Regulation is to provide a methodology for alternative design and arrangements for structure, machinery, electrical installations, fire safety, and life-saving appliances and arrangements.

(*b*) Structural arrangements, machinery, electrical installations, fire safety design and arrangement measures, as well as life-saving appliances and arrangements, may deviate from the prescriptive requirements set out in chapters 3, 6, 7 and 8 of the Polar Code, provided that the alternative design and arrangements meet the intent of the goal and functional requirements concerned and provide an equivalent level of safety to the requirements in those chapters.

(*c*) When any alternative design or arrangement deviates from the prescriptive requirements of chapters 3, 6, 7 and 8 of the Polar Code, an engineering analysis, evaluation and approval of the design and arrangement must be carried out based on the guidelines approved by the Organization*.

(*d*) Any alternative design or arrangement deviating from the prescriptive requirements must be recorded in the Polar Ship Certificate and the ship's Polar Water Operational Manual, as required by the Polar Code, such record also defining the technical and operational measures and conditions for the allowed deviation.

[S 669/2016 wef 01/01/2017]

CHAPTER XV

SAVING

Regulation 1

The revoked Merchant Shipping (Safety Convention) Regulations 1981 (G.N. No. S 174/81) as in force immediately before 1 September 1984 continue to apply, unless otherwise expressly provided, to ships constructed before 1 September 1984.

[S 669/2016 wef 01/01/2017]

* Refer to the Guidelines for the Approval of Alternatives and Equivalents as Provided for in Various IMO Instruments (MSC.1/Circ.1455), the Guidelines on Alternative Design and Arrangements for SOLAS Chapters II-1 and III (MSC.1/Circ.1212) and the Guidelines on Alternative Design and Arrangements for Fire Safety (MSC/Circ.1002), as applicable.

FIRST SCHEDULE

Regulation 15 of Chapter I

FORM OF SAFETY CERTIFICATE FOR PASSENGER SHIPS

PASSENGER SHIP SAFETY CERTIFICATE

This Certificate shall be supplemented by a Record of Equipment for Passenger Ship Safety (Form P)

(Official seal) REPUBLIC OF SINGAPORE

for *an/a short*[1] 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
the Republic of Singapore

by _____
(person or organisation authorised)

Particulars of ship[2]

Name of ship .....

Distinctive number or letters .....

Port of registry .....

Gross tonnage .....

Sea areas in which ship is certified to operate (Regulation IV/2)

.....

IMO Number[3] .....

Date of build:

Date of building contract .....

Date on which keel was laid or ship was at similar stage of construction .....

Date of delivery .....

Date on which work for a conversion or an alteration or a modification of a major character was commenced (where applicable) .....

FIRST SCHEDULE — *continued*

All applicable dates shall be completed.

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-1/18)[4]	Freeboard	To apply when the spaces in which passengers are carried include the following alternative spaces
P1	.....	.....
P2	.....	.....
P3	.....	.....

2.2 the ship complied with Part G of Chapter II-1 of the Convention using ..... as fuel/N.A.[1]

[S 669/2016 wef 01/01/2017]

2.3 the ship complied with the requirements of the Convention as regards structural fire protection, fire safety systems and appliances and fire control plans;

2.4 the life-saving appliances and the equipment of the lifeboats, liferafts and rescue boats were provided in accordance with the requirements of the Convention;

2.5 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;

2.6 the ship complied with the requirements of the Convention as regards radio installations;

FIRST SCHEDULE — *continued*

2.7 the functioning of the radio installations used in life-saving appliances complied with the requirements of the Convention;

2.8 the ship complied with the requirements of the Convention as regards shipborne navigational equipment, means of embarkation for pilots and nautical publications;

2.9 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;

2.10 in all other respects the ship complied with the relevant requirements of the Convention;

2.11 the ship was/was not[1] subjected to an alternative design and arrangements in pursuance of Regulation(s) II-1/55 / II-2/17 / III/38[1] of the Convention;

2.12 a Document of approval of alternative design and arrangements for machinery and electrical installations/fire protection/life-saving appliances and arrangements[1] is/is not[1] appended to this Certificate.

3 That an Exemption Certificate has/has not[1] been issued.

[S 669/2016 wef 01/01/2017]

This certificate is valid until .....

Completion date of the survey on which this certificate is based: ..... *(dd/mm/yyyy)*

Issued at .....

(Place of issue of certificate)

.....	.....
(Date of issue)	*(Signature of authorised official issuing the certificate)*

(Seal or stamp of the issuing 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 .....

FIRST SCHEDULE — *continued*

Signed:

.....

(Signature of authorised official)

Place:

.....

Date:

.....

(Seal or stamp of the 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*)[1] of the Convention, be accepted as valid until .....

Signed:

.....

(Signature of authorised official)

Place:

.....

Date:

.....

(Seal or stamp of the authority, as appropriate)

---

[1] Delete as appropriate.

[2] Alternatively, the particulars of the ship may be placed horizontally in boxes.

[3] In accordance with the IMO Ship Identification Number Scheme, adopted by the Organisation by resolution A.600(15).

[4] For ships constructed before 1st January 2009, the applicable subdivision notation "C.1, C.2 and C.3" should be used.

[S 432/2014 wef 01/07/2014]

FORM OF SAFETY CONSTRUCTION CERTIFICATE FOR CARGO SHIPS

FIRST SCHEDULE — *continued*

CARGO SHIP SAFETY CONSTRUCTION CERTIFICATE

(Official seal) REPUBLIC OF SINGAPORE

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
the Republic of Singapore

by _____
(person or organisation authorised)

Particulars of ship[1]

Name of ship .....

Distinctive number or letters .....

Port of registry .....

Gross tonnage .....

Deadweight of ship (metric tons)[2] .....

IMO Number[3] .....

Type of ship[4]

Bulk carrier

Oil tanker

Chemical tanker

Gas carrier

Cargo ship other than any of the above

Date of build:

Date of building contract .....

Date on which keel was laid or ship was at similar stage of construction .....

Date of delivery .....

Date on which work for a conversion or an alteration or a modification of a major character was commenced (where applicable) .....

All applicable dates shall be completed.

FIRST SCHEDULE — *continued*

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).

[S 669/2016 wef 01/01/2017]

3 That the last two inspections of the outside of the ship's bottom took place on ..... and ..... *(dates)*.

4 That an Exemption Certificate has/has not[4] been issued.

5 The ship was/was not[4] subjected to an alternative design and arrangements in pursuance of Regulation(s) II-1/55 / II-2/17[4] of the Convention.

6 A Document of approval of alternative design and arrangements for machinery and electrical installations/fire protection[4] is/is not[4] appended to this Certificate.

This certificate is valid until .....[5] 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.

Completion date of the survey on which this certificate is based: ..... *(dd/mm/yyyy)*

Issued at .....
(Place of issue of certificate)

.....	.....
(Date of issue)	*(Signature of authorised official issuing the certificate)*

(Seal or stamp of the issuing authority, as appropriate)

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.

FIRST SCHEDULE — *continued*

Annual survey: Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the authority, as appropriate)

Annual/Intermediate[4] survey: Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the authority, as appropriate)

Annual/Intermediate[4] survey: Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the authority, as appropriate)

Annual survey: Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the authority, as appropriate)

Annual/intermediate survey in accordance with Regulation I/14(h)(iii)

THIS IS TO CERTIFY that, at an annual/intermediate[4] survey in accordance with Regulation I/14(*h*)(iii) of the Convention, this ship was found to comply with the relevant requirements of the Convention.

Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

FIRST SCHEDULE — *continued*

(Seal or stamp of the authority, as appropriate)

Endorsement for inspections of the outside of the ship's bottom[6]

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 the authority, as appropriate)

Second inspection: Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the 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 the 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 .....

FIRST SCHEDULE — *continued*

Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the 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

The 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 the 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 the 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 the authority, as appropriate)

FIRST SCHEDULE — *continued*

---

[1] Alternatively, the particulars of the ship may be placed horizontally in boxes.

[2] For oil tankers, chemical tankers and gas carriers only.

[3] In accordance with the IMO Ship Identification Number Scheme, adopted by the Organisation by resolution A.600(15).

[4] Delete as appropriate.

[5] Insert the date of expiry as specified by the Director in accordance with Regulation I/14(*a*) of the Convention. The day and the 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*).

[6] Provision may be made for additional inspections.

[S 432/2014 wef 01/07/2014]

FORM OF SAFETY EQUIPMENT CERTIFICATE FOR CARGO SHIPS

CARGO SHIP SAFETY EQUIPMENT CERTIFICATE

This Certificate shall be supplemented by a Record of Equipment for Cargo Ship Safety (Form E)

(Official seal) REPUBLIC OF SINGAPORE

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
the Republic of Singapore

by _____
(person or organisation authorised)

Particulars of ship[1]

Name of ship .....

Distinctive number or letters .....

Port of registry .....

Gross tonnage .....

Deadweight of ship (metric tons)[2] .....

Length of ship (Regulation III/3.12) .....

FIRST SCHEDULE — *continued*

IMO Number[3] .....

Type of ship[4]

Bulk carrier

Oil tanker

Chemical tanker

Gas carrier

Cargo ship other than any of the above

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 .....

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:

.1 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); and

.2 the ship complied with Part G of Chapter II-1 of the Convention using .... as fuel/N.A[4].

[S 669/2016 wef 01/01/2017]

3 That the ship operates in accordance with Regulation III/26.1.1.1[5] within the limits of the trade area .....

4 That an Exemption Certificate has/has not[4] been issued.

This certificate is valid until .....[6]subject to the annual and periodical surveys in accordance with Regulation I/8 of the Convention.

Completion date of the survey on which this certificate is based: ..... *(dd/mm/yyyy)*

Issued at .....

(Place of issue of certificate)

FIRST SCHEDULE — *continued*

....
(Date of issue) *(Signature of authorised official issuing the certificate)*

(Seal or stamp of the issuing authority, as appropriate)

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 the authority, as appropriate)

Annual/Periodical[4] survey: Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the authority, as appropriate)

Annual/Periodical[4] survey: Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the authority, as appropriate)

Annual survey: Signed: .....
(Signature of authorised official)

Place: .....

FIRST SCHEDULE — *continued*

Date: .....

(Seal or stamp of the authority, as appropriate)

Annual/periodical survey in accordance with Regulation I/14(h)(iii)

THIS IS TO CERTIFY that, at an annual/periodical[4] survey in accordance with Regulation I/14(*h*)(iii) of the Convention, this ship was found to comply with the relevant requirements of the Convention.

Signed:

.....

(Signature of authorised official)

Place:

.....

Date:

.....

(Seal or stamp of the 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 the authority, as appropriate)

Endorsement where the renewal survey has been completed and Regulation I/14(d) applies

FIRST SCHEDULE — *continued*

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 the 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

The certificate shall, in accordance with Regulation I/14(*e*) / I/14(*f*)[4] of the Convention, be accepted as valid until .....

Signed:

.....

(Signature of authorised official)

Place:

.....

Date:

.....

(Seal or stamp of the 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:

.....

FIRST SCHEDULE — *continued*

Date:

.....

(Seal or stamp of the 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 the authority, as appropriate)

---

[1] Alternatively, the particulars of the ship may be placed horizontally in boxes.

[2] For oil tankers, chemical tankers and gas carriers only.

[3] In accordance with the IMO Ship Identification Number Scheme, adopted by the Organisation by resolution A.600(15).

[4] Delete as appropriate.

[5] Refer to the 1983 amendments to SOLAS (MSC.6(48)), applicable to ships constructed on or after 1st July 1986, but before 1st July 1998 in the case of self-righting partially enclosed lifeboat(s) on board.

[6] Insert the date of expiry as specified by the Director in accordance with Regulation I/14(*a*) of the Convention. The day and the 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).

[S 432/2014 wef 01/07/2014]

FORM OF SAFETY RADIO CERTIFICATE FOR CARGO SHIPS

CARGO SHIP SAFETY RADIO CERTIFICATE

This Certificate shall be supplemented by a Record of Equipment for Cargo Ship Safety Radio (Form R)

FIRST SCHEDULE — *continued*

(Official seal) REPUBLIC OF SINGAPORE

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
the Republic of Singapore

by _____
(person or organisation authorised)

Particulars of ship[1]

Name of ship .....

Distinctive number or letters .....

Port of registry .....

Gross tonnage .....

Sea areas in which ship is certified to operate (Regulation IV/2)
.....

IMO Number[2] .....

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 a modification of a major character was commenced .....

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[3] been issued.

This certificate is valid until .....[4]
subject to the periodical surveys in accordance with Regulation I/9 of the Convention.

FIRST SCHEDULE — *continued*

Completion date of the survey on which this certificate is based: .....
(dd/mm/yyyy)

Issued at .....
(Place of issue of certificate)

.....	.....
(Date of issue)	*(Signature of authorised official issuing the certificate)*

(Seal or stamp of the issuing authority, as appropriate)

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 the authority, as appropriate)

Periodical survey:

Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the authority, as appropriate)

Periodical survey:

Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the authority, as appropriate)

FIRST SCHEDULE — *continued*

Periodical survey:

Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the 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, this ship was found to comply with the relevant requirements of the Convention.

Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the 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 the authority, as appropriate)

Endorsement where the renewal survey has been completed and Regulation I/14(d) applies

FIRST SCHEDULE — *continued*

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 the 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

The certificate shall, in accordance with Regulation I/14(*e*) / I/14(*f*)[3] of the Convention, be accepted as valid until .....

Signed:

.....

(Signature of authorised official)

Place:

.....

Date:

.....

(Seal or stamp of the 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 the authority, as appropriate)

FIRST SCHEDULE — *continued*

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 the authority, as appropriate)

---

[1] Alternatively, the particulars of the ship may be placed horizontally in boxes.

[2] In accordance with the IMO Ship Identification Number Scheme, adopted by the Organisation by resolution A.600(15).

[3] Delete as appropriate.

[4] Insert the date of expiry as specified by the Director in accordance with Regulation I/14(*a*) of the Convention. The day and the 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*).

[S 432/2014 wef 01/07/2014]

FORM OF SAFETY CERTIFICATE FOR CARGO SHIPS

CARGO SHIP SAFETY CERTIFICATE

This Certificate shall be supplemented by a Record of Equipment for Cargo Ship Safety (Form C)

(Official seal) REPUBLIC OF SINGAPORE

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
the Republic of Singapore

by _____
(person or organisation authorised)

FIRST SCHEDULE — *continued*

Particulars of ship[1]

Name of ship .....

Distinctive number or letters .....

Port of registry .....

Gross tonnage .....

Deadweight of ship (metric tons)[2] .....

Length of ship (Regulation III/3.12) .....

Sea areas in which ship is certified to operate (Regulation IV/2)
.....

IMO Number[3] .....

Type of ship[4]

Bulk carrier

Oil tanker

Chemical tanker

Gas carrier

Cargo ship other than any of the above

Date of build:

Date of building contract .....

Date on which keel was laid or ship was at similar stage of construction
.....

Date of delivery .....

Date on which work for a conversion or an alteration or a modification of a major character was commenced (where applicable) .....

All applicable dates shall be completed.

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of Regulations I/8, I/9 and I/10 of the Convention.

2 That the survey showed that:

2.1 the condition of the structure, machinery and equipment as defined in Regulation I/10 was satisfactory and the ship complied with the relevant requirements of Chapter II-1 and Chapter II-2 of the Convention (other

FIRST SCHEDULE — *continued*

than those relating to fire safety systems and appliances and fire control plans);

2.2 the last two inspections of the outside of the ship's bottom took place on ... . and ..... *(dates)*;

2.3 the ship complied with the requirements of the Convention as regards fire safety systems and appliances and fire control plans;

2.4 the life-saving appliances and the equipment of the lifeboats, liferafts and rescue boats were provided in accordance with the requirements of the Convention;

2.5 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;

2.6 the ship complied with the requirements of the Convention as regards radio installations;

2.7 the functioning of the radio installations used in life-saving appliances complied with the requirements of the Convention;

2.8 the ship complied with the requirements of the Convention as regards shipborne navigational equipment, means of embarkation for pilots and nautical publications;

2.9 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;

2.10 in all other respects the ship complied with the relevant requirements of the Convention;

2.11 the ship was/was not[4] subjected to an alternative design and arrangements in pursuance of Regulation(s) II-1/55 / II-2/17 / III/38[4] of the Convention;

2.12 a Document of approval of alternative design and arrangements for machinery and electrical installations/fire protection/life-saving appliances and arrangements[4] is/is not[4] appended to this Certificate.

3 That the ship operates in accordance with Regulation III/26.1.1.1[5] within the limits of the trade area .....

4 That an Exemption Certificate has/has not[4] been issued.

This certificate is valid until .....[6]
subject to the annual, intermediate and periodical surveys and inspections of the

FIRST SCHEDULE — *continued*

outside of the ship's bottom in accordance with Regulations I/8, I/9 and I/10 of the Convention.

Completion date of the survey on which this certificate is based: ..... *(dd/mm/yyyy)*

Issued at .....
(Place of issue of certificate)

....
(Date of issue) *(Signature of authorised official issuing the certificate)*

(Seal or stamp of the issuing authority, as appropriate)

Endorsement for annual and intermediate surveys relating to structure, machinery and equipment referred to in paragraph 2.1 of this certificate

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 the authority, as appropriate)

Annual/Periodical[4] survey: Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the authority, as appropriate)

Annual/Periodical[4] survey: Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

FIRST SCHEDULE — *continued*

(Seal or stamp of the authority, as appropriate)

Annual survey: Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the authority, as appropriate)

Annual/intermediate survey in accordance with Regulation I/14(h)(iii)

THIS IS TO CERTIFY that, at an annual/intermediate[4] survey in accordance with Regulations I/10 and 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 the authority, as appropriate)

Endorsement for inspections of the outside of the ship's bottom[7]

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 the authority, as appropriate)

Second inspection: Signed: .....
(Signature of authorised official)

FIRST SCHEDULE — *continued*

Place: .....

Date: .....

(Seal or stamp of the authority, as appropriate)

Endorsement for annual and periodical surveys relating to life-saving appliances and other equipment referred to in paragraphs 2.3, 2.4, 2.5, 2.8 and 2.9 of this certificate

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 the authority, as appropriate)

Annual/Periodical[4] survey: Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the authority, as appropriate)

Annual/Periodical[4] survey: Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the authority, as appropriate)

Annual survey: Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

FIRST SCHEDULE — *continued*

(Seal or stamp of the authority, as appropriate)

Annual/periodical survey in accordance with Regulation I/14(h)(iii)

THIS IS TO CERTIFY that, at an annual/periodical[4] survey in accordance with Regulations I/8 and 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 the authority, as appropriate)

Endorsement for periodical surveys relating to radio installations referred to in paragraphs 2.6 and 2.7 of this certificate

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 the authority, as appropriate)

Periodical survey:

Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the authority, as appropriate)

FIRST SCHEDULE — *continued*

Periodical survey: Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the authority, as appropriate)

Periodical survey: Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the 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 Regulations I/9 and 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 the 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: .....

FIRST SCHEDULE — *continued*

Date: .....

(Seal or stamp of the 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 .....

Annual survey: Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the 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

The certificate shall, in accordance with Regulation I/14(*e*) / I/14(*f*)[4] of the Convention, be accepted as valid until .....

Signed: .....
(Signature of authorised official)

Place: .....

Date: .....

(Seal or stamp of the 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 the authority, as appropriate)

FIRST SCHEDULE — *continued*

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 the authority, as appropriate)

---

[1] Alternatively, the particulars of the ship may be placed horizontally in boxes.

[2] For oil tankers, chemical tankers and gas carriers only.

[3] In accordance with the IMO Ship Identification Number Scheme, adopted by the Organisation by resolution A.600(15).

[4] Delete as appropriate.

[5] Refer to the 1983 amendments to SOLAS (MSC.6(48)), applicable to ships constructed on or after 1st July 1986, but before 1st July 1998 in the case of self-righting partially enclosed lifeboat(s) on board.

[6] Insert the date of expiry as specified by the Director in accordance with Regulation I/14(*a*) of the Convention. The day and the 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*).

[7] Provision may be made for additional inspections.

[S 432/2014 wef 01/07/2014]

FORM OF EXEMPTION CERTIFICATE

EXEMPTION CERTIFICATE

(Official seal) REPUBLIC OF SINGAPORE

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
the Republic of Singapore

by _____
(person or organisation authorised)

FIRST SCHEDULE — *continued*

Particulars of ship[1]

Name of ship .....

Distinctive number or letters .....

Port of registry .....

Gross tonnage .....

IMO Number[2].....

THIS IS TO CERTIFY:

That the ship is, under the authority conferred by Regulation ..... of the Convention, exempted from the requirements ..... 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 of certificate)

....
(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)

FIRST SCHEDULE — *continued*

Place: .....

Date: .....

(Seal or stamp of the 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 the 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*)[3] 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 the authority, as appropriate)

[S 432/2014 wef 01/07/2014]

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[1] Alternatively, the particulars of the ship may be placed horizontally in boxes.

[2] In accordance with the IMO Ship Identification Number Scheme, adopted by the Organisation by resolution A.600(15).

[3] Delete as appropriate.

FIRST SCHEDULE — *continued*

FORM OF NUCLEAR PASSENGER SHIP SAFETY CERTIFICATE

NUCLEAR PASSENGER SHIP SAFETY CERTIFICATE

This Certificate shall be supplemented by a Record of Equipment for Passenger Ship Safety (Form P)

(Official seal) REPUBLIC OF SINGAPORE

for *an/a short*[1] international voyage

Issued under the provisions of the
INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, as amended

under the authority of the Government of
the Republic of Singapore

by _____
(person or organisation authorised)

Particulars of ship[2]

Name of ship .....

Distinctive number or letters .....

Port of registry .....

Gross tonnage .....

Sea areas in which ship is certified to operate (Regulation IV/2)
.....

IMO Number[3].....

Date of build:

Date of building contract .....

Date on which keel was laid or ship was at similar stage of construction .....

Date of delivery .....

Date on which work for a conversion or an alteration or modification of a major character was commenced (where applicable) .....

FIRST SCHEDULE — *continued*

All applicable dates shall be completed.

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of Regulation VIII/9 of the Convention.

2 That the ship, being a nuclear ship, complied with all the requirements of Chapter VIII of the Convention and conformed to the Safety Assessment approved for the ship; and 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, including the nuclear propulsion plant and the collision protective structure;

.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-1/18)[4]	Freeboard	To apply when the spaces in which passengers are carried include the following alternative spaces
P1	.....	.....
P2	.....	.....
P3	.....	.....

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 ship complied with the requirements of the Convention as regards radiation protection systems and equipment;

2.4 the life-saving appliances and the equipment of the lifeboats, liferafts and rescue boats were provided in accordance with the requirements of the Convention;

2.5 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;

2.6 the ship complied with the requirements of the Convention as regards radio installations;

FIRST SCHEDULE — *continued*

2.7 the functioning of the radio installations used in life-saving appliances complied with the requirements of the Convention;

2.8 the ship complied with the requirements of the Convention as regards shipborne navigational equipment, means of embarkation for pilots and nautical publications;

2.9 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;

2.10 all other respects the ship complied with the relevant requirements of the Convention;

2.11 the ship was/was not[1] subjected to an alternative design and arrangements in pursuance of Regulation(s) II-1/55 / II-2/17 / III/38[1] of the Convention;

2.12 a Document of approval of alternative design and arrangements for machinery and electrical installations/fire protection/life-saving appliances and arrangements[1] is/is not[1] appended to this Certificate.

This certificate is valid until .....

Completion date of the survey on which this certificate is based: .....
(dd/mm/yyyy)

Issued at .....
(Place of issue of certificate)

....
(Date of issue) *(Signature of authorised official issuing the certificate)*

(Seal or stamp of the issuing authority, as appropriate)

---

[1] Delete as appropriate.

[2] Alternatively, the particulars of the ship may be placed horizontally in boxes.

[3] In accordance with the IMO Ship Identification Number Scheme, adopted by the Organisation by resolution A.600(15).

FIRST SCHEDULE — *continued*

[4] For ships constructed before 1st January 2009, the applicable subdivision notation "C.1, C.2 and C.3" should be used.

[S 432/2014 wef 01/07/2014]

FORM OF NUCLEAR CARGO SHIP SAFETY CERTIFICATE

NUCLEAR CARGO SHIP SAFETY CERTIFICATE

This Certificate shall be supplemented by a Record of Equipment for Cargo Ship Safety (Form C)

(Official seal) REPUBLIC OF SINGAPORE

Issued under the provisions of the
INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE
AT SEA, 1974, as amended

under the authority of the Government of
the Republic of Singapore

by _____
(*person or organisation authorised*)

Particulars of ship[1]

Name of ship .....

Distinctive number or letters .....

Port of registry .....

Gross tonnage .....

Deadweight of ship (metric tons)[2] .....

Length of ship (Regulation III/3.12) .....

Sea areas in which ship is certified to operate (Regulation IV/2)
.....

IMO Number[3] .....

Type of ship[4]

Bulk carrier

FIRST SCHEDULE — *continued*

Oil tanker

Chemical tanker

Gas carrier

Cargo ship other than any of the above

Date of build:

Date of building contract .....

Date on which keel was laid or ship was at similar stage of construction .....

Date of delivery .....

Date on which work for a conversion or an alteration or modification of a major character was commenced (where applicable) .....

All applicable dates shall be completed.

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of Regulation VIII/9 of the Convention.

2 That the ship, being a nuclear ship, complied with all the requirements of Chapter VIII of the Convention and conformed to the Safety Assessment approved for the ship; and that:

2.1 the condition of the structure, machinery and equipment as defined in Regulation I/10 (as applicable to comply with Regulation VIII/9), including the nuclear propulsion plant and the collision protective structure, was satisfactory and the ship complied with the relevant requirements of Chapter II-1 and Chapter II-2 of the Convention (other than those relating to fire safety systems and appliances and fire control plans);

2.2 the ship complied with the requirements of the Convention as regards 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;

FIRST SCHEDULE — *continued*

2.5 the ship complied with the requirements of the Convention as regards radio installations;

2.6 the functioning 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 Collisions at Sea in force;

2.9 in all other respects the ship complied with the relevant requirements of the regulations, so far as these requirements apply thereto;

2.10 the ship was/was not[4] subjected to an alternative design and arrangements in pursuance of Regulation(s) II-1/55 / II-2/17 / III/38[4] of the Convention;

2.11 a Document of approval of alternative design and arrangements for machinery and electrical installations/fire protection/life-saving appliance and arrangements[4] is/is not[4] appended to this Certificate.

This certificate is valid until .....

Completion date of the survey on which this certificate is based: ..... *(dd/mm/yyyy)*

Issued at .....
(Place of issue of certificate)

.....	.....
(Date of issue)	*(Signature of authorised official issuing the certificate)*

(Seal or stamp of the issuing authority, as appropriate)

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[1] Alternatively, the particulars of the ship may be placed horizontally in boxes.

[2] For oil tankers, chemical tankers and gas carriers only.

[3] In accordance with the IMO Ship Identification Number Scheme, adopted by the Organisation by resolution A.600(15).

FIRST SCHEDULE — *continued*

[4] Delete as appropriate.

[S 432/2014 wef 01/07/2014]

SECOND SCHEDULE

Regulations 12 and 15 of chapter i

RECORD OF EQUIPMENT FOR PASSENGER SHIP SAFETY (FORM P)

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 .....

Distinctive number or letters .....

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 LSA Code, section 4.5)	.....	.....
2.3	Number of self-righting partially enclosed lifeboats (Regulation III/43[1])	.....	.....

SECOND SCHEDULE — *continued*

2.4	Number of totally enclosed lifeboats (Regulation III/21 and LSA Code, section 4.6)	.....	.....
2.5	Other lifeboats	.....	.....
2.5.1	Number	.....	.....
2.5.2	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	.....	
4.2	Number of boats which are fast rescue boats	.....	
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	Number of Marine Evacuation Systems (MES)	.....	
6.1	Number of liferafts served by them	.....	
6.2	Number of persons accommodated by them	.....	
7	Buoyant apparatus		
7.1	Number of apparatus	.....	

SECOND SCHEDULE — *continued*

7.2	Number of persons capable of being supported	.....
8	Number of lifebuoys	.....
9	Number of lifejackets (total)	.....
9.1	Number of adult lifejackets	.....
9.2	Number of child lifejackets	.....
9.3	Number of infant lifejackets	.....
10	Immersion suits	
10.1	Total number	.....
10.2	Number of suits complying with the requirements for lifejackets	.....
11	Number of anti-exposure suits	.....
12	Number of thermal protective aids[2]	.....
13	Radio installations used in life-saving appliances	
13.1	Number of search and rescue locating devices	
13.1.1	Radar search and rescue transponders (SART)	.....
13.1.2	AIS search and rescue transmitters (AIS-SART)	.....
13.2	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	.....

SECOND SCHEDULE — *continued*

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	.....
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	.....
5	VHF EPIRB	.....
6	Ship's search and rescue locating device	
6.1	Radar search and rescue transponder (SART)	.....
6.2	AIS search and rescue transmitter (AIS-SART)	.....

4 ***Methods used to ensure availability of radio facilities***
(Regulations IV/15.6 and IV/15.7)

4.1 Duplication of equipment .....

4.2 Shore-based maintenance .....

SECOND SCHEDULE — *continued*

4.3 At-sea maintenance capability .....

5 ***Details of navigational systems and equipment***

Item		Actual provision
1.1	Standard magnetic compass[3]	.....
1.2	Spare magnetic compass[3]	.....
1.3	Gyro-compass[3]	.....
1.4	Gyro-compass heading repeater[3]	.....
1.5	Gyro-compass bearing repeater[3]	.....
1.6	Heading or track control system[3]	.....
1.7	Pelorus or compass bearing device[3]	.....
1.8	Means of correcting heading and bearings	.....
1.9	Transmitting heading device (THD)[3]	.....
2.1	Nautical charts/Electronic chart display and information system (ECDIS)[4]	.....
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 radionavigation system[3, 4]	.....
3.2	9 GHz radar[3]	.....
3.3	Second radar (3 GHz/9 GHz[4])[3]	.....
3.4	Automatic radar plotting aid (ARPA)[3]	.....
3.5	Automatic tracking aid[3]	.....

SECOND SCHEDULE — *continued*

3.6	Second automatic tracking aid[3]	.....
3.7	Electronic plotting aid[3]	.....
4.1	Automatic identification system (AIS)	.....
4.2	Long-range identification and tracking system	.....
5	Voyage data recorder (VDR)	.....
6.1	Speed and distance measuring device (through the water)[3]	.....
6.2	Speed and distance measuring device (over the ground in the forward and athwartships direction)[3]	.....
7	Echo-sounding device[3]	.....
8.1	Rudder, propeller, thrust, pitch and operational mode indicator[3]	.....
8.2	Rate-of-turn indicator[3]	.....
9	Sound reception system[3]	.....
10	Telephone to emergency steering position[3]	.....
11	Daylight signalling lamp[3]	.....
12	Radar reflector[3]	.....
13	International Code of Signals	.....
14	IAMSAR Manual, Volume III	.....
15	Bridge navigational watch alarm system (BNWAS)	.....

THIS IS TO CERTIFY that this Record is correct in all respects.

Issued at .....

(Place of issue of the Record)

SECOND SCHEDULE — *continued*

....
(Date of issue) *(Signature of duly authorised official issuing the Record)*

(Seal or stamp of the issuing authority, as appropriate)

---

[1] Refer to the 1983 amendments to SOLAS (MSC.6(48)), applicable to ships constructed on or after 1st July 1986, but before 1st July 1998.

[2] 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] Alternative means of meeting this requirement are permitted under Regulation V/19. In case of other means, they shall be specified.

[4] Delete as appropriate.

[S 432/2014 wef 01/07/2014]

RECORD OF EQUIPMENT FOR CARGO SHIP SAFETY (FORM E)

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 .....

Distinctive number or letters .....

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 davit launched lifeboats	.....	.....
2.1	Total number of persons accommodated by them	.....	.....

SECOND SCHEDULE — *continued*

2.2	Number of self-righting partially enclosed lifeboats (Regulation III/43[1])	.....	.....
2.3	Number of totally enclosed lifeboats (Regulation III/31 of the Convention and LSA Code, section 4.6)	.....	.....
2.4	Number of lifeboats with a self-contained air support system (Regulation III/31 of the Convention and LSA Code, section 4.8)	.....	.....
2.5	Number of fire-protected lifeboats (Regulation III/31 of the Convention and LSA Code, section 4.9)	.....	.....
2.6	Other lifeboats	.....	.....
2.6.1	Number	.....	.....
2.6.2	Type	.....	.....
3	Total number of free-fall lifeboats	.....	
3.1	Total number of persons accommodated by them	.....	
3.2	Number of totally enclosed lifeboats (Regulation III/31 of the Convention and LSA Code, section 4.7)	.....	
3.3	Number of lifeboats with self-contained air support system (Regulation III/31 of the Convention and LSA Code, section 4.8)	.....	
3.4	Number of fire-protected lifeboats (Regulation III/31 of the Convention and LSA Code, section 4.9)	.....	
4	Number of motor lifeboats (included in the total lifeboats shown in 2 and 3 above)	.....	
4.1	Number of lifeboats fitted with searchlights	.....	
5	Number of rescue boats	.....	
5.1	Number of boats which are included in the total lifeboats shown in 2 and 3 above	.....	

[1]Refer to the 1983 amendments to SOLAS (MSC.6(48)), applicable to ships constructed on or after 1 July 1986, but before 1 July 1998.

SECOND SCHEDULE — *continued*

6	Liferafts	.....
6.1	Those for which approved launching appliances are required	.....
6.1.1	Number of liferafts	.....
6.1.2	Number of persons accommodated by them	.....
6.2	Those for which approved launching appliances are not required	.....
6.2.1	Number of liferafts	.....
6.2.2	Number of persons accommodated by them	.....
6.3	Number of liferafts required by Regulation III/31.1.4 of the Convention	.....
7	Number of lifebuoys	.....
8	Number of lifejackets	.....
9	Immersion suits	.....
9.1	Total number	.....
9.2	Number of suits complying with the requirements for lifejackets	.....
10	Number of anti-exposure suits	.....
11	Radio installations used in life-saving appliances	.....
11.1	Number of search and rescue locating devices	.....
11.1.1	Radar search and rescue transponders (SART)	.....
11.1.2	AIS search and rescue transmitters (AIS-SART)	.....
11.2	Number of two-way VHF radiotelephone apparatus	.....

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3 ***Details of navigational systems and equipment***

Item	Actual provision

SECOND SCHEDULE — *continued*

1.1	Standard magnetic compass[2]	.....
1.2	Spare magnetic compass[2]	.....
1.3	Gyro-compass[2]	.....
1.4	Gyro-compass heading repeater[2]	.....
1.5	Gyro-compass bearing repeater[2]	.....
1.6	Heading or track control system[2]	.....
1.7	Pelorus or compass bearing device[2]	.....
1.8	Means of correcting heading and bearings	.....
1.9	Transmitting heading device (THD)[2]	.....
2.1	Nautical charts/Electronic chart display and information system (ECDIS)[3]	.....
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 radionavigation system[2, 3]	.....
3.2	9 GHz radar[2]	.....
3.3	Second radar (3 GHz/9 GHz[3])[2]	.....
3.4	Automatic radar plotting aid (ARPA)[2]	.....
3.5	Automatic tracking aid[2]	.....
3.6	Second automatic tracking aid[2]	.....
3.7	Electronic plotting aid[2]	.....
4.1	Automatic identification system (AIS)	.....
4.2	Long-range identification and tracking system	.....

SECOND SCHEDULE — *continued*

5.1	Voyage data recorder (VDR)[3]	.....
5.2	Simplified voyage data recorder (S-VDR)[3]	.....
6.1	Speed and distance measuring device (through the water)[2]	.....
6.2	Speed and distance measuring device (over the ground in the forward and athwartships direction)[2]	.....
7	Echo-sounding device[2]	.....
8.1	Rudder, propeller, thrust, pitch and operational mode indicator[2]	.....
8.2	Rate-of-turn indicator[2]	.....
9	Sound reception system[2]	.....
10	Telephone to emergency steering position[2]	.....
11	Daylight signalling lamp[2]	.....
12	Radar reflector[2]	.....
13	International Code of Signals	.....
14	IAMSAR Manual, Volume III	.....
15	Bridge navigational watch alarm system (BNWAS)	.....

THIS IS TO CERTIFY that this Record is correct in all respects.

Issued at .....

(Place of issue of the Record)

....

(Date of issue) *(Signature of duly authorised official issuing the Record)*

(Seal or stamp of the issuing authority, as appropriate)

SECOND SCHEDULE — *continued*

[1] Refer to the 1983 amendments to SOLAS (MSC.6(48)), applicable to ships constructed on or after 1st July 1986, but before 1st July 1998.

[2] Alternative means of meeting this requirement are permitted under Regulation V/19. In case of other means, they shall be specified.

[3] Delete as appropriate.

[S 432/2014 wef 01/07/2014]

RECORD OF EQUIPMENT FOR CARGO SHIP SAFETY RADIO (FORM R)

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 .....

Distinctive number or letters .....

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	

SECOND SCHEDULE — *continued*

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	.....
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	.....
5	VHF EPIRB	.....
6	Ship's search and rescue locating device	
6.1	Radar search and rescue transponder (SART)	.....
6.2	AIS search and rescue transmitter (AIS-SART)	.....

3 ***Methods used to ensure availability of radio facilities*** (Regulations IV/15.6 and IV/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 of the Record)

SECOND SCHEDULE — *continued*

.....	.....
(Date of issue)	*(Signature of duly authorised official issuing the Record)*

(Seal or stamp of the issuing authority, as appropriate)

[S 432/2014 wef 01/07/2014]

RECORD OF EQUIPMENT FOR CARGO SHIP SAFETY (FORM C)

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 .....

Distinctive number or letters .....

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 davit launched lifeboats	.....	.....
2.1	Total number of persons accommodated by them	.....	.....
2.2	Number of self-righting partially enclosed lifeboats (Regulation III/43[1])	.....	.....
2.3	Number of totally enclosed lifeboats (Regulation III/31 of the Convention and LSA Code, section 4.6)	.....	.....

[1]Refer to the 1983 amendments to SOLAS (MSC.6(48)), applicable to ships constructed on or after 1 July 1986, but before 1 July 1998.

SECOND SCHEDULE — *continued*

2.4	Number of lifeboats with a self-contained air support system (Regulation III/31 of the Convention and LSA Code, section 4.8)	.....	.....
2.5	Number of fire-protected lifeboats (Regulation III/31 of the Convention and LSA Code, section 4.9)	.....	.....
2.6	Other lifeboats	.....	.....
2.6.1	Number	.....	.....
2.6.2	Type	.....	.....
3	Total number of free-fall lifeboats	.....	
3.1	Total number of persons accommodated by them	.....	
3.2	Number of totally enclosed lifeboats (Regulation III/31 of the Convention and LSA Code, section 4.7)	.....	
3.3	Number of lifeboats with self-contained air support system (Regulation III/31 of the Convention and LSA Code, section 4.8)	.....	
3.4	Number of fire-protected lifeboats (Regulation III/31 of the Convention and LSA Code, section 4.9)	.....	
4	Number of motor lifeboats (included in the total lifeboats shown in 2 and 3 above)	.....	
4.1	Number of lifeboats fitted with searchlights	.....	
5	Number of rescue boats	.....	
5.1	Number of boats which are included in the total lifeboats shown in 2 and 3 above	.....	
6	Liferafts	.....	
6.1	Those for which approved launching appliances are required	.....	
6.1.1	Number of liferafts	.....	

SECOND SCHEDULE — *continued*

6.1.2	Number of persons accommodated by them	.....
6.2	Those for which approved launching appliances are not required	.....
6.2.1	Number of liferafts	.....
6.2.2	Number of persons accommodated by them	.....
6.3	Number of liferafts required by Regulation III/31.1.4 of the Convention	.....
7	Number of lifebuoys	.....
8	Number of lifejackets	.....
9	Immersion suits	.....
9.1	Total number	.....
9.2	Number of suits complying with the requirements for lifejackets	.....
10	Number of anti-exposure suits	.....
11	Radio installations used in life-saving appliances	.....
11.1	Number of search and rescue locating devices	.....
11.1.1	Radar search and rescue transponders (SART)	.....
11.1.2	AIS search and rescue transmitters (AIS-SART)	.....
11.2	Number of two-way VHF radiotelephone apparatus	.....

[S 277/2016 wef 01/07/2016]

3 ***Details of radio facilities***

Item		Actual provision
1	Primary systems	
1.1	VHF radio installation	.....
1.1.1	DSC encoder	.....

SECOND SCHEDULE — *continued*

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	.....
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	.....
5	VHF EPIRB	.....
6	Ship's search and rescue locating device	
6.1	Radar search and rescue transponder (SART)	.....
6.2	AIS search and rescue transmitter (AIS-SART)	.....

4 ***Methods used to ensure availability of radio facilities***
(Regulations IV/15.6 and IV/15.7)

SECOND SCHEDULE — *continued*

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[2]	.....
1.2	Spare magnetic compass[2]	.....
1.3	Gyro-compass[2]	.....
1.4	Gyro-compass heading repeater[2]	.....
1.5	Gyro-compass bearing repeater[2]	.....
1.6	Heading or track control system[2]	.....
1.7	Pelorus or compass bearing device[2]	.....
1.8	Means of correcting heading and bearings	.....
1.9	Transmitting heading device (THD)[2]	.....
2.1	Nautical charts/Electronic chart display and information system (ECDIS)[3]	.....
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 radionavigation system[2, 3]	.....
3.2	9 GHz radar[2]	.....
3.3	Second radar (3 GHz/9 GHz[3])[2]	.....
3.4	Automatic radar plotting aid (ARPA)[2]	.....
3.5	Automatic tracking aid[2]	.....

SECOND SCHEDULE — *continued*

3.6	Second automatic tracking aid[2]	.....
3.7	Electronic plotting aid[2]	.....
4.1	Automatic identification system (AIS)	.....
4.2	Long-range identification and tracking system	.....
5.1	Voyage data recorder (VDR)[3]	.....
5.2	Simplified voyage data recorder (S-VDR)[3]	.....
6.1	Speed and distance measuring device (through the water)[2]	.....
6.2	Speed and distance measuring device (over the ground in the forward and athwartships direction)[2]	.....
7	Echo-sounding device[2]	.....
8.1	Rudder, propeller, thrust, pitch and operational mode indicator[2]	.....
8.2	Rate-of-turn indicator[2]	.....
9	Sound reception system[2]	.....
10	Telephone to emergency steering position[2]	.....
11	Daylight signalling lamp[2]	.....
12	Radar reflector	.....
13	International Code of Signals	.....
14	IAMSAR Manual, Volume III	.....
15	Bridge navigational watch alarm system (BNWAS)	.....

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Issued at .....

(Place of issue of the Record)

SECOND SCHEDULE — *continued*

.....	.....
(Date of issue)	*(Signature of duly authorised official issuing the Record)*

(Seal or stamp of the issuing authority, as appropriate)

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[1] Refer to the 1983 amendments to SOLAS (MSC.6(48)), applicable to ships constructed on or after 1st July 1986, but before 1st July 1998.

[2] Alternative means of meeting this requirement are permitted under Regulation V/19. In case of other means, they shall be specified.

[3] Delete as appropriate.

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LEGISLATIVE HISTORY

MERCHANT SHIPPING (SAFETY CONVENTION) REGULATIONS (CHAPTER 179, RG 11)

This Legislative History is provided for the convenience of users of the Merchant Shipping (Safety Convention) Regulations. It is not part of these Regulations.

1. **G. N. No. S 219/1984 — Merchant Shipping (Safety Convention) Regulations 1984**

   (G.N. No. S 322/1984 — Corrigenda)

   Date of commencement : 1 September 1984

2. **G. N. No. S 139/1986 — Merchant Shipping (Safety Convention) (Amendment) Regulations 1986**

   Date of commencement : 1 July 1986

3. **G. N. No. S 385/1989 — Merchant Shipping (Safety Convention) (Amendment) Regulations 1989**

   Date of commencement : 22 October 1989

4. **G. N. No. S 45/1990 — Merchant Shipping (Safety Convention) (Amendment) Regulations 1990**

   Date of commencement : 29 April 1990

5. **G. N. No. S 39/1992 — Merchant Shipping (Safety Convention) (Amendment) Regulations 1992**

   Date of commencement : 1 February 1992

6. **1990 Revised Edition — Merchant Shipping (Safety Convention) Regulations**

   Date of operation : 25 March 1992

7. **G. N. No. S 213/1992 — Merchant Shipping (Safety Convention) (Amendment No. 2) Regulations 1992**

   Date of commencement : 11 May 1992

8. **G. N. No. S 490/1993 — Merchant Shipping (Safety Convention) (Amendment) Regulations 1993**

   Date of commencement : 1 January 1994

9. **G. N. No. S 366/1994 — Merchant Shipping (Safety Convention) (Amendment) Regulations 1994**

   Date of commencement : 1 October 1994

10. G. N. No. S 578/1995 — Merchant Shipping (Safety Convention) (Amendment) Regulations 1995

Date of commencement : 1 January 1996

11. G. N. No. S 62/1996 — Merchant Shipping (Safety Convention) (Amendment) Regulations 1996

Date of commencement : 2 February 1996

12. G. N. No. S 133/1996 — Merchant Shipping (Safety Convention) (Amendment No. 2) Regulations 1996

Date of commencement : 1 July 1996

13. G. N. No. S 379/1996 — Merchant Shipping (Safety Convention) (Amendment No. 3) Regulations 1996

Date of commencement : 1 January 1997

14. G. N. No. S 231/1997 — Merchant Shipping (Safety Convention) (Amendment) Regulations 1997

Date of commencement : 9 May 1997

15. G. N. No. S 293/1997 — Merchant Shipping (Safety Convention) (Amendment No. 2) Regulations 1997

Date of commencement : 1 July 1997

16. G. N. No. S 90/1998 — Merchant Shipping (Safety Convention) (Amendment) Regulations 1998

Date of commencement : 1 April 1998

17. G. N. No. S 345/1998 — Merchant Shipping (Safety Convention) (Amendment No. 2) Regulations 1998

Date of commencement : 1 July 1998

18. 1999 Revised Edition — Merchant Shipping (Safety Convention) Regulations

Date of operation : 1 April 1999

19. G. N. No. S 287/1999 — Merchant Shipping (Safety Convention) (Amendment) Regulations 1999

Date of commencement : 1 July 1999

20. G. N. No. S 40/2000 — Merchant Shipping (Safety Convention) (Amendment) Regulations 2000

Date of commencement : 3 February 2000

21. G. N. No. S 511/2000 — Merchant Shipping (Safety Convention) (Amendment No. 2) Regulations 2000

Date of commencement : 1 January 2001

22. G. N. No. S 533/2001 — Merchant Shipping (Safety Convention) (Amendment) Regulations 2001

Date of commencement : 1 January 2002

23. G. N. No. S 314/2002 — Merchant Shipping (Safety Convention) (Amendment) Regulations 2002

Date of commencement : 1 July 2002

24. G. N. No. S 613/2002 — Merchant Shipping (Safety Convention) (Amendment No. 2) Regulations 2002

Date of commencement : 1 January 2003

25. G. N. No. S 645/2003 — Merchant Shipping (Safety Convention) (Amendment) Regulations 2003

Date of commencement : 1 January 2004

26. G. N. No. S 217/2004 — Merchant Shipping (Safety Convention) (Amendment) Regulations 2004

Date of commencement : 1 July 2004

27. G. N. No. S 697/2005 — Merchant Shipping (Safety Convention) (Amendment) Regulations 2005

Date of commencement : 1 January 2006

28. G. N. No. S 282/2006 — Merchant Shipping (Safety Convention) (Amendment) Regulations 2006

Date of commencement : 1 July 2006

29. G. N. No. S 691/2006 — Merchant Shipping (Safety Convention) (Amendment No. 2) Regulations 2006

Date of commencement : 1 January 2007

30. G. N. No. S 339/2008 — Merchant Shipping (Safety Convention) (Amendment) Regulations 2008

Date of commencement : 1 July 2008

31. G. N. No. S 686/2008 — Merchant Shipping (Safety Convention) (Amendment No. 2) Regulations 2008

Date of commencement : 1 January 2009

32. G. N. No. S 286/2009 — Merchant Shipping (Safety Convention) (Amendment) Regulations 2009

Date of commencement : 1 July 2009

33. G. N. No. S 664/2009 — Merchant Shipping (Safety Convention) (Amendment No. 2) Regulations 2009

Date of commencement : 1 January 2010

34. G. N. No. S 366/2010 — Merchant Shipping (Safety Convention) (Amendment) Regulations 2010

Date of commencement : 1 July 2010

35. G. N. No. S 793/2010 — Merchant Shipping (Safety Convention) (Amendment No. 2) Regulations 2010

Date of commencement : 1 January 2011

36. G. N. No. S 622/2011 — Merchant Shipping (Safety Convention) (Amendment) Regulations 2011

Date of commencement : 1 January 2012

37. G. N. No. S 284/2012 — Merchant Shipping (Safety Convention) (Amendment) Regulations 2012

Date of commencement : 1 July 2012

38. G. N. No. S 621/2012 — Merchant Shipping (Safety Convention) (Amendment No. 2) Regulations 2012

Date of commencement : 1 January 2013

39. G. N. No. S 847/2013 — Merchant Shipping (Safety Convention) (Amendment) Regulations 2013

Date of commencement : 1 January 2014

40. G. N. No. S 432/2014 — Merchant Shipping (Safety Convention) (Amendment) Regulations 2014

Date of commencement : 1 July 2014

41. G. N. No. S 866/2014 — Merchant Shipping (Safety Convention) (Amendment No. 2) Regulations 2014

Date of commencement : 1 January 2015

42. G. N. No. S 375/2015 — Merchant Shipping (Safety Convention) (Amendment) Regulations 2015

Date of commencement : 1 July 2015

43. G. N. No. S 802/2015 — Merchant Shipping (Safety Convention) (Amendment No. 2) Regulations 2015

Date of commencement : 1 January 2016

44. G. N. No. S 277/2016 — Merchant Shipping (Safety Convention) (Amendment) Regulations 2016

Date of commencement : 1 July 2016

45. G. N. No. S 669/2016 — Merchant Shipping (Safety Convention) (Amendment No. 2) Regulations 2016

Date of commencement : 1 January 2017