

July 2024 Edition

## Part A

Large Yacht Code  
(up to 12 passengers)

*Including Corrigenda no. 1*



# Red Ensign Group Yacht Code



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## PREAMBLE

The Preamble is provided for explanatory purposes and is not part of the Code provisions.

This Code of Practice has been developed jointly by the United Kingdom, its relevant overseas territories and crown dependencies<sup>1</sup>, and international industry representatives. The Code prescribes standards of safety and pollution prevention which are appropriate to the size and type of yacht. The standards applied are either set by the relevant International Conventions or by equivalent standards where it is not reasonable or practicable for yachts to comply.

This Code is an equivalence under the provisions of Article 8 of the International Convention on Load Lines, 1966, Regulation I-5 of the International Convention on Safety of Life at Sea, and Article 9 of the International Convention on Standards of Training Certification and Watchkeeping for Seafarers 1978 as amended. Notification of equivalences can be found on the IMO website at <https://gisis.imo.org>.

The development of the Code is based on the consideration that full compliance with the provisions of the above mentioned Conventions is unreasonable and in some instances disproportionately onerous compared to the incremental increase in safety levels achieved for yachts. Yachts have a very different operating pattern when compared to a typical commercial ship which usually operate 24/7 on a tight schedule. The Code is intended to cater exclusively to the yachting sector of the market and it is not intended to apply to commercial cruise, excursion or ferry passenger (including passenger/cargo vessels) sectors of the industry. Yachts which comply with the Code do not have to comply with the requirements of the HSC Code.

During 2022 and 2023, the Red Ensign Group (REG) worked alongside the Large Yacht industry to develop this revision of this Edition of the 'REG Yacht Code'. This Code consists of two parts; Part A and Part B both of which are an update to the January 2019 revision including Corrigenda No.1 and No.2. The two parts are still separate entities. However, where there are commonalities between the two Parts, Annexes have been produced which are applicable to both Parts A and B. The Scope of Parts A and B of the Code have not been changed and are as follows:

- Part A applicable to yachts which are 24 metres and over in load line length, are in commercial use for sport or pleasure, do not carry cargo and do not carry more than 12 passengers;
- Part B applicable to pleasure yachts of any size, in private use or engaged in trade, which carry more than 12 but not more than 36 passengers and which do not carry cargo.

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<sup>1</sup> Crown Dependencies (Isle of Man, Guernsey and Jersey) and the UK Overseas Territories (Anguilla, Bermuda, British Virgin Islands, Cayman Islands, Falkland Islands, Gibraltar, Montserrat, St Helena and the Turks & Caicos Islands)

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## CHAPTER 1

### APPLICATION AND INTERPRETATION

#### **1.1 Purpose**

- (1) The purpose of Part A of the Red Ensign Group Yacht Code (“the Code”), is to provide design criteria, construction standards and other safety measures for yachts carrying no more than 12 passengers so as to minimise the risk to such yachts, persons onboard and the environment. The criteria are largely aligned to the Conventions and Instruments referred to in the preamble to the Code but have been modified to create an equivalence where deemed appropriate to ensure their suitability for application to yachts.

#### **1.2 Application**

- (1) The Code applies to motor or sailing vessels of 24 metres in load line length and over or, if built before 21 July 1968, is of 150GT<sup>2</sup> or over and which, at the time, is in commercial use for sport or pleasure and carries no cargo and no more than 12 passengers. Sail training vessels are included in this application.
- (2) Subject to 1.6, existing vessels may alternately elect to apply for certification in accordance with the Code, and the Code shall apply to such vessels in the same way as it applies to new vessels.
- (3) Subject to Section (4), all ships which undergo repairs, alterations, modifications and outfitting related thereto shall continue to comply with, as a minimum, the requirements previously applicable to these ships.
- (4) Any ship, whenever built, which is converted to a yacht, shall be treated as a new vessel constructed on the date on which such a conversion commenced. Detailed proposals regarding any such conversions shall be submitted to the Administration for the purpose of review and comment at the earliest possible opportunity<sup>3</sup>.
- (5) Those areas of a yacht that undergo repair, alteration or modification which substantially alter the dimensions of the yacht, or substantially increase its service life, shall be treated as a new vessel constructed on the date on which such alterations or modifications commenced. The replacement, addition and / or modification of propulsion and auxiliary machinery is to comply with the applicable requirements of MARPOL Annex VI. Where a change in vessel particulars reaches a new regulatory threshold (i.e. 500GT, >85m Loadline Length etc) compliance with the relevant provisions applicable to a new vessel

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<sup>2</sup> "tons" means gross tons, measured in accordance with the Regulations for measuring tonnage in force on 20th July 1968.

<sup>3</sup> Refer to IACS' SC226 for the interpretation of 'the date on which a conversion occurs'.

of that size is required. Detailed proposals regarding any such alternations or modifications shall be submitted to the Administration for the purpose of review and comment at the earliest possible opportunity.

- (6) The Administration may establish alternative standards for yachts operating under World Sailing (previously ISAF) or Union Internationale Motonautique (UIM) racing rules.
- (7) Shadow Vessels or Yacht Support Vessels intended to support the activities of a mother ship (and which may also act as an independent yacht in their own right), may be certificated in accordance with the provisions of the Code, provided that the support vessel does not carry cargo. This does not preclude the carriage of spares / replacement parts, and other products associated with servicing and maintenance, tenders, toys and recreational equipment to support the activities of the mother ship. However, limitations on the quantity of items to be carried which could be considered to constitute a significant fire risk (i.e. lithium ion batteries) may be imposed by the Administration. The carriage of bunkers and/or refuelling capabilities for the mother ship are not permitted although refuelling for tenders and toys, and helicopters may be permitted provided these arrangements comply with the provisions of the Code. The support vessel shall also be provided with guest and crew accommodation to the satisfaction of the Administration.

### ***1.3 Review of the Code***

- (1) The content of the Code shall be reviewed by the REG annually to ascertain if amendments to it are required.

### ***1.4 International Conventions and Related Instruments***

- (1) Where the Code requires a yacht to comply with any of the provisions of an International Convention (or other related instrument), and the applied requirements are separated into different vessel types, a yacht shall comply with the applied requirements of the Convention that apply to a cargo ship. This is subject to any express provision to the contrary in the Code.

### ***1.5 Areas of Operation***

- (1) In general, requirements given within the Code are based on unrestricted geographical operation outside Polar Regions, however, where considered appropriate, standards for vessels operating as Short Range Yachts have been included.
- (2) Short Range Yachts are restricted to operating in forecast or actual wind of a maximum Beaufort Force 4 for a motor yacht, and Beaufort Force 6 for a sailing yacht, within 60 nautical miles from a safe haven. (The Administration may permit operation on specified routes up to 90 nautical miles from a safe haven as appropriate). Furthermore, the Administration may permit, upon application, vessels certified as Short Range Yachts to make transitional voyages beyond the specified limits. The voyage must be completed with no passengers on board and in compliance with any special conditions imposed by the vessel's Administration.

- (3) Yachts which intend to operate in Polar Regions shall meet requirements of the Code, the IMO Polar Code (see Annex L) and those of a Recognised Organisation appropriate to the intended area of operation.

### ***1.6 Editions of the Code***

- (1) Vessels, the keels of which were laid or were at a similar stage of construction before 01 July 2024 and which have not previously been certificated in accordance with LY1, LY2, LY3 or the 2019 Edition of Part A, shall comply with this edition of the Code except as permitted under 1.6(4). In the case of an existing vessel (i.e.; a vessel that is already in service) which does not comply fully with the Code safety standards but for which the Code standards are reasonable and practicable, the Administration may give due consideration to a proposal from the Company to phase in requirements within an agreed time scale not exceeding 18 months.
- (2) Vessels, the keels of which were laid or were at a similar stage of construction before 01 July 2024 and which have been or are currently under survey to LY1, LY2, LY3 or the 2019 revision of Part A, may continue to be considered under the standards in force at the time of initial survey. Vessels, the keels of which were laid or were at a similar stage of construction, prior to 01 January 2019 shall also comply with section 1.6 (2) of the 2019 revision of Part A.
- (3) Vessels, for which the building contract is placed on or after 01 July 2024 or in the absence of a building contract, the keel of which is laid or were at a similar stage of construction on or after 01 July 2024 shall comply with this edition of the Code, in its entirety except as permitted under 1.6(4).
- (4) The following amendments shall be applied to vessels whose building contract is placed on or after 01 January 2027 or, in the absence of a building contract, the keel of which is laid, or the vessel is at a similar stage of construction on or after 01 January 2027. The early adoption of these amendments, either partially or fully, is recommended. In the meantime, compliance with the corresponding requirements in the 2019 edition of the Code shall be required for those vessels certified in accordance with the 2024 edition, unless the amended requirements are adopted early in accordance with the above:
  - (a) Sections 4.4(4), 4.4(9), 4.4(10) and 4.4(11) Enclosed Compartments within the hull and below the bulkhead deck provided with access through openings in the hull;
  - (b) Section 11.5 Stability criteria for vessels with openings in the hull, the lower edge of which is less than 600 millimeters above the uppermost Load Line;
  - (c) Section 11.6 Stability criteria for vessels with Floodable tender garages;
  - (d) Section 23A.12(1) Safe use of hull shell doors;
  - (e) Section 23B.1 Procedures for the safe use of hull shell doors.

**1.7 Interpretation**

- (1) Where a question of interpretation of any part of this Code arises, which cannot be resolved by a delegated authority and the Company (or for vessels under 500GT, the owner(s)/managing agent(s)) for a vessel, a decision on the interpretation may be obtained on written application to the Administration.

**1.8 Equivalent Arrangements**

- (1) Proposals for the application of alternative standards considered to be at least equivalent to the requirements of the Code shall be submitted to the Administration for approval. Deviations from the requirements of the Code may be considered by the Administration, provided that the equivalence:
  - (a) is based on the underlying Convention requirements;
  - (a) incorporates increased requirements to balance deficiencies and thereby provide an equivalent level of safety to the chapter concerned;
  - (b) meets the intent of the requirements concerned and the objectives of the chapter;
  - (c) incorporates any specific requirements in the chapter's 'Additional Equivalence Considerations' section; and
  - (d) where necessary;
    - (i) has successfully undergone testing to the satisfaction of the Administration; or
    - (ii) has successfully undergone, an engineering analysis, evaluation and approval by the Administration.

**1.9 Alternative Design and Arrangements**

- (1) Purpose
  - (a) The purpose of this Section is to provide a methodology for alternative design and arrangements which are limited by the extent to which International Conventions allow. Only chapters containing provisions for Alternative Design and Arrangements may utilise such provisions outlined in this Section.
- (2) General
  - (a) Design and arrangements may deviate from the requirements of Part A, provided that the alternative design and arrangements meet the intent of the requirements concerned, the chapter's objectives and functional requirements where provided, and provide an equivalent level of safety to the chapter concerned. Alternative design and arrangements shall be based on the underlying Convention

requirements and follow any Administrations alternative design and arrangement procedures.

- (b) When alternative design or arrangements deviate from the prescriptive requirements of Part A, an engineering analysis, evaluation and approval of the design and arrangements shall be carried out in accordance with this Section.
- (3) Engineering analysis
  - (a) The engineering analysis shall be prepared and submitted to the Administration, based on the guidelines<sup>4</sup> and shall include, as a minimum, the elements listed under 'Engineering Analysis Elements' in the relevant chapter.
- (4) Evaluation of the alternative design and arrangements
  - (a) The engineering analysis required in Section (3) shall be evaluated and approved by the Administration, taking into account the guidelines<sup>4</sup>.
  - (b) A copy of the documentation, as approved by the Administration, indicating that the alternative design and arrangements comply with this Section, shall be carried onboard the ship.
- (5) Exchange of information
  - (a) The Administration shall communicate to the IMO pertinent information concerning alternative design and arrangements approved by them for circulation to all Contracting Governments.
- (6) Re-evaluation due to change of conditions
  - (a) 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 Administration.

### **1.10 Exemptions**

- (1) Exemptions shall be granted only by the Administration.
- (2) Applications for exemption shall be made to the Administration and be supported by justification for the exemption.
- (3) The granting of exemptions shall be limited by the extent to which the International Conventions allow and shall in all instances be regarded as exceptional.

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<sup>4</sup> Refer to the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III (MSC.1/Circ.1212) and SOLAS Chapters II-2 (MSC.1/Circ.1002).

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## CHAPTER 2

### DEFINITIONS

#### 2.1 *General Requirements*

- (1) For the purpose of this Code, unless expressly provided otherwise, the terms used therein have the meanings defined in this section. (Note: where a definition is not contained within this Code, guidance shall be taken from definitions within the applicable International Conventions).
- (2) Except where the context otherwise requires, throughout the Code the terms “yacht”, “ship” and “vessel” are synonymous.
- (3) The following definitions are applicable for this Part A of the Code:

“*A*” *Class divisions*” means those divisions formed by bulkheads and decks which comply with the following criteria:

1. they are constructed of steel or other equivalent material;
2. they are suitably stiffened;
3. they are insulated with approved non-combustible materials such that the average temperature of the unexposed side will not rise more than 140°C above the original temperature, nor will the temperature, at any one point, including any joint, rise more than 180°C above the original temperature, within the time listed below:
  - class "A-60" 60 minutes
  - class "A-30" 30 minutes
  - class "A-15" 15 minutes
  - class "A-0" 0 minutes
4. 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
5. the Administration 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.

“*Accommodation spaces*” means 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.

“*Administration*” with regard to this Code means the Government of the State whose flag the ship is entitled to fly, or a Recognised Organisation who has been delegated the responsibilities.

- “*Aft terminal*” means the aft limit of the subdivision length.
- “*Aft perpendicular*” means the perpendicular taken at the after end of length (L).
- “*Amidship*” means at the middle of the length (L).
- “*Approved*” in respect to materials or equipment means approved by the Administration or approved by an Administration or organisation which is formally recognised by the Administration.
- “*Atrium*” means a public space within a single main vertical zone spanning three or more open decks.
- “*Aviation Inspection Body*” means a body delegated the responsibility of inspecting helicopter landing areas by the Administration. The verification process shall include inspection, certification and, where necessary, the application of appropriate operational limitations.
- “*“B” class divisions*” means those divisions, referred to as “B-15” or “B-0”, formed by bulkheads, decks, ceilings or linings which comply with the following criteria-
1. they are constructed of approved non-combustible materials and all materials used in the construction and erection of "B" class divisions are non-combustible.
  2. they have an insulation value such that the average temperature of the unexposed side shall not rise more than 140°C above the original temperature, nor shall the temperature at any one point, including any joint, rise more than 225°C above the original temperature, within the time listed below-  
  

class "B-15"	15 minutes
class "B-0"	0 minutes
  3. they are so constructed as to be capable of preventing the passage of flame to the end of the first half hour of the standard fire test; and
  4. the Administration 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.
- “*Breadth*” or “*B*”” means the maximum breadth of the ship, measured amidships to the moulded line of the frame in a ship with a metal shell and to the outer surface of the hull in a ship with a shell of any other material, unless expressly provided otherwise.
- “*Bulkhead deck*” means the uppermost deck up to which the transverse watertight bulkheads are carried.
- “*Buoyant lifeline*” means a line complying with the requirements of the LSA Code.

- “C” class division* means 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 14A or 14B.
- “Cargo”* means an item(s) of value that is carried from one place and discharged at another place and for which either a charge or no charge is made and is not for use exclusively onboard the vessel.
- “Central control station”* means a control station in which the following control and indicator functions are centralised-
- (a) fixed fire detection and fire alarm systems;
  - (b) automatic sprinkler, fire detection and fire alarm systems;
  - (c) fire door indicator panels;
  - (d) fire door closure;
  - (e) watertight door indicator panels;
  - (f) watertight door closures;
  - (g) ventilation fans;
  - (h) general/fire alarms;
  - (i) communication systems including telephones; and
  - (j) microphones to public address systems
- “Code”* means Red Ensign Group Yacht Code.
- “COLREGs”* means the Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREG 72), as applicable for vessels to which this Edition of the Code applies.
- “Combustible material”* means any material other than a non-combustible material.
- “Company”* means the Owner of the ship or any other Organisation or person such as the Manager, or the Bareboat Charterer, who has assumed the responsibility for operation of the ship from the Shipowner and who on assuming such responsibility has agreed to take over all the duties and responsibilities imposed by the Code.
- “Continuous B” class ceilings or linings”* means those "B" class ceilings or linings which terminate at an "A" or "B" class division.
- “Continuously manned central control station”* means a central control station which is continuously manned by a responsible member of the crew.

<i>“Control stations”</i>	means those spaces in which the ship's radio or main navigating equipment or the emergency source of power is located or where the fire recording or fire control equipment is centralised; spaces where the fire recording or fire control equipment is centralised are also considered to be a fire control station.
<i>“Deadlight”</i>	means a secondary watertight closure fitted to a glazed opening and which is fitted to the inside of the vessel.
<i>“Design Waterline”</i>	Deepest loaded draught as per the all-seasons Load Line assigned to the vessel.
<i>“Design pressure”</i>	means the hydrostatic pressure for which each structure or appliance assumed watertight in the intact and damage stability calculations is designed to withstand.
<i>“Draught” or (d)</i>	means the vertical distance from the keel line at mid-length to the waterline in question.
<i>“Efficient”</i>	in relation to a fitting, piece of equipment or material means that all reasonable and practicable measures have been taken to ensure that it is suitable for the purpose for which it is intended to be used.
<i>“Embarkation ladder”</i>	means the ladder provided at survival craft embarkation stations to permit safe access to survival craft after launching; complying with the requirements of the LSA Code.
<i>“Embarkation station”</i>	means the place from which a survival craft is boarded. An embarkation station may also serve as a muster station, provided there is sufficient room, and the muster station activities can safely take place there.
<i>“Emergency source of electrical power”</i>	means for Part A vessels less than 500GT a source of electrical power, intended to supply the emergency switchboard in the event of failure of the supply from the main source of electrical power. For all other vessels, it means the emergency source of electrical power required by SOLAS II-1/42.
<i>“Emergency switchboard”</i>	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.
<i>“Engaged in trade”</i>	means, for the purposes of the Code, the carriage of passengers for reward or remuneration under a charter or hire agreement.
<i>“EPIRB”</i>	means a satellite emergency position-indicating radio beacon, being an earth station in the mobile-satellite service, the emissions of which are intended to facilitate search and rescue operations, complying with performance standards adopted by the IMO contained in either Resolution A.810(19) or Resolution

- A.812(19) and Resolution A.662(16), or any Resolution amending or replacing these from time to time and which is considered by the Administration to be relevant, and is capable of:
- (a) floating free and automatically activating if the ship sinks;
  - (b) being manually activated; and
  - (c) being carried by one person.
- “Existing vessel”* means any vessel, the keel of which was laid or was at a similar stage of construction prior to the 01 July 2024.
- “Fire damper”* means 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. In using the above definition, the following terms may be associated:  
*“automatic fire damper”* is a fire damper that closes independently in response to exposure to fire products;  
*“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  
*“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.
- “Fire Safety Systems Code”* means the International Code for Fire Safety Systems as adopted by the Maritime Safety Committee of the IMO by resolution MSC.98 (73), as may be amended by the IMO, 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 thereof.
- “Fire Test Procedures Code”* means the International Code for Application of Fire Test Procedures as adopted by the Maritime Safety Committee of the IMO by resolution MSC.307(88) as may be amended by the IMO, 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 thereof.
- “Flashpoint”* means the temperature in degrees Celsius (closed cup test) at which a product shall give off enough flammable vapour to be ignited, as determined by an approved flashpoint apparatus.
- “Float-free launching”* means that method of launching a survival craft whereby the craft is automatically released from a sinking ship and is ready for use.
- “Forward perpendicular”* means the perpendicular taken at the forward end of the length (L) such that the perpendicular coincides with the fore side of the stem on the waterline on which the length is measured.

- “Freeboard”* has the meaning given in annex I of ICLL. The freeboard assigned is the distance measured vertically downwards amidships from the upper edge of the deck line to the upper edge of the related load line.
- “Freeboard deck”* means, subject to paragraphs (a) to (d) below, the uppermost complete deck exposed to weather and sea, which has permanent means of closing all openings in the weather part thereof, and below which all openings in the sides of the ship are fitted with permanent means of watertight closing-
- (a) in a ship having a discontinuous freeboard deck, the lowest line of the exposed deck and the continuation of that line parallel to the upper part of the deck is taken as the freeboard deck; and
  - (b) at the option of the Company and subject to the approval of the Administration, a lower deck may be designated as the freeboard deck provided it is a complete and permanent deck continuous in a fore and aft direction at least between the machinery space and peak bulkheads and continuous athwartships, provided that-
  - (c) when this lower deck is stepped the lowest line of the deck and the continuation of that line parallel to the upper part of the deck is taken as the freeboard deck;
  - (d) when a lower deck is designated as the freeboard deck, that part of the hull which extends above the freeboard deck is treated as a superstructure so far as concerns the application of the conditions of assignment and the calculation of freeboard and it is from this deck that the freeboard is calculated.
- “Garage spaces”* means those enclosed spaces above and below the bulkhead deck used for the storage of pleasure craft, vehicles, jet skis or any other such engine driven units and recreational dive systems.
- “Garbage”* means all kinds of victual, domestic and operational waste excluding fresh fish and parts thereof, generated during the normal operation of the vessel and liable to be disposed of continuously or periodically, except sewage originating from vessels.
- “General emergency alarm system”* means the general emergency alarm system complying with the requirements of Chapter VII, 7.2.1 the LSA Code.
- “Glazed Opening”* means an opening in the hull, superstructure or deckhouse of a ship structure fitted with a transparent or translucent material.
- “Hazardous area”* means those areas which may contain flammable or explosive gases, dusts or vapours, the use without proper consideration of machinery or electrical equipment may lead to fire hazard or explosion.
- “IMO High Speed Craft Code”* means the International Code of Safety for High Speed Craft, 2000, adopted by the Maritime Safety Committee of the IMO by resolution MSC.97(73), as amended.
- “ICLL”* means the International Convention on Load Lines, 1966, as amended, as applicable for vessels to which this Edition of the Code applies.

“ILO”	means the International Labour Organisation.
“Immersion suit”	means a protective suit which reduces the body heat loss of a person wearing it in cold water complying with the requirements of the LSA Code.
“IMO”	means the International Maritime Organisation, a specialised agency of the United Nations devoted to maritime affairs.
“Inflatable lifejacket”	means a lifejacket complying with the requirements of the LSA Code.
“Intact Stability Code, 2008”	means the International Code on Intact Stability, 2008 (2008 IS Code) As adopted by IMO Circular MSC.267(85). This revised Code includes a mandatory Part A and a recommendatory Part B. Also included in Part A are Severe Wind and Weather Rolling Criteria.
“Keel line”	means a line parallel to the slope of the keel passing amidships through- (a) 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; or (b) in wood and composite ships, the distance is measured from the lower edge of the keel rabbet and when 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 inward intersects the centreline amidships.
“L1”	a virtual line drawn at a height of 2.5% of the breadth (B), or 500 millimetres, whichever is the greatest distance, above the design waterline.
“L2”	a virtual line drawn at a height of $h_{std} + 0.02L$ above the design waterline where 0.02L need not exceed 3 metres.
“L3”	a virtual line drawn at a height of $2 \times h_{std} + 0.02L$ above the design waterline where 0.02L need not exceed 3 metres.
“Level 1”	The area between ‘L1’ and ‘L2’.
“Level 2”	The area between ‘L2’ and ‘L3’.
“Landing Area”	A generic term referring to any area primarily intended for the landing or take-off of aircraft.
“Launching appliance (or arrangement)”	means a provision complying with the requirements of the LSA Code for safely transferring a lifeboat, rescue boat, or liferaft respectively, from its stowed position to the water and recovery where applicable.

<i>“Length”</i>	means 96% of the total length on a waterline of a ship 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.
<i>“Lightest seagoing condition”</i>	means the loading condition with the ship on even keel, with 10% stores and fuel remaining and with the full number of passengers and crew and their luggage.
<i>“Lifeboat”</i>	means a lifeboat complying with the requirements of the LSA Code.
<i>“Lifebuoy”</i>	means a lifebuoy complying with the requirements of LSA Code.
<i>“Lifejacket”</i>	means a lifejacket complying with the requirements of LSA Code.
<i>“Liferaft”</i>	means a liferaft complying with the requirements of LSA Code.
<i>“Lightweight”</i>	means the displacement of a ship in tonnes without, fuel, lubricating oil, ballast water, fresh water and feedwater in tanks, consumable stores, and passengers and crew and their effects.
<i>“Line throwing appliance”</i>	means an appliance complying with the requirements of LSA Code.
<i>“Low-flashpoint fuel”</i>	means gaseous or liquid fuel having a flashpoint lower than otherwise permitted under SOLAS II-2/4.2.1.1.
<i>“Low flame spread”</i>	means that the surface thus described shall adequately restrict the spread of flame, this being determined in accordance with the Fire Test Procedures Code.
<i>“LSA Code”</i>	means the International Life-Saving Appliance Code adopted by the Maritime Safety Committee of the IMO by resolution MSC.48(66), as it may be amended by the IMO.
<i>“Machinery rooms”</i>	means spaces between the watertight boundaries of a room containing the main and auxiliary propulsion machinery, including boilers, generators and electric motors primarily intended for propulsion; provided that in the case of unusual arrangements, the Administration may define the limits of the machinery rooms.
<i>“Machinery Control Room”</i>	means a space which serves for control and/or monitoring of machinery used for the ship’s main propulsion as given in MSC.1/Circ.1511.
<i>“Machinery spaces”</i>	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.
<i>“Machinery spaces of category A”</i>	means those spaces and trunks to such spaces which contain either- (a) internal combustion machinery used for main propulsion; (b) internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375 kW; or (c) any oil-fired boiler or oil fuel unit, or any oil-fired equipment other than boilers, such as inert gas generators, incinerators, etc.
<i>“Main source of electrical power”</i>	is a source intended to supply electrical power to the main switchboard for distribution to all services necessary for maintaining the ship in normal operation and habitable condition.
<i>“Main switchboard”</i>	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.
<i>“Main vertical zone”</i>	means those sections into which the hull, superstructure and deckhouses are divided by “A” class divisions, the mean length of which on any deck does not normally exceed 40 metres.
<i>“Man-riding”</i>	means the use of a crane, lifting appliance or launching appliance with persons within the tender, rescue boat or other vehicle or platform during launch or recovery.
<i>“Margin line”</i>	is a line drawn at least 76 millimetres below the upper surface of the bulkhead deck at side.
<i>“Marine evacuation system”</i>	means an appliance complying with the requirements of the LSA Code, for the rapid transfer of persons from the embarkation deck of a ship to a floating survival craft.
<i>“MARPOL”</i>	means the International Convention for the Prevention of Pollution from Ships, 1973, as amended.
<i>“Master”</i>	includes every person (except a pilot) having command or charge of a ship and, in relation to a yacht, include the captain or skipper.
<i>“Mid-length”</i>	means the mid-point of the subdivision length of the ship.
<i>“Major conversion”</i>	means a conversion of a vessel: (a) that substantially alters the dimensions of a vessel; (b) which changes the type of the vessel; (c) the intent of which in the opinion of the Administration is substantially to prolong its life;

	(d) which otherwise so alters the ship that, if it were a new vessel, it would become subject to relevant provisions of the present Code not applicable to it as an existing vessel.
<i>"Mile"</i>	means a nautical mile of 1852 metres.
<i>"MLC"</i>	means the International Labour Organisation's Maritime Labour Convention 2006, as amended, as applicable for vessels to which this Edition of the REG Code applies.
<i>"Moulded depth"</i>	means, subject to paragraphs (a) to (c) below, the vertical distance measured from the top of the keel to the top of the freeboard deck beam at side, provided that- (a) in wood and composite ships, the distance is measured from the lower edge of the keel rabbet and 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; and (c) where the freeboard deck is stepped and the raised part of the deck extends over the point at which the moulded depth shall 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.
<i>"Muster station"</i>	means an area where passengers and crew can be gathered in the event of an emergency, given instructions and prepared to abandon the craft, if necessary.
<i>"Non-combustible material"</i>	means 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.
<i>"Motor vessel"</i>	means a vessel which is described in the register and on the certificate of registry as such, and which has a sole means of propulsion either one or more power units.
<i>"Multihull vessel"</i>	means any vessel which in any normally achievable operating trim or heel angle, has a rigid hull structure which penetrates the surface of the sea over more than one separate or discrete area.
<i>"New vessel"</i>	means a vessel, to which this Code applies as defined in 1.6.
<i>"Not readily ignitable"</i>	means that the surface thus described shall not continue to burn for more than 20 seconds after removal of a suitable impinging test flame.
<i>"Occasional Worker"</i>	As defined in Annex E

“Officer”	“Officer” means a) any seafarer who is required to be qualified under the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended (STCW); or b) any other seafarer considered by the Company to be an officer.
“Oil fuel unit”	means 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 <sup>2</sup> .
“Over-side Working Systems”	means the securing, anchoring or track and rail systems used to access external portions of the vessel for maintenance and wash down. This can include but not limited to track and car systems or static harness points.
“Partial subdivision draft” or “(dp)”	means the light service draft plus 60% of the difference between the light service draft and the Design Waterline draft.
“Passenger”	As defined in Annex E.
“Passenger ship”	means a ship carrying more than 12 passengers.
“Permeability or “(μ)””	of a space means the proportion of the immersed volume of that space which can be occupied by water.
“Person”	means a person over the age of one year.
“Pleasure vessel”	shall have the meaning assigned to the term as defined in the national legislation of the REG Member State implementing the provisions of the Code.
“Position 1”	means upon freeboard decks and raised quarterdecks, or other exposed decks <sup>5</sup> lower than one standard height of superstructure above the freeboard deck, and upon exposed decks situated forward of a point located a quarter of the ship’s length from the forward perpendicular that are located lower than two standard heights of superstructure above the freeboard deck.
“Position 2”	means upon exposed decks situated abaft a quarter of the ship’s length from the forward perpendicular and located at least one standard height of superstructure above the freeboard deck and lower than two standard heights of superstructure above the freeboard deck. Upon exposed decks situated forward of a point located a quarter of the ship’s length from the forward perpendicular and located at least two standard heights of superstructure above the freeboard deck and lower than three standard heights of superstructure above the freeboard deck.

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<sup>5</sup> “Exposed decks” include top decks of superstructures, deckhouses, companionways and other similar deck structures.

<i>“Positive stability”</i>	means the ability of a ship to return to its original position after the removal of a heeling moment.
<i>“Prescribed international voyage”</i>	means an international voyage during the course of which a ship is not more than 200 nautical miles from a port or place in which the passengers and crew could be placed in safety and within a geographical area which limits the length of the voyage to a maximum of 1000 nautical miles from the initial point of departure, as specified in any Certificate issued in accordance with the Code with respect to the ship.
<i>“Prescriptive requirements”</i>	means the construction characteristics, limiting dimensions or fire safety systems specified in this Code or in applicable International Conventions or national laws and regulations.
<i>“Public spaces”</i>	means those portions of the accommodation which are used for halls, dining rooms, lounges and includes similar permanently enclosed spaces.
<i>“Radar transponder”</i>	means a radar transponder for use in survival craft to facilitate location of survival craft in search and rescue operations.
<i>“Recess”</i>	means an indentation or depression in a deck and which is surrounded by the deck and has no boundary common with the shell of the vessel.
<i>“Recognised Organisation or “RO””</i>	means a Classification Society or other body which has been authorised by the Administration under a written agreement to undertake statutory surveys and issue statutory Certificates on the Administration’s behalf.
<i>“Recreational Diving System”</i>	means any system storing compressed gas of any type to aid or facilitate recreational underwater activities.
<i>“Recreational Fire Appliances”</i>	means heating or cooking appliances with open flames such as fireplaces, charcoal galley ovens, barbecues, spit roasts and fire pits.
<i>“REG”</i>	Means The Red Ensign Group comprising of the United Kingdom, Crown Dependencies (Isle of Man, Guernsey and Jersey) and UK Overseas Territories (Anguilla, Bermuda, British Virgin Islands, Cayman Islands, Falkland Islands, Gibraltar, Montserrat, St Helena and the Turks & Caicos Islands) which operate shipping registers.
<i>“Rescue boat”</i>	means a boat complying with the requirements of LSA Code and designed to rescue persons in distress and for marshalling liferafts.
<i>“Retro-reflective material”</i>	means a material which reflects in the opposite direction a beam of light directed on it.

<i>“Rocket parachute flare”</i>	means a pyrotechnic signal complying with the requirements of LSA Code.
<i>“Safe haven”</i>	means a harbour or shelter of any kind which affords entry, subject to prudence in the weather conditions prevailing, and protection from the force of the weather.
<i>“Safety Critical Systems”</i>	such systems including but not limited to those which are required for the retraction of the launching appliance(s), any active system that is used to control heel angles during launch and recovery operations, closing and locking of the hull shell door(s), the bilge system and any system provided for compliance with fire safety related requirements including general alarm and public address systems. This term also applies to the vessel’s steering, propulsion and main and emergency power generation and distribution systems. It does not apply to bow and stern thrusters.
<i>“Sailing vessel”</i>	means a vessel designed to carry sail, whether as a sole means of propulsion or as a supplementary means.
<i>“Sail Training Vessel”</i>	shall have the meaning assigned to the term as defined in the national legislation of the REG Member State implementing the provisions of the Code.
<i>“Sauna”</i>	means a hot room with temperatures normally varying between 80°C and 120°C where the heat is provided by a hot surface (e.g., by an electrically heated oven) and may include the space where the oven is located and adjacent bathrooms.
<i>“Seafarer”</i>	includes every person (except Occasional Workers and pilots) employed or engaged in any capacity onboard a ship.
<i>“Sea area A1”</i>	means an area within the radiotelephone coverage of at least one VHF coast station in which continuous DSC alerting is available.
<i>“Sea area A2”</i>	means an area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continuous DCS alerting is available.
<i>“Sea area A3”</i>	means an area, excluding sea areas A1 and A2, within the coverage of a recognised mobile satellite service, in which continuous alerting is available.
<i>“Sea area A4”</i>	means an area outside sea area A1, A2 and A3.
<i>“Self-activating smoke signal”</i>	means a signal complying with the requirements of LSA Code.
<i>“Self-igniting light”</i>	means a light complying with the requirements of LSA Code.

- “*Service spaces*” means those spaces used for galleys, pantries containing cooking appliances, lockers, store-rooms, workshops other than those forming part of the machinery spaces, and similar spaces and trunks to such spaces.
- “*Ships constructed*” means ships the keels of which are laid or which are at a similar stage of construction.
- “*Short Range Yacht*” a vessel subject to the operational restrictions contained in REG-A 1.5(2) which is either:
- less than 500GT constructed prior to 1 August 2005,
  - less than 300GT constructed on or after 1 August 2005, or
  - between 300 and 499 GT constructed on or after 1 August 2005, which meet the enhanced requirements of Table 14A.1.
- “*Similar stage of construction*” means at a stage which:
- construction identifiable with a specific vessel begins; and
  - assembly of that vessel, comprising at least 50 tonnes or 1% of the estimated mass of all structural material has commenced; or
  - In the case of vessels constructed of FRP or GRP this shall be considered as the date when more than 5% of the hull resin and reinforcement has been laid.
- “*Smoke damper*” means 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. A smoke damper is not expected to contribute to the integrity of a fire rated division penetrated by a ventilation duct. In using the above definition the following terms may be associated:
- “automatic smoke damper” is a smoke damper that closes independently in response to exposure to smoke or hot gases;
- “manual smoke damper” is a smoke damper intended to be opened or closed by the crew by hand at the damper itself; and
- “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.
- “*Sprinkler*” means a fixed pressure water-spraying fire-extinguishing system complying with the provisions of the Fire Safety Systems Code.
- “*SOLAS*” means the International Convention for the Safety of Life at Sea, 1974 as amended, as applicable for vessels to which this Edition of the Code applies.
- “*SOLAS 90*” means the International Convention for the Safety of Life at Sea, 1974 as amended by the IMO October 1988 amendments, which were adopted by resolution MSC.12(56) and entered into force on 29 April 1990.
- “*SOLAS A pack*” means a liferaft emergency pack complying with the requirements of LSA Code.

<i>“SOLAS B pack”</i>	means a liferaft emergency pack complying with the requirements of LSA Code.
<i>“Standard fire test”</i>	means a test in which specimens of the relevant bulkheads, decks or other constructions are exposed in a test furnace by a specified test method in accordance with the Fire Test Procedures Code.
<i>“Standard Superstructure Height ‘h<sub>std</sub>’”</i>	means standard superstructure height which shall be taken as- (a) 1.8 metres for vessels up to 75 metres in length; (b) 2.3 metres for vessels of 125 metres or more in length; and (c) superstructure heights for vessels of intermediate lengths shall be obtained by interpolation.
<i>“STCW”</i>	means the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended, as applicable for vessels to which this Edition of the Code applies.
<i>“Steel or other equivalent material”</i>	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).
<i>“Storm Covers”</i>	means a portable protective closure fitted to a glazed opening and which is fitted to the outside (weatherside) of the vessel. Also known as a Storm Shutter.
<i>“Sub-division length or ‘(L<sub>s</sub>)’”</i>	of a ship means 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 Design Waterline draft.
<i>“Submersible Craft”</i>	means any description of manned mobile submersible apparatus which is designed to maintain some or all of its occupants at or near atmospheric pressure including free, self-propelled, tethered, towed or bottom contact propelled apparatus and atmospheric diving suits.
<i>“Superstructure”</i>	means a decked structure on the freeboard deck, extending from side to side of the ship or with the side plating not being inboard of the shell plating more than 4% of the breadth (B).
<i>“Survival craft”</i>	means a craft capable of sustaining the lives of persons in distress from the time of abandoning the ship, including Liferafts, MES & Lifeboats.
<i>“Tender poles”</i>	means a rigging spar or specific pole used to aid in the launching of a tender, normally on sailing vessels to offset a halyard’s lead to give a vertical lift of a rescue boat.
<i>“Training manual”</i>	with regard to life-saving appliances means a manual complying with the requirements of SOLAS III/Part B – Life Saving Appliances and Arrangements, Regulation 35.

<i>“Trim”</i>	means the difference between the draft forward and the draft aft, where the drafts are measured at the forward and aft terminals respectively, disregarding any rake of keel.
<i>“Two-way VHF radiotelephone set”</i>	means a portable or a fixed VHF installation for survival craft complying with the performance standards adopted by the IMO contained in A.762(18) or any Resolution amending or replacing it which is considered by the Administration to be relevant from time to time.
<i>“Uppermost Load Line”</i>	means the uppermost seasonal Load Line and not the fresh water or tropical fresh water mark.
<i>“Voyage”</i>	includes an excursion.
<i>“Watertight”</i>	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 and in the damaged condition the head of water shall be considered in the worst situation at equilibrium, including intermediate stages of flooding.
<i>“Weather deck”</i>	means a deck which is completely exposed to the weather from above and from at least two sides.
<i>“Weathertight”</i>	means that in any sea conditions water shall not penetrate into the ship.
<i>“Well”</i>	means any area on the deck exposed to the weather, where water may be entrapped and includes deck areas bounded on two or more sides by deck structures.
<i>“Wheelhouse”</i>	means the control position occupied by the officer of the watch who is responsible for the safe navigation of the vessel.
<i>“Window”</i>	means a ship's window, being any window, regardless of shape, suitable for installation aboard ships.
<i>“Wing Station”</i>	means a manoeuvring station at which the vessel can be manoeuvred with increased visibility of the vessel side, normally with restricted navigational capability used when berthing rather than to hold a navigational watch.

## **CHAPTER 3**

### **APPLICATION OF INTERNATIONAL CONVENTIONS AND NATIONAL LEGISLATION**

#### **3.1 *General Requirements***

- (1) Vessels shall comply with the requirements of Annex L and those of the Administration.

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## CHAPTER 4

### CONSTRUCTION AND STRENGTH

Objective: The purpose of this Chapter is to ensure that all vessels are constructed to a consistent standard in respect of strength and watertight integrity. New Vessels shall be built to the requirements of a Recognised Organisation and issued with a commercial Certificate of Classification. Existing Vessels which do not have a Certificate of Classification issued by a Recognised Organisation shall obtain such a certificate. For vessels under 500GT alternative arrangements for Short Range operation may be agreed by the Administration. The extent of the watertight bulkheads defined in Section 4.3 is to ensure that sufficient buoyancy is maintained by the vessel to meet the damaged stability requirements of Chapter 11.

#### **4.1 General Requirements**

- (1) All vessels shall have a freeboard deck.
- (2) All vessels shall be fitted with a weather deck throughout the length of the vessel and be of adequate strength to withstand the sea and weather conditions likely to be encountered in the declared area(s) of operation.
- (3) The declared area(s) of operation and any other conditions which restrict the use of the vessel at sea shall be recorded on the Certificate of Class issued to the vessel.
- (4) The choice of hull construction material affects fire protection requirements, for which reference shall be made to Chapter 14A and 14B as applicable.
- (5) Where there are no Recognised Organisation requirements for the fitting of double bottoms, SOLAS II-1/9 shall be applied to vessels of 80 metres in length and over. The wording “subdivision draft” in MSC.429(98) regarding the application of SOLAS II-1/9.2 shall be replaced with “maximum assigned load line draught”. Vessels of less than 80 metres in length shall comply with the applicable requirements of a Recognised Organisation (if any).

#### **4.2 Structural Strength**

- (1) All vessels shall be constructed in accordance with the requirements of a Recognised Organisation.
- (2) Attention shall be paid to local or global hull strength requirements for the provision of ballast

**4.3 Watertight Bulkheads**

- (1) Chapter 11 of the Code deals with subdivision and damage stability requirements which shall determine the number and positioning of watertight bulkheads defined below.
- (2) Watertight bulkheads shall be fitted in accordance with the following requirements:
  - (a) The strength of watertight bulkheads and their penetrations, and watertight integrity of the division shall be in accordance with the requirements of a Recognised Organisation
  - (b) Generally, openings in watertight bulkheads shall comply with the standards required for passenger vessels, as defined in SOLAS II-1. Hand operation from above the bulkhead deck and a hydraulic accumulator may be omitted if each door has its own individual power-pack electrically driven via the emergency switchboard, and control voltage from emergency battery, and each door can be operated manually at the door. Edge strips which stop the door closing on contact are not permitted. Push buttons shall be located at a minimum height of 1.6 metres above the deck and positioned such that a person passing through may open the door and then reach to the other control to keep the door in the open position until transit is complete. Control handles for emergency operation of the doors shall be located at a height immediately below the push buttons. Push buttons and control handles shall be located in close proximity to the door at the edge opposite the door pocket. The height of control handles / push buttons for spaces of restricted height shall be specially considered.
  - (c) Power operated sliding watertight doors shall normally be limited to a maximum clear opening in width of 1.2 metres. The Administration 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:
    - (i) special consideration shall be given to the strength of the door and its closing appliances in order to prevent leakages; and
    - (ii) the door shall be located inboard of the damage zone B/5.
  - (d) Watertight Doors may be located outboard of the B/5 Line. However, where powered watertight doors are provided, the main control system shall in all cases be located inboard of the B/5 line in order to ensure the continued operation of undamaged doors.
  - (e) Approved hinged doors may be provided for infrequently used openings in watertight compartments, where a crew member shall be in immediate attendance when the door is open at sea. Audible and visual alarms shall be provided in the wheelhouse.

- (f) Unless otherwise required by section 4.4, watertight doors in yachts under 500GT may be approved hinged doors provided that there is an audible and visual alarm on the Bridge indicating when the door is open. The doors shall be kept closed at sea and marked accordingly. A time delay for the alarm is acceptable.
- (g) Procedures for the operation of watertight doors shall be posted in suitable locations. Watertight doors shall be normally closed, with the exception of sliding watertight doors providing the normal access to frequently used living and working spaces. Additionally when an access is unlikely to be used for lengthy periods, the door shall be closed. Operational tests of watertight doors, shall take place weekly. For vessels in which the voyage exceeds one week in duration, a complete set of operational tests shall be held before the voyage commences, and others thereafter at least once a week during the voyage.

**4.4 Enclosed Compartments Within the Hull and Below the Bulkhead Deck  
Provided with Access Through Openings in the Hull**

- (1) Compartment(s) below the bulkhead deck, provided for recreational purposes, oil fuelling/fresh water reception or other purposes to do with the business of the vessel and having access openings in the hull, shall be bounded by watertight divisions without any opening (i.e. doors, manholes, ventilation ducts or any other opening) separating the compartment(s) from any other compartment below the bulkhead deck, unless provided with sliding watertight doors complying with 4.3(2), or for vessels under 500GT, hinged doors complying with 4.4(2).
- (2) For vessels under 500GT, openings from any other compartment below the bulkhead deck may be fitted with hinged watertight doors provided:
  - (a) after flooding through the shell opening of the space containing the shell opening, the resultant waterline is below the sills of the internal openings in that space; or
  - (b) bilge alarms are fitted in the compartment containing the shell opening, with a visual and audible warning both on the bridge and locally; and
  - (c) any hinged door opens into the compartment containing the shell opening; and
  - (d) "open" door alarms, both visual and audible fitted on the bridge; and
  - (e) the door shall be fitted with a single closing mechanism; and
  - (f) where the sill height of the internal door is not higher above the deepest loaded waterline than the sill height of the shell opening, an audible alarm shall sound in the space immediately whenever this door is opened.
- (3) Openings in the hull shall comply with SOLAS II-1/15-1 - External openings in cargo ships. Doors shall, in general, open outwards. However, where fitted, inward opening

doors shall be provided with suitable strong backs. Provision shall be made to ensure that doors may be manually closed and locked in the event of loss of electrical power or the failure of any single component in a hydraulic system including, but not limited to, hoses, locking pins and rams. Suitably rated blocks and tackles together with their attachment points may be used for this purpose if it can be demonstrated that such an arrangement is capable of closing the door and restraining it securely in this position.

- (4) In general, the lower edges of hull shell openings shall be located not less than 600 millimetres above the uppermost load line. Further, the lower edge of the opening shall not be less than 300 millimetres above the uppermost load line when the vessel heels due to any launching and recovery operations. Calculations shall be based on the maximum safe working load (SWL) of the appliance at maximum outreach. Where compliance cannot be achieved, acceptance is subject to compliance with the requirements of 4.4(9) and 11.5.
- (5) Means shall be provided to prevent the unauthorised use of the doors locally through provision of secondary or remote control, through an interlock, dual control process or procedure.
- (6) The design and construction of the hinges and supporting structures for fold up shell doors shall be in accordance with the requirements of a Recognised Organisation.
- (7) The design and construction of the hinges and supporting structures for fold down shell doors shall take into account the deck loads and possible buoyancy forces considering the vessel's angle of trim and heel. To mitigate the risk of damage to rams, hinges and their supporting foundations, pressure relief valves shall be provided for hydraulically operated control systems.
- (8) The design deck load for fold down shell doors shall be in accordance with the rules of a Recognised Organisation and shall, where applicable, consider the mass of tenders and / or other items of equipment which is intended to be placed on the doors when in the open position.
- (9) Openings in the hull with a sill height less than 600 millimetres above the uppermost load line (or less than 300 millimetres during launching and recovery operations), may be specially considered by the Administration. This consideration shall include but may not necessarily be limited to the following:
  - (a) The provision of watertight boundaries and the arrangement of the space(s) shall ensure the continued operation of those safety critical systems that are required for the safe movement of the vessel once the shell doors have been closed and locked and the space evacuated of any water ingress;
  - (b) Doors from the space providing internal access to adjacent watertight compartments are to have a sill height of at least 600 millimetres above the uppermost load line and above the damaged waterline in all conditions;

- (c) The effect of flooding on stability shall be assessed in accordance with the requirements of 11.5;
- (d) The electrical equipment including cabling for the door closure and locking control system(s) shall be located either in a watertight compartment other than the space being served or as high up in the compartment as is technically feasible (but in no case below the flooded waterline required for the stability analysis in 11.5, unless certified as suitable for immersion in sea water) to provide maximum protection against water ingress in the event of the space being flooded;
- (e) Controls for the closing and locking of the shell door shall be provided locally at the door. A secondary set of readily accessible controls (which shall also include a means of being able to retract the launching appliance(s)) intended only for use in an emergency shall also be provided in an adjacent watertight compartment or other suitable space above the level of the bulkhead deck (e.g. a deck locker). Unless required for compliance with 13.4 (2) (b) or 13.4 (3) (b) (i), neither set of controls need be provided with an emergency source of power. It shall be ensured that suitable equipment (which shall include CCTV and fixed or portable VHF or UHF radios and any other equipment required for communication and monitoring during shell door operations) is available and operational procedures implemented as required to safely retract the launching appliance(s) and operate the shell door when using both the main and emergency controls;
- (f) Special consideration shall be given to the installation of any railings, stanchions, lifelines, swim ladders, fendering systems or other fittings, which would prevent the door(s) from closing in the event of an emergency. Where technically feasible to do so, a means to remove such fittings without the need to enter the space shall be provided. Where removal from outside the compartment proves to be unfeasible, such fittings shall be readily removable (e.g. without the use of tools).
- (g) High and low level bilge alarms shall be provided;
- (h) Operational controls and limitations shall be implemented to control when and where an opening may be used. Any such limitations shall be clearly identified, included in a dedicated section / appendix of the Stability Information Booklet and documented in the safety management system or other standard operating procedure to support the Masters decision making process with respect to door usage. Special consideration shall be given to the simultaneous use of multiple shell doors. The Stability Information Booklet shall, where applicable, clearly state that the vessel is not capable of withstanding flooding of two or more compartments and that such an event would lead to capsize and / or sinking. Suitable signage, clearly indicating such limitations, shall be provided local to any door controls;

- (10) Protection of safety critical systems which are installed inside the space shall have a liquid ingress protection of level 5 (e.g. IP 65) in accordance with the International Protection (IP) Marking, IEC Standard 60529 or equivalent.
- (11) Where practicable, such compartments shall not be left unattended whenever the shell doors are left open. CCTV monitoring from the bridge shall also be provided.

#### **4.5 Rigging on Sailing Vessels**

##### (1) General

- (a) The condition of the rig shall be monitored in accordance with a Maintenance Manual and a planned maintenance schedule. The schedule shall include, in particular, regular monitoring of all the gear associated with safe work aloft and on the bowsprit (see 22.3).

##### (2) Masts and Spars and Standing Rigging

- (a) The design and construction of masts and spars and dimensions of standing rigging including its connection to chain plates shall be in accordance with the requirements or recommendations of a Recognised Organisation or a recognised national or international standard.
- (b) The associated structure for masts and spars (including chainplates, fittings, decks and floors) shall be constructed to effectively carry and transmit the forces involved.
- (c) Compliance with (a) and (b) shall be confirmed by design review and approval by a Recognised Organisation (e.g. Rig Design Certificate) which is assigned with the review of the rig. Additionally, vessels of 500GT and over shall have the rig surveyed under build by a Recognised Organisation.
- (d) The Maintenance Manual provided by the mast manufacturer shall be reviewed and approved by the Recognised Organisation which is assigned to review the rig design.
- (e) A physical survey on the rig stepping procedure and the rig behavior during sea trials is to be carried out by or on behalf of the Recognised Organisation that is involved with the rig design review and for vessels of 500GT and over, the survey under build.
- (f) Annual surveys on the vessel shall include reviewing records and history of rig maintenance measures against the specifications provided by the maintenance manual.

##### (3) Rigging Fittings

- (a) The strength of all blocks, shackles, rigging screws, cleats and associated fittings and attachment points shall in general, exceed the breaking strain of the associated

running or standing rigging. Where it has been determined that compliance with this requirement is technically unfeasible due to the size of the rig and the use of synthetic ropes, any proposed use of alternative safeguards shall be subject to the agreement of a Recognised Organisation responsible for the survey and certification of the rig.

- (4) Sails
  - (a) Adequate means of reefing or shortening sail shall be provided.
  - (b) Sailing vessels operating as Short Range Yachts need not carry storm canvas.
  - (c) All other vessels shall either be provided with separate storm sails or have specific sails designated and constructed to act as storm canvas.

#### **4.6 Asbestos Containing Materials**

- (1) Any installation of materials that contain asbestos shall be prohibited, for all yachts without exceptions.
- (2) Where the presence of asbestos is detected onboard an existing vessel in contravention of SOLAS II-1/3.5, action shall be taken to have it removed <sup>6</sup>.

#### **4.7 Additional Equivalence Considerations**

- (1) None.

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<sup>6</sup> See MSC.1/Circ.1374 Information on prohibiting the use of asbestos onboard ships

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## CHAPTER 5

### WEATHERTIGHT INTEGRITY

Objective: This Chapter is intended to outline standards to be achieved for weathertight integrity. As far as is practicable, the standards of the ICLL shall be adhered to. However, due consideration may be given to arrangements that provide an equivalent level of safety in respect of the risks of down flooding and green sea loading.

#### **5.1 Virtual Freeboard Deck**

- (1) For the purposes of this section only, where actual freeboard to the weather deck exceeds that required by ICLL by at least one standard superstructure height, openings on that deck, abaft of the forward quarter, may be assumed to be in Position 2. This shall be taken, unless otherwise stated, as defined in ICLL.
- (2) For vessels up to 75 metres load line length, a standard superstructure height shall be taken as 1.8 metres. For vessels over 125 metres load line length, this shall be taken as 2.3 metres. Superstructure heights for vessels of intermediate lengths shall be obtained by interpolation.

#### **5.2 Hatchways and Skylight Hatches**

- (1) General Requirements
  - (a) All openings leading to spaces below the weather deck not capable of being closed weathertight, shall be enclosed within either an enclosed superstructure or a weathertight deckhouse of adequate strength meeting with the requirements of the Recognised Organisation assigning the Load Line.
  - (b) All exposed hatchways which give access from Position 1 and Position 2 shall be of substantial weathertight construction and provided with efficient means of closure. Weathertight hatch covers shall be permanently attached to the vessel and provided with adequate arrangements for securing the hatch closed.
  - (c) Hatches which are designated for escape purposes shall:
    - (i) be provided with covers which shall be openable from either side and in the direction of escape they shall be openable without a key. All handles on the inside shall be non-removable<sup>7</sup>;

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<sup>7</sup> See MSC/Circ.847 Interpretations of vague expressions and other vague wording in SOLAS Chapter II-2

- (ii) be readily identified and easy and safe to use, having due regard to its position;
- (iii) be fitted with a means to be secured / supported in the open position; and
- (iv) not be required to have a coaming provided:
  - (ba) the hatch cover is weathertight; and
  - (bb) the hatch shall be closed at sea and marked accordingly and shall be provided with open/close indication at the navigating position.

(2) Hatchways Which are Open at Sea

- (a) In general, hatches shall be kept closed at sea. However, hatchways which may be kept open for access at sea shall be as small as practicable (a maximum of 1 square metre in clear area), and fitted with coamings of at least 300 millimetres in height in positions 1 and 2 Hatchways shall be as near to the centreline as practicable, especially on sailing vessels. Covers of hatchways shall be permanently attached to the hatch coamings and, where hinged, the hinges shall be located on the forward side.

**5.3 Doorways and Companionways**

(1) Doorways Located Above the Weather Deck

- (a) External doors in deckhouses and superstructures shall be weathertight. Doors opening directly onto any space which contains a staircase leading down or other down flooding points which are located in the following positions, shall have coaming heights of at least:

Location	Unrestricted Yachts	Short Range Yachts
A	600mm	300mm
B	300mm	150mm
C	150mm	75mm

Location A The door is in the forward quarter length of the vessel and is used when the vessel is at sea whilst underway

Location B The door is in an exposed forward facing location aft of the forward quarter length.

Location C The door is in a protected location aft of the forward quarter length, or an unprotected door on the first tier deck above the weather deck or a door defined in 5.3(1)(d).

- (b) Weathertight doors shall be arranged to open outwards and when located in a superstructure side, be hinged at the forward edge. Alternative closing arrangements (such as sliding doors) shall be considered providing it can be demonstrated that the efficiency of the closing arrangements and their ability to prevent the ingress of water shall not impair the safety of the vessel.
- (c) An access door leading directly to the engine room from the weather deck shall be fitted with a coaming height of at least:

<b>Location</b>	<b>Unrestricted Yachts</b>	<b>Short Range Yachts</b>
Position 1	600mm	450mm
Position 2	380mm	200mm

- (d) Construction and securing standards for weathertight doors which are provided for use only when the vessel is in port or at anchor in calm sheltered waters and are locked closed when the vessel is at sea, may be considered individually. Coaming heights shall meet the requirements of 5.3(1)(a) Location C.
- (e) Proposals to reduce the coaming heights required by 5.3(1)(a) and 5.3(1)(c) shall be subject to special consideration and approval by the Administration, having regard for the protected location of the weathertight door, the space to which it serves, increased freeboard and increased water freeing arrangements.
- (f) The use of negative sills / gutters aft of 0.25L in lieu of compliance with 5.3(1)(a) may be permitted subject to compliance with the following requirements:
  - (i) the gutter shall extend the full width of the door;
  - (ii) the depth and width of the gutter shall be at least the same dimensions as the height of the sill required by 5.3(1)(a), however, gutters of an equivalent volume may be accepted where the 150 millimetres depth cannot be achieved due to space restrictions. In such cases, the depth of the gutter shall be not less than 100 millimetres. The depth of gutters for short range yachts shall be not less than 75 millimetres;
  - (iii) efficient overboard drainage of the gutter shall be provided;
  - (iv) such gutters shall be kept clear of any obstructions and not used for the installation of equipment unless additional volume, which is at least equivalent in volume has been provided;
  - (v) any gratings shall be provided with clear openings equivalent to at least 50% of their area.

**(2) Companionway Hatch Openings**

- (a) Companionway hatch openings which give access to spaces below the weather deck shall be fitted with a coaming, the top of which is at least 300 millimetres above the deck, or 150 millimetres in the case of Short Range Yachts. Any

proposal to accept a reduced coaming height based on such mitigating measures as an excess of freeboard and / or deck height and protected locations, shall be subject to the agreement of the Administration.

- (b) Washboards may be used to close the vertical opening. When washboards are used, they shall be so arranged and fitted such that they shall not be readily dislodged. Whilst stowed, provisions shall be made to ensure that they are retained in a secure location.
- (c) The maximum breadth of an opening in a companionway hatch shall not exceed 1 metre.

## **5.4 Glazed Openings & Skylights**

### **General**

- (1) Glazed openings & Skylights shall:
  - (a) not be fitted in such a position that their sills are below a line drawn parallel to the freeboard deck at side and having its lowest point 2.5% of the breadth (B), or 500 millimetres, whichever is the greatest distance, above the design waterline. However, proposals to install glazed openings in way of and / or below the waterline shall be specially considered for vessels provided with watertight subdivision only. Such subdivision, shall, as a minimum, be installed locally in way of the space where such a glazed opening is installed. Such proposals shall include (but not necessarily be limited to) the following details:
    - (i) proposed size of opening(s);
    - (ii) proposed design pressures;
    - (iii) proposed method of glass toughening and construction;
    - (iv) proposed method of framing and fastening;
    - (v) proposed testing regime;
    - (vi) provision of internal deadlights and any fixed and / or portable mullions;  
and
    - (vii) arrangements for means of escape with the space flooded.
    - (viii) compliance with the applicable requirements for damage stability in Chapter 11.
  - (b) be attached to the ship in such a manner, that they are capable of fulfilling their role in the application of ICLL requirements;

- (c) follow the requirements of Chapter 18 where they are for glazed openings in the navigating position;
  - (d) not be fitted in the hull in way of machinery spaces of Category A and where the Administration considers it desirable, in other machinery spaces (this does not preclude the use of glass in control room bulkheads within machinery spaces) and
  - (e) be of the non-readily opening type which shall be securely closed when the vessel is in navigation and indication provided on the bridge that they are closed.
- (2) When glazed openings are fitted by bonding, the following provisions shall be observed:
- (a) proposals shall include measures to ensure the integrity of the bond line taking into account environmental and ageing effects; and
  - (b) when required to be fire rated, arrangements shall be such that glazed openings and doors cannot fall from their mounting should the bond line fail, except where the glazed opening or door assembly has successfully passed the standard fire test without the need to provide any additional means of fastening.

#### ***Deadlights***

- (3) Glazed openings within the buoyant part of the hull shall be provided with deadlights so arranged that they can be easily and effectively closed and secured watertight.
- (4) Deadlights shall be designed and constructed in accordance with the rules of a Recognised Organisation, a recognised National or International standard and may be portable provided these are stored in an easily accessible location and are readily mountable in a seaway. Instructions to the master as to when deadlights shall be applied to portlights shall be provided.
- (5) Enhanced strength requirements for glazed openings in lieu of the provision of deadlights may be accepted subject to compliance with the applicable requirements of a Recognised Organisation, National or International standard.

#### ***Storm Covers***

- (6) For all vessels other than Short Range Yachts, storm covers shall be required in the following locations, where deadlights are not already required by Section (3):
  - (a) glazed openings in the front and sides of Level 1;
  - (b) glazed openings in the front of Level 2; and
  - (c) where storm covers are interchangeable between port and starboard, a minimum of 50% of each size shall be provided.
- (7) Storm covers shall be designed and constructed in accordance with the rules of a Recognised Organisation, a recognised National or International standard. However,

where required by Section (6), if the glazed openings meet an enhanced structural standard, in accordance with Recognised Organisation rules, a recognized International Standard, or a factor of 1.5 applied to the design pressure of the glazed opening, then storm covers are not required provided the glazing is of laminated construction.

- (8) A and B Class cabin bulkheads and doors are accepted in place of deadlights or storm covers fitted to glazed openings, except in the following locations where deadlights or storm covers are to be provided:
- (a) In Levels 1 and 2 when considered buoyant in the stability calculations;
  - (b) In Levels 1 and 2 when above the buoyant part of the hull and separating forward facing glazed openings from a direct access leading below;
  - (c) In Level 1 when above the buoyant part of the hull and separating side facing glazed openings from a direct access leading below.

### ***Skylights***

- (9) Fixed or opening skylights shall-
- (a) be provided with protection from mechanical damage to the skylight load-bearing glazing in any position;
  - (b) except where the arrangements comply with (10), when fitted in Level 1 or 2, be provided with deadlights or storm covers that can be easily and safely mounted in a seaway; and
  - (c) if designated for escape purposes, be provided with a means of opening from either side of the skylight provided that in the direction of escape they are able to be opened without a key.
- (10) the Administration may permit the storm covers specified in Sections (9)(b) to be omitted provided the glazing meets Section (7).

### ***Strength***

- (11) Glazed openings and Skylights, including their frames, deadlights and storm covers, if fitted, shall meet an appropriate national or international standard or the rules regarding side scuttles and windows of a Recognised Organisation<sup>8</sup>. The design pressure shall not be less than that required for the surrounding plating. In general, the regulatory requirements applied to each level or tier of glazing should be consistent. However, where the use of a specific standard is identified as being the most suitable for an individual opening or group of openings then the use of one or more standards may be considered subject to the agreement of the Administration.

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<sup>8</sup> For illustration purposes see the requirements set out in Part 4, Chapter 2 Section 11.3 of Lloyd's Registers Rules and Regulations for the Classification of Ships.

- (12) In all cases, it shall be ensured that any limitations (i.e. aspect ratio, maximum window size, etc) included in the rules of the Recognised Organisation, National or International Standard being used are observed and complied with.
- (13) Where the glazing material, glazing thickness, or fixing of the glazed opening do not meet the requirements of a recognised standard<sup>9</sup> they may be tested<sup>10</sup>, to the satisfaction of the Administration, in accordance with the following provisions:
- (a) the glazed opening shall be tested to a minimum test pressure of 4 times the required design pressure derived from an appropriate national or international standard, provided that as a minimum, the calculated thicknesses shall meet the Recognised Organisation requirements; and
  - (b) the testing shall be witnessed by a Recognised Organisation.

### 5.5 Ventilators and Exhausts

- (1) Adequate ventilation shall be provided throughout the vessel. The accommodation shall be protected from the entry of gas and/or vapour fumes from machinery, exhaust and fuel systems, where machinery exhaust systems pass through accommodation they shall be fitted in a gas tight trunk or each space shall be fitted with a carbon monoxide detector, having an alarm provided locally and at a continuously manned station. Trunks which form engine room casings shall comply with the fire safety requirements of Chapter 14A or 14B as applicable.
- (2) Ventilators shall be of efficient construction. Generally, ventilators serving spaces below the freeboard deck or an enclosed superstructure, shall have a minimum coaming height of:

Location	Unrestricted Yachts	Short Range Yachts
Forward quarter length	900mm	450mm
Elsewhere	760mm	380mm

- (3) Ventilators shall be kept as far inboard as practicable and the height above the deck of the ventilator opening shall be sufficient to prevent the ingress of water when the vessel heels.
- (4) The ventilation of spaces such as the machinery space, which shall remain open, requires special attention with regard to the location and height of the ventilation openings above the deck, taking into account the effect of down flooding angle on stability standard (See Chapter 11) and alternative ventilation for use in bad weather.

<sup>9</sup> For example ISO 11336-1 Large yachts – Strength, weathertightness and watertightness of glazed openings

<sup>10</sup> For example hydrostatic testing of the windows and frames or ISO 11336-1 Large yachts – Strength, weathertightness and watertightness of glazed openings

- (5) The means of closure of ventilators serving the machinery space shall be selected with regard to the fire protection and extinguishing arrangements provided in the machinery space.
- (6) Engine exhaust outlets which penetrate the hull below the freeboard deck shall be provided with means to prevent back flooding into the hull through a damaged exhaust system. For vessels operating on unrestricted service a positive means of closure shall be provided. The system shall be of equivalent construction to the hull on the outboard side of the closure. For Short Range Yachts, where the fitting of a positive closure is not practicable, the exhaust shall be looped up above the waterline on the outboard side of the system, to a minimum height of 1000 millimetres, and be of equivalent construction to the hull.
- (7) Ventilators shall be provided with permanently attached means of weathertight<sup>11</sup> closure. Where the full coaming heights of 5.5(2) are met, permanently attached means of closure may be omitted if it can be shown that the open end of a ventilator is afforded adequate protection by other structure(s) which shall prevent the ingress of water.
- (8) Proposals to reduce the coaming heights required by 5.5(2) may be subject to special consideration and approval by the Administration, having regard for their protected location, means to prevent the ingress of water, excess freeboard and impact on stability.

**5.6 Air Pipes**

- (1) Air pipes serving fuel and other tanks shall be of efficient construction, led to above the bulkhead deck and provided with automatic closing devices. Where the full coaming heights of 5.6(2) are met, automatic closing devices may be omitted if it can be shown that the open end of an air pipe is afforded adequate protection by other structure(s) which shall prevent the ingress of water.
- (2) Air pipes shall be kept as far inboard as practicable and be fitted with a coaming of sufficient height to prevent inadvertent flooding. Generally, air pipes to tanks shall have a minimum coaming height of:

<b>Location</b>	<b>Unrestricted Yachts</b>	<b>Short Range Yachts</b>
On weather deck	760mm	380mm
Elsewhere	450mm	225mm

- (3) Air pipes to fuel tanks shall terminate at a height of not less than 760 millimetres above either, the top of the filler pipe for a gravity filling tank or, the top of the overflow tank for a pressure filling tank.

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<sup>11</sup> Weathertightness tested in accordance with Section 8.1.1 of ISO 14884:2015 Large yachts -- Weathertight doors -- Strength and weathertightness requirements or IACS UR S14 - Testing Procedures of Watertight Compartments, Section 4.4.3.

- (4) Proposals to reduce the coaming heights required by 5.6(2) may be subject to special consideration and approval by the Administration, having regard for their protected location, means to prevent the ingress of water, excess freeboard and impact on stability.

### ***5.7 Scuppers, Sea Inlets and Discharges and Other Hull Penetrations***

- (1) The standards of ICLL shall be applied to every discharge led through the shell of the vessel as far as it is reasonable and practicable to do so, and in any case, all sea inlet and overboard discharges shall be provided with efficient shut-off valves arranged in positions where they are readily accessible at all times.
- (2) Underwater lights and associated penetrations fitted in the hull shall be approved by the Recognised Organisation.

### ***5.8 Materials for Valves and Associated Piping***

- (1) Valves which are fitted below the waterline shall be of steel, bronze or other material having a similar resistance to impact, fire and corrosion. Non-metallic valves shall not normally be considered equivalent.
- (2) The associated piping shall, in areas as indicated above, be of steel, bronze, copper or other equivalent material. Non-metallic piping shall not normally be considered equivalent.
- (3) Where the use of plastic piping is proposed, it shall be specially considered. Full details of the type of piping, its intended location, and use, shall be submitted for the purpose of approval. Particular attention shall be paid to compliance with the requirements of the Recognised Organisation and the maintenance of watertight integrity including the prevention of down flooding and / or cross flooding. Due regard shall also be paid to the requirements for plastic piping as published by the IMO (including but not limited to the 2010 Fire Test Procedures Code), and 14A.2(4)(d) or 14B.11(5) as applicable.
- (4) The use of flexible piping in any location shall be kept to a minimum compatible with the essential reason for its use. Flexible piping and the means of joining it to its associated hard piping system shall be approved as fit for the purpose.

### ***5.9 Additional Equivalence Considerations***

- (1) Alternative arrangements to those prescribed in this Chapter, which, in the opinion of the Administration, achieve an equivalent standard, may be accepted subject to the following considerations:
  - (a) openings to be kept closed at sea;
  - (b) enhanced bilge pumping capacity and additional bilge alarms;
  - (c) compliance with damage stability if not already a requirement (see Section 11);

- (d) provision of dorade boxes or baffle systems to prevent direct ingress of water;
  - (e) alternative ventilation for use in bad weather;
  - (f) consideration of down-flooding angle and reduced risk of green sea loads, i.e. protected position;
  - (g) enhanced survey inspection regime; and
  - (h) operational limitations.
- (2) Where alternative arrangements have been accepted by the Administration, the details shall be documented in the Record of Conditions of Assignment.

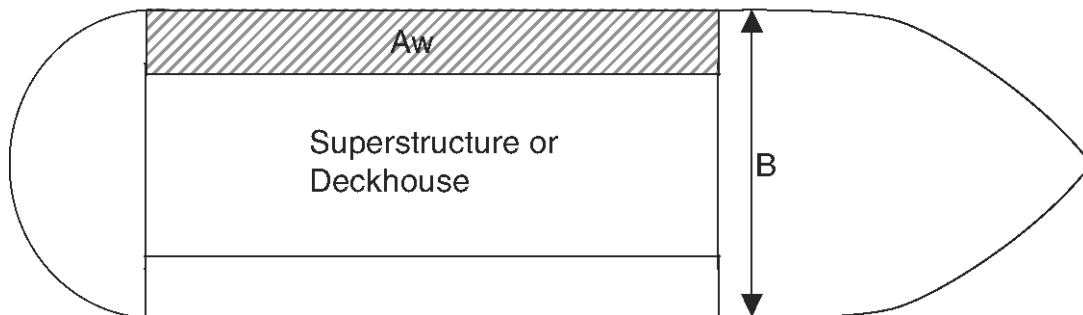
## CHAPTER 6

### WATER FREEING ARRANGEMENTS

Objective: This Chapter provides for consideration of the risks of green water being shipped aboard and the resulting consequences with respect to the vessel's stability and safety of personnel on deck.

#### 6.1 General Requirements

- (1) The standards for water freeing arrangements shall comply either with the ICLL or the rules of a Recognised Organisation on any weather decks in the forward quarter, and up to Position 2 elsewhere. In any case the intention shall be to achieve a standard of safety which is at least equivalent to the standard of the ICLL to the satisfaction of the Administration given the design and use of the vessel.
- (2) Additionally (unless already covered by the rules of the Recognised Organisation), where a well is created on each side of the vessel between a superstructure or deckhouse, and the bulwark in way of that superstructure or deck house, the following formula may be used to determine the required freeing port areas on each side of the vessel for the well concerned :



$$FP_{REQ} = 0.28 \times A_w / B$$

Where;

$FP_{REQ}$  = Freeing port area required,

$A_w$  = Area of well in way of superstructure or deckhouse,

$B$  = Full beam at deck.

- (3) Where the solid bulwark height does not exceed 150 millimetres, specific freeing ports, as defined above, are not required.

- (4) For Short Range Yachts, it is considered that the requirement for freeing port area for a forward or aft well may be reduced by a form factor equal to the ratio of (actual area well) divided by (length of well x breadth of well). Dimensions shall be taken at half height of the bulwark. This may be reduced by 50% providing it can be shown that the intact stability of the yacht remains acceptable if the well is flooded to any level up to the bulwark height and that area provided shall allow the well to drain in less than 3 minutes.

## **6.2 Recesses**

- (1) Any recess in the weather deck (excluding swimming pools, spa baths and jacuzzis) shall be of weathertight construction in accordance with the applicable rules of a Recognised Organisation shall be self-draining under all normal conditions of heel and trim of the vessel.
- (2) The means of drainage provided shall be capable of efficient operation when the vessel is heeled to an angle of 10° in the case of a motor vessel, and 30° in the case of a sailing vessel.
- (3) The drainage arrangements shall have the capability of draining the recess (when fully charged with water) within 3 minutes when the vessel is upright and at the load line draught. Means shall be provided to prevent the backflow of sea water into the recess.
- (4) When it is not practical to provide drainage which meets the requirements of 6.2(3), alternative safety measures may be proposed for approval by the Administration. Where the above requirements for quick drainage cannot be met, the effect on intact and damage stability shall be considered taking into account the mass of water and its free surface effect.

## **6.3 Swimming Pools (Including Spa Baths and Jacuzzis)**

- (1) Vessels provided with swimming pools, spa baths and/or jacuzzis shall meet the stability criteria contained in 11.7.

## **6.4 Additional Equivalence Considerations**

- (1) Freeing arrangements may take account of a reduced permeability and volume of the well, when compared to a full size well.
- (2) For existing vessels, the Administration may take into account the vessel's past performance in service, the declared area(s) of operation and any other conditions which restrict the use of the vessel at sea which shall be recorded on the International Load Line Certificate issued to the vessel (see Section 4.1(3)).

## **CHAPTER 7A**

### **MACHINERY**

### **VESSELS OF LESS THAN 500GT**

Objective: This Chapter outlines the minimum requirements for machinery, which shall be in accordance with the requirements of a Recognised Organisation and shall cover the minimum aspects defined below, even if the machinery is not considered the primary means of propulsion. Existing Vessels which are not already Classed shall be taken into Class, however alternative arrangements for Short Range operation may be agreed by the Administration.

#### **7A.1 General Requirements**

- (1) The machinery and its installation shall meet with the requirements of a Recognised Organisation. The Class Survey or Notation shall include, as a minimum, propulsion and electrical generation machinery and shafting. For existing and new vessels which operate with periodically unattended machinery spaces, the machinery and its installation shall meet the standards of SOLAS II-1/Part E - “Additional requirements for periodically unattended machinery spaces, so far as is reasonable and practicable to do so”.
- (2) Plastic piping may be accepted where the piping and the arrangements for its use meet the requirements of the Fire Test Procedures Code.
- (3) The requirements for main propulsion are based upon the installation of diesel powered units, When other types of main propulsion are proposed, the arrangements and installation shall be specially considered. The use of alternative fuels for the purpose of reducing greenhouse gas emissions is permitted subject to ensuring full compliance with all applicable Rules and Regulations to the satisfaction of the Administration. Reference shall also be made to Common Annex P.
- (4) Where gas turbines are fitted, attention shall be paid to the guidance contained within the IMO High Speed Craft Code, and installation shall be to the satisfaction of the Administration.
- (5) Notwithstanding the requirements of Section 7A.1(1), in a fuel supply system to an engine unit, where a flexible section of piping is provided, connections shall be of a screw type or equivalent approved type. Flexible pipes shall be fire resistant/metal reinforced. Materials and fittings shall be of a suitable recognised national or international standard.

**7A.2 Installation**

- (1) Notwithstanding the requirements referred to in 7A.1, the machinery, fuel tanks and 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 during normal movement about the vessel, with due regard being made to moving parts, hot surfaces, and other hazards.
- (2) Means shall be provided to isolate any source of fuel which may feed a fire in an engine space. A fuel shut-off valve(s) shall be provided which is capable of being closed from a position outside the engine space. The valve(s) shall be fitted as close as possible to the fuel tank(s).
- (3) All external high-pressure fuel delivery lines between the high pressure fuel pumps and fuel nozzles shall be protected with a jacketed tubing system capable of containing fuel resulting from a high-pressure line failure. The jacketed tubing system shall include means for collection of leakage and arrangements shall be provided for an alarm to be given in the event of a fuel line failure.
- (4) When a glass fuel level gauge is fitted it shall be of the "flat glass" type with self-closing valves between the gauge and the tank.

**7A.3 Additional Equivalence Considerations**

- (1) None.

**7A.4 Alternative Design and Arrangements**

- (1) Vessels may follow Section 1.9 on Alternative Design and Arrangements for this chapter as allowed by SOLAS II-1/55.
- (2) The engineering analysis required by 1.9(3) shall be prepared and submitted to the Administration, based on the guidelines<sup>12</sup> and shall include, as a minimum, the following engineering analysis elements:
  - (a) determination of the ship type, machinery, electrical installations and space(s) concerned;
  - (b) identification of the prescriptive requirement(s) with which the machinery and electrical installations will not comply;
  - (c) identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognized engineering or industry standards;

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<sup>12</sup> Refer to the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III (MSC.1/Circ.1212).

- (d) determination of the performance criteria for the ship, machinery, electrical installation or the space(s) concerned addressed by the relevant prescriptive requirement(s):
  - (i) performance criteria shall provide a level of safety not inferior to the relevant prescriptive requirements contained in SOLAS II-1 parts C, D and E; and
  - (ii) performance criteria shall be quantifiable and measurable;
- (e) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions;
- (f) technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and
- (g) risk assessment based on identification of the potential faults and hazards associated with the proposal.

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## **CHAPTER 7B**

### **MACHINERY VESSELS OF 500GT AND OVER**

Objective: This Chapter outlines the minimum requirements for machinery, which shall be in accordance with the requirements of a Recognised Organisation. The Class Notation shall cover the minimum aspects defined within this chapter even if the machinery is not considered the primary means of propulsion.

#### **7B.1 General Requirements**

- (1) For existing and new vessels, the machinery and its installation shall meet the requirements of a Recognised Organisation and of SOLAS II-1/Part C Machinery installations and II-1/Part E - Additional requirements for periodically unattended machinery spaces, so far as is reasonable and practicable to do so.
- (2) In any case the intention shall be to achieve a standard of safety which is at least equivalent to the standard of SOLAS. Equivalence may be achieved by incorporating increased requirements to balance deficiencies and thereby achieve the required overall standard.
- (3) The use of alternative fuels for the purpose of reducing greenhouse gas emissions is permitted subject to ensuring compliance with all applicable Rules and Regulations to the satisfaction of the Administration. Reference shall also be made to Common Annex P.
- (4) Where gas turbines are fitted, attention shall be paid to the guidance contained within the IMO High Speed Craft Code, and installation shall be to the satisfaction of the Administration.
- (5) For vessels installed with high powered engines designed for short sprint speeds, on a case by case basis the Administration may relax SOLAS II-1/26.11 to accommodate day tanks sized for maximum continuous rating, and use the vessel's cruising speed.

#### **7B.2 Additional Equivalence Considerations**

- (1) None.

#### **7B.3 Alternative Design and Arrangements**

- (1) Vessels may follow Section 1.9 on Alternative Design and Arrangements for this chapter as allowed by SOLAS II-1/55.

- (2) The engineering analysis required by 1.9(3) shall be prepared and submitted to the Administration, based on the guidelines<sup>13</sup> and shall include, as a minimum, the following engineering analysis elements:
- (a) determination of the ship type, machinery, electrical installations and space(s) concerned;
  - (b) identification of the prescriptive requirement(s) with which the machinery and electrical installations will not comply;
  - (c) identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognized engineering or industry standards;
  - (d) determination of the performance criteria for the ship, machinery, electrical installation or the space(s) concerned addressed by the relevant prescriptive requirement(s):
    - (i) performance criteria shall provide a level of safety not inferior to the relevant prescriptive requirements contained in SOLAS II-1 parts C, D and E; and
    - (ii) performance criteria shall be quantifiable and measurable;
  - (e) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions;
  - (f) technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and
  - (g) risk assessment based on identification of the potential faults and hazards associated with the proposal.

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<sup>13</sup> Refer to the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III (MSC.1/Circ.1212).

## **CHAPTER 8A**

### **ELECTRICAL INSTALLATIONS VESSELS OF LESS THAN 500GT**

Objective: This Chapter outlines the minimum requirements for electrical installations, which shall be in accordance with the requirements of a Recognised Organisation, and shall cover the minimum aspects defined below. For sailing vessels, this shall also cover the elements necessary to ensure safety of the vessel including control of the sails, where appropriate. Existing Vessels which are not already Classed shall be taken into Class, however alternative arrangements for Short Range operation may be agreed by the Administration.

#### **8A.1 Installation**

- (1) Particular attention shall be paid to the provision of overload and short circuit protection of all circuits, except engine starting circuits supplied from batteries.
- (2) Electrical devices working in potentially hazardous areas, into which petroleum vapour or other hydrocarbon gas may leak, shall be of a type certified safe for the hazard.
- (3) Vessels shall be provided with lightning strike protection<sup>14</sup>.

#### **8A.2 Lighting**

- (1) Lighting circuits, including those for emergency lighting, shall be distributed through the spaces so that a total blackout cannot occur due to failure of a single protective device.
- (2) An emergency source of lighting shall be provided which shall be independent of the general lighting system. This source shall be sufficient for up to 3 hours duration and shall include navigation light supplies. The lighting is to provide sufficient lighting for personnel to escape from the accommodation or working spaces to their muster station and launch and board survival craft. Additionally, this light, supplemented by torches, shall be sufficient to permit emergency repairs to machinery etc.

#### **8A.3 Battery Systems**

- (1) Batteries of a type suitable for marine use and not liable to leakage shall be used. Areas in which batteries are stowed shall be provided with appropriate ventilation to prevent an accumulation of gas which is emitted from batteries of all types.

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<sup>14</sup> See IEC 60092-401:1980 as amended or IEC 60092-507 as appropriate and Recognised Organisation requirements.

- (2) Where batteries are used for propulsion and/or electric power supply purposes during ship operations, the Battery System design and operation shall consider the guidelines provided in Annex A.

#### ***8A.4 Emergency Power***

- (1) Emergency power shall be readily available to supply the required emergency lighting, radio installation and navigation aids for at least 3 hours. As a minimum, the navigation aids to be supplied by emergency power to include Global Navigation Satellite System (GNSS), echo sounder and AIS. The emergency power supply shall also be adequate to supply any electrically operated emergency equipment, such as fire pumps, bilge pumps, watertight doors, power operated doors in way of escape routes (unless capable of manual operation in the deadship condition) and rescue boat davits.
- (2) The emergency source of power shall be independent of the main power supply, external to the engine room, and with separate distribution.

#### ***8A.5 Additional Equivalence Considerations***

- (1) None.

#### ***8A.6 Alternative Design and Arrangements***

- (1) Vessels may follow Section 1.9 on Alternative Design and Arrangements for this chapter as allowed by SOLAS II-1/55.
- (2) The engineering analysis required by 1.9(3) shall be prepared and submitted to the Administration, based on the guidelines<sup>15</sup> and shall include, as a minimum, the following engineering analysis elements:
  - (a) determination of the ship type, machinery, electrical installations and space(s) concerned;
  - (b) identification of the prescriptive requirement(s) with which the machinery and electrical installations will not comply;
  - (c) identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognized engineering or industry standards;
  - (d) determination of the performance criteria for the ship, machinery, electrical installation or the space(s) concerned addressed by the relevant prescriptive requirement(s):

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<sup>15</sup> Refer to the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III (MSC.1/Circ.1212).

- (i) performance criteria shall provide a level of safety not inferior to the relevant prescriptive requirements contained in SOLAS II-1 parts C, D and E; and
- (ii) performance criteria shall be quantifiable and measurable;
- (e) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions;
- (f) technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and
- (g) risk assessment based on identification of the potential faults and hazards associated with the proposal.

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## **CHAPTER 8B**

### **ELECTRICAL INSTALLATIONS VESSELS OF 500GT AND OVER**

Objective: This Chapter outlines the minimum requirements for electrical, installations which shall be in accordance with the requirements of a Recognised Organisation, and shall cover the minimum aspects defined below. For sailing vessels, this shall also cover the elements necessary to ensure safety of the vessel including control of the sails, where appropriate.

#### **8B.1 General Requirements**

- (1) The electrical equipment and its installation shall meet the standards of SOLAS II-1/Part D - Electrical installations and II-1/Part E - Additional requirements for periodically unattended machinery spaces for cargo vessels, where appropriate, so far as it is reasonable and practicable to do so.
- (2) The emergency generator, if fitted, should be located above the uppermost continuous deck but may be located below this deck provided it is protected from the effects of fire and flooding. In all cases, the emergency generator should be separated from main generators and main switchboard by a division capable of ensuring its continued operation. The emergency generator should be self-contained (independent of a sea water suction) and readily accessible from the open deck.
- (3) Cables and wiring serving essential or emergency power, lighting, internal communications or signals shall be routed clear of galleys, machinery places of Category A and their casings, spaces for storage of petrol, and other high-risk fire areas.
- (4) Where batteries are used for propulsion and/or electric power supply purpose during ship operations, the Battery System shall consider the guidelines provided in Annex A.
- (5) Vessels shall be provided with lightning strike protection<sup>16</sup>.

#### **8B.2 Additional Equivalence Considerations**

- (1) None

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<sup>16</sup> See IEC 60092-401:1980 as amended or IEC 60092-507 as appropriate and Recognised Organisation requirements.

**8B.3 Alternative Design and Arrangements**

- (1) Vessels may follow Section 1.9 on Alternative Design and Arrangements for this chapter as allowed by SOLAS II-1/55.
- (2) The engineering analysis required by 1.9(3) shall be prepared and submitted to the Administration, based on the guidelines<sup>17</sup> and shall include, as a minimum, the following engineering analysis elements:
  - (a) determination of the ship type, machinery, electrical installations and space(s) concerned;
  - (b) identification of the prescriptive requirement(s) with which the machinery and electrical installations will not comply;
  - (c) identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognized engineering or industry standards;
  - (d) determination of the performance criteria for the ship, machinery, electrical installation or the space(s) concerned addressed by the relevant prescriptive requirement(s):
    - (i) performance criteria shall provide a level of safety not inferior to the relevant prescriptive requirements contained in SOLAS II-1 parts C, D and E; and
    - (ii) performance criteria shall be quantifiable and measurable;
  - (e) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions;
  - (f) technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and
  - (g) risk assessment based on identification of the potential faults and hazards associated with the proposal.

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<sup>17</sup> Refer to the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III (MSC.1/Circ.1212).

## **CHAPTER 9A**

### **STEERING GEAR VESSELS OF LESS THAN 500GT**

Objective: This Chapter outlines the minimum requirements for steering gear, which shall be in accordance with the requirements of a Recognised Organisation. The Class Notation or Survey shall cover the minimum aspects defined within this chapter. Due regard shall be paid to the requirements for emergency steering.

#### **9A.1 General Requirements**

- (1) The steering gear and its installation shall, in general, meet with the requirements of a Recognised Organisation.
- (2) In the event that the above requirements cannot be met on an existing vessel, the Administration may be requested to consider and approve alternative arrangements to achieve adequate safety standards.
- (3) Vessels shall be provided with a means of directional control of adequate strength and suitable design to enable the heading and direction of travel to be effectively controlled at all operating speeds. When appropriate to the safe steering of the vessel, the steering gear shall be power operated in accordance with the requirements of the Administration.
- (4) When the steering gear is fitted with remote control, arrangements shall be made for emergency steering in the event of a failure of such control.
- (5) The emergency steering position shall be fitted with:
  - (a) the angular position of the rudder; and
  - (b) heading indication.

#### **9A.2 Additional Equivalence Considerations**

- (1) None.

#### **9A.3 Alternative Design and Arrangements**

- (1) Vessels may follow Section 1.9 on Alternative Design and Arrangements for this chapter as allowed by SOLAS II-1/55.

- (2) The engineering analysis required by 1.9(3) shall be prepared and submitted to the Administration, based on the guidelines<sup>18</sup> and shall include, as a minimum, the following engineering analysis elements:
- (a) determination of the ship type, machinery, electrical installations and space(s) concerned;
  - (b) identification of the prescriptive requirement(s) with which the machinery and electrical installations will not comply;
  - (c) identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognized engineering or industry standards;
  - (d) determination of the performance criteria for the ship, machinery, electrical installation or the space(s) concerned addressed by the relevant prescriptive requirement(s):
    - (i) performance criteria shall provide a level of safety not inferior to the relevant prescriptive requirements contained in SOLAS II-1 parts C, D and E; and
    - (ii) performance criteria shall be quantifiable and measurable.
  - (e) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions;
  - (f) technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and
  - (g) risk assessment based on identification of the potential faults and hazards associated with the proposal.

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<sup>18</sup> Refer to the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III (MSC.1/Circ.1212).

## **CHAPTER 9B**

### **STEERING GEAR VESSELS OF 500GT AND OVER**

Objective: This Chapter outlines the minimum requirements for steering gear, which shall be in accordance with the requirements of a Recognised Organisation. The Class Notation shall cover the minimum aspects defined within this Chapter. Due regard shall be paid to the requirements for emergency steering.

#### ***9B.1 General Requirements***

- (1) For existing and new vessels, the steering gear and its installation shall meet the standards of SOLAS II-1/Part C - Machinery installations for cargo vessels, so far as it is reasonable and practicable to do so.
- (2) In any case, the intention shall be to achieve a standard of safety which is at least equivalent to the standard of SOLAS. Equivalence may be achieved by incorporating increased requirements to balance deficiencies and thereby achieve the required overall standard.

#### ***9B.2 Additional Equivalence Considerations***

- (1) None.

#### ***9B.3 Alternative Design and Arrangements***

- (1) Vessels may follow Section 1.9 on Alternative Design and Arrangements for this chapter as allowed by SOLAS II-1/55.
- (2) The engineering analysis required by 1.9(3) shall be prepared and submitted to the Administration, based on the guidelines<sup>19</sup> and shall include, as a minimum, the following engineering analysis elements:
  - (a) determination of the ship type, machinery, electrical installations and space(s) concerned;
  - (b) identification of the prescriptive requirement(s) with which the machinery and electrical installations will not comply;

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<sup>19</sup> Refer to the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III (MSC.1/Circ.1212).

- (c) identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognized engineering or industry standards;
- (d) determination of the performance criteria for the ship, machinery, electrical installation or the space(s) concerned addressed by the relevant prescriptive requirement(s):
  - (i) performance criteria shall provide a level of safety not inferior to the relevant prescriptive requirements contained in SOLAS II-1 parts C, D and E; and
  - (ii) performance criteria shall be quantifiable and measurable;
- (e) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions;
- (f) technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and
- (g) risk assessment based on identification of the potential faults and hazards associated with the proposal.

## **CHAPTER 10A**

### **BILGE PUMPING VESSELS OF LESS THAN 500GT**

Objective: This Chapter outlines the minimum requirements for bilge pumping, which shall be in accordance with the requirements of a Recognised Organisation. The Class Notation shall cover the minimum aspects defined within this chapter. The principle objective of this section is that in the event of one compartment being flooded, which may or not be the engine room, there is an ability to control any leakage to adjacent compartments.

#### **10A.1 General Requirements**

- (1) The bilge pumping equipment and its installation shall, in general, meet with the requirements of a Recognised Organisation. Either the vessel shall be in class or a statement of compliance issued by one of the Societies shall be provided to the Administration.
- (2) In the event that 10A.1(1) cannot be met on an existing vessel, the Administration may be requested to consider alternative arrangements to achieve adequate safety standards.
- (3) All vessels shall be provided with at least two fixed and independently powered bilge pumps, with suction pipes so arranged that any compartment can be effectively drained when the vessel is heeled to an angle of 10°. For Short Range Yachts, the second pump and suction pipes may be portable.
- (4) The location of pumps required by 10A.1(3), their individual power supplies and controls, including those for bilge valves shall be such that, in the event of any one compartment being flooded at least one of those pumps is capable of removing water from the flooded space and adjacent compartments and discharging this via a dedicated discharge overboard.
- (5) Each bilge pump suction line shall be fitted with an efficient strum box.
- (6) In the case of a vessel where the propulsion machinery space may be unmanned at any time, a bilge level alarm shall be fitted. The alarm shall provide an audible and visual warning in the master's cabin and in the wheelhouse. The audible and visual alarm may be accepted elsewhere if it is considered that such a location may be more appropriate.
- (7) Pumping and piping arrangements for bilges into which fuel or other oils of similar or higher fire risk could collect, under either normal or fault conditions, shall not contravene MARPOL requirements. Bilge level alarms meeting the requirements of 10A.1(6) shall be fitted to all such bilges.

***10A.2 Additional Equivalence Considerations***

- (1) None.

***10A.3 Alternative Design and Arrangements***

- (1) Vessels may follow Section 1.9 on Alternative Design and Arrangements for this chapter as allowed by SOLAS II-1/55.
- (2) The engineering analysis required by 1.9(3) shall be prepared and submitted to the Administration, based on the guidelines<sup>20</sup> and shall include, as a minimum, the following engineering analysis elements:
- (a) determination of the ship type, machinery, electrical installations and space(s) concerned;
  - (b) identification of the prescriptive requirement(s) with which the machinery and electrical installations will not comply;
  - (c) identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognized engineering or industry standards;
  - (d) determination of the performance criteria for the ship, machinery, electrical installation or the space(s) concerned addressed by the relevant prescriptive requirement(s):
    - (i) performance criteria shall provide a level of safety not inferior to the relevant prescriptive requirements contained in SOLAS II-1 parts C, D and E; and
    - (ii) performance criteria shall be quantifiable and measurable;
  - (e) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions;
  - (f) technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and
  - (g) risk assessment based on identification of the potential faults and hazards associated with the proposal.

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<sup>20</sup> Refer to the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III (MSC.1/Circ.1212).

## **CHAPTER 10B**

### **BILGE PUMPING**

### **VESSELS OF 500GT AND OVER**

Objective: This Chapter outlines the minimum requirements for bilge pumping, which shall be in accordance with the requirements of Recognised Organisation. The Class Notation shall cover the minimum aspects defined within this chapter. The principle objective of this section is that in the event of one compartment being flooded, which may or not be the engine room, there is an ability to control any leakage to adjacent compartments.

#### ***10B.1 General Requirements***

- (1) For all vessels, the bilge pumping and its installation shall as a minimum meet the cargo vessel standards of SOLAS II-1/Part C - Bilge pumping arrangements Regulation 35-1.
- (2) A minimum of two bilge pumps shall be provided. The capacity of the pumps and the size of the bilge main and branches shall meet the capacity requirements for passenger ships contained in SOLAS.
- (3) In addition, the minimum requirements for vessels of less than 500GT contained in section 10A, shall also be met.

#### ***10B.2 Additional Equivalence Considerations***

- (1) None.

#### ***10B.3 Alternative Design and Arrangements***

- (1) Vessels may follow Section 1.9 on Alternative Design and Arrangements for this chapter as allowed by SOLAS II-1/55.
- (2) The engineering analysis required by 1.9(3) shall be prepared and submitted to the Administration, based on the guidelines<sup>21</sup> and shall include, as a minimum, the following engineering analysis elements:
  - (a) determination of the ship type, machinery, electrical installations and space(s) concerned;

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<sup>21</sup> Refer to the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III (MSC.1/Circ.1212).

- (b) identification of the prescriptive requirement(s) with which the machinery and electrical installations will not comply;
- (c) identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognized engineering or industry standards;
- (d) determination of the performance criteria for the ship, machinery, electrical installation or the space(s) concerned addressed by the relevant prescriptive requirement(s):
  - (i) performance criteria shall provide a level of safety not inferior to the relevant prescriptive requirements contained in SOLAS II-1 parts C, D and E; and
  - (ii) performance criteria shall be quantifiable and measurable;
- (e) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions;
- (f) technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and
- (g) risk assessment based on identification of the potential faults and hazards associated with the proposal.

## CHAPTER 11

### STABILITY

Objective: This Chapter outlines the minimum requirements for intact and damage stability. For vessels less than 85 metres Load Line length, a minor damage methodology is adopted in which damage is assumed not to occur on any bulkhead, deck, or other watertight boundary.

#### **11.1 General**

- (1) This Chapter deals with the standards for both intact and damage stability.
- (2) An intact stability standard proposed for assessment of a vessel type not covered by the standards defined in the Code shall be submitted to the Administration for approval at the earliest opportunity.
- (3) If used, permanent ballast shall be located in accordance with a plan approved by the Administration and in a manner that prevents shifting of position. Permanent ballast shall not be removed from the ship or relocated within the ship without the approval of the Administration. Permanent ballast particulars shall be noted in the ship's stability booklet. Attention shall be paid to local or global hull strength requirements from the point of view of the fitting of additional ballast.
- (4) For the purpose of assessing whether the stability criteria are met, GZ curves shall be produced for the loading conditions applicable to the operation of the vessel.

#### **11.2 Intact Stability Standards**

- (1) **Standard Criteria:**
  - (a) The curves of statical stability for seagoing conditions shall meet the following criteria:
    - (i) the area under the righting lever curve (GZ curve) shall not be less than 0.055 metre-radians up to 30° angle of heel and not less than 0.09 metre-radians up to 40° angle of heel, or the angle of downflooding, if this angle is less;
    - (ii) the area under the GZ curve between the angles of heel of 30° and 40° or between 30° and the angle of downflooding if this is less than 40°, shall not be less than 0.03 metre-radians;
    - (iii) the righting lever (GZ) shall be at least 0.20 metres at an angle of heel equal to or greater than 30°;

- (iv) the maximum GZ shall occur at an angle of heel of preferably exceeding 30° but not less than 25°;
- (v) after correction for free surface effects, the initial metacentric height (GM) shall not be less than 0.15 metres; and
- (vi) in the event that the vessels intact stability standard fails to comply with the criteria defined in (i) to (v) the Administration may be consulted for the purpose of specifying alternative but equivalent criteria.

(2) **Vessels operating as Short Range Yachts:**

- (a) Where Short Range Yachts are unable to meet the criteria above, the following criteria may be used:

- (i) the area under the righting lever curve (GZ curve) shall not be less than 0.07 metre-radians up to 15° angle of heel, when maximum GZ occurs at 15°, and 0.055 metre-radians up to 30° angle of heel, when maximum GZ occurs at 30° or above. Where the maximum GZ occurs at angles of between 15° and 30°, the corresponding area under the GZ curve,  $A_{req}$  shall be taken as follows:-

$$A_{req} = 0.055 + 0.001(30^\circ - \theta_{max}) \text{ metre-radians}$$

where  $\theta_{max}$  is the angle of heel, in degrees, where the GZ curve reaches its maximum;

- (ii) the area under the GZ curve between the angles of heel of 30° and 40° or between 30° and the angle of downflooding if this is less than 40°, shall not be less than 0.03 metre-radians;
- (iii) the righting lever (GZ) shall be at least 0.20 metres at an angle of heel equal to or greater than 30°;
- (iv) the maximum GZ shall occur at an angle of heel not less than 15°;
- (v) after correction for free surface effects, the initial metacentric height (GM) shall not be less than 0.15 metres.

(3) **Alternative Criteria:**

- (a) The curves of statical stability for seagoing conditions shall meet the following criteria:

- (i) the area under the righting lever curve (GZ curve) shall not be less than 0.075 metre-radians up to an angle of 20° when the maximum righting lever (GZ) occurs at 20° and, not less than 0.055 metre-radians up to an angle of 30° when the maximum righting lever (GZ) occurs at 30° or

above. When the maximum GZ occurs at angles between 20° and 30° the corresponding area under the GZ curve,  $A_{req}$  shall be taken as follows:-

$$A_{req} = 0.055 + 0.002(30^\circ - \theta_{max}) \text{ metre-radians};$$

where  $\theta_{max}$  is the angle of heel in degrees where the GZ curve reaches its maximum;

- (ii) the area under the GZ curve between the angles of heel of 30° and 40°, or between 30° and the angle of downflooding if this is less than 40°, shall not be less than 0.03 metre-radians;
  - (iii) the righting lever (GZ) shall be at least 0.20 metres at an angle of heel where it reaches its maximum;
  - (iv) the maximum GZ shall occur at an angle of heel not less than 20°;
  - (v) after correction for free surface effects, the initial metacentric height (GM) shall not be less than 0.15 metres; and
  - (vi) if the maximum righting lever (GZ) occurs at an angle of less than 20° approval of the stability shall be considered by the Administration as a special case.
- (4) For the purpose of assessing whether the stability criteria are met, GZ curves should be produced for the loading conditions applicable to the operation of the vessel.
- (5) **Superstructures:**
- (a) The buoyancy of enclosed superstructures complying with regulation 3(10)(b) of the ICLL may be taken into account when producing GZ curves.
  - (b) Superstructures, the doors of which do not comply with the requirements of regulation 12 of ICLL, shall not be taken into account.
- (6) **High Speed Vessels:**
- (a) In addition to the criteria above designers and builders shall address the following hazards which are known to affect vessels operating in planing modes or those achieving relatively high speeds:
    - (i) directional instability, often coupled to roll and pitch instabilities;
    - (ii) bow diving of planing vessels due to dynamic loss of longitudinal stability in calm seas;
    - (iii) reduction in transverse stability with increasing speed in monohulls;

- (iv) porpoising of planing monohulls being coupled with pitch and heave oscillations;
- (v) generation of capsizing moments due to immersion of chines in planing monohulls (chine tripping).

(7) **Sailing Vessel Monohulls**

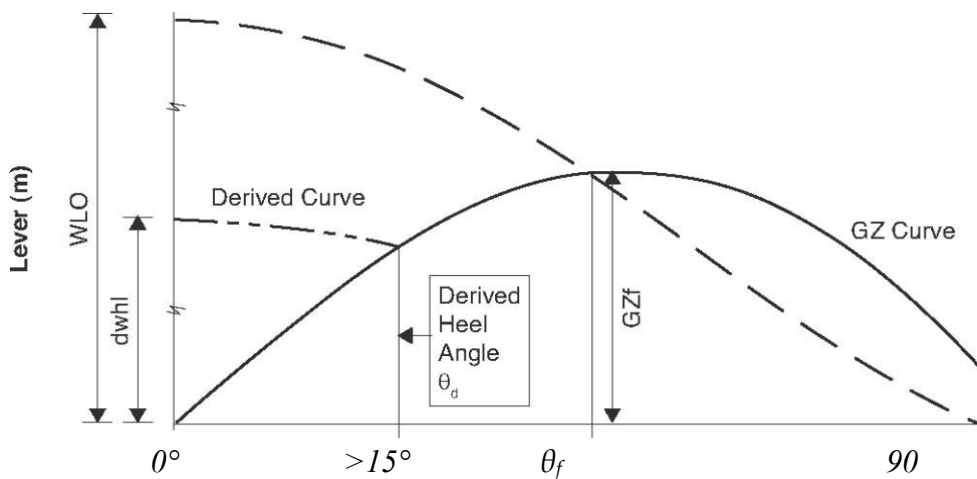
- (a) Curves of statical stability (GZ curves) for at least the Loaded Departure with 100% consumables and the Loaded Arrival with 10% consumables shall be produced.
- (b) The GZ curves required by (a) should have a positive range of not less than 90 degrees. For vessels of more than 45 metres, a range of less than 90 degrees may be considered but may be subject to agreed operational criteria.
- (c) In addition to the requirements of (b), the angle of steady heel should be greater than 15 degrees (see figure). The angle of steady heel is obtained from the intersection of a "derived wind heeling lever" curve with the GZ curve required by (a).

In the figure:-

'dwhl' = the "derived wind heeling lever" at any angle  $\theta^\circ$

$$= 0.5 \times WLO \times \text{Cos}^{1.5}\theta$$

where  $WLO = \frac{GZ_f}{\text{Cos}^{1.5}\theta_f}$



Noting That:

$WLO =$  is the magnitude of the actual wind heeling lever at  $0^\circ$  which would cause the vessel to heel to the 'down flooding angle'  $\theta_f$  or  $60^\circ$  whichever is least.

$GZ_f =$  is the lever of the vessel's GZ at the down flooding angle ( $\theta_f$ ) or  $60^\circ$  whichever is least.

$\theta_d =$  is the angle at which the 'derived wind heeling' curve intersects the GZ curve. (If  $\theta_d$  is less than  $15^\circ$  the vessel shall be considered as having insufficient stability for the purpose of the Code).

$\theta_f =$  the 'down-flooding angle' is the angle of heel causing immersion of the lower edge of openings having an aggregate area, in square metres, greater than:-

$$\frac{\Delta}{1500} = \text{where } \Delta = \text{vessels displacement in tonnes}$$

- (8) All regularly used openings for access and for ventilation shall be considered when determining the downflooding angle. No opening regardless of size which may lead to progressive flooding shall be immersed at an angle of heel of less than  $40^\circ$ . Air pipes to tanks can, however, be disregarded.
- (9) As a result of immersion of openings in a superstructure, a vessel cannot meet the required standard, those superstructure openings may be ignored and the openings in the weather deck used instead to determine  $\theta_f$ . In such cases the GZ curve shall be derived without the benefit of the buoyancy of the superstructure.
- (10) It might be noted that provided the vessel complies with the requirements of (7)(a) to (c) and is sailed with an angle of heel which is no greater than the 'derived angle of heel', it shall be capable of withstanding a wind gust equal to 1.4 times the actual wind velocity (i.e. twice the actual wind pressure) without immersing the 'down-flooding openings', or heeling to an angle greater than  $60^\circ$ .
- (11) **Sailing Vessels Multi-hulls:**
- (a) Curves of statical stability in both roll and pitch shall be prepared for at least the Loaded Arrival with 10% consumables. The VCG shall be obtained by one of the three methods listed below:
- (i) inclining of complete craft in air on load cells, the VCG being calculated from the moments generated by the measured forces; or
- (ii) separate determination of weights of hull and rig (comprising masts and all running and standing rigging), and subsequent calculation assuming that the hull VCG is 75% of the hull depth above the bottom of the canoe body, and that the VCG of the rig is at half the length of the mast (or a weighted mean of the lengths of more than one mast); or
- (iii) a detailed calculation of the weight and CG position of all components of the vessel, plus a 15% margin of the resulting VCG height above the underside of canoe body.

- (b) If naval architecture software is used to obtain a curve of pitch restoring moments, then the trim angle shall be found for a series of longitudinal centre of gravity (LCG) positions forward of that necessary for the Design Waterline. The curve can then be derived as follows:

$$GZ \text{ in pitch} = CG' \times \cos(\text{trim angle})$$

$$\text{trim angle} = \tan^{-1} \left( \frac{T_{FP} - T_{AP}}{L_{BP}} \right)$$

where

CG' = shift of LCG forward of that required for design trim, measured parallel to baseline

T<sub>FP</sub> = draught at forward perpendicular

T<sub>AP</sub> = draught at aft perpendicular

L<sub>BP</sub> = length between perpendiculars

(Approximations to maximum roll or pitch moments are not acceptable)

- (c) Data shall be provided to the user showing the maximum advised mean apparent wind speed appropriate to each combination of sails, such wind speeds being calculated as the lesser of the following:

$$v_w = 1.5 \sqrt{\frac{LM_R}{A'_S h \cos \phi_R + A_D b}}$$

Or

$$v_w = 1.5 \sqrt{\frac{LM_P}{A'_S h \cos \phi_P + A_D b}}$$

where

v<sub>w</sub> = maximum advised apparent wind speed (knots)

LM<sub>R</sub> = maximum restoring moment in roll (N.m)

LM<sub>P</sub> = limiting restoring moment in pitch (N.m), defined as the pitch restoring moment at the least angle of the following:

- a. angle of maximum pitch restoring moment;

- b. angle at which foredeck is immersed; or
  - c.  $0^\circ$  from design trim
- $A'_S$  = area of sails set including mast and boom (square metres)
- $h$  = height of combined centre of effort of sails and spars above the waterline
- $\phi_R$  = heel angle at maximum roll righting moment (in conjunction with  $LM_R$ )
- $\phi_P$  = limiting pitch angle used when calculating  $LM_P$  (in conjunction with  $LM_P$ )
- $A_D$  = plan area of the hulls and deck (square metres)
- $b$  = distance from centroid of  $A_D$  to the centreline of the leeward hull

This data shall be accompanied by the note:

*In following winds, the tabulated safe wind speed for each sail combination shall be reduced by the boat speed*

- (d) If the maximum safe wind speed under full fore-and-aft sail is less than 27 knots, it shall be demonstrated by calculation using annex D of ISO 12217-2 (2002) that, when inverted and/or fully flooded, the volume of buoyancy, expressed in cubic metres ( $m^3$ ), in the hull, fittings and equipment is greater than:

$$1.2 \times (\text{fully loaded mass in tonnes})$$

thus ensuring that it is sufficient to support the mass of the fully loaded vessel by a margin. Allowance for trapped bubbles of air (apart from dedicated air tanks and watertight compartments) shall not be included.

- (e) The maximum safe wind speed with no sails set calculated in accordance with 11.2(11)(c) shall exceed 36 knots. For Part A Short Range Yachts this wind speed shall exceed 32 knots.
- (f) Trimarans used for unrestricted operations shall have sidehulls each having a total buoyant volume of at least 150% of the displacement volume in the fully loaded condition.
- (g) The stability information booklet shall include information and guidance on:
- (i) the stability hazards to which these craft are vulnerable, including the risk of capsize in roll and/or pitch;

- (ii) the importance of complying with the maximum advised apparent wind speed information supplied;
  - (iii) the need to reduce the tabulated safe wind speeds by the vessel speed in following winds;
  - (iv) the choice of sails shall be set with respect to the prevailing wind strength, relative wind direction, and sea state;
  - (v) the precautions shall be taken when altering course from a following to a beam wind.
- (h) In vessels required to demonstrate the ability to float after inversion (according to 11.2(11)(d), an emergency escape hatch shall be fitted to each main inhabited watertight compartment such that it is above both upright and inverted waterlines.

### 11.3 Damage Stability

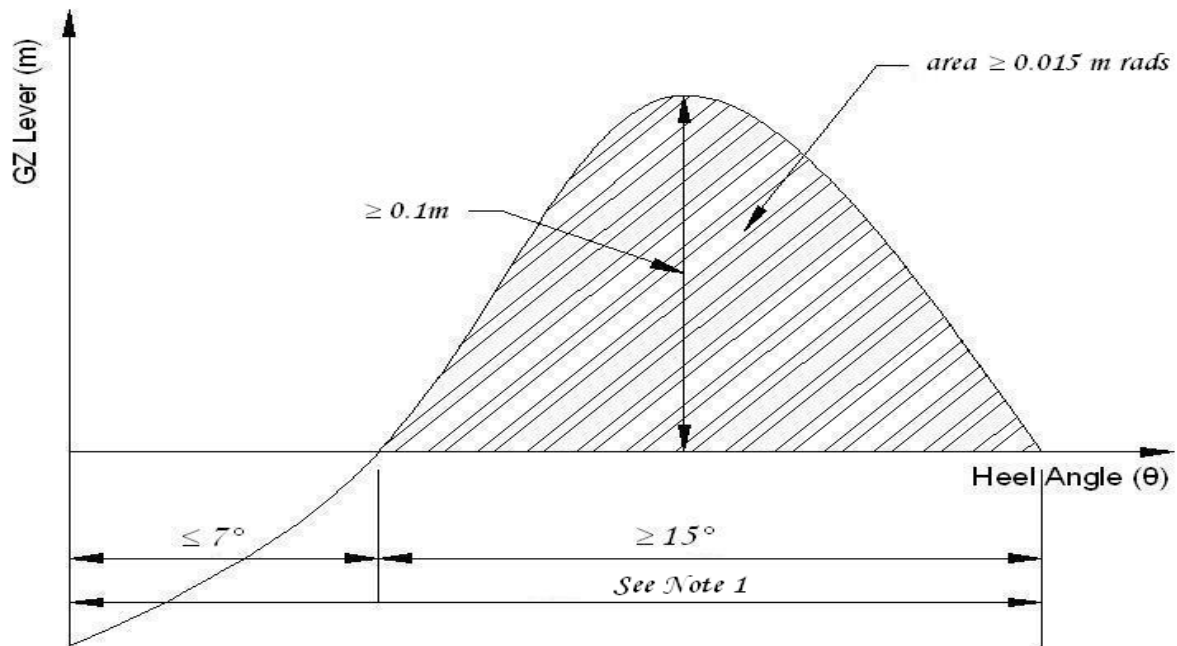
- (1) The following requirements are applicable to all vessels, other than those operating as Short Range Yachts. Whilst Short Range Yachts are not required to meet the damage stability criteria defined below, it is recommended that they meet the requirements where practicable.
- (2) It shall be noted that compliance with the damage stability criteria is not required for vessels that obtain full compliance with the ICLL conditions of assignment.
- (3) The watertight bulkheads of the vessel shall be so arranged that minor hull damage that results in the free flooding of any one compartment, shall cause the vessel to float at a waterline which, at any point, is not less than 75 millimetres below the weather deck, freeboard deck, or bulkhead deck if not concurrent.
- (4) Minor damage shall be assumed to occur anywhere in the length of the vessel, but not on a watertight bulkhead.
- (5) Standard permeabilities which shall be used in this assessment, are as follows:

Space	Percentage Permeability
Stores	60
Stores but not a substantial quantity thereof	95
Accommodation	95
Machinery	85

However, the acceptance of reduced permeabilities based on the as-built condition may be considered subject to detailed calculations being provided to the satisfaction of the Administration.

- (6) In the damaged condition, considered in 11.3(3), the residual stability shall be such that any angle of equilibrium does not exceed 7° from the upright, the resulting righting lever

curve has a range to the downflooding angle of at least 15° beyond any angle of equilibrium, the maximum righting lever within that range is not less than 100 millimetres and the area under the curve is not less than 0.015 metre radians.



Notes:

1. Range of stability in “damaged” condition shall have regard, where appropriate, to truncation due to downflooding
  2. The required properties of the “damaged” GZ curve, namely max.GZ  $\geq$  0.1m and the area under the curve of  $\geq$  0.015metre radians. shall be achieved within the positive range of the curve taking into account any restrictions imposed by Note 1.
- (7) A vessel of 85 metres and over shall:
- (a) Have damages defined using the following extents (methodology taken from the 1990 amendments to SOLAS 1974). Damage cases of a lesser extent which produce more onerous results shall be considered:
    - (i) longitudinal extent: 3 metres plus 3% of the length of the vessel, or 11 metres whichever is the less;
    - (ii) transverse extent (measured inboard from the ship’s side, at right angles to the centreline at the level of the deepest draught): a distance of one fifth of the breadth of the ship; and
    - (iii) vertical extent: from the base line and upwards without limit.
  - (b) In the equilibrium damage condition, the residual stability shall comply with the damage stability requirements of Section 11.3.(6). In the intermediate damage conditions, the residual stability shall be such that any angle of intermediate

flooding does not exceed 15° from the upright, the resulting righting lever curve has a range to the downflooding angle of at least 7° and the maximum righting lever within that range is not less than 50 millimetres.

- (c) Such vessels shall be provided with a Damage Control Plan and Booklet, in accordance with the requirements of SOLAS Chapter II-I, Regulation 19, as amended.

#### ***11.4 Use of Internal Crossflooding and Downflooding Devices***

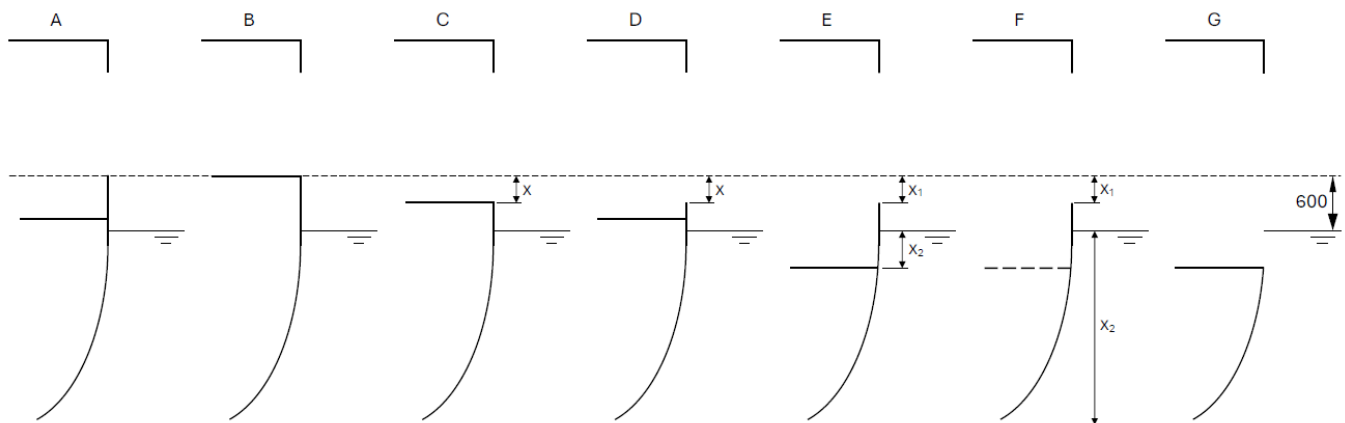
- (1) In complying with the damage stability requirements of Section 11.3(6), the minor hull damage shall be limited to the watertight compartment of origin. The use of internal flooding devices shall be limited to transverse cross-flooding only in order to correct large angles of heel. In so doing, the maximum angle of heel after flooding but before equalisation shall not exceed 15°. The equalisation shall be achieved within 15 minutes. The internal flooding devices shall be passively operated / activated. Any requirement for manual operation is prohibited.
- (2) The use of internal flooding devices in transverse watertight bulkheads or transverse stepped watertight bulkheads is not permitted. Applications for the limited use of internal flooding devices in horizontal decks for the purpose of allowing direct downflooding to a space immediately below that which is considered damaged, shall be specially considered and is subject to the agreement of the Administration.
- (3) If lower decks are non-watertight but would substantially restrict the flow of water downwards, damage cases shall be assessed assuming such decks are both watertight and non- watertight.

#### ***11.5 Stability criteria for vessels with openings in the hull, the lower edge of which is less than 600 millimetres above the Uppermost Load Line***

- (1) In general, the lower edge of the opening shall not be immersed when the vessel heels due to any launching and recovery operations. Calculations shall be based on the maximum safe working load (SWL) of the appliance at maximum outreach. However, if the opening is immersed, the space shall be treated as a floodable tender garage in accordance with the requirements of 11.6.
- (2) Applications for the acceptance of active systems to transfer solid and / or liquid ballast for the purpose of controlling heel angles during any launching and recovery operations to comply with 11.5 (1) shall be specially considered and are subject to the agreement of the Administration.
- (3) The effect of flooding on stability shall be determined by applying a layer of entrained water in the compartment along with the associated free surface moment, which shall be applied in the same manner as it would be for an enclosed tank.
- (4) The depth of the entrained water shall be equivalent to the deficiency in height, (i.e., the difference between 600 millimetres and the height of the opening from the uppermost

Load Line). For those vessels provided with internal decks, which are located below the uppermost Load Line, the depth of water shall be further increased by the vertical distance from the uppermost Load Line to the surface of the deck. In the case of a non-watertight deck, the measurement shall be taken from the uppermost Load Line to the tank top or bilge as applicable. The length and breadth of the layer of water shall be taken at the height of the internal deck and extend to the nearest watertight boundaries. Any other boundaries, (unless confirmed as watertight up to the most onerous flooded waterline) located within the compartment (whether fire rated or combustible) shall be ignored for the purpose of the measurement.

- (5) Where the decks in such spaces are non-watertight but would substantially restrict the flow of water downwards, flooded cases shall be assessed assuming such decks are both watertight and non-watertight.
- (6) The required volume of entrained water may be calculated based on the actual permeability of the space. Detailed calculations and drawings are to be included in the dedicated section / appendix of the Stability Information Booklet referred to in 4.4 (9) (h) for the purpose of consultation during re-fit / modification(s). Only fixed, permanent items shall be considered to contribute to a reduction in permeability of the space.
- (7) The compartment shall be considered closed, (i.e. spill out shall not be assumed). The following conditions apply for the purpose of the assessment:
  - (a) the height of the opening and height of the entrained water is to be measured with the vessel upright in the most onerous operational trim condition and;
  - (b) the following drawings illustrate some common examples and what shall be applied.



For examples A and B, no additional considerations are required noting the sill height is 600 millimetres.

For examples C and D, the volume of entrained water referred to 11.5 (4) shall be equal to dimension 'X' multiplied by the deck area.

For examples E and F where internal decks (watertight and non-watertight respectively), are sighted below the uppermost Loadline, the volume of entrained water referred to in 11.5 (4) shall be equal to the sum of dimensions X1 and X2, multiplied by the deck area.

For example G (floodable tender garage), requirements are contained in 11.6.

- (8) For the partially flooded condition, considered in 11.5 (4), the residual stability shall be such that any angle of equilibrium does not exceed  $7^\circ$  from the upright, the resulting righting lever curve has a range to the down flooding angle of at least  $15^\circ$  beyond any angle of equilibrium, the maximum righting lever within that range is not less than 100 millimetres and the area under the curve is not less than 0.015 metre radians.
- (9) Larger initial heel angles up to a maximum of  $15^\circ$  may, however, be accepted subject to ensuring that it can be demonstrated that the vessel can return to an angle of no more than  $7^\circ$  within 15 minutes. This time is to include the retraction of the launching appliance(s), the closing and locking of the shell door and the evacuation of the required amount of water using both the main and emergency sources of power.
- (10) Alternatively, the vessel shall comply with the applicable intact stability criteria when applying the lost buoyancy principle (i.e. once the compartment has been removed from the buoyant hull).
- (11) The assessment shall be applied to all loading conditions which are contained in the Stability Information Booklet.

#### ***11.6 Stability Criteria for vessels with Floodable Tender Garages***

- (1) Floodable tender garages without internal sills or internal sills of less than 600 millimetres above the uppermost Load Line for openings leading to other watertight compartments shall comply with 11.5(10).
- (2) Floodable tender garages provided with internal sills having a height of at least 600 millimetres above the uppermost Load Line shall comply with the requirements of 11.5(8) or (10).

#### ***11.7 Stability Criteria for Swimming Pools, Spa Baths and Jacuzzis***

- (1) All swimming pools, spa baths and jacuzzis shall be included in the stability analysis of all loading condition at all times. The mass of water and free surface moments shall be included. The stability and drainage requirements are summarised below:

Stability Criteria:	Compliance with pools, Spa baths and/or Jacuzzis full:	Emergency Drainage:	Restrictions:
Intact & Damage Stability	- Intact stability compliance achieved - Damage stability compliance achieved	Not required	None
Intact Stability only	- Intact stability compliance achieved - Damage stability compliance not achieved	10 minutes	Filling of swimming pools, spa baths and jacuzzis shall not be used in seagoing loading conditions; i.e. limited to when the vessel is at anchor or alongside only
None	- Intact stability compliance not achieved - Damage stability compliance not achieved	10 minutes	Filling of swimming pools, spa baths and jacuzzis shall be covered in a separate section of the approved stability booklet with the following note added:  <i>In this loading condition(s), the vessel may not have its [swimming pool] [spa bath] [jacuzzi] full due to insufficient stability</i>

- (2) Where any loading condition(s) include partially full swimming pools, spa baths and jacuzzis, any limitations that may be required in order to control free surface moments shall be clearly indicated.
- (3) When evaluating intact stability compliance, the effects of spill out of the swimming pool contents may be taken into account.
- (4) Swimming pools, spa baths and jacuzzis shall be fitted with arrangements to enable drainage in case of bad weather.

**11.8 Stability Criteria for Spaces fitted with glazed openings in way of and / or below the uppermost load line**

- (1) For compartments provided with glazed openings which are below the waterline, the effect of flooding on stability shall be assessed. This shall be done in line with 11.5 except that the level of the entrained water in 11.5(1)(b) shall be level with the equilibrium external waterline.
- (2) The watertight doors bounding the compartment in question shall be above the equilibrium waterline. If this is not achieved, the flooding assessment shall be extended to include the adjacent compartment(s).

- (3) It shall be noted that this flooding assessment is an additional requirement to that of the compartment needing to comply with damage stability criteria. It is not necessary to apply damage stability criteria at the same time as applying the flooding investigation.

### **11.9 Elements of Stability**

- (1) Unless otherwise specified, the lightship weight, vertical centre of gravity (KG) and longitudinal centre of gravity (LCG) of a vessel shall be determined from the results of an inclining experiment.<sup>22</sup>
- (2) An inclining experiment shall be conducted in accordance with a detailed standard which is approved by the Administration and, in the presence of the Administration.
- (3) The report of the inclining experiment and the lightship particulars derived shall be approved by the Administration prior to its use in stability calculations.
- (4) At the discretion of the Company and prior to approval of the lightship particulars by the Administration, a margin for safety may be applied to the lightship weight and KG calculated after the inclining experiment. Such a margin shall be clearly identified and recorded in the stability booklet.
- (5) A formal record shall be kept in the stability booklet of alterations or modifications to the vessel for which the effects on lightship weight and vertical centres of gravity are offset against the margin.
- (6) When sister vessels are built at the same shipyard, the Administration may accept a lightweight check on subsequent vessels to corroborate the results of the inclining experiment conducted on the lead vessel of the class.

### **11.10 Stability Documents**

- (1) A vessel shall be provided with a Stability Information Booklet (and Damage Control Plan and Booklet if applicable) for the master, that shall be approved by the Administration.
- (2) The content, form and presentation of information contained in the stability information booklet shall be based on the model booklet for the vessel type (motor or sailing) published by/for the Administration.
- (3) A vessel with previously approved stability information which undergoes a major conversion or alterations shall be subjected to a complete reassessment of stability and provided with newly approved stability information. A major refit or major alteration is one which results in either a change in the lightship weight of 2% and over and/or the longitudinal centre of gravity of 1% and over (measured from the aft perpendicular)

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<sup>22</sup> "Reference shall be made to the document entitled 'Large Commercial Yachts – Guidance Notes for Carrying out an Inclining Test' as published by the Maritime and Coastguard Agency".

and/or the calculated vertical centre of gravity rises by 0.25% and over (measured from the keel).

- (4) Unless it can be clearly demonstrated that no major change has occurred, a lightweight check shall be carried out every five years.
- (5) Sailing vessels shall have, readily available, a copy of the 'Curves of Maximum Steady Heel Angle to Prevent Downflooding in Squalls', or in the case of a multihull, the values of maximum advised mean apparent wind speed, for the reference of the watchkeeper. This shall be a direct copy taken from that contained in the approved stability booklet.
- (6) The overall sail area and spar weights and dimensions shall be as documented in the vessel's stability information booklet. Any rigging modifications that increase the overall sail area, or the weight/dimensions of the rig aloft, shall be accompanied by an approved updating of the stability information booklet.
- (7) For Short Range Yachts, where the damage stability has not been assessed, the following note shall be added to the approved stability booklet;

<p><i>This vessel has not been assessed for damage stability, and therefore might not remain afloat in the event of damage or flooding</i></p>
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**11.11 Additional Equivalence Considerations**

- (1) None.

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## CHAPTER 12

### FREEBOARD

Objective: The purpose of this Chapter is to ensure that all vessels are assigned a freeboard in accordance with the International Convention on Load Lines (1966)<sup>23</sup>. This section also outlines the requirements for draught marks to enable trim to be readily calculated.

#### **12.1 General Requirements**

- (1) The freeboard for the vessel and its marking shall be approved by the Assigning Authority for the assignment of freeboard and issue of the International Load Line Certificate (1966).
- (2) Vessels shall comply with International Convention on Load Lines (1966) for the assignment of a freeboard mark which corresponds to the deepest loading condition included in the stability information booklet for the vessel.
- (3) The freeboard assigned shall be compatible with the strength of hull structure, intact and damage stability requirements for the vessel, and shall ensure that minimum bow height requirements of the International Convention on Load Lines (1966) are met.
- (4) The Assigning Authority shall provide the Company of the vessel with a copy of the particulars of the freeboard assigned and a copy of the record of particulars relating to the conditions of assignment.

#### **12.2 Freeboard Mark and Loading**

- (1) The freeboard mark applied shall be positioned port and starboard at amidships on the load line length.
- (2) Where a ship is assigned a greater than minimum freeboard so that the load line is marked at a position corresponding to, or lower than, the lowest seasonal load line assigned at minimum freeboard in accordance with the present Protocol, only the freshwater load line need be marked.
- (3) If the seasonal load line assigned is not all-seasons (i.e., Summer only and not Winter and Winter North Atlantic) then the operational limitation should be clearly stated on the load line certificate and the Yacht Code certificate.

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<sup>23</sup> For the purpose of Chapter 12, the 1966 version of the International Convention on Load Lines shall be applied and not as amended

- (4) The mark of the Authority by whom the load lines are assigned may<sup>24</sup> be indicated alongside the load line ring above the horizontal line which passes through the centre of the ring, or above and below it. This mark shall consist of not more than four initials to identify the Authority's name, each measuring approximately 115 millimetres in height and 75 millimetres in width.
- (5) The fresh water freeboard allowance shall be obtained by deducting from the all-seasons freeboard assigned, the quantity

$$\frac{\Delta}{4T} \text{ millimetres}$$

where:-

$\Delta$  = displacement in salt water in tonnes at the all-seasons draught

T = tonnes per centimetres immersion at the all seasons load waterline

Alternatively, the deduction may be taken as 1/48th of the all-seasons draught of the ship at amidships.

- (6) Where the nature of the vessel's service or navigational limits makes the freshwater mark inapplicable, this may be omitted.
- (7) A vessel shall not operate in any condition which shall result in its appropriate freeboard marks being submerged when it is at rest and upright in calm water.

### **12.3 Deck Lines**

- (1) Where provided, the marks shall be permanent and easily read but need not be of contrasting colour to the hull.
- (2) A deck line need not be marked where the deck from which the freeboard is measured can be easily determined (i.e. where a freeing port is positioned directly above the disc there is no need to mark the deck line). In such cases, the Load Line certificate shall not indicate that a deck line is marked.

### **12.4 Datum Draught Marks**

- (1) Datum draught marks shall be provided at the bow and stern, port and starboard, and be adequate for assessing the condition and trim of the vessel. Such draught marks may be single datum lines.

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<sup>24</sup> The mark of the authority is not a mandatory requirement.

- (2) The marks shall be permanent and easily read but need not be of contrasting colour to the hull. The marks need not indicate more than one draught at each position and shall be above, but within 1000 millimetres, of the deepest load waterline.
- (3) The draught to which marks relate shall be indicated either above the mark on the hull and/or in the stability information booklet for the vessel. The position of the marks shall be verified at initial placement by the Administration or the vessel's Assigning Authority.

***12.5 Methods of Marking***

- (1) The ring, lines and letters (except for the deck lines and datum draught marks) shall be marked in a contrasting colour to the hull.
- (2) All markings required by this Chapter shall be permanent. The method of permanent marking shall be one of the following:
  - (a) welded to hull plating;
  - (b) cut into fairing compound and painted;
  - (c) mounted on locating studs, which are glued into fairing compound; or
  - (d) a metallic disc bonded to the painted hull surface / gel coat.

***12.6 Additional Equivalence Considerations***

- (1) None.

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## CHAPTER 13

### LIFE-SAVING APPLIANCES

Objective: The purpose of this Chapter is to ensure that all vessels are equipped with the minimum essential life-saving Appliances appropriate to yacht operations. The basic provision is for the principles of SOLAS to be met, however, some sections have been identified where alternative standards can be accepted, where appropriate.

#### **13.1 General Requirements**

- (1) Life-Saving Appliances shall be provided in accordance with Table 13.1 - Life-Saving Appliances.
- (2) All equipment fitted shall be of a type which has been accepted by the Administration as complying with LSA Code and IMO Resolution MSC.81(70) as amended.
- (3) Additional life-saving equipment which is provided shall meet the requirements of 13.1(2).
- (4) When personal safety equipment is provided for use in water sports activities, arrangements for its stowage shall ensure that it shall not be used mistakenly as lifesaving equipment in an emergency situation.
- (5) All life-saving equipment carried shall be fitted with retro-reflective material in accordance with the recommendations of IMO Resolution A.658(16) as amended.
- (6) Liferaft embarkation arrangements shall comply with the following:
  - (a) Where the distance between the embarkation deck and the top of the liferaft buoyancy tube exceeds 1 metre with the vessel in its lightest condition, an embarkation ladder shall be provided. A means for fastening shall be provided and ladders shall be readily available for use at all times.
  - (b) Where the distance between the embarkation deck and the top of the liferaft buoyancy tube exceeds 4.5 metres with the vessel in its lightest condition, davit launched liferafts and at least one launching appliance for launching shall be provided on each side of the vessel.
- (7) Liferaft embarkation ladders shall be of an approved type. Ladders for vessels of less than 500GT shall be of sufficient length to allow for the boarding of liferafts with the vessel upright and in the lightest seagoing condition. Ladders for vessels of 500GT and over shall be of sufficient length to allow for the boarding of lifeboats and / or liferafts in the lightest seagoing condition under unfavourable conditions of trim of up to 10° or

the maximum angle of trim in the damaged condition as defined in the stability information booklet, combined with a list of up to 20° either way or the angle at which the vessels weather deck edge becomes submerged, whichever is less.

- (8) Falls for launching devices are to comply with the LSA Code. When falls are of stainless steel, they shall be renewed at intervals not exceeding the service life recommended by the manufacturer, or where no service life is stated be treated as galvanised steel falls.
- (9) Falls manufactured from synthetic fibre rope shall be in accordance with the applicable rules of a Recognised Organisation, and renewed at intervals not exceeding the aforementioned rule requirements. Where renewal intervals are based on number of operating cycles, records of the same shall be maintained and kept onboard as part of the mini ISM or ISM system as applicable. Where renewal intervals have not been specified in the applicable rules of a Recognised Organisation or by the manufacturer, the falls shall be replaced at intervals specified by the Administration.
- (10) Every inflatable lifejacket, inflatable liferaft, marine evacuation system and hydrostatic release unit other than a disposable hydrostatic release unit shall be serviced, at intervals not exceeding 12 months unless extended service intervals have been approved by the Administration; at a manufacturer's approved service station.
- (11) All repairs and maintenance of permanently inflated rescue boats shall be carried out in accordance with the manufacturers' instructions; emergency repairs may be carried out onboard; however, permanent repairs shall be effected at an approved servicing station.
- (12) Maintenance of equipment shall be carried out in accordance with the instructions for onboard maintenance.
- (13) The stowage and installation of all life-saving appliances shall be to the satisfaction of the Administration.
- (14) All life-saving appliances shall be in working order and be ready for immediate use at the commencement of, and at all times during, the voyage.
- (15) For a vessel equipped with stabiliser fins or having other projections at the sides of the hull, special consideration shall be given, and provisions made, as necessary to avoid possible interference with the safe evacuation of the vessel in an emergency.
- (16) Means shall be provided to prevent overboard discharge of water into survival craft.
- (17) In addition to or in conjunction with the servicing intervals of marine evacuation systems required by Section 13.1(10), each marine evacuation system shall be deployed<sup>25</sup> from the ship on a rotational basis at intervals to be agreed by the Administration, provided that each system shall be deployed at least once every six years.

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<sup>25</sup> Results of MES rotational deployments shall be reported to the Administration in accordance with MGN 558 (M) Life-Saving Appliances - Marine Evacuation Systems (MES) - Servicing and Deployments

- (18) All survival craft required to provide for abandonment by the total number of persons onboard 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 and after all persons have been assembled, with lifejackets donned.

Table 13.1 - LIFE-SAVING APPLIANCES

VESSEL SIZE	Short Range Yacht	≥ 24m	≥ 500GT	≥ 85m
LIFEBOATS	-	-	-	YES
LIFERAFTS	YES	YES	YES	YES
EMBARKATION LADDERS	1	1	1	1 <sup>1</sup>
MANOVBORBOARD RECOVERY SYSTEM	YES	-	-	-
RESCUE BOAT	-	YES	YES	YES
LIFEJACKETS	YES	YES	YES	YES
IMMERSION SUITS	YES	YES	YES	YES
LIFEBUOYS (TOTAL)	4	4	8	8 <sup>2</sup>
LIFEBUOYS WITH LIGHT AND SMOKE	2	2	2	2 <sup>2</sup>
LIFEBUOYS WITH LIGHT	-	-	2	2 <sup>2</sup>
LIFEBUOYS WITH BUOYANT LIFELINE	2	2	2	2 <sup>2</sup>
SET OF LINE THROWING APPLIANCES (4 lines plus 4 charges)	1	1	1	1
ROCKET PARACHUTE FLARES	6	6	12	12
TWO-WAY RADIOTELEPHONE SETS	2	2	2	3
EPIRB	1	1	1	1
SART	1	1	2	2
GENERAL ALARM	YES	YES	YES	YES
LIGHTING	YES	YES	YES	YES
POSTERS AND SIGNS SHOWING SURVIVAL CRAFT AND EQUIPMENT OPERATING INSTRUCTIONS	YES	YES	YES	YES
TRAINING MANUAL	YES	YES	YES	YES
INSTRUCTIONS FOR ONBOARD MAINTENANCE	YES	YES	YES	YES
LIFESAVING SIGNALS AND RESCUE POSTER - SOLAS No 1 IN WHEELHOUSE	YES	YES	YES	YES

<sup>1</sup> Vessels provided with a means of dry-shod evacuation (i.e. DLLR's and / or MES) may replace the embarkation ladder with an approved controlled means of descent (CMD)<sup>26</sup> subject to compliance with any conditions and limitations included in the Certificate of Type Approval. In such cases, a CMD shall be provided for each davit and / or MES.

<sup>2</sup> The number of Lifebuoys to be provided for Yachts of 100 metres and over is to be in accordance with SOLAS III/32.1 Stowage arrangements and attachments shall be in accordance with SOLAS III/7.1.

<sup>26</sup> Reference shall be made to MGN 519(M) "Life Saving Appliances – Controlled Means of Descent at Embarkation Stations – Replacement for Embarkation Ladders and Access to Remotely Located Liferafts"

**13.2 Lifeboats (Required for Vessels over 85 metres in Length)**

- (1) When lifeboats are required to be carried their acceptance is conditional upon the provision of suitable stowage and launching arrangements.
- (2) When lifeboats are provided on each side of the vessel, the lifeboat(s) on each side shall be of sufficient capacity to accommodate the total number of persons onboard.
- (3) Alternative arrangements to the carriage of lifeboats may be considered as indicated below:
  - (a) substitution of lifeboats by liferafts where the vessel complies with a SOLAS two compartment subdivision standard; or
  - (b) substitution of lifeboats by a sufficient number of davit launched liferafts such that in the event of any one liferaft being lost or rendered unserviceable, sufficient capacity is available on either side of the vessel for all persons onboard. Additionally, one approved rescue boat shall be provided on each side of the vessel.
  - (c) substitution of lifeboats by a sufficient number of marine evacuation systems (MES) in accordance with 13.15, such that in the event of any one MES being lost or rendered unserviceable:
    - (i) sufficient aggregate capacity of liferafts is available on either side of the vessel for all persons onboard;
    - (ii) an alternative means of evacuating passengers and crew into survival craft on the same side of the craft in conditions up to and including those in 13.15(3)(b) shall be provided, such as an embarkation ladder; and
    - (iii) additionally, one approved rescue boat shall be provided on each side of the vessel capable of marshaling liferafts and towing the largest liferaft carried onboard.
- (4) A lifeboat shall also be acceptable as a rescue boat provided it also meets the requirements of the LSA Code as a rescue boat.

**13.3 Liferafts**

- (1) The liferafts carried shall be stowed in GRP containers and shall contain the necessary "emergency pack". For Short Range Yachts, or vessels operating within 60 miles from a safe haven, liferafts provided may be equipped with a "SOLAS B PACK". For all other vessels, liferafts shall be equipped with a "SOLAS A PACK".
- (2) Liferaft approval includes approval of their stowage, launching and float-free arrangements.

- (3) Every liferaft shall be stowed with its painter permanently attached to the ship following the original equipment manufacturers instructions.
- (4) For vessels of less than 85 metres in length, or those complying with 13.2(3) a sufficient number of liferafts shall be provided so that in the event of any one liferaft being lost or rendered unserviceable, sufficient aggregate capacity is available on either side of the vessel for all persons onboard. This may be achieved by transferring liferafts from one side to the other, subject to such liferafts having a mass of less than 185 kg and being stowed in a position providing for easy side to side transfer at a single, open deck level. Where liferafts are transferable, this requirement may be met by the ability of the liferafts to be transferred within 5 minutes, as below:
  - (a) Liferafts of 6 - 15 persons capacity to be carried by 2 persons.
  - (b) Liferafts of more than 15 persons capacity to be carried by 4 persons.
- (5) If the liferaft or liferafts are not transferable in accordance with 13.3(4), the total capacity available on each side, in the event of any one liferaft being lost or rendered unserviceable, shall be sufficient to accommodate the total number of persons on board.
- (6) Liferafts, other than davit launched liferafts, shall be capable of launching from their stowed location and upon release, fall clear of any obstructions, superstructures or hull with the vessel in an upright condition.
- (7) Liferafts which form part of the float free complement for all vessels regardless of length or GT shall be capable of floating free, clear of any obstructions with the vessel in the upright condition.
- (8) For vessels of 500GT and over, liferafts of sufficient capacity to accommodate at least 100% of the persons onboard (assuming at least one liferaft is lost or rendered unserviceable) shall also be capable of floating free under unfavourable conditions of trim of up to 10°, combined with a list of up to 20° either way, or to the angle at which the liferafts become submerged, whichever is less.
- (9) When lifeboats are provided in accordance with 13.2(2), sufficient liferafts shall be provided such that in the event of any one lifeboat being lost or rendered unserviceable, sufficient aggregate liferaft capacity remains on either side of the vessel for all persons onboard. Where liferafts are transferable, this requirement may be met by the ability of the liferafts to be transferred within 5 minutes, as detailed in 13.3(4).
- (10) GRP containers containing liferafts shall be stowed on the weather deck or in an open space. Those liferafts which form part of the float free complement shall be fitted with hydrostatic release units so that the liferafts shall float free of the vessel and automatically inflate. Where rafts are stowed under covers or hatches, such arrangements shall:
  - (a) not impair the liferafts floating free;
  - (b) provide safe and easy access for inspection and launching;

- (c) allow for the crew to undertake safety drills; and
  - (d) ensure the free flooding of all liferaft storage compartments.
- (11) For vessels operating with reduced personnel aboard, attention is drawn to the dangers associated with the use of large capacity liferafts with small numbers of persons embarked.
- (12) For vessels of 500GT and over, the Muster Station(s) shall be accessible via the open deck or a continuous fire shelter.
- (13) If for any reason, any or all Davit Launched Liferafts and / or Liferafts which form part of a Marine Evacuation System are located such that they are unable to float-free, additional Liferafts shall be provided. The final arrangement is to ensure that the number and capacity of unobstructed float-free Liferafts is sufficient to accommodate 100% of the maximum number of persons onboard in the event that one float free liferaft is lost or rendered unserviceable.

#### **13.4 Rescue Boats**

- (1) General Requirements:
- (a) Means shall be provided for the recovery of a person from the sea to the vessel and it shall be assumed that the person is unconscious or unable to assist in the rescue. This requirement is satisfied by the following sections as appropriate to the size of the vessel. If an overside boarding ladder or scrambling net is provided the ladder or net shall extend from the weather deck to at least 600 millimetres below the lowest operational waterline.
  - (b) Rescue boats need not be capable of being launched on both sides of the vessel. Vessels of 500GT and over which aren't provided with lifeboats shall be capable of launching the rescue boat(s) under unfavourable conditions of trim of up to 10°, or the maximum angle of trim in the damaged condition as defined in the stability information booklet, whichever is less, combined with a list of up to 20° either way. For vessels which are capable of launching a rescue boat on either side, the ability to launch on the high side only under this condition may be accepted. Alternative proposals may be accepted subject to the satisfaction of the Administration.
  - (c) When the vessel side is not immediately below the launching station(s), launching arrangements shall be designed to mitigate the risk of the rescue boat(s) becoming trapped in recessed side deck areas or other structural features when the vessel is in the heeled condition.
  - (d) 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, the rescue boat can be launched down the straight side of the ship whilst maintaining . The minimum required speed to

maintain steerage in calm water. Where rescue boats are located forward, due consideration may be given to the acceptance of a procedure that consists of stopping the vessel, keeping station and launching on the leeward side, subject to the agreement of the Administration,

- (e) If stowed forward the launching appliance and rescue boat shall be entirely located in a sheltered position abaft the vertical extension of the aft most portion of the collision bulkhead.
- (f) Rescue boats shall be stowed 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.
- (g) Rescue boats shall have sufficient mobility and manoeuvrability in a seaway to enable persons to be retrieved from the water, marshal liferafts and tow the largest liferaft carried on the ship when loaded with its full complement of persons and equipment or its equivalent at a speed of at least 2 knots.
- (h) All rescue boats covered within this section shall be equipped to the requirements of the LSA Code Chapter V/5.1.2.

(2) **Vessels of 500GT and over:**

- (a) All vessels of 500GT and over shall be provided with a rescue boat approved in accordance with the LSA Code in all respects, except for the colour. If the rescue boat or boats are not a highly visible colour<sup>27</sup>, covers or patches of a highly visible colour equaling at least 1m<sup>2</sup> in area, divided up into no more than 2 parts, shall be able to be displayed on the rescue boat. If a patch(es) is used, it shall be capable of being attached to the top of the rescue boat (e.g. on the tubes).
- (b) Each rescue boat shall be served by its own appliance. The launching appliances shall comply and be approved in accordance with the LSA Code except that when a power operated crane is fitted, it shall be capable of operation either by hand or by an emergency source of power in the event of a main power failure. Power operated shell doors, mooring observation platforms (where required for painter line transfer operations) and any other obstructions to launching such as fashion plates etc., shall also be provided with both a main and emergency power supply unless these are capable of manual operation in the event of main power failure. The routing of the emergency source of power shall be considered in respect of damaged waterlines and fire. Furthermore, a means to lower the boat from within the boat is not required.
- (c) Each hydraulically operated davit shall be provided with its own hydraulic power unit (HPU), which shall be located in close proximity to the davit. Where davits are installed in enclosed spaces, the HPU shall be in the same space. Where this is

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<sup>27</sup> "Highly visible colour" only includes colours of strong chromatic content, i.e. pure achromatic colours such as white and all shades of grey shall not be accepted as "comparable" colours.

not possible, the HPU may be located in an immediately adjacent space considered to constitute a low fire and flooding risk subject to the agreement of the Administration.

- (d) The launching appliances shall be sized for the maximum approved launching weight of the rescue boat loaded with its full complement of persons (i.e. at least six, assumed to have an average mass of 82.5 kg each), fuel and equipment.

**(3) Vessels under 500GT:**

- (a) Vessels under 500GT shall be provided with a rescue boat either:
  - (i) meeting the requirements of 13.4(2); or
  - (ii) a boat which is not approved in accordance with the LSA Code but which is suitable for rescue purposes. The boat may be rigid, rigid inflated, or inflated, and shall have a capacity for not less than 4 persons, one of which shall be assumed to be lying down. Tubes of rigid inflatable or inflatable boats shall have a minimum of 3 buoyancy compartments. The boat shall be capable of displaying a highly visible colour<sup>28</sup>. Covers or patches of a highly visible colour equaling at least 1m<sup>2</sup> in area, divided up into no more than 2 parts, shall be able to be displayed and shall be capable of being attached to the top of the rescue boat (e.g. on the tubes). If the equipment as required is stowed in a grab bag, it may be stowed in the boat or in an easily accessible location close to the rescue boat.
- (b) Launching appliances which are intended for man riding applications shall be sized for the maximum approved launching weight of the rescue boat loaded with its full complement of persons (i.e. at least two, assumed to have an average mass of 82.5 kg each), fuel and equipment. Appliances shall be approved in accordance with Chapter VI of the LSA Code, or comply with the following requirements:
  - (i) when a power operated device is fitted, it shall be capable of operation either by hand or by an emergency source of power in the event of a main power failure. Power operated shell doors, mooring observation platforms (where required for painter line transfer operations) and any other obstructions to launching such as fashion plates etc., shall also be provided with both a main and emergency power supply unless these are capable of manual operation in the event of main power failure. The routing of the emergency source of power shall be considered in respect of damaged waterlines and fire;
  - (ii) the launching appliance and its attachments shall be constructed to withstand a static proof load on test of not less than 2.2 times the maximum working load. Acceptable factors of safety are 6 for wires, hooks and

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<sup>28</sup> "Highly visible colour" only includes colours of strong chromatic content, i.e. pure achromatic colours such as white and all shades of grey shall not be accepted as "comparable" colours.

- sheaves, and 4.5 for the remainder of the launching appliance. The appliance and its attachments shall also be tested dynamically to 1.1 times the working load. It shall be noted that there is no requirement to recover the rescue boat provided that the casualty and the boat's crew can be recovered onboard from the boat in the water;
- (iii) the design of the falls and winch system shall take account of the principles of LSA Code Ch VI/6.1.2;
  - (iv) a means to lower the boat from within the boat is not required.
- (c) Launching appliances, intended for non-man riding applications may be accepted subject to compliance with 13.4(3)(b)(i) to (iii) inclusive. In such cases, appliances shall be sized for the maximum approved launching weight of the rescue boat loaded with its full complement of equipment and shall be clearly marked 'NOT TO BE USED FOR MAN RIDING'. Manufacturer's Certificates confirming compliance with the foregoing may be accepted.
- (d) The acceptance of such arrangements is subject to the provision of a safe means of transferring the rescue boat from its launching position to the point of embarkation / disembarkation (including the recovery of a person on a stretcher). In general, access via an approved embarkation ladder in the parallel mid body of the vessel having particular regard to clearance from propellers and / or stabilizers shall be provided. Proposals to utilize stern platforms shall not be accepted. The acceptance of proposals to provide ladder access in way of steeply overhanging portions of the hull is subject to ensuring that provisions are made for each step to rest firmly against the hull side such that the ladder is fully supported in the vertical position and is prevented from swinging inboard when in use. Handrails and / or handholds at the top of the ladder shall also be provided to the satisfaction of the Administration. The use of other water borne craft to assist in the launching and / or recovery of the rescue boat is prohibited.
- (e) In the case of an existing vessel, launching appliances shall be marked as "NOT SUITABLE FOR MAN-RIDING", unless they comply with the following:
- (i) have an automatic brake such that it shall not lower without continuous positive intervention from the crew;
  - (ii) be provided with original approved manufacturer's certification or that from a Recognised Organisation stating that it is suitable for man-riding with a fully loaded rescue boat of persons and equipment;
  - (iii) the use be risk assessed in accordance with Chapter 23A.
- (f) Where it is proposed to use the running rigging on sailing vessels as a launching appliance, the above requirements shall also be met.

- (g) With the exception of tender poles and davits of similarly simple design (such as slot-in portable davits), man-riding launching appliances shall be serviced in accordance with IMO MSC.402(96), except that the Service Providers carrying out the thorough examination and operational testing may be one of the following:
    - (i) a manufacturer (or their approved agents) of similar SOLAS approved equipment;
    - (ii) a manufacturer (or their approved agents) of approved marine lifting appliances; or
    - (iii) a recognised lifting appliance testing company. Such companies shall be approved by a Recognised Organisation or a National Government acceptable to the Administration.
    - (iv) tests conducted by (i) to (iii) need not be witnessed by a third party.
  - (h) Tender poles and davits of similarly simple design (such as slot-in portable davits) used for man-riding, shall be inspected annually by a competent person. Five-yearly load testing (dynamic at 1.1 x MWL) shall be completed by a competent shore-based organisation as far as is reasonable and practical.
  - (i) Launching appliances not used for man-riding shall be serviced in accordance with the manufacturer's instructions and Administration requirements.
- (4) Vessels operating as Short Range Yachts shall either comply with requirements of 13.4(2) or 13.4(3) or the following:
- (a) The vessel shall have sufficient mobility and manoeuvrability in a seaway to enable persons to be retrieved from the water. For assessing this ability, it is not considered acceptable to retrieve persons over the stern of the vessel or adjacent to the propeller(s). The recovery location shall be visible from the conning position at all times during the recovery, although this may be achieved by the use of remote controls where necessary; and
  - (b) The vessel shall be provided with suitable equipment and/or arrangements to enable the person(s) to be recovered without further persons entering the water; or
  - (c) The vessel may tow a tender considered suitable for rescue purposes in accordance with 13.4(3)(a)(ii) and subject to the vessel being provided with Towing Lights in accordance with Rule 24 of COLREGS, or other suitable means of recovery to the satisfaction of the Administration.

### **13.5 Lifejackets**

- (1) One adult lifejacket shall be provided for each person onboard plus spare adult lifejackets sufficient for at least 10% of the total number of persons onboard or two, whichever is the greater. Each lifejacket shall be fitted with a light and whistle.

- (2) 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 millimetres, a sufficient number of suitable accessories as may be required to provide a lifejacket for each such person shall be available onboard to allow them to be secured to such persons.
- (3) Included in the above number of lifejackets, there shall be at least two inflatable lifejackets for use of the crew of any rescue boat or inflatable boat carried onboard together with a sufficient number of lifejackets stowed on the bridge for use by persons on watch and in the engine control room for vessels which aren't assigned and maintain an 'unmanned machinery space' notation.
- (4) One suitably sized lifejacket shall be provided for each child and infant when carried onboard. Furthermore, spare lifejackets sufficient for at least 10% of the children (or one) and 10% of the infants (or one) shall be provided, whichever is the greater. Each lifejacket shall be fitted with an automatic light and whistle. The maximum number of children and infants for which lifejackets (and immersion / thermal protection in accordance with 13.6 (2)) has been provided shall be clearly stated on the Life Saving Appliances / Safety Plan.

### **13.6 Immersion Suits**

- (1) One approved immersion suit of an appropriate size shall be provided for each person onboard, these may be of the non-insulated type unless cold water operations are undertaken as per 13.6 (4) below. These immersion suits need not be required if the ship is constantly engaged on voyages in warm climates<sup>29</sup> where, in the opinion of the Administration, immersion suits are unnecessary.
- (2) Included in the above number of immersion suits, there shall be at least two immersion suits for use of the crew of any rescue boat or inflatable boat carried onboard together with a sufficient number of immersion suits stowed on the bridge for use by persons on watch and in the engine / machinery control room for vessels which aren't assigned and maintain an 'unmanned machinery space' notation.
- (3) Due consideration shall be given to the provision of appropriate immersion/thermal protection for children and infants carried onboard.
- (4) For cold water areas of operation, the insulated type shall be carried. Reference to Resolution IMO MSC/Circ.1046 shall be made for assessment of thermal protection.

### **13.7 Lifebuoys**

- (1) Lifebuoys port and starboard provided with combined self-igniting light and self-activating smoke signals shall be capable of quick deployment from the navigating bridge.

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<sup>29</sup> Refer to the Guidelines for Assessment of Thermal Protection (MSC/Circ.1046).

- (2) The attached buoyant lifeline required on each of two of the lifebuoys is to have a minimum length of 30 metres.
- (3) Each lifebuoy shall be marked with the vessel's name and Port of Registry.

**13.8 EPIRB**

- (1) An approved EPIRB shall be installed in an easily accessible position ready to be manually released, capable of being placed in a survival craft and floating free if the vessel sinks. All EPIRBs shall be registered with the Administration. EPIRBs shall be tested annually and serviced at not more than five yearly intervals by an approved shore-based maintainer.
- (2) Where additional EPIRBs are carried over and above what is required by Table 1, they shall comply with 13.8 (1) except that the capability to float free is not required.

**13.9 Radar Transponders (SART)**

- (1) The SART shall be stowed in an easily accessible position so that it can rapidly be placed in any survival craft. Means shall be provided in order that it can be mounted in the survival craft at a height of at least 1 metre above sea level.

**13.10 General Alarm**

- (1) For a vessel of less than 500GT this alarm may consist of the ship's whistle or siren providing it can be heard in all parts of the vessel, which shall be provided with both a main and emergency power supply sufficient for at least 30 minutes of intermittent operation.
- (2) For a vessel of 500GT and over the requirement of 13.10(1) shall be supplemented by an electrically operated bell or Klaxon system, which shall be powered from the vessel's main supply and also the emergency source of power (see Chapter 8B).
- (3) Sound systems used solely for entertainment purposes which may interfere with the audibility of the general alarm shall be automatically muted in the event that the fire alarm is activated.
- (4) For a vessel of 85 metres in length and over, in addition to the requirements of 13.10(2) a public address system or other suitable means of communication shall be provided in accordance with the requirements of 14B.17(1).
- (5) Engine rooms and other spaces with high ambient noise levels shall be provided with supplemental visual indicators and calls<sup>30</sup>.

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<sup>30</sup> Visual presentation of calls and indicators shall comply with the Code on Alerts and Indicators, Section 6 (visual presentation of indicators and calls).

**13.11 Lighting**

- (1) Alleyways, internal and external stairways, and exits giving access to, and including, the muster and embarkation stations shall be adequately lit. (See also Chapter 8A or 8B).
- (2) Adequate lighting shall be provided in the vicinity of survival craft, launching appliance(s) (when provided) and the overside area of sea in way of the launching position(s). The lighting shall be supplied from the emergency source of power.

**13.12 Life-saving Signals and Rescue Poster**

- (1) When display space in the wheelhouse is restricted, the 2 sides of a SOLAS No.2 poster (as contained in liferaft equipment packs) may be displayed in lieu of a SOLAS No. 1 poster.

**13.13 Launching Appliances for Vessels Complying with 13.2(3)(b)**

- (1) Davit launched liferafts shall be capable of being launched under unfavourable conditions of trim of up to 10° or the maximum angle of trim in the damaged condition as defined in the stability information booklet whichever is less, combined with a list of up to 20° either way or the angle at which the vessels weather deck edge becomes submerged. In this condition, the ability to abandon the vessel on the high side only may be accepted.
- (2) The launching appliances shall comply and be approved in accordance with the LSA Code except, it shall be capable of operation either by hand or by an emergency source of power in the event of a main power failure. The routing of the emergency source of power shall be considered in respect of damaged waterlines and fire. At least one davit shall be provided on each side of the yacht. Each hydraulically operated davit shall be provided with its own hydraulic power unit (HPU), which shall be located in close proximity to the davit. Where davits are installed in enclosed spaces, the HPU shall be in the same space. Where this is not possible, the HPU may be located in an immediately adjacent space considered to constitute a low fire and flooding risk subject to the agreement of the Administration.

**13.14 Recovery of Persons From the Water**

- (1) All vessels shall have vessel-specific plans and procedures for recovery of persons from the water, taking into account the guidelines developed by the IMO<sup>31</sup>. 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.

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<sup>31</sup> Refer to the Guidelines for the development of plans and procedures for recovery of persons from the water (MSC.1/Circ.1447).

**13.15 Marine Evacuation Systems**

- (1) Where Marine Evacuation Systems (MES) are intended to be utilised as either the sole or supplementary means of abandonment in accordance with 13.2(3)(c), all such systems shall be of an approved type in compliance with the LSA Code and comply with the following requirements:
  - (a) Due consideration shall be given to the location and protection of MES stowage arrangements with respect to protection against fire. Such locations shall be treated as Category (5) Spaces for the purpose of Structural Fire Protection, Detection and Extinction.
  - (b) The MES embarkation station shall not be higher than the bulkhead deck.
  - (c) Powered hatches and doors that are required to be opened prior to MES deployment shall:
    - (i) be provided with both main and a local source of emergency power and capable of manual operation; and
    - (ii) have the time to operate included in the timed evacuation analysis as described under IMO Resolution MSC.81 (70) Part 1 Section 12.6.1 and in accordance with 13.1(18).
  - (d) At least one suitably sized inflatable slide or chute as applicable shall be provided on either side of the vessel. Where the installation results in the slide or chute coming into direct contact with the hull shell under any of the conditions listed section 13.15(3)(b) below, the side shell shall be locally insulated to A-60. The extent of insulation to be provided shall be sufficient to cover at least +/- 10 degrees of longitudinal trim in way of the applicable areas.
- (2) Stowage of Marine Evacuation Systems
  - (a) The ship's side shall not have any openings (including scuppers and overboard discharges) between the Embarkation Station of the Marine Evacuation System and the waterline in the lightest seagoing condition. Means shall be provided to protect the system from any projections including but not limited to fin stabilisers.
  - (b) Where glazed openings are located in the ship's side between the Embarkation Station of the Marine Evacuation System and the waterline in the lightest seagoing condition, they shall be A-0, unless the side shell in which they are located is required to be of a higher fire rating in accordance with 13.15(1)(d).
  - (c) Marine Evacuation Systems 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 practicable, the system can be launched down the straight side of the Yacht.

- (d) Each Marine Evacuation System shall be stowed so that neither the passage nor platform nor its stowage or operational arrangements shall interfere with the operation of any other life-saving appliance at any other launching station.
  - (e) Where appropriate, the Yacht shall be so arranged that the Marine Evacuation Systems in their stowed positions are protected from damage by heavy seas.
- (3) Functional Requirements for Marine Evacuation Systems
- (a) MES shall be arranged such that liferafts shall be securely attached to the platform and released from the platform by a person either in the liferaft or on the platform.
  - (b) MES shall be capable of being deployed from the ship under unfavourable conditions of trim of up to 10° or the maximum angle of trim in the damaged condition as defined in the stability information booklet whichever is less, combined with a list of up to 20° either way or the angle at which the vessels weather deck edge becomes submerged. In this condition, the ability to abandon the vessel on the high side only may be accepted.
  - (c) In the case of being fitted with an inclined slide, operate such that the angle of the slide to the horizontal is:
    - (i) within a range of 30° to 35° when the ship is upright and in the lightest sea-going condition; and
    - (ii) a maximum of 55° in the final stage of flooding set by the applicable requirements in Section 11.3.
  - (d) Any part requiring maintenance by the ship's crews shall be readily accessible and easily maintained.
  - (e) So constructed and installed that where one or more Marine Evacuation Systems are provided, at least 50% of such systems shall be subjected to a trial deployment after installation. Subject to these deployments being satisfactory, the untried systems shall be deployed within 12 months of installation.
  - (f) Any inflatable liferaft used in conjunction with the marine evacuation system shall:
    - (i) be sited close to the system container but be capable of dropping clear of the deployed system and boarding platform;
    - (ii) be capable of release one at a time from its stowage rack with arrangements which shall enable it to be moored alongside the platform;
    - (iii) be stowed with its painter permanently attached to the ship;
    - (iv) where forming part of the float free complement, be stowed with a float-free arrangement complying with the requirements of paragraph 4.1.6 of

- the LSA Code and, if inflatable, inflates automatically when the ship sinks;
- (v) be so stowed as to permit manual release of one raft or container at a time from their securing arrangements;
  - (vi) be provided with pre-connected or easily connected retrieving lines to the platform;
  - (vii) Shall be self-righting or canopied reversible type where the rafts are too large to be righted by the crew.

**13.16 Emergency Training and Drills:**

- (1) See Annex C for requirements.

**13.17 Additional Equivalence Considerations**

- (1) None.

**13.18 Alternative Design and Arrangements**

- (1) Vessels may follow Section 1.9 on Alternative Design and Arrangements for this chapter as allowed by SOLAS III/38.
- (2) The engineering analysis required by 1.9(3) shall be prepared and submitted to the Administration, based on the guidelines<sup>32</sup> and shall include, as a minimum, the following engineering analysis elements:
  - (a) determination of the ship type and the life-saving appliance and arrangements concerned;
  - (b) identification of the prescriptive requirement(s) with which the life-saving appliance and arrangements will not comply;
  - (c) identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognized engineering or industry standards;
  - (d) determination of the performance criteria for the ship and the life-saving appliance and arrangements concerned addressed by the relevant prescriptive requirement(s):
    - (i) performance criteria shall provide a level of safety not inferior to the relevant prescriptive requirements contained in this chapter; and

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<sup>32</sup> Refer to the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III (MSC.1/Circ.1212).

- (ii) performance criteria shall be quantifiable and measurable;
- (e) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions;
- (f) technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and
- (g) risk assessment based on identification of the potential faults and hazards associated with the proposal.

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## CHAPTER 14

### FIRE SAFETY

#### ***14.1 Protection of Spaces Containing Vehicles or Craft with Fuel in their Tanks or Lockers Storing such Fuels or flammable paint and solvents and Spaces Containing Recreational Dive Systems.***

- (1) Special consideration shall be given to safe conditions of carriage for petrol and other highly flammable liquids either in hand portable containers/tanks or in the tanks of vehicles (such as personal watercraft, motor cars and helicopters) and flammable paint and solvents which may be transported. This section is not considered applicable to diesel stowage.

#### ***Petrol and / or other highly flammable liquids***

- (2) The quantity of spare petrol and/or other highly flammable liquids carried shall be kept to a minimum, generally up to 150 litres maximum. Greater quantities may be specially considered by the Administration when the storage location, ventilation, containers, fire suppression and space fire protection and detection are considered adequate for the given increase.
- (3) Containers used for the carriage of flammable liquids shall be constructed to a recognised standard appropriate to the contents and each container clearly marked to indicate its contents.
- (4) Small lockers on open deck for the stowage of hand portable containers of petrol and / or paint shall be located away from high-risk areas, have no electrical fittings, and be provided with the following:
  - (a) Natural ventilation openings top and bottom;
  - (b) Drainage leading overboard (this requirement is not applicable to lockers which only contain paint);
  - (c) Means of securing the containers; and
  - (d) A fire extinguishing arrangement in accordance with the applicable requirements of SOLAS II-2/10.6.3. For lockers of a deck area of less than 4 m<sup>2</sup>, 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.

- (5) Enclosed spaces, and larger lockers on open deck, designated for the safe carriage of petrol or similar fuel, refuelling units or vehicles with fuel in their tanks and / or paint shall be fitted with:
- (a) A manual water spray system giving a coverage of 3.5 ltr/m<sup>2</sup>/minute for petrol over the total area of deck, which may be taken from the fire main with the isolating valve located outside of the protected space. An equivalent arrangement may also be considered. Adequate provision shall be made for drainage of water introduced to the space, which shall be separate from other systems and shall not lead to machinery or other spaces where a source of ignition may exist. Spaces containing paint shall be provided with a means of fire extinguishing in accordance with the applicable requirements of SOLAS II-2/10.6.3.
  - (b) Drainage systems may lead either directly overboard or to a dedicated storage tank. When drainage leads directly overboard, a means of temporarily blocking the drain holes and an oil spill kit (which may part of the SOPEP spill kit) shall be provided.
  - (c) A fixed fire detection and fire alarm system complying with the requirements of SOLAS II-2/Part A / Fire Safety Systems Code Chapter IX. The system within the space shall also comply with 14.1(5)(e).
  - (d) Ducted mechanical exhaust ventilation, which is isolated from other ventilated spaces, shall provide the following:
    - (i) at least 6 air changes per hour (based on the gross empty space between structures). Ventilation systems may be operated at lower air changes per hour when controlled by a detection system that monitors the flammable and harmful gases in the space<sup>33</sup>;
    - (ii) reduction of the airflow shall be signalled by an audible and visual alarm on the navigating bridge and at the "in port" control station(s);
    - (iii) exhaust ducting shall be arranged to extract from the lower bilge area;
    - (iv) if the fan motors are located in the space or in the ventilation duct they shall be certified safe to the correct designation for the flammable vapour/liquid; and
    - (v) the ventilation fans shall be of a non-sparking type and the ventilation system shall be capable of rapid shut down and effective closure in event of fire.

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<sup>33</sup> Refer to the revised design guidelines and operational recommendations for ventilation systems in ro-ro cargo spaces (MSC.1/Circ.1515)

- (e) A suitable gas detection system shall be provided, appropriate to the type of vehicle fuel or recreational dive system, with audible and visual alarm in the wheelhouse and where it may always be observed by the crew.
- (f) All electrical equipment located up to 450 millimetres above the deck shall be certified safe for petrol vapours.
- (g) Electrical equipment located higher than 450 millimetres above the deck shall either;-
  - (i) be to IP55 standard of construction (IEC Publication 529 - Classification of Degree of protection Provided by Enclosures); or
  - (ii) provided with automatic isolation (on all poles) located outside the space on activation of the gas detection system. This option shall not be used for safety systems such as steering motors, rudder indicators, etc.
- (h) Regardless of the height of installation, it is considered that the following equipment located within the space shall be certified safe for the flammable vapours:
  - (i) gas detection system;
  - (ii) bilge alarm;
  - (iii) fire detection system;
  - (iv) at least one light fitting (on a dedicated circuit, possibly emergency).

It shall be noted that electrical equipment includes starters, distribution boxes, etc.

- (i) The drainage or bilge 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 IMO<sup>34</sup>. The drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls. 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 Administration. Such information shall be included in the stability book.

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<sup>34</sup> Refer to the Guidelines for drainage systems in closed vehicle and ro-ro spaces and special category spaces, to be developed by the IMO.

***Storage of small quantities of paint and / or flammable liquids in cabinets installed within enclosed spaces***

- (6) In spaces where a limited supply of paint and / or other flammable liquid is necessary for the practical utility of the space, it may be permissible to install an approved flammable liquid cabinet having a capacity of no more than 200 litres to stow small quantities of items for daily use. These cabinets shall:
- (a) be certified in accordance with a recognised national or international standard relevant to their intended use;
  - (b) be designed to contain leakage and spills;
  - (c) be securely mounted, indicated on the Fire Control Plan and included in the ship's Safety Management System (SMS) or mini ISM as applicable. The quantity and types of materials contained in these lockers shall be consistent with the manufacturer's recommendations; and
  - (d) not be located in accommodation spaces (including stairways, corridors and lobbies) or spaces considered to constitute a high fire risk.

***Diving Systems***

- (7) Diving Systems including recreational dive systems, submersible craft, hyperbaric recompression chambers and nitrox systems shall comply with the requirements of Annex Q and those of the Administration.

***14.2 Construction and Arrangement of Saunas***

- (1) All boundaries of the sauna shall be of "A" class divisions, and may include changing rooms, showers and toilets and other low risk spaces, subject to the agreement of the Administration. Such spaces shall not form part of an escape route other than from the aforementioned spaces. The sauna shall be insulated to A-60 for vessels of 500GT and over, and A-30 for vessels less than 500GT. Spaces containing infrared saunas using infrared heaters each with a maximum power of 2kW and a surface temperature not above 150°C may be treated as accommodation spaces. The boundaries of infrared saunas in excess of these limitations shall be at least A-0.
- (2) Saunas fitted in Short Range Yachts, shall be insulated to B-15 against other spaces except those inside the perimeter of the sauna. Spaces containing infrared saunas using infrared heaters each with a maximum power of 2kW and a surface temperature not above 150°C, need not be insulated.
- (3) Wooden linings on bulkheads and ceilings are permitted. The ceiling above the oven shall be lined with a non-combustible plate with an air gap of at least 30 millimetres. The distance from the hot surfaces to combustible materials shall be at least 500 millimetres or the combustible materials shall be protected (e.g. non-combustible plate with an air gap of at least 30 millimetres).

- (4) Wooden benches are permitted.
- (5) The sauna door shall open outwards by pushing.
- (6) Electrically heated ovens shall be provided with a timer.
- (7) All spaces within the perimeter of the sauna shall be protected by a fire detection and alarm system and an automatic sprinkler system. Yachts of less than 500GT may in lieu of an automatic sprinkler system be provided with a manual water spray system giving a coverage of 3.5 ltr/m<sup>2</sup>/minute over the total area of the floor. Such a system may be taken from the fire main or be independent. Electrically driven fire pumps shall be provided with an emergency power supply in accordance with the requirements of Chapter 8A, 8A.4.

### ***14.3 Construction and Arrangement of Steam Room***

- (1) The perimeter of the steam room may include changing rooms, showers and toilets.
- (2) If a steam generator of more than 5 kW is contained within the perimeter, the suite boundary shall be constructed to an A-0 standard, or B-0 for Short Range Yachts. If a steam generator of more than 5 kW is not contained within the perimeter the steam generator shall be protected by A-0 standard divisions, or B-0 for Short Range Yachts and pipes leading to the discharge nozzles shall be lagged.
- (3) If a suite arrangement contains a sauna then the requirements contained in 14.2 are applicable, regardless of the steam generator location.
- (4) All spaces within the perimeter shall be protected by a fire detection and alarm system.

### ***14.4 Deep Fat Frying Equipment***

- (1) Attention is drawn to the requirements in SOLAS II-2/10.6.4 for fire extinguishing systems for deep fat cooking equipment.
- (2) For fryers of up to 15 litres cooking oil capacity, the provision of a suitably sized Class F<sup>35</sup> extinguisher together with manual isolation of the electrical power supply is acceptable.
- (3) For the purpose of determining cooking oil capacity, multiple fryers installed in close proximity to one another shall be treated as a single fryer.

### ***14.5 Fire Control Plan(s)***

- (1) A fire control (general arrangement) plan(s), shall be permanently exhibited for the guidance of the master and crew of the vessel. The content of the plan(s) shall adequately show and describe the principal fire prevention and protection equipment and materials.

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<sup>35</sup> See IMO Resolution A.951(23) chapter 5 for 'Fire Classifications'

As far as practical, symbols used on the plans shall comply with a recognised international standard. The fire control plan may be a combined Fire and Safety Plan, which shall show the positions of stowage of the life-saving and fire appliances.

- (2) For each deck, the plan(s) shall show the position of control stations; sections of the vessel which are enclosed respectively by "A" class divisions and "B" class divisions; location of flammable liquid storage (see section 14.1.); particulars of and locations of fire alarms, fire detection systems, sprinkler installations, fixed and portable fire extinguishing appliances; fireman's outfit(s); means of access and emergency escapes for compartments and decks; locations and means of control of systems and openings which shall be closed down in a fire emergency.
- (3) The plan(s) required by 14.5(1) shall be kept up to date. Updating alterations shall be applied to all copies of the plan(s) without delay. Each plan shall include a list of alterations and the date on which each alteration was applied.
- (4) A duplicate set of the plan(s) shall be permanently stored in a prominently marked weathertight enclosure readily accessible to assist non-vessel fire-fighting personnel who may board the vessel in a fire emergency.
- (5) Instructions valid to the maintenance and operation of all the equipment and installations onboard for the fighting and containment of fire shall be kept in one document holder, readily available in an accessible location. For yachts over 500GT, a Fire Training Manual, as required by SOLAS II-2/15 shall be provided.

#### **14.6 *Guidance On The Storage Of Large Quantities Of Petrol In Fixed Tanks***

- (1) Vessels are to follow the guidance contained in Annex F.

#### **14.7 *Additional Equivalence Considerations***

- (1) None.

#### **14.8 *Alternative Design and Arrangements***

- (1) Vessels may follow Section 1.9 on Alternative Design and Arrangements for this chapter as allowed by SOLAS II-2/17.
- (2) The engineering analysis required by 1.9(3) shall be prepared and submitted to the Administration, based on the guidelines<sup>36</sup> and shall include, as a minimum, the following engineering analysis elements:
  - (a) determination of the ship type and space(s) concerned;

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<sup>36</sup> Refer to the Guidelines on alternative design and arrangements for fire safety (MSC/Circ.1002)

- (b) identification of prescriptive requirement(s) with which the ship or the space(s) will not comply;
- (c) identification of the fire and explosion hazards of the ship or the space(s) concerned, including:
  - (i) identification of the possible ignition sources;
  - (ii) identification of the fire growth potential of each space concerned;
  - (iii) identification of the smoke and toxic effluent generation potential for each space concerned; and
  - (iv) identification of the potential for the spread of fire, smoke or of toxic effluents from the space(s) concerned to other spaces;
- (d) determination of the required fire safety performance criteria for the ship or the space(s) concerned addressed by the prescriptive requirement(s) in particular:
  - (i) performance criteria shall be based on the fire safety objectives and on the functional requirements of this chapter;
  - (ii) performance criteria shall provide a degree of safety not less than that achieved by using the prescriptive requirements; and
  - (iii) performance criteria shall be quantifiable and measurable;
- (e) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions; and
- (f) technical justification demonstrating that the alternative design and arrangements meet the required fire safety performance criteria.

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## CHAPTER 14A

### STRUCTURAL FIRE PROTECTION VESSELS OF LESS THAN 500GT

Objective: The purpose of this Chapter is to ensure a consistent level of structural fire protection. This Chapter is primarily concerned with protecting high risk spaces such as the engine room and galley. It also makes provision for restricting the quantity of combustibile materials and sets out the principles for detection of fire and effective escape.

#### **14A.1 General**

- (1) Terms used in this section shall have the same meaning as defined in SOLAS.
- (2) Table 14A.1 is a guide to the major requirements of this Chapter. The Table is intended as a quick reference to the requirements and is not to be used in isolation when designing the fire safety arrangements.

Table 14A.1

Passive fire protection (see 14A.2).	Category ‘A’ machinery spaces: ‘A-30’, (“B-15” for Short Range Yachts);  Enclosed spaces containing vehicles or craft with lithium ion batteries shall apply MGN 681(M) as amended;  Galleys: “B-15” (for Unrestricted Yachts and Short Range Yachts of 300- 499GT).
Means of escape (see 14A.3):	
Category ‘A’ machinery spaces.	Two (2).
Accommodation and other spaces	Two (2).
Fixed fire detection system (see 14A.7).	Fitted in machinery spaces. Fitted in service spaces, control stations and accommodation spaces.
Automatic sprinkler system or equivalent	Fitted in yachts that do not meet restrictions on combustibile materials (See 14A.2(4)(f) and 14A.2(4)(h) and Short Range Yachts of 300-499GT.

**14A.2 Structure**

- (1) Purpose:
  - (a) The purpose of this section is to contain a fire in the space of origin. For this purpose, the following functional requirements shall be met:
    - (i) the engine room, enclosed spaces containing vehicles or craft with lithium ion batteries (the number and capacity of which shall be kept as low as reasonably practicable) and galley shall be contained within boundaries required by this section;
    - (ii) the fire integrity of the divisions shall be maintained at openings and penetrations.
- (2) Forms of construction - Fire divisions:
  - (a) Fire divisions required by 14A.2(3) shall be constructed in accordance with the remaining paragraphs of this Section.
  - (b) Fire divisions using steel equivalent, or alternative forms of construction may be accepted if it can be demonstrated that the material by itself, or due to non-combustible insulation provided, has the fire resistance properties equivalent to those divisions required by 14A.2(3)(a) and 14A.2(3)(b).
  - (c) Insulation required by 14A.2(2)(b) shall be such that the temperature of the structural core does not rise above the point at which the structure would begin to lose its strength at anytime during the applicable exposure to the standard fire test as referenced in the Fire Test Procedures Code. For 'A' Class divisions, the applicable exposure is 60 minutes, and for 'B' Class divisions, the applicable exposure is 30 minutes.
  - (d) For aluminium alloy structures, the insulation 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.
  - (e) For composite structures, the ambient temperature to be considered for the acceptance of the fire test carried out on the sample panels, shall not be less than 30 degrees Celsius. The insulation shall be such that the temperature of the laminate is less than the minimum temperature of deflection under load of the resin at any time during the applicable fire exposure. The temperature of deflection under load shall be determined in accordance with a recognised international standard. The size of the test panels and scope of approval for the insulation system regarding variations in construction shall be in accordance with the rules of a Recognised Organisation and / or MGN 407 (M+F).

- (f) Insulation need only be applied on the side that is exposed to the greatest fire risk (for example inside the engine room), a division between two such spaces shall however be insulated on both sides unless it is a steel division.
  - (g) Special attention shall be given to the fixing of fire rated doors, hatches and dampers in bulkheads and decks constructed of materials other than steel. Measures shall be taken to ensure that the temperature of the fixings when exposed to fire does not exceed the temperature at which the bulkhead or deck itself loses strength.
- (3) Structural Fire Protection:
- (a) Machinery spaces of category 'A' shall be enclosed by 'A-30' Class boundaries (bulkheads, deck heads, casings and side shell). For Short Range Yachts, such machinery spaces shall be enclosed by 'B-15' class boundaries (bulkheads, deckheads, casings and side shell).
  - (b) Enclosed spaces containing lithium ion batteries shall be insulated in accordance with the requirements of 'MGN 681(M) Fire safety and storage of small electric powered craft on yachts' as amended.
  - (c) Windows within the exterior hull or superstructure of galleys and enclosed spaces containing vehicles or craft with petrol driven engines and / or lithium ion batteries are not required to be fire rated. Doors within the exterior superstructure of galleys are not required to be fire rated but shall be covered by non-combustible insulation as far as is reasonable and practicable. Doors within enclosed spaces containing vehicles or craft with petrol driven engines and / or lithium ion batteries within this boundary shall be insulated in so far as is reasonable and practicable to an equivalent level of fire safety as the surrounding structure. Where it is technically unfeasible to insulate the internal surfaces of aluminium or composite shell doors due to the geometry of the internal stiffening and / or closing and locking arrangements, increased fixed fire extinguishing arrangements shall be provided in lieu to the satisfaction of the Administration.
  - (d) Vessels other than Short Range Yachts of less than 300GT, are to have galleys enclosed by 'B-15' boundaries (bulkheads, deck heads and side shell). For those vessels not provided with a fixed fire fighting system, decorative linings and finishes may be non-combustible. Windows and doors within the exterior hull or superstructure within this boundary are not expected to meet "B-15" standards however, doors shall be covered by non-combustible insulation as far as is reasonable and practicable. Floating / base floors shall be non-combustible. Floor coverings shall comply with IMO FTP Code, Annex 1, Parts 2 and 5.
  - (e) Openings in 'A' and 'B' Class divisions shall be provided with permanently attached means of closing that shall be at least as effective for resisting fires as the divisions in which they are fitted. Windows shall not be fitted in machinery space boundaries.

- (f) Where 'A' Class divisions are penetrated for the passage of electric cables, pipes, trunks, ducts, etc., or for girders, beams or other structural members, arrangements shall be made to ensure that the fire resistance is not impaired.
  - (g) 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.
  - (h) Where 'A' Class divisions are required to be insulated, it shall be ensured that the heat from a fire is not transmitted through the intersections and terminal points of the divisions or penetrations to uninsulated boundaries. Where the insulation installed does not achieve this, arrangements shall be made to prevent this heat transmission by insulating the horizontal and vertical boundaries or penetrations for a distance of 450 millimetres.
  - (i) For structures in contact with seawater, the required insulation shall extend to at least 300 millimetres below the lightest waterline.
- (4) Materials:
- (a) Except in refrigerated compartments of service spaces, all insulation (e.g. thermal and acoustic) shall be of not readily-ignitable materials.
  - (b) Pipes penetrating 'A' or 'B' Class divisions shall be of approved materials having regard to the temperature such divisions are required to withstand.
  - (c) Pipes conveying oil or other combustible liquids through accommodation and service spaces shall be of approved materials having regard to the fire risk.
  - (d) Materials readily rendered ineffective by heat are not to 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. Due regard shall be paid to the Fire Test Procedures Code.
  - (e) Vapour barriers and adhesives used in conjunction with insulation, as well as insulation of pipe fittings for cold service systems need not be non-combustible, but shall be kept to the minimum quantity practicable. Their exposed surfaces are to have low flame spread characteristics.
  - (f) Upholstery composites (fabric in association with any backing or padding material) used throughout the vessel excluding open decks shall be approved in accordance with the Fire Test Procedures Code, Annex 1, Part 8, or equivalent in accordance with 14A.2(4)(i). This does not apply to spaces fitted with sprinklers or equivalent fixed fire extinguishing systems.
  - (g) Organic foams used in upholstered furniture and mattresses shall be of the combustion modified type in accordance with a recognised national or international standard.

- (h) Suspended textile materials such as curtains or drapes shall be approved in accordance with the Fire Test Procedures Code, Annex 1, Part 7, or equivalent in accordance with 14A.2(4)(i). This does not apply to spaces fitted with sprinklers or equivalent fixed fire extinguishing systems.
- (i) Where upholstery composites and suspended textile materials do not meet Fire Test Procedures Code standards in accordance with 14A.2(4)(f) and (h), they may meet equivalent standards as follows:
  - (i) materials shall be subject to fire protection treatment process<sup>37</sup>;
  - (ii) vessel shall have installed a sprinkler or equivalent fixed fire extinguishing system, that is compliant with the Fire Safety Systems Code in all aspects except they may be exempt from Fire Safety Systems Code Chapter 8 section 2.2.2 requirement for 2 sources of power. Or for sprinkler systems equivalent to that referred to in SOLAS II-2/12, Section 3.8 of the Annex to Resolution A.800. The system shall be designed to enable simultaneous operation of all sprinklers fitted in the most hydraulically demanding area. The minimum area for simultaneous operation may be taken as the largest enclosed accommodation space protected; or
  - (iii) an equivalent standard acceptable to the Administration.
- (5) Surface of Insulation:
  - (a) In spaces where penetration of oil products is possible, the surface of insulation shall be impervious to oil or oil vapours. Insulation boundaries shall be arranged to avoid immersion in oil spillages.
- (6) Fuel Arrangements:
  - (a) Arrangements for the storage, distribution and utilisation of oil fuel shall be such as to minimise the risk of fire or explosion.
  - (b) Oil fuel tanks situated within, or adjacent to, the boundaries of Category 'A' machinery spaces are not to contain oil fuel having a flashpoint of less than 60°C.
  - (c) Oil fuel, lubricating oil and other flammable oils are not to be carried in fore-peak tanks.
  - (d) 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 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.

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<sup>37</sup> Refer to MGN 580 (M) FIRE PROTECTION – Fire Retardant Treatment for Fabrics – Equivalent Testing Standards for Large Commercial Yacht Code

- (e) Means shall be provided to stop fuel transfer pumps, oil fired boilers and separators from outside the machinery space.
- (f) Fuel filter bowls shall be of metal construction.

### **14A.3 Means of Escape**

(1) Purpose:

- (a) The purpose of this section is to provide means of escape so that persons onboard can safely and swiftly escape to the 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.

(2) Provisions to satisfy the above referenced requirements shall include but not be limited to the following:

- (a) Deck hatches used for escape purposes as well as routine access / egress shall be provided with at least one deck stanchion per hatch.
- (b) Interior and exterior power operated doors installed in any possible escape route shall be provided with both a main and emergency source of power unless capable of manual operation from both sides.

(3) Requirements:

- (a) Stairways, ladders and corridors serving all spaces normally accessible shall be arranged so as to provide ready means of escape to a deck from which embarkation into survival craft may be effected.
- (b) The arrangement of the vessel shall be such that all compartments are provided with a satisfactory means of escape. In the case of the accommodation, two means of escape from every restricted space or group of spaces shall be provided. Concealed escapes and escape routes shall be clearly marked to ensure ready exit.
- (c) Category 'A' machinery spaces on motor vessels shall also be provided with a minimum of two means of escape. Other machinery spaces shall also have at least two means of escape as widely separated as possible, except where the small size of the machinery space makes it impracticable.

- (d) The normal means of access to the accommodation and service spaces below the open deck shall be arranged so that it is possible to reach the open deck without passing through a galley, engine room or other space with a high fire risk, wherever practicable.
  - (e) Where accommodation arrangements are such that access to compartments is through another compartment, the second escape route shall be as remote as possible from the main escape route. This may be through hatches of adequate size, leading to the open deck or separate space to the main escape route.
  - (f) In exceptional circumstances, a single means of escape may be accepted for spaces, other than accommodation spaces, that are entered only occasionally, if the escape route does not pass through a galley, machinery space or watertight door.
  - (g) No escape route shall be obstructed by furniture or fittings. Additionally, furniture along escape routes shall be secured in place to prevent shifting if the yacht rolls or lists.
  - (h) All doors in escape routes shall be openable from either side. In the direction of escape they are all to be openable without a key. All handles on the inside of weathertight doors and hatches shall be non removable. Where doors are lockable measures to ensure access from outside the space shall be provided for rescue purposes.
  - (i) Doors in escape routes shall, in general, open in way of the direction of the primary means of escape, except that:
    - (i) individual cabin doors may open into the cabins in order to avoid injury to persons in the corridor when the door is opened; and
    - (ii) 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.
- (4) Lifts are not considered as forming a means of escape.
- (5) Adequate deck area shall be provided at muster stations and embarkation areas having due regard to the expected number of persons. Generally, 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 0.35m<sup>2</sup> per person.
- (6) In addition to the requirements of 13.11(2), adequate lighting supplied from the emergency source of power shall be provided in the following locations:
- (a) at every muster and embarkation station;
  - (b) in alleyways, stairways and exits giving access to the muster and embarkation stations;

- (c) in all service and accommodation alleyways, stairways and exits and personnel lifts;
- (d) in the machinery spaces and main generating stations including their control positions;
- (e) in all control stations, machinery control rooms, and at each main and emergency switchboard;
- (f) at all stowage positions for firemen's outfits;
- (g) at the steering gear; and
- (h) at the fire pump, the sprinkler pump (where provided) and the emergency bilge pump and at the starting position of their motors.

**14A.4 Ventilation Systems**

- (1) Ventilation fans for machinery spaces and enclosed galleys shall be capable of being stopped, and main inlets and outlets of ventilation systems closed, from outside the spaces being served. This position shall not be readily cut off in the event of a fire in the spaces served.
- (2) Ventilation ducts for Category 'A' machinery spaces, galleys, spaces containing vehicles or craft with fuel in their tanks, or lockers storing such fuels, are generally not to pass through accommodation spaces, service spaces or control stations. Where this is unavoidable, the trunking shall be constructed of steel at least 3 millimetres thick or equivalent to the satisfaction of the Administration. The ducting within the accommodation, service space or control station shall be fitted with:
  - (a) fire insulation to "A-30" ("B-15" on Short Range Yachts of 300 – 499GT) standard to a point at least 5 metres from the boundary of the machinery space or galley; and
  - (b) automatic fire dampers located in the deck or bulkhead within the accommodation, service space or control station where the trunking passes from the machinery space or galley into the accommodation, service space or control station. These automatic fire dampers are also to be manually closable from outside the galley or machinery space; and
  - (c) fixed means for extinguishing a fire within the galley exhaust duct.
- (3) Ventilation ducts for accommodation spaces, service spaces or control stations are not to pass through Category 'A' machinery spaces, galleys, spaces containing vehicles or craft with fuel in their tanks, or lockers storing such fuels, unless the ducts are constructed of steel and arranged to preserve the integrity of the division.

- (4) Store-rooms containing highly flammable products shall be provided with ventilation arrangements that are separate from other ventilation systems. Ventilation shall be arranged to prevent the build up of flammable vapours at high and low levels. The inlets and outlets of ventilators shall be positioned so that they do not draw from or vent into an area which would cause undue hazard, and shall be fitted with spark arresters.
- (5) Ventilation systems serving Category 'A' machinery spaces shall be independent of systems serving other spaces.
- (6) All enclosed spaces containing free standing fuel tanks shall be ventilated independently of systems serving other spaces.
- (7) Ventilation shall be provided to prevent the accumulation of dangerous concentrations of flammable gas which may be emitted from batteries.
- (8) Ducts provided for tumble driers shall be fitted with filters readily removable for cleaning purposes and suitably located cleaning and inspection openings.
- (9) All fire dampers shall be capable of manual operation. The dampers shall have a direct mechanical means of release or, alternatively, be closed by electrical, hydraulic, or pneumatic operation. All dampers shall be manually operable from both sides of the division. Automatic fire dampers, including those capable of remote operation, shall have a failsafe mechanism that shall close the damper in a fire even upon loss of electrical power or hydraulic or pneumatic pressure loss. Remotely operated fire dampers shall be capable of being reopened manually at the damper.
- (10) Fire dampers shall be easily accessible. Where they are placed behind ceilings or linings, these ceilings or linings shall be provided with an inspection hatch on which the identification number of the fire damper is marked. The fire damper identification number shall also be marked on any remote controls provided.
- (11) Ventilation ducts installed within high-risk spaces shall be of non-combustible material.
- (12) Flexible bellows of short length not exceeding 600 millimetres used for connecting fans to the ducting in air-conditioning rooms and short ducts not generally exceeding 2 metres in length and with a cross-section not exceeding  $0.02\text{m}^2$ , need not be non-combustible, subject to the following conditions:
  - (a) they shall be of a suitable material having low flame-spread characteristics and, in each case, a calorific value not exceeding  $45\text{ MJ/m}^2$  of their surface area for the thickness used.
  - (b) they shall be used only at the end of the ventilation device; and
  - (c) they shall not be situated less than 600 millimetres, measured along the duct, from an opening in an "A" or "B" class division including continuous "B" class ceilings.

- (13) Where the ducting is enclosed solely within a group of spaces confined in the same fire division category, ventilation ducts of any length need not be non-combustible, subject to meeting 14A.4(12)(a) & (c), as well as the following additional conditions:
- (a) such ducts shall not be installed within high-risk spaces (i.e. machinery spaces, tender garages, galleys, spaces containing low flash point fuels or lithium ion batteries);
  - (b) such ducting shall be compliant with Class 1 surface spread of flame criteria in accordance with BS 476 Part 7;
  - (c) ducting size shall not exceed 0.02m<sup>2</sup>;
  - (d) there is no increased risk in fire growth potential within each space concerned;
  - (e) there is no increased risk with smoke and toxic effluent generation potential for each space concerned; and
  - (f) there is no increased risk of the potential for the spread of fire, smoke or of toxic effluents from the space(s) concerned to other spaces.
- (14) Ventilation ducts shall be provided with hatches for inspection and cleaning. The hatches shall be located near the fire dampers.

***14A.5 Arrangements for 'Recreational Fire Appliances'***

- (1) 'Recreational Fire Appliances' as defined in Chapter 2, shall meet the requirements of Annex D.

***14A.6 Space Heaters***

- (1) Space heaters, if used, shall be fixed in position and so constructed as to reduce fire risks to a minimum. The design and location of these units shall be such that clothing, curtains or other similar materials cannot be scorched or set on fire by heat from the unit.

***14A.7 Fixed Fire Detection and Fire-Alarm Systems***

- (1) The purpose of this section is to detect a fire in the space of origin and to provide for an alarm for safe escape and fire-fighting activity.
- (2) A fixed fire detection and fire alarm system shall be fitted in all enclosed spaces except those containing no significant fire risk (toilets, bathrooms, void spaces, etc). Manually operated call points shall be placed effectively to ensure a readily accessible means of notification. The fixed fire detection and fire-alarm system shall be installed in accordance with the requirements of SOLAS II-2/7 and the Fire Safety Systems Code, Chapter 9, and shall be audible externally.

- (3) Sound systems used solely for entertainment purposes which may interfere with the audibility of the fire alarm system shall be automatically muted in the event that the fire alarm is activated.

***14A.8 Fixed Fire-Extinguishing Systems Not Required by this Section***

- (1) Where a fixed fire-extinguishing system not required by this Chapter, is installed, the arrangement may comply with the following requirements:
  - (a) The system may consist of a single sprinkler pump unit only. However, in such cases, a cross connection to the fire main shall be provided;
  - (b) Sprinkler pumps may be located in any space which they are not intended to protect;
  - (c) Accumulator bottles and an emergency power supply over and above that which is already required for the fire pumps are not mandatory;
  - (d) The system may be sized to supply a most hydraulically demanding area based on  $B^2$  (where B = moulded Breadth) but need not be more than 280m<sup>2</sup>;
  - (e) 125% bilge pumping for low pressure systems; and
  - (f) sprinkler heads to be of an approved type.

***14A.9 Emergency Training and Drills***

- (1) See Annex C for requirements.

***14A.10 Additional Equivalence Considerations***

- (1) None.

***14A.11 Alternative Design and Arrangements***

- (1) Vessels may follow Section 1.9 on Alternative Design and Arrangements for this chapter as allowed by SOLAS II-2/17.
- (2) The engineering analysis required by 1.9(3) shall be prepared and submitted to the Administration, based on the guidelines<sup>38</sup> and shall include, as a minimum, the following engineering analysis elements:
  - (a) determination of the ship type and space(s) concerned;

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<sup>38</sup> Refer to the Guidelines on alternative design and arrangements for fire safety (MSC/Circ.1002)

- (b) identification of prescriptive requirement(s) with which the ship or the space(s) will not comply;
- (c) identification of the fire and explosion hazards of the ship or the space(s) concerned, including:
  - (i) identification of the possible ignition sources;
  - (ii) identification of the fire growth potential of each space concerned;
  - (iii) identification of the smoke and toxic effluent generation potential for each space concerned;
  - (iv) identification of the potential for the spread of fire, smoke or of toxic effluents from the space(s) concerned to other spaces;
- (d) determination of the required fire safety performance criteria for the ship or the space(s) concerned addressed by the prescriptive requirement(s) in particular:
  - (i) performance criteria shall be based on the fire safety objectives and on the functional requirements of this chapter;
  - (ii) performance criteria shall provide a degree of safety not less than that achieved by using the prescriptive requirements; and
  - (iii) performance criteria shall be quantifiable and measurable;
- (e) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions; and
- (f) technical justification demonstrating that the alternative design and arrangements meet the required fire safety performance criteria.

## CHAPTER 14B

### STRUCTURAL FIRE PROTECTION VESSELS OF 500GT AND OVER

Objective: The purpose of this Chapter is to ensure a consistent level of structural fire protection. The principles of the section aim to achieve a level of fire protection compatible with the requirements of SOLAS for passenger ships carrying up to 36 passengers. These have been adapted where appropriate to fit the general yacht design philosophy. Much emphasis is placed on the provision of sprinkler/mist systems as trade-off for certain aspects.

#### 14B.1 General Requirements

- (1) Table 14B.1 is a guide to the major requirements of this Chapter. The table is intended as a quick reference to the requirements and is not to be used in isolation when designing the fire safety arrangements.

Table 14B.1

Form of construction (see 14B.2)	Steel or equivalent, or alternative forms of construction may be accepted subject to requirements.
Passive fire protection (see 14B.2 to 14B.8)	See Tables 14B.2 14B.3  Enclosed spaces containing vehicles or craft with lithium ion batteries shall apply MGN 681(M) as amended;
Means of escape (see 14B.12)	
Category 'A' machinery spaces Accommodation, etc.	2 (two) 2 (two)
Fixed fire detection system (see 14B.16)	Fitted in machinery spaces  Fitted in service spaces, control stations and accommodation spaces
Fire extinguishing arrangements in Category 'A' machinery spaces (see 15B)	In accordance with SOLAS II-2/10.5
Automatic sprinkler system or equivalent (see 14B.16)	Fitted in all vessels

**14B.2 Structure**

- (1) The purpose of this Chapter is to contain a fire in the space of origin. For this purpose, the following functional requirements shall be met:
  - (a) The ship shall be subdivided by thermal and structural boundaries;
  - (b) Thermal insulation of boundaries shall have due regard to the fire risk of the space and adjacent spaces;
  - (c) The fire integrity of the divisions shall be maintained at openings and penetrations.
- (2) The hull, superstructures, structural bulkheads, decks and deckhouses shall be constructed of steel or other equivalent material.
- (3) However, in cases where any part of the structure is of aluminium alloy, the following shall apply:
  - (a) Insulation of aluminium alloy components of "A" or "B" class divisions, except structure which, in the opinion of the Administration, 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. This insulation shall be applied on all sides except for the upper sides of decks and the outside of the vessel.
  - (b) Special attention shall be given to the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas, and "A" and "B" class divisions to ensure that for members:
    - (i) supporting lifeboat and liferaft areas and "A" class divisions, the temperature rise limitation specified in (a) above shall apply at the end of one hour; and
    - (ii) supporting "B" class divisions, the temperature rise limitation specified in (a) above shall apply at the end of half an hour.
  - (c) Aluminium alloy components of divisions that are required to be equivalent to steel (identified by an \* in tables 1 and 2) shall be insulated with a certified system approved for use in Aluminium A Class Bulkheads and Decks as applicable. Alternatively, such structure may be insulated with 25 millimetres of 100kg/m<sup>3</sup> mineral wool or equivalent for other insulation types, approved for use in "A" class divisions.
- (4) Composite structures:
  - (a) For composite structures, the ambient temperature to be considered for the acceptance of the fire test carried out on the sample panels for insulation systems used in Machinery spaces of Category A, shall not be less than 30 degrees Celsius.

The ambient temperature at which the sample panels are tested for insulation systems used in other spaces shall not be less than 20 degrees Celsius. The insulation shall be such that the temperature of the laminate is less than the minimum temperature of deflection under load of the resin at any time during the applicable fire exposure. The temperature of deflection under load shall be determined in accordance with the requirements of a recognised international standard. The size of the test panels and scope of approval for the insulation system regarding variations in construction shall be in accordance with the rules of a Recognised Organisation and / or MGN 407 (M+F).

- (b) This insulation shall be applied on all sides except for the upper sides of decks and the outside of the vessel.
  - (c) Special attention shall be given to the insulation of composite 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 that for members:
    - (i) supporting lifeboat and liferaft areas and "A" class divisions, the temperature rise limitation specified in (a) above shall apply at the end of one hour; and
    - (ii) supporting "B" class divisions, the temperature rise limitation specified in (a) above shall apply at the end of half an hour.
  - (d) Special attention shall be given to the fixing of fire rated doors, hatches and dampers in bulkheads and decks constructed of materials other than steel. Measures shall be taken to ensure that the temperature of the fixings when exposed to fire does not exceed the temperature at which the bulkhead itself loses strength.
- (5) Crowns and casings of a machinery space of category A shall be A60 divisions and openings therein, if any, shall be suitably arranged and protected to prevent the spread of fire.
- (6) For structures in contact with seawater, the required insulation shall extend to at least 300 millimetres below the lightest waterline.
- (7) Fire divisions using steel equivalent, or alternative forms of construction may be accepted if it can be demonstrated that the material by itself, or due to non-combustible insulation provided, has the fire resistance properties equivalent to the "A" or "B" class standard required.
- (8) Insulation required by 14B.2(7) shall be such that the temperature of the structural core does not rise above the point at which the structure would begin to lose its strength at any time during the applicable exposure to the standard fire test. For 'A' Class divisions, the applicable exposure is 60 minutes, and for 'B' Class divisions, the applicable exposure is 30 minutes.

**14B.3 Main Vertical Zones and Horizontal Zones**

- (1) 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 1 and 2.
- (2) As far as practicable, the bulkheads forming the boundaries of the main vertical zones above the bulkhead deck shall be in line with watertight subdivision bulkheads situated immediately below the bulkhead deck. The length and width of main vertical zones may be extended to a maximum of 48 metres in order to bring the ends of main vertical zones to coincide with watertight subdivision bulkheads or in order to accommodate a large public space extending for the whole length of the main vertical zone provided that the total area of the main vertical zone is not greater than 800 m<sup>2</sup> on any deck. The length or width of a main vertical zone is the maximum distance between the furthestmost points of the bulkheads bounding it.
- (3) Such bulkheads shall extend from deck to deck and to the shell or other boundaries.
- (4) When a main vertical zone is subdivided by "A" class divisions for the purpose of providing an appropriate barrier between spaces protected and not protected by a sprinkler system, the divisions shall be insulated in accordance with the fire insulation and integrity values given in tables 1 and 2.

**14B.4 Bulkheads Within a Main Vertical Zone**

- (1) All 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 14B.1 and 14B.2 except for the interior bulkheads between cabins and ensuite facilities which may be combustible.
- (2) All such divisions may be faced with combustible materials.
- (3) All corridor bulkheads, where not required to be "A" class shall be "B" class divisions which shall extend from deck to deck except:
  - (a) when continuous "B" class ceilings or linings are fitted on both sides of the bulkhead, the portion of the bulkhead behind the continuous ceilings 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 practical in the opinion of the Administration;
  - (b) the corridor bulkheads of "B" class materials may terminate at a ceiling in the corridor provided such a ceiling is of material which, in thickness and composition, is acceptable in the construction of "B" class divisions. All doors and frames in such bulkheads shall be so constructed and erected to provide a "B" class standard.

- (4) All bulkheads required to be "B" class divisions, except corridor bulkheads, shall extend from deck to deck and to the shell or other boundaries unless continuous "B" class ceilings or linings are fitted on both sides of the bulkhead, in which case the bulkhead may terminate at the continuous ceiling or lining.

**14B.5 Fire Integrity of Bulkheads and Decks**

- (1) In addition to complying with the specific provisions for fire integrity of bulkheads and decks mentioned elsewhere in this section, the minimum fire integrity of bulkheads and decks shall be as prescribed in tables 1 and 2.
- (2) The following requirements shall govern application of the tables:
- (a) Tables 14B.2 and 14B.3 shall apply respectively to the bulkheads and decks separating adjacent spaces.
- (b) 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 (9) below. 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 vessel's radio equipment.
  - Fire-extinguishing rooms.
  - Fire control rooms and fire-recording stations.
  - Control room for propulsion machinery when located outside the machinery space.
  - Spaces containing centralized fire alarm equipment.
- (2) *Corridors and lobbies*
- Passenger and crew corridors and lobbies.
- (3) *Accommodation spaces*
- Cabins, dining rooms, lounges, offices, pantries containing no cooking appliances<sup>39</sup>, and similar spaces.
- (4) *Stairways*
- Interior stairways, lifts, dumb waiters and escalators (other than those wholly contained within the machinery space(s)) and enclosures thereto.

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<sup>39</sup> Refer to MSC/Circ.1120 Unified interpretations of SOLAS Chapter II-2, the Fire Safety Systems Code, the Fire Test Procedures Code and related fire test procedures

- 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, spaces dedicated exclusively to the storage of AV/IT racks and store-rooms (including refrigerator and cold rooms) not having provisions for the storage of flammable liquids and having areas less than 4m<sup>2</sup>, drying rooms and laundries, and spaces containing Marine Evacuation Systems
- (6) *Machinery spaces of category A*
- Spaces so defined.
- (7) *Other machinery spaces*
- Spaces so defined, excluding machinery spaces of category A.
  - Sprinkler, drencher or fire pump spaces.
- (8) *Service spaces (high risk)*
- Galleys, pantries containing cooking appliances, paint lockers, spaces dedicated exclusively to the storage of AV/IT racks and store-rooms (including refrigerator and cold rooms) having areas of 4m<sup>2</sup> or more, spaces for the storage of flammable liquids, workshops other than those forming part of the machinery spaces, and spaces containing vehicles or craft with fuel in their tanks (garages), or lockers storing such fuels storage lockers for gaseous fuels for domestic purposes. Storage lockers containing compressed gas (including breathing air, oxygen and enriched air (nitrox)). Lockers having an area less than 4m<sup>2</sup> containing compressed air used solely by firefighting teams may be considered as Category 5.
- (9) *Open decks*
- Open deck spaces and enclosed promenades having no fire risk. Air spaces (the space outside the hull above the uppermost load line, superstructures and deckhouses).
- (3) 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.
- (4) External boundaries which are required to be of steel or other equivalent material may be pierced for the fitting of windows and portholes provided that there is no requirement for such boundaries to have "A" class integrity elsewhere in this section. Similarly, in such boundaries which are not required to have "A" class integrity, doors may be of combustible materials, substantially constructed.

- (5) Atriums shall be within enclosures formed of “A” class divisions having a fire rating determined in accordance with Table 14B.3.
- (6) Decks separating spaces within atriums shall have a fire rating determined in accordance with Table 14B.3.
- (7) For other spaces which span multiple decks, deck integrity shall be maintained at each deck level. Table 14B.3 shall therefore be used to determine the required bulkhead rating for all vertical boundaries of the multi deck space, which shall be regarded as the space below when using the deck table. Each deck within such spaces shall be steel or equivalent material.
- (8) Enclosed spaces containing lithium ion batteries shall be insulated in accordance with the requirements of ‘MGN 681(M) Fire safety and storage of small electric powered craft on yachts’ as amended.

Table 14B.2 - Fire Integrity of Bulkheads Separating Adjacent Spaces

Spaces	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Control stations (1)	A-0 <sub>c</sub>	A-0	A-60	A-0	A-15	A-60	A-15	A-60	*
Corridors and lobbies (2)		C <sub>d</sub>	B-0 <sub>d</sub>	A-0 <sub>a</sub> B-0 <sub>d</sub>	B-0 <sub>d</sub>	A-60	A-0	A-0	*
Accommodation spaces (3)			C <sub>dh</sub>	A-0 <sub>af</sub> B-0 <sub>d</sub>	B-0 <sub>d</sub>	A-60	A-0	A-0	*
Stairways (4)				A-0 or C <sub>a</sub> B-0 <sub>d</sub>	A-0 <sub>a</sub> B-0 <sub>d</sub>	A-60	A-0	A-0	*
Service spaces (low risk) (5)					C <sub>d</sub>	A-60	A-0	A-0	*
Machinery spaces of category A (6)						*	A-0	A-60	*
Other machinery spaces (7)							A-0 <sub>b</sub>	A-0	*
Service spaces (high risk) (8)								A-0 <sub>b</sub>	*
Open decks (9)									

Table 14B.3 - Fire Integrity of Decks Separating Adjacent Spaces

Spaces above Spaces below	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Control stations (1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	*
Corridors and lobbies (2)	A-0	*g	*g	A-0	*g	A-60	A-0	A-0	*
Accommodation spaces (3)	A-60	A-0	*g	A-0	*g	A-60	A-0	A-0	*
Stairways (4)	A-0	A-0	A-0	*g	A-0	A-60	A-0	A-0	*
Service spaces (low risk) (5)	A-15	A-0	A-0	A-0	*g	A-60	A-0	A-0	*
Machinery spaces of category A (6)	A-60	A-60	A-60	A-60	A-60	*g	A-60 <sub>e</sub>	A-60	*
Other machinery spaces (7)	A-15	A-0	A-0	A-0	A-0	A-0	*g	A-0	*
Service spaces (high risk) (8)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	A-0	*
Open decks (9)	*	*	*	*	*	*	*	*	-

Notes: To be applied to both Tables 14B.2 and 14B.3, as appropriate.

- a For clarification on which applies, see 14B.6.
- b Where spaces are of the same numerical category and subscript 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 Bulkheads separating the wheelhouse and chartroom from each other may be "B-0" rating.
- d For the application of 14B.3(1), "B-O" and "C", where appearing in table 14B.2, shall be read as "A-0".
- e Fire insulation need not be fitted if the machinery space in category (7), in the opinion of the Administration, has little or no fire risk
- f For Spaces located entirely within the "A" Class boundaries of a stairway enclosure, see 14B.10(7).
- g For the application of 14B.3(1) an asterisk, where appearing in table 14B.2, (except for category (9)), shall be read as "A-0".
- h Bathrooms / Ensuites with direct access to a suite or cabin may be considered as part of it. In such cases, the vertical boundary between the suite and the bathroom need not be C Class
- \* 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.

***14B.6 Protection of Stairways, Lifts and Dumb Waiters in Accommodation and Service Spaces***

- (1) A stairway shall be of steel frame construction except where the Administration sanctions the use of other equivalent material, and shall be within enclosures formed of "A" class divisions, with positive means of closure at all openings, except that:
  - (a) An isolated stairway which penetrates a single deck only may be protected at one level only by at least "B" class divisions and self-closing door(s);
  - (b) Stairways may be fitted in the open in a public space, provided they lie wholly within such public space; and
  - (c) When located within the same fire zone, multiple staircases or lifts may be contained within a single "A" Class trunk, with the provision of "C" Class bulkheads between the staircases or lifts.
  
- (2) A stairway enclosure shall have direct communication with the corridors and be of sufficient area to prevent congestion, having in view the number of persons likely to use them in an emergency. Stairway enclosures shall not give direct access to galleys, machinery spaces, high or low risk service spaces (except for lockers of non-combustible material providing storage for non-hazardous equipment / materials and safety equipment). Direct access to cabins shall be avoided where practicable. In cases where it is not practicable to provide a lobby between a cabin and a stairway enclosure the following conditions/limitations should be met;
  - (a) The cabins shall be located no more than one deck below the main / bulkhead deck;
  - (b) Direct access to the open deck shall be provided at main / bulkhead deck level;
  - (c) Activation of a smoke detector head in the stairway enclosure or any cabin with direct access into the stairway enclosure shall automatically activate the fire alarm (without delay) in all cabins that have direct access to the stairway;
  - (d) The cabin doors shall be A-class self-closing, without hold-backs, and are to be provided with open / closed indication on the fire door indication panel.
  
- (3) A lift trunk shall be so fitted to prevent the passage of flame from one 'tween-deck to another and shall be provided with means of closing 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 or equivalent boundaries, except that small passages for lift cables are permitted.
  
- (4) Dumb waiters shall be regarded as lifts.

- (5) Within the interior of the vessel, the masts of sailing yachts shall either be insulated to A-60 class requirements or contained within a space dedicated to the protection of the mast only and insulated as follows:
  - (a) A-30 when adjacent to spaces of category (1), (2),(3),(4) and (9);
  - (b) A-60 when adjacent to spaces of category (5), (6), (7) or (8).
- (6) Standing and running rigging shall not be located or terminated in spaces of category (5), (6), (7) or (8). Where this is proven to be technically unfeasible, the rigging shall be locally protected to A-60 class.

**14B.7 Openings in "A" Class Divisions**

- (1) Except for hatches between store and baggage spaces, and between such spaces and the weather decks, all 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.
- (2) The construction of all doors and door frames in "A" class divisions, with the means of securing them when closed, shall provide resistance to fire as well as the passage of smoke and flame, as follows:
  - (a) Doors in "A" Class divisions shall comply with the Fire Test Procedures Code, Annex 1, Part 3.
  - (b) Doors approved without the sill being part of the frame, shall be installed such that the gap under the door does not exceed 12 millimetres. A non-combustible sill shall be installed under the door such that floor coverings do not extend beneath the closed door, except where it can be demonstrated that the flooring is not readily ignitable when tested in accordance with Sections 4.1.1 & 4.1.2 of MSC/Circ.1006. The maximum time for the flame to extinguish under the aforementioned test conditions shall not be more than 20 seconds in accordance with the definition provided in Chapter 2. Alternatively, floor coverings certificated in accordance with Annex 1, Part 5 of the IMO's 2010 FTP Code (Test for Surface Flammability) may be accepted.
  - (c) In addition to those doors referred to in 14B.7(4)(a) below, the following "A" Class doors shall be self-closing:
    - (i) doors fitted in boundary bulkheads of machinery spaces;
    - (ii) doors in stairways and lift trunks which penetrate more than a single deck;
    - (iii) any other doors which are provided with electrically actuated hold backs arranged to release upon activation of the fire detection system.
  - (d) Sliding steel watertight doors need not be insulated.

- (e) Where 'double door' arrangements are provided (i.e. a sliding watertight door with a secondary acoustic / privacy door installed on one side of the same door opening), such secondary doors shall be fire rated to the same standard as the bulkhead in which it is installed. Alternatively, the opening and closing mechanism for the watertight door shall be protected from the effects of fire as far as is reasonable and practicable. 'Triple door' arrangements consisting of a watertight, fire rated and decorative door being provided for a single door opening are prohibited.
- (3) It shall be possible for each door to be opened and closed from each side of the bulkhead by one person only.
- (4) 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:
- (a) the doors shall be self-closing and be capable of closing with an angle of inclination of up to 3.5° opposing closure;
  - (b) the approximate time of closure for hinged fire doors shall be no more than 40 seconds and no less than 10 seconds from the beginning of their movement with the ship in the 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 the upright position;
  - (c) 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 also be capable of release, individually, from a position at the door. Release switches shall have an on-off function to prevent automatic resetting of the system;
  - (d) hold-back hooks not subject to central control station release are prohibited;
  - (e) 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;
  - (f) indication shall be provided at the fire door indicator panel in the continuously manned central control station whether each door is closed;
  - (g) the release mechanism shall be so designed that the door shall automatically close in the event of disruption of the control system or central power supply;
  - (h) 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;

- (i) disruption of the control system or central power supply at one door shall not impair the safe functioning of the other doors;
  - (j) remote-released sliding or power-operated doors shall be equipped with an alarm that sounds at least 5 seconds but no more than 10 seconds after the door being released from the central control station and before the door begins to move and continues sounding until the door is completely closed;
  - (k) a door designed to re-open upon contacting an object in its path shall re-open not more than 1 metre from the point of contact;
  - (l) 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;
  - (m) the components of the local control system shall be accessible for maintenance and adjusting; and
  - (n) 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:
    - (i) the control system shall be able to operate the door at the temperature of at least 200°C for at least 60 minutes, served by the power supply;
    - (ii) the power supply for all other doors not subject to fire shall not be impaired; and
    - (iii) 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.
- (5) Where 'A' Class divisions are penetrated for the passage of electric cables, pipes, trunks, ducts, etc., or for girders, beams or other structural members, arrangements shall be made to ensure that the fire resistance is not impaired.

**14B.8**    *Openings in "B" Class Divisions*

- (1) 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 as follows:
  - (a) Doors in "B" Class divisions shall comply with the Fire Test Procedures Code, Annex 1, Part 3;
  - (b) Ventilation opening may be permitted in the lower portion of such doors. When such an opening is in or under a door the total net area of the opening(s) shall not exceed 0.05m<sup>2</sup>. When such an opening is cut in a door it shall be fitted with a grill made of non-combustible material.

- (c) Doors approved as “B” Class without the sill being part of the frame, shall be installed such that the gap under the door does not exceed 25 millimetres.
- (2) The following “B” Class doors shall be self-closing:
  - (a) Cabin doors;
  - (b) Doors in one tween-deck space of a stairway when connecting only two decks;
  - (c) Any other doors which are provided with electrically actuated hold backs arranged to release upon activation of the fire detection system.
- (3) 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 ensure that the fire resistance is not impaired.

**14B.9**     *Windows and Portlights (Also see 5.4 and 5.5)*

- (1) All windows and portlights in bulkheads within accommodation spaces, service spaces and control stations shall be so constructed to preserve the integrity requirements of the type of bulkheads in which they are fitted.
- (2) 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.

**14B.10**    *Details of Construction*

- (1) In accommodation and service spaces, control stations, corridors and stairways:
  - (a) air spaces enclosed behind ceilings, panelling or linings shall be suitably divided by close-fitting draught stops not more than 14 metres apart; and
  - (b) in the vertical direction, enclosed air spaces, including those behind linings of stairways, trunks, etc. shall be closed at each deck.
- (2) The draught stops shall be non-combustible and are to form a continuation above the ceiling of the bulkhead below or the other side of the panelling or lining to the bulkhead, as far as possible.
- (3) Where the structure or 'A' Class divisions are required to be insulated, it shall be ensured that the heat from a fire is not transmitted through the intersections and terminal points of the divisions or penetrations to uninsulated boundaries. Where the insulation installed does not achieve this, arrangements shall be made to prevent this heat transmission by insulating the horizontal and vertical boundaries or penetrations for a distance of 450 millimetres.

- (4) Without impairing the efficiency of the fire protection, the construction of ceilings and bulkheads shall allow a fire patrol to detect any smoke originating in concealed and inaccessible places, except where there is no risk of fire originating in such places.
- (5) When gaseous fuel is used for domestic purposes, the arrangements for the storage, distribution and utilisation of the fuel shall be such that, having regard to the hazards of fire and explosion which the use of such fuel may entail, the safety of the vessel and the persons onboard are preserved.
- (6) Open flame gas appliances provided for cooking, heating or any other purposes, shall comply with the requirements of EC directive 90/396/EEC or equivalent and, the installation of open flame gas appliances shall comply with the appropriate provisions of Annex D.
- (7) Where toilets providing little or no fire risk and lockers providing storage for safety equipment only, are located entirely within the "A" Class boundaries of a stairway enclosure, these spaces are not required to be treated as separate Category Spaces and in such cases, the provision of "C" Class bulkheads between these spaces and the stairway enclosure are considered acceptable.
- (8) Where it is technically unfeasible to insulate the internal surfaces of aluminium or composite shell doors to 'steel equivalent' due to the geometry of the internal stiffening and / or closing and locking arrangements, increased fixed fire extinguishing arrangements shall be provided in lieu to the satisfaction of the Administration.

**14B.11 Restricted Use of Combustible Materials**

- (1) Except in spaces protected by an automatic sprinkler system and fully addressable fire detection system in accordance with 14B.16, all linings, grounds and ceilings shall be of non-combustible materials. However, the use of combustible linings, grounds and ceilings in Machinery Spaces is prohibited.
- (2) Insulation materials including those used for ventilation ducts, shall be non-combustible, however core insulation of refrigerator and cold rooms need not be. Vapour barriers and adhesives used in conjunction with insulation, as well as insulation of plenum chambers installed entirely within the boundaries of a single space, pipe fittings for cold service systems and domestic water need not be non-combustible, but they shall be kept to the minimum quantity practicable and their exposed surfaces shall have low flame spread characteristics.
- (3) Pipes penetrating 'A' or 'B' Class divisions shall be of approved materials having regard to the temperature such divisions are required to withstand.
- (4) Pipes conveying oil or combustible liquids through accommodation and service spaces shall be of approved materials having regard to the fire risk.

- (5) Materials readily rendered ineffective by heat are not to 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 the danger of flooding.
- (6) Furniture in the corridors and escape routes shall be of a type and quantity not likely to obstruct access. Additionally, furniture along escape routes shall be secured in place to prevent shifting if the vessel rolls or lists.
- (7) Primary deck coverings within accommodation spaces cabin balconies, service spaces and control stations shall be of a type which shall not readily ignite, or give rise to toxic or explosive hazards at elevated temperatures. Reference is also to be made to the Fire Test Procedures Code, Annex 1, Parts 2 and 5.
- (8) Upholstery, bedding components and suspended textiles required to comply with the Fire Test Procedures Code or an equivalent standard shall be clearly labelled by the manufacturer stating the standard that they meet and any washing or cleaning instructions needed to ensure they remain fire retardant. These labels are not to be removed.
- (9) In spaces where penetration of oil products is possible, the surface of insulation shall be impervious to oil or oil vapours. Insulation boundaries shall be arranged to avoid immersion in oil spillages so far as is practicable.

**14B.12 Means of Escape**

- (1) The purpose of this Section is to provide means of escape so that persons onboard can safely and swiftly escape to the lifeboat and liferaft embarkation deck. For this purpose, the following functional requirements shall be met:
  - (a) Safe escape routes shall be provided;
  - (b) Escape routes shall be maintained in a safe condition, clear of obstacles; and
  - (c) Additional aids for escape shall be provided as necessary to ensure accessibility, clear marking, and adequate design for emergency situations.
- (2) Provisions to satisfy the above referenced requirements shall include but not be limited to the following:
  - (a) Deck hatches used for escape purposes as well as routine access / egress shall be provided with at least one deck stanchion per hatch.
  - (b) Interior and exterior power operated doors installed in any possible escape route shall be provided with both a main and emergency source of power unless capable of manual operation from both sides.
- (3) Stairways and ladders shall be arranged to provide ready means of escape to the lifeboat and liferaft embarkation deck from all passenger and crew accommodation spaces and service spaces in which the crew are normally employed, other than machinery spaces. In particular, the following provisions shall be complied with:

- (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, main vertical zone or similarly restricted group of spaces. Exceptionally one of the means of escape may be dispensed with, due regard being paid to the nature and location of spaces and to the number of persons who might normally be accommodated or employed there.
- (b) Above the bulkhead deck, there shall be at least two means of escape from each vertical fire zone or similarly restricted spaces or group of spaces, at least one of which is to give access to a readily accessible escape which shall provide continuous fire shelter from the level of its origin to the appropriate survival craft embarkation deck.
- (c) Within each main vertical zone there shall be at least one readily accessible enclosed stairway providing continuous fire shelter, where practical, at all levels up to the appropriate lifeboat and liferaft embarkation decks or the highest level served by the stairway, whichever level is the highest. The width, number and continuity of the stairways shall be satisfactory for the number of persons likely to use them.
- (d) Vessels of 5000GT and over and less than 10,000GT with crew accommodation provided below the level of the bulkhead deck that does not comply with standard A3.1 of the MLC shall, in addition to the facilities contained in 21B.8(6)(a), be arranged to ensure a ready means of access to an enclosed stairway enclosure, without the need to pass through more than one watertight door. Such enclosures shall provide a continuous fire shelter from their level of origin to the open deck upon which the muster station is located, or the highest level served by the stairway (whichever is highest).
- (e) Access from the stairway enclosures to the lifeboat and liferaft embarkation areas shall avoid high fire risk areas.
- (f) Stairways serving only a space and a balcony in that space shall not be considered as forming one of the required means of escape.
- (g) Non-load bearing partial bulkheads which separate adjacent cabin balconies and / or windbreaks / privacy screens provided on open deck areas shall be capable of being opened from each side when the vessel is in the dead ship condition for the purpose of escape and access / egress during firefighting and search and rescue activities.
- (h) If a radio room or wheelhouse has no direct access to the open deck, two means of escape shall be provided, one of which may be a window of sufficient size or another means.
- (i) Stairways are not to exceed 3.5 metres vertical rise without the provision of a landing.

- (j) In the case where direct access to the appropriate survival craft embarkation deck as required by (a) and (b) is not practical, a ready accessible escape which shall provide continuous fire shelter from the level of its origin to the appropriate open deck with subsequent direct passage to the embarkation deck can be accepted provided that these escape routes including external staircases, have emergency lighting and slip free surfaces under foot.
  - (k) 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 14B.2 and 14B.3, as appropriate.
  - (l) Where public spaces span three or more open decks and contain combustibles such as furniture and give access to other enclosed spaces, each level within the space shall have two means of escape, one of which is to give access to a readily accessible escape which shall provide continuous fire shelter from the level of its origin to the appropriate survival craft embarkation deck.
- (4) Two means of escape shall be provided from each machinery space. In particular, the following provisions shall be complied with:
- (a) The two means of escape shall consist of either:
    - (i) 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 survival craft embarkation decks. One of these ladders shall provide continuous fire shelter from the lower part of the space to a safe position outside the space. This shelter shall be of steel or equivalent material, insulated where necessary, and provided with a self-closing door at the lower end. If access is provided at other levels each level shall be provided with a steel or equivalent material self-closing door; or
    - (ii) 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.
    - (iii) all inclined ladders and stairways fitted with open treads in machinery spaces being part of or providing access to escape routes, but not located within a protected enclosure, are to be fitted with steel shields attached to their undersides.
  - (b) One of the means of escape from any such space required by 14B.12(4)(a) may be dispensed with on sailing vessels with small machinery spaces, so long as either a door or a steel ladder and walkways provide a safe escape route to the embarkation

deck with due regard being paid to the nature and location of the space and whether persons are normally employed in that space.

- (c) Two means of escape shall be provided from an engine / machinery control room<sup>40</sup> located within a machinery space, at least one of which shall provide continuous fire shelter to a safe position outside the machinery space. Where the size of the engine / machinery control room results in the provision of an enclosed trunk being unfeasible and the control room is located no more than one deck below the main deck, the secondary means of escape may be via a fixed steel ladder leading directly to the open deck. In such cases, the boundaries of the engine / machinery control room shall be constructed from steel or equivalent material. Windows may be permitted but shall not be located in way of the ladder.
- (d) Two means of escape shall be provided from the main workshop within a machinery space. At least one of these escape routes shall provide a continuous fire shelter to a safe position outside the machinery space.
- (5) Lifts shall not be considered as forming one of the required means of escape.
- (6) In exceptional circumstances, a single means of escape may be accepted for spaces other than accommodation spaces that are entered only occasionally, if the escape route does not pass through a galley, machinery space or watertight door.
- (7) Adequate deck area shall be provided at muster stations and embarkation areas having due regard to the expected number of persons. Generally, 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 0.35m<sup>2</sup> per person.
- (8) Emergency lighting shall be provided in accordance with the requirements of SOLAS II-1/42.2.1.

### ***14B.13 Arrangement of Escape Routes***

- (1) Stairways and corridors used as means of escape shall be not less than 700 millimetres in clear width and shall have a handrail on one side. Stairways and corridors with a clear width of 1,800 millimetres and over shall have handrails on both sides. "Clear width" is considered the distance between the handrail and the bulkhead on the other side or between the handrails.
- (2) The angle of inclination of stairways shall be, in general, 45°, but not greater than 50°, and in machinery spaces and small spaces not more than 60°.

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<sup>40</sup> See MSC.1/Circ.1511 Unified Interpretations of SOLAS II-2/9 and II-2/13 for the definition of a "machinery control room" and the interpretation of clear width for escape trunks

- (3) Doorways which give access to a stairway shall be at least the minimal required width for the stairway being served.
- (4) Hatches in both bulkheads and decks shall be not less than 600 x 600 millimetres in clear width<sup>41</sup> and be provided with a means of being secured in the open position. Vertical escape hatches which are also used for routine access / egress shall be provided with at least one deck stanchion per hatch.
- (5) Where (1) to (4) cannot be reasonably achieved, alternatives may be agreed by the Administration.
- (6) All doors in escape routes shall be openable from either side. In the direction of escape they are all to be openable without a key. All handles on the inside of weathertight doors and hatches shall be non-removable. Where doors are lockable measures to ensure access from outside the space shall be provided for rescue purposes.
- (7) Doors in escape routes shall, in general, open in way of the direction of the primary means 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.

#### ***14B.14 Emergency Escape Breathing Devices***

- (1) Emergency escape breathing devices (EEBD's) shall comply with the Fire Safety Systems Code. At least one spare emergency escape breathing device shall be kept onboard.
- (2) All vessels shall carry at least two EEBD's within accommodation spaces, and at least two EEBD's shall be carried in each main vertical zone.
- (3) On all vessels, within the machinery spaces, EEBD's shall be situated ready for use at easily visible locations, which can be reached quickly and easily at any time in the event of fire. The number and location shall take into account the layout of the machinery space and the number of persons normally working in the space. The number and location of these devices shall be indicated in the fire control plan.

#### ***14B.15 Ventilation Systems***

- (1) Ventilation ducts and any insulation materials shall be of non-combustible material except flexible bellows of short length not exceeding 600 millimetres used for connecting fans to the ducting in air-conditioning rooms. Short ducts, however, not generally

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<sup>41</sup> See MSC.1/Circ.1511 Unified Interpretations of SOLAS II-2/9 and II-2/13 for the definition of a "machinery control room" and the interpretation of clear width for escape trunks

exceeding 2 metres in length and with a cross-section not exceeding 0.02m<sup>2</sup> need not be non-combustible, subject to the following conditions:

- (a) they shall be of a suitable material having regard to the risk of fire;
  - (b) they shall be used only at the end of the ventilation device; and
  - (c) they shall not be situated less than 600 millimetres, measured along the duct, from an opening in an "A" or "B" class division including continuous "B" class ceilings.
  - (d) A re-circulation air duct located entirely within the boundaries of a single space need also not be non-combustible subject to compliance with the IMO's FTP Code, Annex 1, Parts 2 and 5.
- (2) Ducts passing through "A" class divisions shall meet the following requirements:
- (a) where a thin plated duct with a free cross sectional area equal to, or less than, 0.02 m<sup>2</sup> passes through "A" class divisions, the opening shall be fitted with a steel sheet sleeve having a thickness of at least 3 millimetres and a length of at least 200 millimetres, divided preferably into 100 millimetres on each side of 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<sup>2</sup>, but not more than 0.075 m<sup>2</sup>, pass through "A" class divisions, the openings shall be lined with steel sheet sleeves. The ducts and sleeves shall have a thickness of at least 3 millimetres and a length of at least 900 millimetres. When passing through bulkheads, this length shall be divided preferably into 450 millimetres on each side of the bulkhead. These ducts, or sleeves lining such ducts, shall be provided with fire insulation. The insulation shall have at least the same fire integrity as the division through which the duct passes; and
  - (c) automatic fire dampers shall be fitted in all ducts with a free cross-sectional area exceeding 0.075 m<sup>2</sup> that pass through "A" class divisions. Each damper shall be fitted close to the division penetrated and the duct between the damper and the division penetrated shall be constructed of steel in accordance with Sections 14B.15(5)(a) and (b). The fire damper shall operate automatically, but shall also be capable of being closed manually from both sides of the division. The damper shall 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<sup>2</sup> shall 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
- (3) Ducts provided for the ventilation of machinery spaces of category A, galleys or spaces containing vehicles or craft with fuel in their tanks shall not pass through accommodation spaces, service spaces, or control stations unless they comply with Section 14B.15(5).

- (4) Ducts provided for the ventilation of accommodation spaces, service spaces or control stations shall not pass through machinery spaces of category A, spaces that are considered as ventilation ducts leading to machinery spaces of category A, galleys or spaces containing vehicles or craft with fuel in their tanks unless they comply with Section 14B.15(5).
- (5) As permitted by Sections 14B.15(3) and 14B.15(4) ducts shall be either:
- (a) constructed of steel having a thickness of at least 3 millimetres for ducts with a free cross-sectional area of less than 0.075 m<sup>2</sup>, at least 4 millimetres for ducts with a free cross-sectional area of between 0.075 m<sup>2</sup> and 0.45 m<sup>2</sup>, and at least 5 millimetres for ducts with a free cross-sectional area of over 0.45 m<sup>2</sup>;
  - (b) suitably supported and stiffened;
  - (c) fitted with automatic fire dampers close to the boundaries penetrated; and
  - (d) insulated to "A-60" class standard from the boundaries of the spaces they serve to a point at least 5 metres beyond each fire damper;
- or
- (e) constructed of steel in accordance with Sections 14B.15(5)(a) and (b); and
  - (f) 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 SOLAS II-2/9.2.2.3.2.2.
- (6) For the purposes of Sections 14B.15(5)(d) and 14B.15(5)(f), ducts shall 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 it, shall be considered to pass through the specified space, and shall be insulated over the surface they share with the space for a distance of 450 millimetres past the duct<sup>42</sup>.
- (7) Ventilation ducts with a free cross-sectional area exceeding 0.02m<sup>2</sup> passing through "B" class bulkheads shall be lined with steel sheet sleeves of 900 millimetres in length divided preferably into 450 millimetres on each side of the bulkheads, unless the duct is of steel for this length.
- (8) For a control station outside machinery spaces and other normally manned control stations, practical measures shall be taken to ensure that ventilation, visibility and freedom from smoke are maintained so that, in the event of fire, the machinery and equipment contained in the control station may be supervised and continue to function effectively. Alternative and separate means of air supply shall be provided; air inlets of the two sources of supply shall be so disposed that the risk of both inlets drawing in smoke simultaneously is minimized. These requirements need not apply to control

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<sup>42</sup> Sketches of such arrangements are contained in the Unified Interpretations of SOLAS chapter II-2 (MSC.1/Circ.1276).

stations situated on, and opening on to, an open deck, or where local closing arrangements would be equally effective.

- (9) Exhaust duct(s) from a galley range shall be fitted with:
- (a) a grease trap readily removable for cleaning;
  - (b) arrangements for shutting off the exhaust fans;
  - (c) where passing through accommodation spaces and/or spaces containing combustible materials, exhaust duct(s) shall be constructed of "A" class divisions. In addition to the requirements of 14B.15(3) an exhaust duct shall be fitted with:
    - (i) a fire damper located in the lower end of the duct and in addition, a fire damper in the upper end of the duct (if required for the extinguishing medium). The upper fire damper may be arranged to act as one of the fire dampers referred to in 14B.15(5)(c);
    - (ii) fixed means for extinguishing a fire within the duct; and
    - (iii) local controls to activate the extinguishing system, stop the fans and close the fire dampers shall be grouped in one position immediately outside the main entrance to the galley.
- (10) Where it is necessary that a ventilation duct passes through a main vertical zone division, an automatic 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 control location shall be readily accessible and be clearly and prominently marked. The duct between the division and the damper shall be constructed of steel in accordance with 14B.15(5)(a) and (b) and insulated to at least the same fire integrity as the division penetrated. The damper shall be fitted on at least one side of the division with a visible indicator showing the operating position of the damper.
- (11) Inlets and outlets of ventilation systems shall be capable of being closed from outside the space being ventilated. The means of closing shall be easily accessible as well as prominently and permanently marked and shall indicate the operating position of the closing device.
- (12) Power ventilation of accommodation spaces, service 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. The means provided for stopping the power ventilation of a machinery space shall be entirely separate from the means provided for stopping ventilation of other spaces.

- (13) Atriums shall be equipped with a smoke extraction system<sup>43</sup>. The smoke extraction system shall be activated by the required smoke detection system and be capable of manual control. The fans shall be sized such that the entire volume within the space can be exhausted in 10 minutes or less.
- (14) Store-rooms containing highly flammable products shall be provided with ventilation arrangements that are separate from other ventilation systems. Ventilation shall be arranged to prevent the build up of flammable vapours at high and low levels. The inlets and outlets of ventilators shall be positioned so that they do not draw from or vent into an area which would cause undue hazard, and shall be fitted with spark arresters.
- (15) Ventilation systems serving Category 'A' machinery spaces shall be independent of systems serving other spaces.
- (16) All enclosed spaces containing free standing fuel tanks shall be ventilated independently of systems serving other spaces.
- (17) Ventilation shall be provided to prevent the accumulation of dangerous concentrations of flammable gas which may be emitted from batteries.
- (18) Ventilation openings may be fitted in and under the lower parts of cabin and public space doors in corridor bulkheads. The total net area of any such openings is not to exceed 0.05m<sup>2</sup>.
- (19) For spaces containing vehicles or craft with fuel in their tanks or lockers storing such fuels, see 14.1. For additional requirements for the ventilation of domestic gaseous fuel, see Annex D for Recreational Fire Appliances.
- (20) Exhaust ducts from laundries shall be fitted with filters readily removable for cleaning purposes.
- (21) The following arrangements shall 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 dampers located at the lower end of the duct in exhaust ducts for galley ranges, which shall be of steel and capable of stopping the draught in the duct; and
  - (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.
- (22) Fire dampers shall be easily accessible. Where they are placed behind ceilings or linings, these ceilings or linings shall be provided with an inspection hatch on which the

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<sup>43</sup> Refer to MSC/Circ.1034 Guidelines for Smoke Control and Ventilation Systems for Internal Assembly Stations and Atriums on New Passenger Ships.

identification number of the fire damper is marked. The fire damper identification number shall also be marked on any remote controls provided.

- (23) Ventilation ducts shall be provided with hatches for inspection and cleaning where practicable. The hatches shall be located near the fire dampers.
- (24) Combustible gaskets in flanged ventilation duct connections shall not be permitted within 600 millimetres of openings in "A" or "B" class divisions and in ducts required to be of "A" class construction.
- (25) Ventilation openings or air balance ducts between two enclosed spaces shall not be provided except as permitted by Section 14B.8(1)(b).
- (26) All fire dampers shall be capable of manual operation. The dampers shall have a direct mechanical means of release or, alternatively, be closed by electrical, hydraulic, or pneumatic operation. All dampers shall be manually operable from both sides of the division. Automatic fire dampers, including those capable of remote operation, shall have a failsafe mechanism that shall close the damper in a fire even upon loss of electrical power or hydraulic or pneumatic pressure loss. Remotely operated fire dampers shall be capable of being reopened manually at the damper.
- (27) Where a ventilation room serves only such an adjacent machinery space and there is no fire division between the ventilation room and the machinery space, the means for closing the ventilation duct or ducts serving the machinery space shall be located outside of the ventilation room and machinery space.
- (28) Where a ventilation room serves such a machinery space 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 or ducts for the machinery space can be located in the ventilation room.

***14B.16 Fixed Fire Detection and Fire Alarm Systems and Automatic Sprinkler, Fire Detection and Fire Alarm Systems***

- (1) The purpose of this section is to detect a fire in the space of origin and to provide for alarm for safe escape and fire-fighting activity. For this purpose, the following functional requirements shall be met:
  - (a) fixed fire detection and fire alarm system installations shall be suitable for the nature of the space, fire growth potential and potential generation of smoke and gases;
  - (b) fixed fire detection and fire alarm system installations shall not be arranged to automatically release watertight doors acting as fire doors;
  - (c) manually operated call points shall be placed effectively to ensure a readily accessible means of notification and

- (d) sound systems used solely for entertainment purposes which may interfere with the audibility of the fire alarm system shall be automatically muted in the event that the fire alarm is activated.
- (2) All control stations, accommodation and service spaces, including corridors and stairways, except spaces which afford no substantial fire risk such as void spaces and sanitary spaces, shall be provided throughout with:
- (a) an automatic sprinkler where the pumps and alternative supply components shall be capable of supplying the required flow rate and pressure for the space with the greatest hydraulic demand<sup>44</sup>. For the purposes of this calculation, the design area used to calculate the required flow and pressure shall be the deck area of the most hydraulically demanding space, separated from adjacent spaces by “A” class divisions. The design area need not exceed 280 m<sup>2</sup>. For application to a small ship with a total protected area of less than 280 m<sup>2</sup>, the Administration may specify the appropriate area for sizing of pumps and alternate supply components;
  - (b) sprinkler heads or their equivalent, shall be arranged to help protect the openings of multi deck spaces to mitigate the transmission of heat, smoke and flame from below. Where the capacity of a fixed firefighting system is insufficient to protect an opening in the deck, additional sprinkler heads or their equivalent shall be placed close to its boundaries. The installation height, number and spacing of the sprinkler heads or their equivalent shall be in accordance with the details stated in the certificate of type approval;
  - (c) a fixed pressure water-spraying fire-extinguishing system complying with the provisions of the Fire Safety Systems Code shall be installed on cabin balconies;
  - (d) a fully addressable fire detection and fire alarm system of an approved type complying with the requirements of the Fire Safety Systems Code, Chapter 8 and 9, or an equivalent standard acceptable to the Administration.
- (3) A fixed fire detection and fire alarm system shall be fitted in all enclosed spaces except those containing no significant fire risk (toilets, bathrooms, void spaces, etc) and cabin balconies. Ceiling void spaces containing equipment that could present a fire risk shall be fitted with a fixed fire detection and fire alarm system. Manually operated call points shall be placed to ensure a readily accessible means of notification. The fixed fire detection and fire-alarm system shall be installed in accordance with the requirements of SOLAS II-2/7 and the Fire Safety Systems Code, Chapter 9, and shall be audible externally.
- (4) Spaces which span multiple decks shall be fitted with an audible alarm that provides immediate notification of a detector head having been activated in the space(s) below.

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<sup>44</sup> Refer to IMO MSC.1/Circ.1556

**14B.17 Public Address System**

- (1) For vessels having a length of 85 metres or more, a public address system complying with the requirements of SOLAS III/6.5 shall be available throughout the accommodation and service spaces and control stations and open decks.
- (2) Sound systems used solely for entertainment purposes which may interfere with the audibility of the public address system shall be automatically muted whenever an announcement is being made.

**14B.18 Oil Fuel Arrangements**

- (1) Arrangements for the storage, distribution and utilisation of oil fuel shall be such as to minimise the risk of fire or explosion.
- (2) As far as practicable, oil fuel tanks shall be part of the vessel's structure and shall be located outside Category 'A' machinery spaces.
- (3) Where oil fuel tanks, other than double bottom tanks, are necessarily located adjacent to or within Category 'A' machinery spaces, at least one of their vertical sides shall be contiguous to the machinery space boundaries, and is preferably to 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 the vertical boundary of a tank directly exposed to a machinery space meets the vessel's side plating at an acute angle, a small horizontal surface at the base of the tank, necessary to accommodate practical constructional considerations may be permitted. If the arrangement of the machinery is such that a tank with a large horizontal surface at the base is necessary then a cofferdam with suitable ventilation arrangements, to protect the base of the tank from the effect of a machinery space fire, shall be specially considered. Oil fuel tanks situated within the boundaries of Category 'A' machinery spaces shall not contain oil fuel having a flashpoint of less than 60°C. Except for vessels constructed of materials other than steel, where steel tanks shall be provided, the use of free-standing oil fuel tanks is prohibited.

**14B.19 Lubricating Oil Arrangements**

- (1) Arrangements for the storage, distribution and utilisation of oil used in pressure lubrication systems shall be such as to minimise the risk of fire or explosion.

**14B.20 Arrangements for Other Flammable Oils**

- (1) 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 minimise the risk of fire or explosion.

**14B.21 Prohibition of Carriage of Flammable Oils in Forepeak Tanks**

- (1) Oil fuel, lubricating oil and other flammable oils shall not be carried in forepeak tanks.

**14B.22 Space Heaters**

- (1) Space heaters, if used, shall be fixed in position and so constructed as to reduce fire risks to a minimum. The design and location of these units shall be such that clothing, curtains or other similar materials cannot be scorched or set on fire by heat from the unit.

**14B.23 Covered Category (9) (Open Deck) Spaces**

- (1) Covered open decks that have less than 30% communicating openings may be treated as a Category (9) space, subject to compliance with the following additional provisions:
  - (a) a fixed fire detection and alarm system according to Section 14B.16 shall be provided;
  - (b) The space shall be protected by a suitable sprinkler system as defined in Chapter 2; and
  - (c) ventilators and exhausts in accordance with Section 5.5 shall not terminate in these spaces when serving Accommodation, Control Stations, garages or Machinery Spaces.

**14B.24 Arrangements for 'Recreational Fire Appliances'**

- (1) 'Recreational Fire Appliances' as defined in Chapter 2, shall meet the requirements of Annex D.

**14B.25 Emergency Training and Drills**

- (1) See Annex C for requirements.

**14B.26 Additional Equivalence Considerations**

- (1) None.

**14B.27 Alternative Design and Arrangements**

- (1) Vessels may follow Section 1.9 on Alternative Design and Arrangements for this chapter as allowed by SOLAS II-2/17.
- (2) The engineering analysis required by 1.9(3) shall be prepared and submitted to the Administration, based on the guidelines<sup>45</sup> and shall include, as a minimum, the following engineering analysis elements:
  - (a) determination of the ship type and space(s) concerned;

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<sup>45</sup> Refer to the Guidelines on alternative design and arrangements for fire safety (MSC/Circ.1002)

- (b) identification of prescriptive requirement(s) with which the ship or the space(s) will not comply;
- (c) identification of the fire and explosion hazards of the ship or the space(s) concerned, including:
  - (i) identification of the possible ignition sources;
  - (ii) identification of the fire growth potential of each space concerned;
  - (iii) identification of the smoke and toxic effluent generation potential for each space concerned;
  - (iv) identification of the potential for the spread of fire, smoke or of toxic effluents from the space(s) concerned to other spaces;
- (d) determination of the required fire safety performance criteria for the ship or the space(s) concerned addressed by the prescriptive requirement(s) in particular:
  - (i) performance criteria shall be based on the fire safety objectives and on the functional requirements of this chapter;
  - (ii) performance criteria shall provide a degree of safety not less than that achieved by using the prescriptive requirements; and
  - (iii) performance criteria shall be quantifiable and measurable;
- (e) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions; and
- (f) technical justification demonstrating that the alternative design and arrangements meet the required fire safety performance criteria.

## CHAPTER 15A

### FIRE APPLIANCES VESSELS OF LESS THAN 500GT

#### 15A.1 General Requirements

- (1) Fire appliances shall be of an approved type and shall be provided to meet the minimum requirements listed in Table 15A.1 and the specific requirements of Section 15A.2.
- (2) Fire appliances provided in addition to those required by Section 15A.1(1) shall be of a type acceptable to the Administration.
- (3) The location of concealed fire appliances shall be clearly marked.

Table 15A.1 - FIRE APPLIANCES - VESSELS OF LESS THAN 500GT

1	PROVISION OF WATER JET	One (sufficient to reach any part of vessel)
2	POWER DRIVEN FIRE PUMP	One (engine or independent drive)
3	ADDITIONAL INDEPENDENT POWER DRIVEN FIRE PUMP, POWER SOURCE AND SEA CONNECTION	One (not located in the same space as item 2)
4	FIREMAIN and HYDRANTS	Sufficient to achieve item 1 with a single length of hose
5	HOSES	Three (with jet/spray nozzles each fitted with a shut-off facility)
6	PORTABLE FIRE EXTINGUISHERS <sup>46</sup> (Accommodation and Service Spaces))	For each deck, one within 10m of any position within an accommodation or service space
7	FIRE EXTINGUISHERS (For a Machinery Space of Category A)	A fixed fire extinguishing system approved in accordance with the Fire Safety Systems Code; and  One portable extinguisher for oil fires for each 74.6kW power (up to 7 maximum); or  Two portable extinguishers for oil fires together with either one foam extinguisher of 45l capacity or 1 CO2 extinguisher of 16kg capacity
8	FIREMANS OUTFIT <sup>47</sup> - to include an approved breathing apparatus for each outfit <sup>48</sup>	Two
9	FIRE BLANKET - in galley	One

<sup>46</sup> Each powder or carbon dioxide extinguisher shall have a capacity of at least 5 kg and each foam extinguisher shall have a capacity of at least 9 l. The mass of portable fire extinguishers shall not exceed 23 kg and they shall have a fire-extinguishing capability at least equivalent to that of a 9 l fluid extinguisher

<sup>47</sup> Fireman's outfits provided for helideck crew shall be of EN 469 standard

<sup>48</sup> An onboard means of recharging breathing apparatus cylinders used during drills shall be provided or 2 spare cylinders for each SCBA set shall be carried onboard to replace those used.

**15A.2 Provision of Water Jet**

- (1) At least one jet of water, from a single length of hose, shall be able to reach any part of the vessel normally accessible to passengers or crew while the vessel is being navigated and, any store room or any part of a storage compartment when empty.

**15A.3 Fire Pumps**

- (1) The power driven fire pump shall have a capacity of

$$2.5x\{1+0.066x(L(B+D))^{0.5}\}^2 \text{ m}^3/\text{hour}$$

where:

L = the length

B = the greatest moulded breadth

D = the moulded depth measured to the bulkhead deck at amidships.

When discharging at full capacity through 2 adjacent fire hydrants, the pump shall be capable of maintaining a water pressure of  $0.2 \text{ N/mm}^2$  at any hydrant, provided the fire hose can be effectively controlled at this pressure.

- (2) The second fire pump, which may be portable, shall have a capacity of at least 80% of that required by 15A.3(1) and be capable of input to the fire main. A permanent sea connection, external to the machinery space, shall be provided. "Throw-over" sea suctions are not acceptable.
- (3) Each centrifugal fire pump shall be provided with a non-return valve in the connection to the fire main.

**15A.4 Fire Main and Hydrants**

- (1) A fire main, water service pipes and fire hydrants shall be fitted.
- (2) The fire main and water service pipe connections to the hydrants shall be sized for the maximum discharge rate of the pump(s) connected to the main.
- (3) The fire main, water service pipes and fire hydrants shall be constructed such that they shall:
  - (a) not be rendered ineffective by heat;
  - (b) not readily corrode; and
  - (c) be protected against freezing.

- (4) When a fire main is supplied by 2 pumps, 1 in the machinery space and 1 elsewhere, provision shall be made for isolation of the fire main within the machinery space and for the second pump to supply the fire main and hydrants external to the machinery space. Isolation valve(s) shall be manually operated valves fitted outside the machinery space in a position easily accessible in the event of a fire.
- (5) The fire main shall have no permanent connections other than those necessary for firefighting or washing down.
- (6) Fire hydrants shall be located for easy attachment of fire hoses, protected from damage and distributed so that a single length of the fire hoses provided can reach any part of the vessel.
- (7) Fire hydrants shall be fitted with valves that allow a fire hose to be isolated and removed when a fire pump is operating.

**15A.5 *Fire Hoses***

- (1) Fire hoses shall not exceed 20 metres in length, and generally, the diameter for use with a powered pump shall not be less than 38 millimetres.
- (2) Fire hoses and associated tools and fittings shall be kept in readily accessible and known locations, close to the hydrants or connections on which they shall be used. Hoses supplied from a powered pump shall have jet/spray nozzles (incorporating a shut-off facility) of diameter 19 millimetres, 16 millimetres or 12 millimetres depending on firefighting purposes. For accommodation and service spaces, the diameter of nozzles need not exceed 12 millimetres. For machinery spaces and exterior locations, the nozzle size shall be as to obtain the maximum discharge possible from two jets at the pressure referred to in Section 15A.2(1), from the smallest pump.
- (3) Hydrants or connections in interior locations on the vessel shall have hoses connected at all times. For use within accommodation and service spaces, proposals to provide a smaller diameter of hoses and jet/spray nozzles shall be considered.
- (4) The number of fire hoses and nozzles provided shall correspond to the functional fire safety requirements, but be at least 3.

**15A.6 *Portable Fire Extinguishers for Use in Accommodation and Service Spaces***

- (1) The number, location, fire extinguishing medium type and capacity shall be selected according to the perceived fire risk, but for each deck, one portable extinguisher shall be available for use within a distance of 10 metres from any location. A minimum of at least 3 portable fire extinguishers shall be provided. As far as practical, the fire extinguishers provided shall have a uniform method of operation and shall be of an approved 5kg/9 litre type and capacity.
- (2) Portable fire extinguishers of the carbon dioxide type shall not be located or provided for use in accommodation spaces.

- (3) Except for portable extinguishers provided in connection with a specific hazard within a space when it is manned (such as a galley), portable extinguishers generally shall be located external to, but adjacent to, the entrance of the space(s) in which they shall be used. Extinguishers shall be stowed in readily accessible and marked locations.
- (4) Spare charges shall be provided onboard for at least 50% of each type and capacity of portable fire extinguisher onboard. When an extinguisher is not of a type which is rechargeable when the vessel is at sea, an additional portable fire extinguisher of the same type (or its equivalent) shall be provided.

#### ***15A.7 Fire Extinguishing in Machinery Spaces***

- (1) In a category A machinery space containing internal combustion type machinery, fire appliances shall be provided at least to the extent listed in item 7 of Table 15A.1 - Fire Appliances.
- (2) In a machinery space containing an oil fired boiler, oil fuel settling tank or oil fuel unit, a fixed fire extinguishing system complying with the Fire Safety Systems Code shall be installed.
- (3) Portable fire extinguishers shall be installed and the number, location, fire extinguishing medium type and capacity shall be selected according to the perceived fire risk in the space. (Spare charges or spare extinguishers shall be provided per 15A.6(4)). In any case, portable fire extinguishers for extinguishing oil fires shall be fitted as follows:
  - (a) in a boiler room - at least 2;
  - (b) in a space containing any part of an oil fuel installation - at least 2; and
  - (c) in a firing space - at least 1.
- (4) Where fixed carbon dioxide fire-extinguishing systems for the protection of machinery spaces are fitted on ships constructed before 1 July 2002, they shall comply with the provisions of paragraph 2.2.2 of chapter 5 of the Fire Safety Systems Code.

#### ***15A.8 Fire-fighter's communication***

- (1) On existing vessels and new vessels, a minimum of two two-way portable radiotelephone apparatus for each fire party for fire-fighter's communication shall be carried onboard. Those two-way portable radiotelephone apparatus shall be of an explosion-proof type or intrinsically safe.

#### ***15A.9 Additional Equivalence Considerations***

- (1) None.

**15A.10 Alternative Design and Arrangements**

- (1) Vessels may follow Section 1.9 on Alternative Design and Arrangements for this chapter as allowed by SOLAS II-2/17.
- (2) The engineering analysis required by 1.9(3) shall be prepared and submitted to the Administration, based on the guidelines<sup>49</sup> and shall include, as a minimum, the following engineering analysis elements:
  - (a) determination of the ship type and space(s) concerned;
  - (b) identification of prescriptive requirement(s) with which the ship or the space(s) will not comply;
  - (c) identification of the fire and explosion hazards of the ship or the space(s) concerned, including:
    - (i) identification of the possible ignition sources;
    - (ii) identification of the fire growth potential of each space concerned;
    - (iii) identification of the smoke and toxic effluent generation potential for each space concerned;
    - (iv) identification of the potential for the spread of fire, smoke or of toxic effluents from the space(s) concerned to other spaces;
  - (d) determination of the required fire safety performance criteria for the ship or the space(s) concerned addressed by the prescriptive requirement(s) in particular:
    - (i) performance criteria shall be based on the fire safety objectives and on the functional requirements of this chapter;
    - (ii) performance criteria shall provide a degree of safety not less than that achieved by using the prescriptive requirements; and
    - (iii) performance criteria shall be quantifiable and measurable;
  - (e) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions; and
  - (f) technical justification demonstrating that the alternative design and arrangements meet the required fire safety performance criteria.

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<sup>49</sup> Refer to the Guidelines on alternative design and arrangements for fire safety (MSC/Circ.1002)

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## **CHAPTER 15B**

### **FIRE APPLIANCES VESSELS OF 500GT AND OVER**

#### **15B.1 General Requirements**

- (1) All vessels shall comply with the requirements of SOLAS II-2/10. as may be amended, and as appropriate to the vessel and its equipment. For the purpose of the SOLAS regulations, the standards for a cargo ship apply. However, in interior locations, fire hoses shall be connected to hydrants at all times. Existing vessels are encouraged to comply with this requirement in so far as is practicable.
- (2) In no case shall the standards applied be less than those applied to a vessel of less than 500GT.
- (3) The location of concealed fire appliances shall be clearly marked.
- (4) An onboard means of recharging breathing apparatus cylinders used during drills shall be provided, or 2 spare cylinders shall be carried onboard to replace those used for each self-contained breathing apparatus set carried.
- (5) Fireman's outfits provided for helideck crew shall be of EN 469 standard or another suitable recognised national or international standard.

#### **15B.2 Additional Equivalence Considerations**

- (1) None.

#### **15B.3 Alternative Design and Arrangements**

- (1) Vessels may follow Section 1.9 on Alternative Design and Arrangements for this chapter as allowed by SOLAS II-2/17.
- (2) The engineering analysis required by 1.9(3) shall be prepared and submitted to the Administration, based on the guidelines<sup>50</sup> and shall include, as a minimum, the following engineering analysis elements:
  - (a) determination of the ship type and space(s) concerned;
  - (b) identification of prescriptive requirement(s) with which the ship or the space(s) will not comply;

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<sup>50</sup> Refer to the Guidelines on alternative design and arrangements for fire safety (MSC/Circ.1002)

- (c) identification of the fire and explosion hazards of the ship or the space(s) concerned, including;
  - (i) identification of the possible ignition sources;
  - (ii) identification of the fire growth potential of each space concerned;
  - (iii) identification of the smoke and toxic effluent generation potential for each space concerned;
  - (iv) identification of the potential for the spread of fire, smoke or of toxic effluents from the space(s) concerned to other spaces;
- (d) determination of the required fire safety performance criteria for the ship or the space(s) concerned addressed by the prescriptive requirement(s) in particular:
  - (i) performance criteria shall be based on the fire safety objectives and on the functional requirements of this chapter;
  - (ii) performance criteria shall provide a degree of safety not less than that achieved by using the prescriptive requirements; and
  - (iii) performance criteria shall be quantifiable and measurable;
- (e) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions; and
- (f) technical justification demonstrating that the alternative design and arrangements meet the required fire safety performance criteria.

## **CHAPTER 16**

### **RADIO**

#### **16.1 *Vessels of 300GT and over***

- (1) Vessels of 300GT and over shall comply with the cargo ship requirements of SOLAS Chapter IV and COMSAR/Circ.32 as amended.
- (2) Where compliance with the antenna installation requirements of COMSAR/Circ.32 cannot be achieved, alternative arrangements may be accepted subject to satisfactory results being obtained during safety radio surveys regarding general operation, range and interference.

#### **16.2 *Vessels of less than 300GT***

- (1) Vessels of less than 300GT shall comply with the cargo ship requirements of SOLAS Chapter IV and COMSAR/Circ.32 as amended, except that the methods to enhance 'availability' (i.e., the duplication of equipment, shore-based maintenance or at-sea electronic maintenance capability), are non-mandatory.
- (2) Where compliance with the antenna installation requirements of COMSAR/Circ.32 cannot be achieved, alternative arrangements may be accepted subject to satisfactory results being obtained during safety radio surveys regarding general operation, range and interference.
- (3) Furthermore, the independent reserve source of energy, which shall be separate from the emergency power supply, need only be capable of supplying the radio installation for a period of 3 hours.

#### **16.3 *Existing Vessels***

- (1) Existing vessels may comply with the version of the Code that was applicable at the time of keel laying. However, it is strongly recommended that consideration is given to upgrading to the latest requirements when equipment is replaced or when the bridge is being re-fitted.

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## CHAPTER 17

### NAVIGATION LIGHTS, SHAPES AND SOUND SIGNALS

#### **17.1 General Requirements**

- (1) Every vessel shall comply with the requirements of COLREGs in accordance with the national legislation of the Administration.
- (2) All navigation lights shall be provided with main and emergency power supply.
- (3) Masthead lights, sidelights and a stern light installed onboard vessels of 50 metres and over in length shall be duplicated or be fitted with duplicate lamps. With due regard to accessibility, the requirement for duplication of navigation lights required to be shown whilst underway (masthead lights, sidelights and stern light) may be satisfied by having spare bulbs that can be easily fitted within three minutes. However, vessels of 500GT and over and vessels of any size using LEDs these shall be duplicate / double lights.
- (4) Navigation lights shall comply with IMO Resolution MSC.253(83) 'Adoption of the performance standards for navigation lights, navigation light controllers and associated equipment'. The general requirements of MSC.253(83) are as follows:
  - (a) unless expressly required otherwise, navigation lights shall appear steady and non-flashing;
  - (b) lenses of navigation lights shall be produced in a robust, non-corroding material, which shall ensure a long-term durability for the optical qualities of the lens; and
  - (c) only lamps specified by the manufacturer shall be used in each particular navigation lights to avoid reduction of performance due to unsuitable lamps.

#### **17.2 Special requirements for lights using LEDs<sup>51</sup>**

- (1) The luminous intensity of LEDs gradually decreases while the electricity consumption remains unchanged. The rate of decrease of luminous intensity depends on the output of LEDs and temperatures of LEDs. To prevent shortage of luminous intensity of LEDs:
  - (a) an alarm function shall be activated to notify the Officer of the Watch when the luminous intensity of the light reduces below the level required by COLREGs; or
  - (b) LEDs shall only be used within the lifespan (practical term of validity) specified by the manufacturer to maintain the necessary luminous intensity of LEDs. The lifespan of LEDs shall be determined and clearly notified by the manufacturer

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<sup>51</sup> See IMO RESOLUTION MSC.253(83)

based on the appropriate test results on the decrease of luminous intensity of the LEDs under various temperature conditions and on the temperature condition of LEDs in the light during operation, taking the appropriate margin into account.

***17.3 Alternative Design and Arrangements***

- (1) For vessels where compliance is impracticable, alternatives maybe considered by application to the Administration.

***17.4 Additional Equivalence Considerations***

- (1) None.

## CHAPTER 18

### NAVIGATIONAL EQUIPMENT AND VISIBILITY FROM WHEELHOUSE

#### **18.1** *General Requirements*

- (1) A vessel shall be fitted with the following:
  - (a) A properly adjusted standard magnetic compass or other means, independent of any power supply, to determine the ship's heading.
  - (b) In a steel vessel, it shall be possible to correct the compass for coefficients B, C and D, and heeling error.
  - (c) The magnetic compass or repeater shall be so positioned as to be clearly readable by the helmsman at the main steering position. It shall also be provided with an electric light, the electric power supply of which shall be on the main and emergency source of power.
- (2) A vessel shall be fitted with the following additional equipment:
  - (a) an echo sounder;
  - (b) a receiver for a global navigation satellite system or a terrestrial radio-navigation system, or other means suitable for use at all times throughout the intended voyage, to establish and update the ship's position by automatic means;
  - (c) speed and distance measuring device, or other means, to indicate speed and distance through the water;
  - (d) a gyro compass or spare magnetic compass bowl;
  - (e) a rudder angle indicator; and
  - (f) a 9 GHz radar.
- (3) For vessels of less than 300GT the equipment specified in 18.1(1) and 18.1(2) need not be of an approved type.
- (4) For vessels of 500GT and over, an automatic tracking aid, or other means, to plot automatically the range and bearing of other targets to determine collision risk shall be carried.
- (5) Means shall be provided for taking bearings as near as practicable over an arc of the horizon of 360°. This requirement may be met by the fitting of a pelorus compass, or, on a vessel other than a steel vessel, with a hand bearing compass.

- (6) For vessels under 300GT the requirements of 18.1(2)(d) may be met by the use of a fluxgate compass, provided that a suitable back up power supply is available to power the compass in the event of failure of the main electrical supply. Where such a compass incorporates a capability to measure magnetic deviation by undertaking a calibration routine, and where the deviation figures are recorded within the device, a deviation card is not required.
- (7) Attention shall be paid to magnetic effects on magnetic compasses, including fluxgate compasses, when operating in Polar Regions (i.e. north of 70° N, or south of 70° S).

**18.2 Automatic Identification System (AIS)**

- (1) All vessels of 300GT and over shall be fitted with an approved automatic identification system (AIS) in accordance with SOLAS Chapter V. The AIS shall:
  - (a) provide automatically to appropriately equipped shore stations, other ships and aircraft, information including the ships 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.

**18.3 Long-Range Identification and Tracking (LRIT)**

- (1) All vessels of 300GT and over, unless operating solely within sea area A1, shall be fitted with a Long-Range Identification and Tracking (LRIT) system to automatically transmit the identity of the ship; the position of the ship, (latitude and longitude); and the date and time of position provided. The required shipborne equipment shall as a minimum as follows:
  - (a) be capable of automatically, and without human intervention onboard the ship, transmitting the ship's LRIT information at 6-hour intervals to an LRIT Data Centre;
  - (b) be capable of being configured remotely to transmit LRIT information at variable intervals;
  - (c) be capable of transmitting LRIT information following receipt of polling commands;
  - (d) interface directly to the shipborne global navigation satellite system equipment, or have internal positioning capability;
  - (e) be supplied with energy from the main and emergency source of electrical power; and

- (f) be tested for electromagnetic compatibility taking into account the recommendations developed by the IMO.
- (g) The current list of Authorised Testing Application Service Providers (ATASP's) are contained in Marine Information Note MGN 441(M+F), as may be amended.

**18.4 Bridge Navigational Watch Alarm System (BNWAS)**

- (1) All vessels of 150GT and over shall be fitted with a bridge navigational watch alarm system (BNWAS), in accordance with SOLAS V/19 as follows:
  - (a) A bridge navigational watch alarm system (BNWAS) installed prior to 1 July 2011 may subsequently be exempted from full compliance with the standards adopted by the IMO, at the discretion of the Administration.
  - (b) The bridge navigational watch alarm system shall be in operation whenever the ship is underway at sea.
  - (c) Vessels of 3000GT and over shall comply with the requirements of SOLAS V/19.

**18.5 Additional Requirements for Vessels of 3000GT and Over**

- (1) To assist in casualty investigations, vessels shall be fitted with a voyage data recorder (VDR).
- (2) Vessels shall be fitted with an Electronic Chart Display and Information System (ECDIS) (see also Section 19.1 on Nautical Publication).
- (3) A 3 GHz radar or where considered appropriate by the Administration 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 Section 18.1(2).
- (4) 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 Section 18.1(4).

**18.6 Bridge Visibility**

- (1) Navigation bridge visibility shall comply with SOLAS V/22. Vessels under 55 metres in length shall comply as far as reasonable and practicable<sup>52</sup>.

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<sup>52</sup> ISO 24482 – Large Yachts – Navigational Bridge Visibility refers.

- (2) Windows may be vertical swept aft or forward outside of the angles prescribed by SOLAS V/22.9.1, provided that where necessary, appropriate measures are taken to avoid adverse reflections.
- (3) Windows to the navigating position shall not be of either polarised or tinted glass. Portable tinted screens may be provided for selected windows.
- (4) Where the ship's side cannot be fully visible from the bridge wing, wing station or manoeuvring station, the use of cameras may be specially considered by the Administration giving consideration to image quality, night vision, display screen size and location.

***18.7 Additional Equivalence Considerations***

- (1) The application of ISO 24482:2023 – Large Yachts – Navigational Bridge Visibility, subject to the agreement of the Administration.

## CHAPTER 19

### MISCELLANEOUS

#### **19.1 Nautical Publications**

- (1) Every vessel shall carry 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. Nautical charts and publications shall be adequate for the intended voyage and up to date.
- (2) Where this function is partly or fully filled by an approved Electronic Chart Display and Information System (ECDIS), back-up arrangements to meet these functional requirements shall be provided as follows:
  - (a) Vessels of 3,000GT and over shall be fitted with an ECDIS<sup>53</sup> in accordance with 18.5(2) as follows:
    - (i) 1 x ECDIS unit and 1 x paper chart folio; or
    - (ii) 2 x ECDIS units which shall both work independently. The second ECDIS unit shall be connected to an independent power supply and a separate Global Navigation Satellite System (GNSS) position input.
  - (b) Vessels under 3,000GT shall use one of the following options to meet the chart carriage requirements as follows:
    - (i) 1 x paper chart folio;
    - (ii) 1 x ECDIS unit and 1 x paper chart folio; or
    - (iii) 2 x ECDIS units which shall both work independently. The second ECDIS unit shall be connected to an independent power supply and a separate Global Navigation Satellite System (GNSS) position input.
- (3) Where paper charts are used in accordance with 19.1(2)(a) and (b), there shall be provided, a chart table or area to lay out a chart with minimum dimensions 1070 millimetres by 720 millimetres to permit a standard British Admiralty paper chart to be laid out flat for the recording of appropriate position fixes and associated navigation workings. This area shall be located either on or in the vicinity of the bridge to the satisfaction of the Administration having regard for the type of vessel and suitable lighting shall be over the table with red lights for night work.

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<sup>53</sup> See MSC.1/Circ.1503 on 'ECDIS – Guidance for good practice' as amended

**19.2 *Measuring Instruments***

- (1) Every vessel shall carry a barometer. Every sailing vessel shall carry an anemometer and an inclinometer.

**19.3 *Signalling Lamp***

- (1) Every vessel shall carry 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. The signalling lamp may be the searchlight required by 19.4.

**19.4 *Searchlight***

- (1) Every vessel shall carry an efficient fixed or portable searchlight suitable for man-overboard search and rescue operations.

**19.5 *Radar reflectors***

- (1) Vessels of less than 150GT shall have a radar reflector.

**19.6 *Vessel's IMO number***

- (1) Vessels of 300GT and over shall be marked externally with the vessel's IMO number which may be horizontal provided that it is visible from the air.

**19.7 *Portable atmosphere testing instrument or instruments***

- (1) Every vessel 500GT and over shall carry an appropriate portable atmosphere testing instrument or instruments<sup>54</sup>. 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<sup>55</sup>.
- (2) Suitable means shall be provided for the calibration of all such instruments which may be achieved by portable atmosphere testing instruments being calibrated onboard or ashore in accordance with the manufacturer's instructions.
- (3) Vessels under 500GT where enclosed spaces are accessible to the crew, shall comply with Section 19.7(1).

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<sup>54</sup> Refer to the Guidelines to facilitate the selection of portable atmosphere testing instruments for enclosed spaces as required by SOLAS XI-1/7 (MSC.1/Circ.1477).

<sup>55</sup> Refer to the Revised recommendations for entering enclosed spaces aboard ships (resolution A.1050(27))

**19.8** *Navigational Procedures*

- (1) Every vessel to which this Code applies shall comply with the applicable requirements of SOLAS V regulations 28 to 29 and 31 to 35 inclusive.

**19.9** *Additional Equivalence Considerations*

- (1) None.

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## CHAPTER 20

### ANCHORS, CABLES AND MOORING ARRANGEMENTS

Objective: The purpose of this Chapter is to set out the minimum standard for anchoring and mooring arrangements. It shall be noted that this element shall be an integral part of the Classification process and this shall be reflected in the Class Notation.

#### **20.1 General Requirements**

- (1) Vessels shall be considered to have adequate equipment if fitted out in accordance with the standards for such equipment, set by a Recognised Organisation and holding the relevant Class notation.
- (2) Vessels not equipped in accordance with 20.1(1) may be specially considered by the Administration, provided full information is submitted for approval.
- (3) All vessels shall have at least 2 anchors, one of which shall be ready for use at all times. Any powered deployment system shall be connected to an emergency power supply or be capable of being manually operated.
- (4) Towing and mooring equipment shall comply with SOLAS II-1/3-8 and the guidelines published by the IMO<sup>56</sup> as applicable to the size of vessel, however, the rules of the Recognised Organisation may be used for the purpose of determining the required length, diameter and breaking strength of mooring lines.
- (5) The maintenance and in-service inspections of mooring equipment for all vessels shall be carried out in accordance with the guidelines published by the IMO<sup>57</sup>.

#### **20.2 Additional Equivalence Considerations**

- (1) None.

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<sup>56</sup> Refer to the Guidelines on the design of mooring arrangements and the selection of appropriate mooring equipment and safe mooring (MSC.1/Circ.1619) and the revised guidance on shipboard towing and mooring equipment,

<sup>57</sup> Refer to the guidelines for inspection and maintenance of mooring equipment including lines (MSC.1/Circ.1620).

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## CHAPTER 21

### ACCOMMODATION AND RECREATIONAL FACILITIES VESSELS OF LESS THAN 200GT THAT DO NOT TRADE INTERNATIONALLY

#### **21.1**    *General*

- (1)    An adequate standard of accommodation shall be provided to ensure the comfort, recreation, health and safety of all persons onboard, due consideration shall also be given to the number of hotel and other support staff required.
- (2)    Attention is drawn to the achievement of appropriate standards for means of access and escape, lighting, heating, food preparation and storage, messing, safety of movement about the vessel, ventilation and water services.
- (3)    Generally, accommodation standards for the crew shall be at least equivalent to the standards set by the ILO Conventions for crew accommodation in merchant ships. The ILO Convention provisions shall be practicable with regard to vessels of 500GT and over. For smaller vessels, particularly sailing vessels, the standards shall be applied where possible. When it is neither reasonable nor practicable to site crew sleeping accommodation amidships or aft, and above the deepest waterline as required, measures taken to ensure an equivalent level of crew health and safety shall be agreed with the Administration. Sleeping accommodation with the deckhead lining below the deepest waterline is not permitted. It is recommended that where such accommodation is sited partially below the deepest waterline it shall be arranged such that in the event of damage to the watertight compartment in which the accommodation space is situated, the lining shall not be immersed.
- (4)    Crew accommodation shall not be sited within hazardous spaces. The following standards are described by general principles which need to be expanded to meet the requirements which relate to the use and areas of operation of particular vessels.

#### **21.2**    *Lighting*

- (1)    An electric lighting system shall be installed which is capable of supplying adequate light to all enclosed accommodation and working spaces. The system shall be designed and installed in accordance with Chapter 8.

#### **21.3**    *Heating*

- (1)    As considered appropriate, an adequate heating installation shall be provided.

**21.4 Food Preparation, Storage and Messing**

- (1) The galley floor shall be provided with a non-slip surface and provide a good foothold.
- (2) All furniture and fittings in the galley shall be made of a material which is impervious to dirt and moisture. All metal parts of furniture and fittings shall be rust resistant.
- (3) The ventilation in the galley shall be arranged to ensure that there is an adequate supply of fresh air and for the efficient discharge of fumes into the open air (see also 21.6).
- (4) When a cooking appliance is gimballed it shall be protected by a crash bar or other means to prevent personal injury. Means shall be provided to lock the gimbaling mechanism.
- (5) Means shall be provided to allow the cook to be secured in position, with both hands free for working, when the vessel motions threaten safe working.
- (6) Secure and hygienic storage for food and garbage shall be provided.
- (7) A messing area(s) shall be provided, each messing area shall be large enough to accommodate the greatest number of persons likely to use it at any one time.

**21.5 Hand Holds and Grab Rails**

- (1) There shall be sufficient hand holds and grab rails within the accommodation to allow safe movement around the accommodation at all times. Stairways shall be specially considered

**21.6 Ventilation**

- (1) Effective means of ventilation shall be provided to all enclosed spaces which are entered by personnel.
- (2) Mechanical ventilation shall be provided to all accommodation spaces on vessels which are intended to make long international voyages or operate in tropical waters. As a minimum, mechanical ventilation shall be capable of providing 6 changes of air per hour, when all access and other openings (other than ventilation intakes) to the spaces are closed.
- (3) Air conditioning systems shall provide a minimum of 25 m<sup>3</sup> of air per hour, per person accommodated in the ventilated space during normal operating conditions.
- (4) Enclosed galleys shall be specially considered, and where air conditioning is not fitted shall have, as a minimum, a mechanical supply of 20 fresh air changes per hour and a mechanical exhaust of 30 changes.

**21.7 *Water Services***

- (1) An adequate supply of fresh drinking water shall be provided and piped to convenient positions throughout the accommodation spaces.
- (2) To mitigate the risk of burns and legionella, thermostatic anti-scalding valves shall be provided for hot water outlets and installed in accordance with the manufacturer's recommendations. Water temperatures shall be maintained in accordance with the applicable requirements of the Administration.
- (3) In addition, an emergency reserve supply of drinking water shall be carried, sufficient to provide at least 2 litres per person. The installation of fresh water making machines and disinfection arrangements shall be to the acceptance of the Administration (for this purpose silver ionisation or chlorination would be considered acceptable).

**21.8 *Sleeping Accommodation***

- (1) An appropriately sized bed (bunk or cot,) shall be provided for every person onboard, having a minimum inside dimension of either:
  - (a) not less than 190 centimetres by 70 centimetres, with no tapering, where the Administration is satisfied that that this is reasonable and shall not result in discomfort to the seafarers; or
  - (b) not less than 198 centimetres in length and not less than 80 centimetres in width over half the length of the berth. A taper is permitted from half the length of the berth towards the foot of the berth but under no circumstances is the berth permitted to be narrower at any point than 50 centimetres;
- (2) Where considered appropriate, means for preventing the occupants from falling out, shall be provided. There shall be no direct access into sleeping rooms from spaces for machinery, galleys, paint rooms or from engine, deck, and other bulk storerooms, drying rooms, communal wash places or water closets.
- (3) Safe access / egress to and from any top bunks shall be provided in the form of suitable steps, handholds and / or ladders (which may be portable) as is necessary.
- (4) In crew accommodation, wherever possible, the maximum number of persons per sleeping room shall be two and there shall be unobstructed access to at least one side of each bed. Any increase in the maximum number of persons per sleeping room shall be agreed with the Administration.

**21.9 *Toilet Facilities***

- (1) Adequate sanitary toilet facilities shall be provided onboard. The facilities shall be at least one water closet, one shower for every 8 persons or part thereof, and one washbasin for every 6 persons or part thereof.

- (2) In vessels where a sanitary system, including a holding tank, is provided, care shall be taken to ensure that there is no possibility of fumes from the tank finding their way back to a toilet, shall the water seal at the toilet be broken.

***21.10 Stowage Facilities for Personal Effects***

- (1) Adequate stowage facilities for clothing and personal effects shall be provided for every person onboard.

***21.11 Securing of Heavy Equipment***

- (1) All heavy items of equipment such as ballast, batteries, cooking stove, etc, shall be securely fastened in place. All stowage lockers containing heavy items shall have lids or doors which are capable of being securely fastened.

## **CHAPTER 21A**

### **ACCOMMODATION AND RECREATIONAL FACILITIES VESSELS OF LESS THAN 200GT**

Objective: The purpose of this Chapter is to implement substantially equivalent arrangements to the crew accommodation requirements of the MLC. The aim of the Convention is to provide a comprehensive set of global maritime labour standards for all seafarers, including accommodation standards.

#### **21A.1    *General***

- (1) Vessels of less than 200GT that do not trade internationally are excepted from the requirements of this section and shall comply with Chapter 21.
- (2) Accommodation shall provide decent living conditions and recreational facilities for those persons employed or engaged in any work capacity onboard. Due consideration shall be given to likely numbers of hotel and support staff onboard.
- (3) In order to provide decent living conditions and recreational facilities the following requirements are provided as minimum standards.
- (4) The materials used to construct internal bulkheads, panelling and sheeting, floors and joinings shall be suitable for the purpose and conducive to ensuring a healthy environment.
- (5) Excessive noise and vibration shall be limited within accommodation spaces, and as far as practicable in accordance with relevant international standards. Where the seafarers' exposure to noise and vibration is very time limited in accommodation spaces, alternative arrangements may be accepted.

#### **21A.2    *Access/Escape Arrangements***

- (1) Refer to Section 14A.3 for details.

#### **21A.3    *Headroom***

- (1) There shall be adequate and reasonable headroom for all seafarers onboard taking into consideration the size and operation of vessel. Headroom provided shall not result in discomfort to the seafarers onboard.

- (2) For spaces where seafarers are expected to stand for prolonged periods, the minimum headroom shall be 190 centimetres. The competent authority may allow reduced height in some locations if it does not result in discomfort to seafarers.

**21A.4 Ventilation**

- (1) Effective means of ventilation shall be provided to all enclosed spaces which are entered by personnel.
- (2) Mechanical ventilation shall be provided to all accommodation spaces on vessels which are intended to make long international voyages or operate in tropical waters. As a minimum, mechanical ventilation shall be capable of providing 6 changes of air per hour, when all access and other openings (other than ventilation intakes) to the spaces are closed.
- (3) Air conditioning - recirculation of supply air may be permitted provided that sanitary accommodation is provided with mechanical exhaust ventilation and that the fresh air content of the supply to the accommodation is not less than:-
  - (a) 25 cubic metres per hour for each person for whom accommodation is provided; or
  - (b) the total capacity of the sanitary and any other accommodation exhaust fans, excluding the galley, whichever is the greater.
- (4) Enclosed galleys shall be specially considered, and where air conditioning is not fitted shall have, as a minimum, a mechanical supply of 20 fresh air changes per hour and a mechanical exhaust of 30 changes.
- (5) In spaces where sanitary facilities are provided there shall be ventilation that draws from the accommodation and extracts to the open air independent of the other parts of the accommodation.

**21A.5 Heating and Insulation**

- (1) All accommodation spaces shall be adequately heated, taking into account climatic conditions. The accommodation shall be adequately insulated.

**21A.6 Lighting**

- (1) An electric lighting system shall be installed which is capable of supplying adequate light to all enclosed accommodation and working spaces. The system shall be designed and installed in accordance with Chapter 8.
- (2) Seafarer's sleeping rooms and mess rooms shall be lit by natural light and provided with adequate artificial light. Where the provision of natural light is impracticable, adequate artificial light may be acceptable in limited areas.

**21A.7 Water Services and Provision**

- (1) Hot and cold running fresh water shall be available in all wash places.
- (2) To mitigate the risk of burns and legionella, thermostatic anti-scalding valves shall be provided for hot water outlets and installed in accordance with the manufacturer's recommendations. Water temperatures shall be maintained in accordance with the applicable requirements of the Administration.
- (3) An adequate supply of fresh drinking water shall be provided and piped to convenient positions throughout the accommodation spaces.
- (4) In addition, an emergency reserve supply of drinking water shall be carried, sufficient to provide at least 2 litres per person. The installation of fresh water making machines and disinfection arrangements shall be to the acceptance of the Administration (for this purpose silver ionisation or chlorination would be considered acceptable).

**21A.8 Galley Facilities and Provision of Food**

- (1) Adequate food shall be provided for all seafarers onboard free of charge. The provision of food shall take account of the seafarers' religious requirements and cultural practices, the nature and duration of the voyage, and shall be suitable in respect of quantity, nutritional value, quality and variety.
- (2) The organisation and equipment of the catering department shall be such as to permit the provision to the seafarers of adequate, varied and nutritious meals prepared and served in hygienic conditions. This shall include as a minimum that the galley is fitted with a means of cooking and a sink and have adequate working surface for the preparation of food. The galley floor shall be provided with a non-slip surface and provide a good foothold.
- (3) All furniture and fittings in the galley shall be made of a material which is impervious to dirt and moisture. All metal parts of furniture and fittings shall be rust resistant.
- (4) The ventilation in the galley shall be arranged to ensure that there is an adequate supply of fresh air and for the efficient discharge of fumes into the open air (see also 21A.4(4)).
- (5) When a cooking appliance is gimballed it shall be protected by a crash bar or other means to prevent personal injury. Means shall be provided to lock the gimbaling mechanism.
- (6) Means shall be provided to allow the cook to be secured in position, with both hands free for working, when the vessel motions threaten safe working.
- (7) Secure and hygienic storage for food and garbage shall be provided.
- (8) A messing area(s) shall be provided, each messing area shall be large enough to accommodate the greatest number of persons likely to use it at any one time.

**21A.9 Hand Holds and Grab Rails**

- (1) There shall be sufficient hand holds and grab rails within the accommodation to allow safe movement around the accommodation at all times. Stairways shall be specially considered.

**21A.10 Sleeping Accommodation**

- (1) Sleeping accommodation shall be of adequate size and properly equipped so as to ensure reasonable comfort and to facilitate tidiness.
- (2) There shall be no direct access into sleeping rooms from spaces for machinery, galleys, storerooms, drying rooms, or communal sanitary areas.
- (3) In seafarer accommodation, wherever possible, the maximum number of persons per sleeping room shall be two and there shall be unobstructed access to at least one side of each bed. Any increase in the maximum number of persons per sleeping room shall be agreed with the Administration.
- (4) Sleeping accommodation shall be situated or equipped, as practicable, so as to provide appropriate levels of privacy for men and for women.
- (5) Berths for seafarers shall have a minimum inside dimension of either:
  - (a) not less than 190 centimetres by 70 centimetres, with no tapering, where it is satisfied that that this is reasonable and shall not result in discomfort to the seafarers; or
  - (b) not less than 198 centimetres in length and not less than 80 centimetres in width over half the length of the berth. A taper is permitted from half the length of the berth towards the foot of the berth but under no circumstances is the berth permitted to be narrower at any point than 50 centimetres.
- (6) Where considered appropriate, means for preventing the occupants from falling out, shall be provided.
- (7) Safe access / egress to and from any top bunks shall be provided in the form of suitable steps, handholds, and / or ladders (which may be portable) as is necessary.
- (8) Sleeping rooms shall be situated above the load line/freeboard mark amidships or aft (or the maximum loaded displacement where no load line/freeboard mark is provided), but in no case forward of the collision bulkhead.
- (9) Where it is not possible to provide sleeping accommodation above the load line/freeboard mark (or the maximum loaded displacement where no load line/freeboard mark is provided) as required by 21A.10(7), there shall be an alarm fitted to provide early warning of flooding that alerts occupants of the sleeping accommodation and provides them with sufficient time to escape from the accommodation.

**21A.11 *Sanitary Facilities***

- (1) There shall be at least one set of sanitary facilities for each 6 seafarers onboard, separated from the rest of the accommodation. Each set of sanitary facilities shall include one shower or one tub, one wash basin and one toilet. Each set of sanitary facilities shall be provided with a door that is lockable. Where reasonable and practicable there shall be separate sanitary facilities provided for men and for women.
- (2) In vessels where a sanitary system, including a holding tank, is provided, care shall be taken to ensure that there is no possibility of fumes from the tank finding their way back to a toilet, should the water seal at the toilet be broken.

**21A.12 *Mess Rooms***

- (1) Mess rooms shall be of adequate size and comfort and properly furnished and equipped (including ongoing facilities for refreshment), taking account of the number of seafarers likely to use them at any one time. It may be that the mess shall be a shared facility for seafarers and passengers; this shall be subject to agreement by the Administration.

**21A.13 *Recreational Facilities***

- (1) Appropriate seafarers' recreational facilities, amenities and services, as adapted to meet the special needs of seafarers who shall live and work onboard, shall be provided.
- (2) All vessels shall have a space or spaces on open deck to which the seafarers can have safe access when off duty, which are of adequate area having regard to the size of the ship and the number of seafarers onboard, and are protected from the elements. Due consideration shall be given to any areas of deck which may be considered as posing a safety risk to seafarers. Such spaces may be shared with the passengers onboard.

**21A.14 *Stowage Facilities for Personal Effects***

- (1) Each seafarer shall be provided with adequate storage space for personal effects which shall be a minimum of 125 litres per seafarer.

**21A.15 *Machinery Space Boundaries***

- (1) Where machinery spaces are adjacent to accommodation spaces, the boundaries shall be designed to be gas tight. The requirement to be gas-tight is taken to mean that bulkheads shall be so constructed as to prevent ingress of water and noxious gases into adjacent cabins as far as is reasonable and practicable to do so.
- (2) Machinery space boundaries shall retain any liquids which may leak from the equipment within the machinery space.

**21A.16 Securing of Heavy Equipment**

- (1) All heavy items of equipment such as ballast, batteries, cooking stove, etc, shall be securely fastened in place. All stowage lockers containing heavy items shall have lids or doors which are capable of being securely fastened.

**21A.17 Protection from Mosquitoes**

- (1) Vessels regularly trading to and within mosquito infested ports shall be fitted with appropriate devices to protect seafarers from mosquitos, as agreed by the Administration

**21A.18 Master's Inspections**

- (1) There shall be weekly documented inspections carried out onboard vessels, by or under the authority of the master, with respect to:
  - (a) supplies of food and drinking water;
  - (b) all spaces and equipment used for the storage and handling of food and drinking water;
  - (c) galley and other equipment used for the preparation and service of meals; and
  - (d) that seafarer accommodation is clean, decently habitable and maintained in a good state of repair.
- (2) The results of each inspection shall be recorded and made available for review.

## **CHAPTER 21B**

### **ACCOMMODATION AND RECREATIONAL FACILITIES VESSELS OF 200GT AND OVER**

Objective: The purpose of this Chapter is to implement substantially equivalent arrangements to the seafarer accommodation requirements of the MLC. There are alternative arrangements for vessels of traditional design and vessels under 200GT which do not trade internationally. The aim of the Convention is to provide a comprehensive set of global maritime labour standards for all seafarers, including accommodation standards.

#### **21B.1 Introduction**

- (1) This Chapter applies to vessels of 200GT and over, the keel of which was laid or was at a similar stage of construction, on or after the date of entry into force of the MLC.
- (2) When agreed with the Administration, vessels which are of traditional build and are true replicas of traditionally designed yachts, which includes wooden yachts, 'J Class' yachts and other yachts of similar design where their traditional character is incompatible with the detailed accommodation requirements, particularly with regard to cabin size, are excepted from the requirements of this section and shall comply with Chapter 21.

#### **21B.2 General**

- (1) Accommodation shall provide decent living conditions and recreational facilities for all seafarers onboard the vessel. Due consideration shall be given to likely numbers of hotel and support staff onboard
- (2) In order to provide decent living conditions and recreational facilities the following requirements are provided as minimum standards.
- (3) The materials used to construct internal bulkheads, panelling and sheeting, floors and joinings shall be suitable for the purpose and conducive to ensuring a healthy environment. All relevant health and safety standards shall be observed.
- (4) The accommodation shall be adequately insulated; proper lighting and sufficient drainage shall be provided.
- (5) There shall be no direct openings into sleeping rooms from machinery spaces, galleys, storerooms, drying rooms or communal sanitary areas. That part of a bulkhead separating such places from sleeping rooms and external bulkheads shall be efficiently constructed of steel or other approved material and be watertight and gas-tight. The requirement to

be watertight and gas-tight is taken to mean that bulkheads shall be so constructed as to prevent ingress of water, cooking smells, and noxious gases into adjacent cabins.

**21B.3 Headroom**

- (1) There shall be adequate headroom in all seafarer accommodation. The minimum permitted headroom in all seafarer accommodation where full and free movement is necessary shall be not less than 203 centimetres. Some limited reduction in headroom in any space, or part of any space, in such accommodation may be permitted, provided this is reasonable and does not result in discomfort to the seafarer and is agreed with the Administration.
- (2) For other spaces where seafarers are expected to stand for prolonged periods, the minimum headroom shall be 190 centimetres. The competent authority may allow reduced height in some locations if it does not result in discomfort to seafarers.

**21B.4 Access/Escap arrangements**

- (1) See Sections 14A.3 and 14B.12 for details.

**21B.5 Lighting**

- (1) Seafarer's sleeping rooms and mess rooms shall be lit by natural light and provided with adequate artificial light. Where the provision of natural light is impracticable, adequate artificial light may be acceptable in limited areas.

**21B.6 Heating**

- (1) Adequate heat through an appropriate heating system shall be provided, except in vessels exclusively operating in tropical climates.

**21B.7 Ventilation**

- (1) Sleeping rooms and mess rooms shall be adequately ventilated. Vessels, except those regularly operating in areas where temperate climatic conditions do not require this, shall be equipped with air conditioning for seafarer accommodation, for any separate radio room and for any centralised machinery control room. All sanitary spaces shall have ventilation that draws from the accommodation and extracts to the open air, independently of any other part of the accommodation.
- (2) Mechanical ventilation shall be provided to all accommodation spaces on vessels which are intended to make long international voyages or operate in tropical waters. As a minimum, mechanical ventilation shall be capable of providing 6 changes of air per hour, when all access and other openings (other than ventilation intakes) to the spaces are closed.

- (3) Air conditioning - recirculation of supply air may be permitted provided that sanitary accommodation is provided with mechanical exhaust ventilation and that the fresh air content of the supply to the accommodation is not less than:
- (a) 25 cubic metres per hour for each person for whom accommodation is provided; or
  - (b) the total capacity of the sanitary and any other accommodation exhaust fans, excluding the galley, whichever is the greater.

**21B.8** *Sleeping Accommodation*

(1) **General:**

- (a) The sleeping accommodation shall meet 21B.8(2) (the requirements for sleeping accommodation of the MLC for vessels up to 3000GT).
- (b) Where this is not practicable to meet 21B.8(2) the sleeping accommodation shall meet the substantially equivalent requirements of:
  - (i) 21B.8(3) for vessels of 200 GT and over and less than 500GT;
  - (ii) 21B.8(4) for vessels of 500 GT and over and less than 1250GT;
  - (iii) 21B.8(5) for vessels of 3000 GT and over and less than 5000GT:
- (c) For vessels of 5000GT and over but less than 10,000GT, Section 21B.8(6) shall be met.
- (d) Sleeping accommodation shall be of adequate size and properly equipped so as to ensure reasonable comfort and to facilitate tidiness.
- (e) Safe access / egress to and from any top bunks shall be provided in the form of suitable steps, handholds and / or ladders (which may be portable) as is necessary.

(2) **Sleeping Accommodation For Vessels Up To 3000GT:**

- (a) Sleeping rooms shall be situated above the deepest waterline amidships or aft. Where this is impractical, sleeping rooms may be located in the fore part of the vessel, but in no case forward of the collision bulkhead nor immediately beneath working alleyways<sup>58</sup>.
- (b) When it is neither reasonable nor practicable to site seafarer sleeping accommodation amidships or aft, and above the deepest waterline as required, measures taken to ensure an equivalent level of seafarer health and safety shall be agreed with the Administration. Where the sole of the sleeping accommodation is

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<sup>58</sup> Sleeping rooms shall not be subject excessive noise or vibration which may affect the seafarer's ability to rest.

below the deepest waterline amidships, a bilge flooding alarm shall be provided in the sleeping accommodation to provide early warning of flooding to that compartment. Sleeping accommodation with the deck head lining below the deepest intact waterline is not permitted. In addition, for vessels other than short range yachts, where such accommodation is sited partially below the deepest waterline it shall be arranged such that in the event of damage to the watertight compartment in which the accommodation space is situated, the deck head lining shall not be immersed. Due regard shall be given to the provision of a breathing air space for the purpose of ensuring safe escape.

- (c) Satisfactory arrangements shall be made for lighting and ventilation.
- (d) Separate sleeping rooms shall be provided for men and for women.
- (e) A separate berth for each seafarer shall in all circumstances be provided. The minimum inside dimensions of a berth shall not be less than 198 centimetres in length and not less than 80 centimetres in width over half the length of the berth. A taper is permitted from half the length of the berth towards the foot of the berth but under no circumstances is the berth permitted to be narrower at any point than 50 centimetres.
- (f) The master, the chief engineer and the chief navigating officer shall have, in addition to their sleeping rooms, an adjoining sitting room, day room or equivalent additional space. Where this not practicable, an alternative comfortable shared sitting area may be provided. Such a space shall allow such officers to meet privately, or to meet with other seafarers privately. The Navigating Bridge, if suitably fitted, may be considered if it is available for this exclusive use when the ship is not engaged in navigation. When the ship is engaged in navigation, the watchkeepers shall not be distracted.
- (g) Every seafarer shall be provided with a clothes locker of ample space (minimum 475 litres) and a drawer or equivalent space of not less than 56 litres. If the drawer is incorporated in the clothes locker then the combined minimum volume of the clothes locker shall be 500 litres. The locker shall be fitted with a shelf and be able to be locked by the seafarer so as to ensure security and maintain privacy. Where the total required volume cannot be provided within the cabin, the Administration may consider accepting secure facilities for the individual elsewhere within the seafarer accommodation, provided that within the cabin a minimum of 300 litres storage space is provided for each individual seafarer.
- (h) Sleeping rooms shall be provided with a table or desk, which may be of the fixed, drop-leaf or slide-out type or other alternative table, and with comfortable seating accommodation as necessary.
- (i) In calculating the floor area of sleeping rooms, spaces occupied by berths, lockers, seats, chests of drawers and other furniture shall be included in the area but spaces which by reason of their small size or irregular shape cannot accommodate furniture and do not contribute to the area available for free movement shall not

be included. Where a berth or other fixed furniture is situated at the side of the vessel the projected area (to floor level) of such berths or fixed furniture may be used in the calculation of the sleeping room area.

- (j) To the extent possible an individual sleeping room shall be provided for each seafarer, the floor area of which shall not be less than 4.5 square metres. This minimum floor area may include en-suite sanitary facilities where provided.
- (k) Where it is not practical to provide single occupancy cabins, sleeping rooms to be occupied by a maximum of two seafarers may be accepted, provided that the floor area of such sleeping rooms is not less than 7 square metres. The floor area may include en-suite sanitary facilities, if provided.
- (l) The floor area for sleeping rooms for seafarers who are officers on vessels where an adjoining sitting room, day room or equivalent additional space is provided shall not be less than 4.5 square metres per seafarer. This area may include en-suite sanitary facilities. It is not expected that seafarers who are officers shall be required to share a cabin.
- (m) The floor area for sleeping rooms for seafarers who are officers on vessels where no adjoining sitting room, day room or equivalent additional space is provided shall not be less than 7.5 square metres per seafarer. This area may include en-suite sanitary facilities. It is not expected that seafarers who are officers shall be required to share a cabin.

**(3) Sleeping Accommodation For Vessels Of 200GT And Over And Less Than 500GT:**

- (a) Sleeping rooms shall be situated above the deepest waterline amidships or aft where practicable. Where this is impractical, sleeping rooms may be located in the fore part of the vessel, but in no case forward of the collision bulkhead nor immediately beneath working alleyways<sup>59</sup>.
- (b) When it is neither reasonable nor practicable to site seafarer sleeping accommodation amidships or aft, and above the deepest waterline as required, measures taken to ensure an equivalent level of seafarer health and safety shall be agreed with the Administration. Where the sole of the sleeping accommodation is below the deepest waterline amidships, a bilge flooding alarm shall be provided in the cabin to provide early warning of flooding to that compartment. Sleeping accommodation with the deck head lining below the deepest intact waterline is not permitted. In addition, for vessels other than short range yachts, where such accommodation is sited partially below the deepest waterline it shall be arranged such that in the event of damage to the watertight compartment in which the accommodation space is situated, the deck head lining shall not be immersed in order to provide a breathing air space to assist with safe escape. Satisfactory arrangements shall be made for lighting and ventilation.

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<sup>59</sup> Sleeping rooms shall not be subject excessive noise or vibration which may affect the seafarer's ability to rest.

- (c) Separate sleeping rooms shall be provided for men and for women.
- (d) A separate berth for each seafarer shall in all circumstances be provided. The minimum inside dimensions of a berth shall be at least 198 centimetres by 80 centimetres. Narrower berths may be permitted in either (a) sleeping rooms occupied by only one seafarer or (b) sleeping rooms where en-suite sanitary facilities are provided – in such cases the minimum inside dimensions of a berth shall not be less than 198 centimetres in length and not less than 80 centimetres in width over half the length of the berth. A taper is permitted from half the length of the berth towards the foot of the berth but under no circumstances is the berth permitted to be narrower at any point than 50 centimetres.
- (e) Where practical, the master, the chief engineer and the chief navigating officer shall have, in addition to their sleeping rooms, an adjoining sitting room, day room or equivalent additional space. Where this not practicable, an alternative comfortable shared sitting area may be provided. Such a space shall allow such officers to meet privately, or to meet with other seafarers privately. The Navigating Bridge, if suitably fitted, may be considered if it is available for this exclusive use when the ship is not engaged in navigation. When the ship is engaged in navigation, the watchkeepers shall not be distracted.
- (f) Every seafarer shall be provided with a clothes locker of ample space (minimum 475 litres) and a drawer or equivalent space of not less than 56 litres. If the drawer is incorporated in the clothes locker then the combined minimum volume of the clothes locker shall be 500 litres. The locker shall be fitted with a shelf and be able to be locked by the seafarer so as to ensure security and maintain privacy. Where the total required volume cannot be provided within the cabin, the Administration may consider accepting secure facilities for the individual elsewhere within the seafarer accommodation, provided that within the cabin a minimum of 300 litres storage space is provided for each individual seafarer.
- (g) Sleeping rooms shall be provided with a table or desk, which may be of the fixed, drop-leaf or slide-out type or other alternative table, and with comfortable seating accommodation as necessary.
- (h) Where a single berth seafarer's cabin without en-suite sanitary facilities is provided it shall have a floor area of not less than 3.6 square metres.
- (i) A single berth seafarer's cabin provided with en-suite sanitary facilities, shall have a floor area of not less than 4.5 square metres. En-suite sanitary facilities are considered to compensate for reduced floor area and form part of the floor area.
- (j) Sleeping rooms occupied by two seafarers without en-suite sanitary facilities shall have a floor area of not less than 7 square metres.
- (k) A cabin occupied by two seafarers where en-suite sanitary facilities are provided shall have a minimum floor area of 6.2 square metres. En-suite sanitary facilities are considered to compensate for reduced floor area and form part of the floor area.

- (l) Where the reduced floor areas in 21B.8(3)(h) to 21B.8(3)(k) are adopted, the free floor area in the sleeping accommodation shall be at least 1.45 square metres per seafarer to provide for sufficient comfortable movement.
  - (m) Where the requirement of 21B.8(3)(l) is not practical due to the hull shape or hull stiffening, but the arrangements in the cabin allow for a free movement of the upper part of the body (i.e, the part of the body above waist level) equivalent to an area of 1.45 square metres, a reduced free floor area (i.e, that part of the floor finished with carpet or other type of floor covering) may be provided with the Administration's agreement, but shall not be less than 1 square metre per seafarer.
  - (n) Where the requirements of 21B.8(3)(m) are accepted by the Administration, the en-suite sanitary facilities shall be large enough to allow for the facilities to be used with the door closed and would not be expected to have a floor area of less than 1.2 square metres. Where the floor area of the en-suite sanitary facilities provided is greater than 1.2 square metres, the free floor area of the cabin may be reduced accordingly, but shall never be less than 1 square metre per seafarer.
- (4) **Sleeping Accommodation For Vessels Of 500GT And Over And Less Than 1250GT:**
- (a) Sleeping rooms shall be situated above the deepest waterline amidships or aft where practicable. Where this is impractical, sleeping rooms may be located in the fore part of the vessel, but in no case forward of the collision bulkhead nor immediately beneath working alleyways<sup>60</sup>.
  - (b) When it is neither reasonable nor practicable to site seafarer sleeping accommodation amidships or aft, and above the deepest waterline as required, measures taken to ensure an equivalent level of seafarer health and safety shall be agreed with the Administration. Where the sole of the sleeping accommodation is below the deepest waterline amidships, a bilge flooding alarm shall be provided in the cabin to provide early warning of flooding to that compartment. Sleeping accommodation with the deck head lining below the deepest intact waterline is not permitted. In addition, where such accommodation is sited partially below the deepest waterline it shall be arranged such that in the event of damage to the watertight compartment in which the accommodation space is situated, the deck head lining shall not be immersed. Satisfactory arrangements shall be made for lighting and ventilation.
  - (c) Separate sleeping rooms shall be provided for men and for women.
  - (d) A separate berth for each seafarer shall in all circumstances be provided. The minimum inside dimensions of a berth shall be at least 198 centimetres by 80 centimetres. Narrower berths may be permitted in either (a) sleeping rooms occupied by only one seafarer or (b) sleeping rooms where en-suite sanitary facilities are provided – in such cases the minimum inside dimensions of a berth

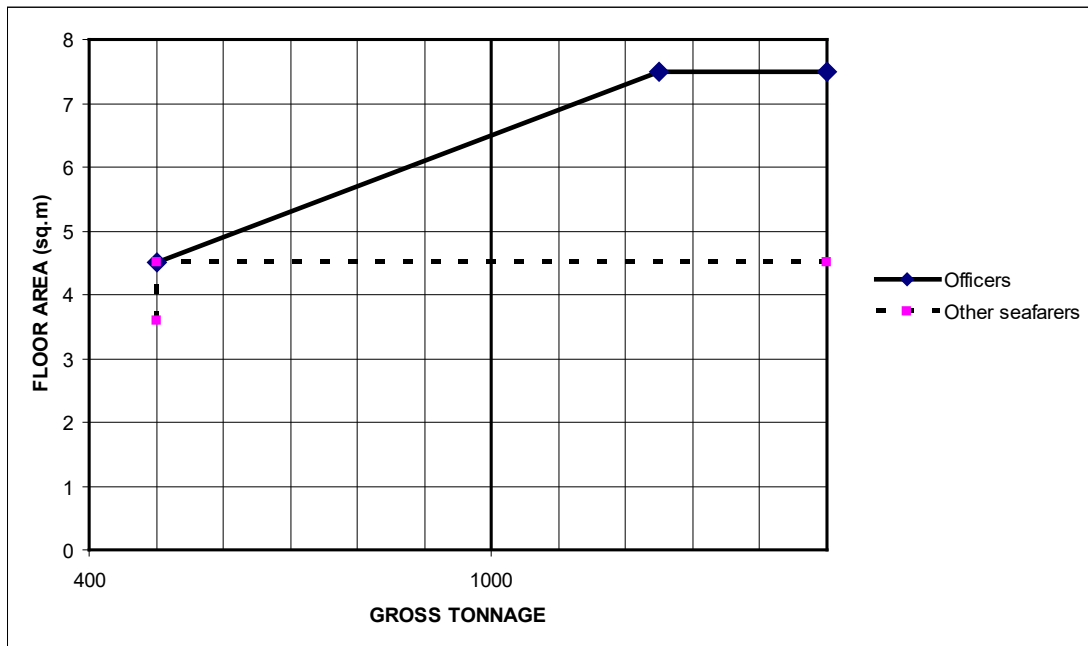
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<sup>60</sup> Sleeping rooms shall not be subject excessive noise or vibration which may affect the seafarer's ability to rest.

shall not be less than 198 centimetres in length and not less than 80 centimetres in width over half the length of the berth. A taper is permitted from half the length of the berth towards the foot of the berth but under no circumstances is the berth permitted to be narrower at any point than 50 centimetres.

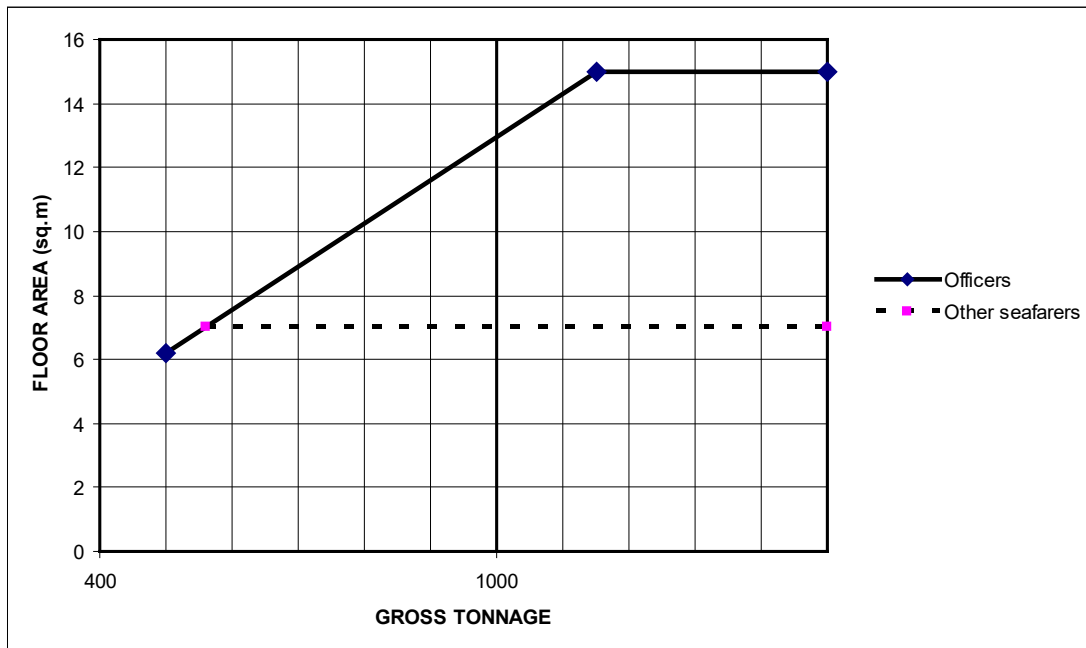
- (e) Where practical, the master, the chief engineer and the chief navigating officer shall have, in addition to their sleeping rooms, an adjoining sitting room, day room or equivalent additional space. If an adjoining sitting room, day room or equivalent additional space is provided the minimum floor area of the cabin shall not be less than 4.5 square metres. If there is no dayroom provided see 21B.8(4)(n).
- (f) Every seafarer shall be provided with a clothes locker of ample space (minimum 475 litres) and a drawer or equivalent space of not less than 56 litres. If the drawer is incorporated in the clothes locker then the combined minimum volume of the clothes locker shall be 500 litres. The locker shall be fitted with a shelf and be able to be locked by the seafarer so as to ensure security and maintain privacy. Where the total required volume cannot be provided within the cabin, the Administration may consider accepting secure facilities for the individual elsewhere within the seafarer accommodation, provided that within the cabin a minimum of 300 litres storage space is provided for each individual seafarer.
- (g) Sleeping rooms shall be provided with a table or desk, which may be of the fixed, drop-leaf or slide-out type or other alternative table, and with comfortable seating accommodation as necessary.
- (h) Where a single berth seafarer's cabin without en-suite sanitary facilities is provided it shall have a floor area of not less than 3.6 square metres.
- (i) A single berth seafarer's cabin provided with en-suite sanitary facilities, shall have a floor area of not less than 4.5 square metres. En-suite sanitary facilities are considered to compensate for reduced floor area and form part of the floor area.
- (j) Sleeping rooms occupied by two seafarers without en-suite sanitary facilities shall have a floor area of not less than 7 square metres.
- (k) Single occupancy cabins for seafarers who are officers for whom no adjoining sitting room, day room or equivalent additional space are provided shall be not less than 4.5 square metres for a vessel of 500GT and not less than 7.5 square metres for vessels of 1250GT and over. For a vessel of intermediate gross tonnage, the floor area shall be determined by linear interpolation, as shown in Figure 21B.1 below. En-suite sanitary facilities are considered to compensate for reduced floor area and form part of the floor area.

Figure 21B.1 – Cabin Floor Areas – Single Occupancy



- (1) Floor areas of double occupancy cabins with en-suite sanitary facilities for seafarers who are officers for whom no adjoining sitting room, day room or equivalent additional space are provided shall be not less than 6.2 square metres for a vessel of 500GT and not less than 15 square metres for vessels of 1150GT and over. For a vessel of intermediate gross tonnage, the floor area shall be determined by linear interpolation, as shown in Figure 21B.2 below. For seafarers who are not officers, the floor area of a double occupancy cabin with en-suite sanitary facilities shall increase at the same rate as cabins provided for seafarers who are officers until it is 7 square metres.

Figure 21B.2 – Cabin Floor Areas – Double Occupancy



- (m) Officer's cabins with a floor area less than 7.5 square metres shall be provided with televisions and other suitable electronic audio-visual equipment.
  - (n) Where adjoining sitting rooms, day rooms or other equivalent additional spaces are not provided in accordance with 21B.8(4)(k) an additional space providing a comfortable shared sitting area for such officers shall be provided with a floor area of at least 1.5 square metres per officer. Such a space shall allow the seafarers who are officers to meet privately, or the seafarers who are officers to meet with other seafarers privately. The wheelhouse, if suitably fitted, may be considered if it is available for this exclusive use when the vessel is not engaged in navigation. When the ship is engaged in navigation, the watchkeepers shall not be distracted.
- (5) **Sleeping Accommodation For Vessels Of 3000GT And Over And Less Than 5000GT:**
- (a) Vessels of 3000GT and over and less than 5000GT, constructed on or after 20 August 2012 shall comply with the full requirements of standard A3.1 of the MLC, except for the following equivalent arrangement to MLC standards, A3.1.8, A3.1.9(a), (b) and (f), and A3.1.11(a) which may be followed:
    - (i) all seafarers who are officers shall have their own cabin.
    - (ii) no more than two seafarers not performing the duties of officers may be accommodated per cabin, in a twin cabin arrangement.
    - (iii) vessels shall be designed and crewed in such a way that cabins can be allocated by gender – i.e. there shall be no mixed gender cabins. This does not prevent a mixed gender couple voluntarily sharing a cabin in

operation. The seafarer cabins shall be designed and shall only be approved as twin cabins, not as double cabins. There shall not be any compulsion in any way whatsoever for seafarers of different genders to share a cabin.

- (iv) there shall be a minimum cabin size for seafarers who are not performing the duties of officers who are provided with a twin cabin. Based on the MLC requirement for vessels of 3000GT or over for 5.5 square metres of floor area per seafarer, the minimum floor area for such a cabin shall be no less than 11 square metres.
- (v) each seafarer berth in a twin cabin shall be arranged longitudinally, i.e., so that it is a 'fore and aft' bunk. Bunks arranged athwartships shall not be permitted in twin cabins.
- (vi) each twin cabin shall be provided with en suite sanitary facilities. Each set of en suite sanitary facilities shall meet the minimum requirements set out in the MLC for sanitary facilities, i.e. that they provide a WC, a basin and a shower or a bath tub. The floor area for en suite sanitary facilities may be incorporated within the minimum 11 square metres floor area for each twin cabin.
- (vii) each cabin shall be lit by natural light and shall be provided with artificial light. There shall be a minimum of one window providing natural light per cabin.

**(6) Sleeping Accommodation For Vessels Of 5000GT And Over And Less Than 10,000GT:**

- (a) Vessels of 5000GT and over and less than 10,000GT, constructed on or after 20 August 2012 shall either comply with the full requirements of standard A3.1 of the MLC or Chapter 21B.8 (5) – Sleeping Accommodation for vessels of 3000GT and over and less than 5000GT. Where the latter option is chosen, the following additional facilities shall be provided:
  - (i) ensuite facilities for each cabin consisting of a WC, a basin and a shower or tub;
  - (ii) berths having minimum inside dimensions of 1000mm x 2000mm and fitted with privacy curtains;
  - (iii) each cabin shall be individually temperature controlled;
  - (iv) an officer's lounge;
  - (v) a crew lounge;
  - (vi) a crew gym, and
  - (vii) compliance with the escape criteria contained in 14B.12(3)(d).

**21B.9 Mess Rooms**

- (1) Mess rooms shall be located apart from the sleeping rooms to avoid disturbing those persons sleeping and as close as practicable to the galley. Mess rooms shall be of adequate comfort and properly furnished and equipped (including ongoing facilities for refreshment), taking account of the number of seafarers likely to use them at any one time. Mess rooms for seafarers who are officers and other seafarers may be separate or common, as appropriate.
- (2) Where the substantially equivalent arrangements in Section 21B.8(3) and 21B.8(4) are used, the floor area of mess rooms for seafarers shall not be less than 1.5 square metres per person of the planned seating capacity.

**21B.10 Galley Areas, Food Preparation, Storage, and Provision of Food**

- (1) Adequate food shall be provided for all seafarers onboard free of charge. The provision of food shall take account of the seafarers' religious requirements and cultural practices, the nature and duration of the voyage, and shall be suitable in respect of quantity, nutritional value, quality and variety.
- (2) The organisation and equipment of the catering department shall be such as to permit the provision to the seafarers of adequate, varied and nutritious meals prepared and served in hygienic conditions. This shall include as a minimum that the galley is fitted with a means of cooking and a sink and have adequate working surface for the preparation of food. The galley floor shall be provided with a non-slip surface and provide a good foothold.
- (3) All furniture and fittings in the galley shall be made to be impervious to dirt and moisture. All metal parts of furniture and fittings shall be rust resistant.
- (4) The ventilation in the galley shall be arranged to ensure that there is an adequate supply of fresh air and for the efficient discharge of fumes into the open air. Air conditioning systems shall provide a minimum of 25 cubic metres of air per hour, per person working in the ventilated space during normal operating conditions. Enclosed galleys shall be specially considered, and where air conditioning is not fitted shall have, as a minimum, a mechanical supply of 20 fresh air changes per hour and a mechanical exhaust of 30 changes per hour.
- (5) When a cooking appliance is gimballed it shall be protected by a crash bar or other means to prevent personal injury. Means shall be provided to lock the gimbaling mechanism.
- (6) Means shall be provided to allow the person cooking to be secured in position, with both hands free for working, when the vessel motions threaten safe working. Secure and hygienic storage for food and garbage shall be provided.

**21B.11 Water Services**

- (1) An adequate supply of fresh drinking water shall be provided and piped to convenient positions throughout the accommodation spaces.
- (2) To mitigate the risk of burns and legionella, thermostatic anti-scalding valves shall be provided for hot water outlets and installed in accordance with the manufacturer's recommendations. Water temperatures shall be maintained in accordance with the applicable requirements of the Administration.
- (3) In addition, an emergency reserve supply of drinking water shall be carried, sufficient to provide at least 2 litres per person the vessel is certificated to carry. The installation of fresh water making machines and disinfection arrangements shall be to the acceptance of the Administration - for this purpose silver ionisation or chlorination would be considered acceptable.

**21B.12 Sanitary Facilities**

- (1) A minimum of one toilet, one wash basin and one tub or shower or both for every six seafarers or less who do not have en-suite sanitary facilities shall be provided at a convenient location.
- (2) Separate sanitary facilities shall be provided for men and for women. In respect of sanitary facilities for men and for women, vessels shall be provided with a minimum of 2 sets of sanitary facilities for the first two seafarers onboard plus an additional set of sanitary facilities for every additional 6 seafarers.
- (3) Where a sleeping room is provided with en-suite sanitary facilities those facilities shall include a minimum of one toilet, one wash basin and one tub or shower or both.
- (4) Where private or semi-private facilities cannot be provided, all seafarers shall have convenient access on the vessel to sanitary facilities meeting minimum standards of health and hygiene and reasonable standards of comfort. Hot and cold running fresh water shall be available in all wash places.
- (5) Sanitary facilities within easy access of the wheelhouse, and the machinery space or near the engine room control centre shall be provided where practical.
- (6) Every sleeping room shall be provided with a washbasin with hot and cold running fresh water, except where such a washbasin is situated in the en-suite sanitary facilities provided.

**21B.13 Hospital Accommodation**

- (1) Vessels carrying 15 or more seafarers and engaged in a voyage of more than three days' duration shall provide separate hospital accommodation to be used exclusively for medical purposes. This may be a treatment room that also meets the requirements for

hospital accommodation. Hospital accommodation shall be designed to facilitate the giving of medical first aid and to help prevent the spread of infectious diseases.

- (2) It is recommended that the arrangement of the entrance, berths, lighting, ventilation, heating and water supply shall be designed to ensure comfort and facilitate the treatment of occupants.
- (3) Sanitary facilities shall be provided for the exclusive use of the occupants of the hospital accommodation, either as part of the accommodation or in close proximity thereto. Such sanitary facilities shall comprise a minimum of one toilet, one washbasin and one shower or tub.
- (4) Short-range yachts and other vessels that remain within 60 miles of the coast are exempt from 21B.13(1). In cases where such vessels are engaged on voyages of more than three days duration, for example on re-positioning trips, an en-suite cabin shall be designated exclusively for medical purposes. Such a cabin shall be designed to facilitate (when in hospital mode) the giving of medical first aid and to help prevent the spread of infectious diseases and it is recommended that the arrangement of the entrance, berths, lighting, ventilation, heating and water supply shall be designed to ensure comfort and facilitate the treatment of occupants.
- (5) To help prevent the spread of infectious diseases and for patient comfort every hospital shall be fitted with mechanical exhaust ventilation independent from any ventilators provided for other parts of the seafarer accommodation.
- (6) For black and grey water requirements from hospitals MARPOL requirements shall be followed.

**21B.14 Laundry Facilities**

- (1) Appropriately situated and furnished laundry facilities shall be available.

**21B.15 Offices**

- (1) Separate offices or a common office for use by deck and engineer seafarers shall be provided where practicable.

**21B.16 Other Provisions**

- (1) A space or spaces shall be provided on open deck for the recreation of seafarers to which seafarers can have access when off duty. This shall have a total floor area of 1.5 square metres per person for the greatest number of seafarers likely to use the space at any one time.
- (2) Vessels regularly trading to and within mosquito infested ports shall be fitted with appropriate devices to protect seafarers from mosquitos, as agreed by the Administration.

- (3) Appropriate seafarers' recreational facilities, amenities and services, as adapted to meet the special needs of seafarers who live and work onboard shall be provided.

**21B.17 *Master's Inspections***

- (1) There shall be weekly documented inspections carried out onboard vessels, by or under the authority of the master, with respect to:
  - (a) supplies of food and drinking water;
  - (b) all spaces and equipment used for the storage and handling of food and drinking water;
  - (c) galley and other equipment used for the preparation and service of meals; and
  - (d) that seafarer accommodation is clean, decently habitable and maintained in a good state of repair.
- (2) The results of each inspection shall be recorded and made available for review.

**21B.18 *Hand Holds and Grab Rails***

- (1) There shall be sufficient hand holds and grab rails within the accommodation to allow safe movement around the accommodation at all times. Stairways shall be specially considered.

**21B.19 *Securing of Heavy Equipment***

- (1) All heavy items of equipment such as ballast, batteries, cooking stove, etc, shall be securely fastened in place. All stowage lockers containing heavy items shall have lids or doors which are capable of being securely fastened.

**21B.20 *Sailing Vessels***

- (1) The requirements of Chapter 21B apply to sailing vessels in the same way as they do to motor vessels.
- (2) Where the sailing vessel under 1500GT the variations described in 21B.20(3) and 21B.20(4) may be adopted.
- (3) On a case by case basis where due to the number of seafarers and passengers on a sailing vessel, it is not possible to meet the equivalent arrangements of 21B.8(3)(m) (minimum of 1 square metre free floor area per seafarers), seafarers shall have no worse accommodation arrangements than the passengers.
- (4) Where it is not possible to meet the requirements of 21B.8(4)(n) due to there not being a wheelhouse, an additional space that provides privacy for the seafarers who are officers,

such as a spare cabin, may be provided to the satisfaction of the Administration. Such a space shall allow the seafarers who are officers to meet privately, or the seafarers who are officers to meet with other seafarers privately.

## **CHAPTER 22**

### **PROTECTION OF PERSONNEL**

#### **22.1 General Requirements**

- (1) Vessels shall comply with the requirements of Annex O and those of the Administration.
- (2) Vessels shall comply with the requirements of Annex B and those of the Administration.

#### **22.2 Deckhouses and Superstructures**

- (1) The structural strength of any deckhouse or superstructure shall comply with the requirements of a Recognised Organisation, as appropriate to the vessel and its areas of operation.

#### **22.3 Bulwarks and Guardrails**

- (1) Bulwarks and/or guardrails on all accessible decks including cabin balconies and any fold down platforms for enclosed mooring deck observation platforms, beach clubs etc shall be 1000 millimetres high except that on vessels built to 1959 Load Line rules these may be 915 millimetres high. Any opening shall not exceed 380 millimetres. Where no bulwarks are fitted, or bulwark height is less than 230 millimetres, the lowest opening shall not exceed 230 millimetres. They shall be supported at intervals not exceeding 2.2 metres. Intermediate courses of rails or wires shall be evenly spaced.
- (2) Satisfactory means (in the form of guard rails, life lines, gangways or underdeck passages, etc.) shall be provided for the protection of the crew in getting to and from their quarters, the machinery space and all other areas used in the necessary work of the vessel.
- (3) Where Sun Pads are located within 600 millimetres of any Bulwarks and / or Guardrails, the minimum height of the Bulwark and / or Guardrails shall be at least 1m above the surface of the Sun Pad (taken as the height of the Sun Pad + 50% of the thickness of the mattress). This requirement does not apply to bench seating or any other horizontal surfaces, which persons would not reasonably be expected to step or stand on.
- (4) Where the function of the vessel would be impeded by the provision of bulwarks and/or guard rails complying with (1), alternative proposals detailed to provide equivalent safety for persons on deck shall be submitted to the Administration for approval, where recognised national or international standards may be accepted as equivalence.
- (5) The structural strength of any bulwarks (including glazed bulwarks) or guardrails shall comply with the requirements of a Recognised Organisation, or a recognised national or international standard as appropriate to the vessel and its areas of operation.

- (6) Manufacturers certification confirming compliance with the applicable strength requirements of ISO 15085 may be accepted for portable stanchions and guard wires. The fixing of such stanchions and guard wires shall be to the satisfaction of a Recognised Organisation.
- (7) Where applicable, it shall be ensured that the design of any bulwarks (including glazed bulwarks) complies with the water freeing arrangements in Chapter 6.

#### **22.4 Safety Measures for External Deck Areas**

- (1) The surfaces of all external deck areas including any staircases shall be non-slip.
- (2) External deck areas including any staircases shall be well lit.
- (3) Handrails shall be provided on at least one side external staircases. Staircases greater than 1800 millimetres wide shall be provided with handrails on both sides.
- (4) Due consideration to be given to the provision of handrails on external deck areas where no other handholds such as capping rails are provided.

#### **22.5 Noise**

- (1) All new vessels of 1600GT and over, unless the Administration deems that compliance with a particular provision is unreasonable or impractical, shall be constructed to reduce onboard noise and to protect personnel from the noise in accordance with the IMO Code on noise levels onboard ships, adopted by the IMO Maritime Safety Committee by resolution MSC.337(91), as may be amended by the IMO.
- (2) For new vessels under 1600GT, attention is drawn to the IMO Code on noise levels onboard ships, adopted by the IMO Maritime Safety Committee by resolution MSC.337(91) as amended. Vessels covered by this Code shall meet the requirements so far as is reasonable and practicable.
- (3) For all existing vessels, the IMO Code on Noise Levels Onboard Ships promotes the control of noise within the framework of internationally agreed guidelines, whilst recommending methods of measuring noise at listening posts.
- (4) For safe navigation, it is important that sound signals and VHF communications can be heard, at the navigating position in normal operating conditions.
- (5) For machinery spaces, workshops and stores which are manned either continuously or for lengthy periods, the recommended limits are 90dB(A) for machinery spaces and 85dB(A) for workshops and stores.
- (6) For machinery spaces which are not intended to be continuously manned or are attended for short periods only, the recommended limits are 110dB(A).

- (7) The limits have been set from hearing damage risk considerations and the use of suitable ear protectors.
- (8) To indicate the need to wear ear protectors, safety signs, signs with symbols and supplementary warning notices shall be displayed at all entrances to spaces in which the noise level exceeds 85dB(A).

**22.6 Additional Equivalence Considerations**

- (1) None.

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## **CHAPTER 23A**

### **SAFETY MANAGEMENT VESSELS OF LESS THAN 500GT**

#### **23A.1 *General Requirements***

- (1) All vessels under 500GT shall employ a safety management system as described in this Chapter.
- (2) All vessels shall include emergency towing procedures, as required by SOLAS II-1/3-4, in their safety management system or in a separate plan.

#### **23A.2 *Introduction***

- (1) The purpose of this Annex is to provide guidance on how to develop and implement an effective safety management system for vessels under 500GT, where full certification to the International Safety Management Code is not a requirement.

#### **23A.3 *General***

- (1) Each operator shall create a safe working environment, which shall include the following:

#### **23A.4 *Health and Safety Protection Policy***

- (1) This shall address the issues of health, safety and the environment as they affect the company and its staff, both ashore and afloat. Such a policy might read along the following lines:

"The policy of (name of Company/Owner) is to conduct its activities taking full account of the health and safety of its employees and of all persons using or connected with the Company/Owner. In implementing this policy, (name of Company/Owner) shall ensure that the [vessel] is, at all times, properly maintained and operated by qualified personnel in full compliance with relevant legislation. In particular the [Company/Owner] shall carry out an assessment of the risks to the health and safety of workers and others affected by [the undertaking], and shall take the necessary measures to minimise the risks identified."

- (2) The Company/Owner is recommended to develop and implement an oil management plan to the same standard as the garbage management plan and to integrate it with the Health and Safety Protection Policy. This is not required for vessels over 400GT, for which an IOPP certificate is required.

**23A.5 *Procedures to Ensure Safe Operation of Vessels in Compliance with the Regulations and Rules***

- (1) The regulations and rules, not addressed by this Code of Practice, which apply to all vessels include, but are not limited to:
  - (a) International Regulations for Preventing Collisions at Sea;
  - (b) Local Navigation rules;
  - (c) National health and safety regulations;
  - (d) The Code of Safe Working Practices for Merchant Seamen;
  - (e) All relevant national shipping or guidance notices.
- (2) The company shall draw up simple procedures to ensure that safe working practices are carried out in the operation of the vessel. These may be in the form of checklists which can be followed by all personnel.
- (3) For some vessels, it might be appropriate to have permanently exhibited checklists, e.g. in the wheelhouse for navigational items. Alternatively, in a smaller vessel, the record could take any suitable form such as a diary as distinct from a specially printed logbook. Whatever form the record takes, such entries shall be accepted as evidence of compliance with the procedural requirements onboard.

**23A.6 *Lines of Communication Between Personnel, Ashore and Afloat***

- (1) Responsibility and authority of each employee shall be clear. This may be best illustrated in a simple diagram, showing who reports to whom.

**23A.7 *Procedures for Reporting Accidents***

- (1) The requirement for reporting accidents shall be well understood by all personnel and in so doing improve the safety culture practiced onboard.

**23A.8 *Procedures for Responding to Emergency Situations***

- (1) There shall be clearly stated procedures for responding to emergency situations. These may include but not be limited to:
  - (a) fire;
  - (b) collision;
  - (c) grounding;

- (d) violent act;
  - (e) main propulsion or steering failure;
  - (f) man overboard.
- (2) Checklists may be useful in this regard.

**23A.9 Health and Safety Protection Policy**

- (1) One or more competent persons shall be delegated to take responsibility for health and safety, and that person/persons shall be clearly identified. It is the responsibility of the Company/Owner to ensure that the policy is complied with, and that the responsibilities are understood.
- (2) The Company/Owner shall develop a policy on prevention of alcohol and drug abuse.
- (3) All personnel both ashore and afloat have a duty to take care of themselves and other persons who may be affected by their acts or omissions.
- (4) It is essential that, in the event of an emergency, there is the ability to communicate with the emergency services via a shore base. The shore base may be the company office ashore, the local Coastguard, Police or Fire Station, or another office as may be agreed between the vessel and the shore base.

**23A.10 Responsibilities**

- (1) The master shall have authority at all times, to make decisions with regard to the safety of the vessel and the persons onboard. To ensure that there is no ambiguity regarding the authority of the master, there shall be a simple written statement to this effect.

**23A.11 Personnel and Training**

- (1) All personnel shall receive training appropriate to the tasks they undertake. It is the responsibility of the Company/Owner to ensure that this training is given, and that the personnel have an understanding of the relevant regulations and rules. As a minimum, this means:
  - (a) for the master, the relevant qualifications;
  - (b) for the crew, relevant qualifications and any additional training appropriate to their designated duties.
- (2) Prior to the first occasion of working on the vessel, each employee shall receive appropriate familiarisation training and proper instruction in onboard procedures. This could include, but not necessarily be, limited to:
  - (a) mooring and unmooring;

- (b) launching and recovery of survival craft;
- (c) evacuation from all areas of the vessel;
- (d) donning of lifejackets; and
- (e) use and handling of firefighting equipment.

**23A.12 Onboard Procedures**

- (1) Simple procedures shall be developed for the operation of the vessel. These shall include, but not be limited to:
  - (a) testing of equipment, including steering gear, prior to commencing a passage;
  - (b) navigation and handling of the vessel;
  - (c) maintenance routines;
  - (d) bunkering operations;
  - (e) watertight/weathertight integrity;
  - (f) stability of the vessel;
  - (g) conduct of passengers and crew while onboard;
  - (h) emergency towing (may be in a separate document);
  - (i) safe use and qualification of users for personal watercraft; and
  - (j) safe use of hull shell doors (reference shall be made to 4.4(9)(h)).

**23A.13 Preparation for Emergencies**

- (1) The potential emergencies likely to be encountered by the vessel shall be considered. Exercises shall then be carried out in the handling of these emergencies and evacuation from the vessel.
- (2) Where possible, all personnel shall be involved in these exercises, both ashore and afloat.
- (3) The roles and responsibilities of all personnel in an emergency situation shall be defined.
- (4) The exercises shall be recorded. The names of those who participated shall also be recorded.

**23A.14 Reporting of Accidents**

- (1) Vessels operating under this Code shall report any accidents to the Administration and the company shall therefore have a procedure in place. Additionally, all accidents and near accidents shall be recorded and reported to the Company/Owner, who shall implement corrective action, with the aim of improving safety.

**23A.15 Maintenance of the Vessel and Equipment**

- (1) Maintenance of the vessel and equipment is an essential ingredient of safety management. The equipment shall be checked and tested daily when in use, in addition to the tests referred to in the Annex I.
- (2) There shall be procedures for a more detailed inspection and maintenance programme of the vessel and equipment.
- (3) The frequency of the inspections shall be determined by the Company/Owner, but every event shall be recorded.
- (4) Where vessels comply with Section 14A.2(4)(i) the re-application process for the fire protection treatment shall be documented including the frequency and any limitations set by the service supplier.
- (5) A checklist could be employed as an aide memoir for the inspection of equipment.

**23A.16 Review**

- (1) Every Company/Owner shall undertake a review of the safety management system of all vessels at least once in every three years.

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## **CHAPTER 23B**

### **SAFETY MANAGEMENT VESSELS OF 500GT AND OVER**

#### **23B.1 *General Requirements***

- (1) Every ship to which this Code applies shall comply with the applicable requirements of SOLAS IX (IMO's International Safety Management Code).
- (2) All vessels shall include emergency towing procedures, as required by SOLAS II-1/3-4, in their safety management system or in a separate plan.
- (3) All vessels shall also include procedures for the safe use of hull shell doors in their safety management system (reference shall be made to 4.4(9)(h)).

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## **CHAPTER 24**

### **MANNING, CERTIFICATION AND HOURS OF WORK**

#### **24.1 *General Requirements***

- (1) Vessels shall comply with the requirements of Annex G and those of the Administration.

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## **CHAPTER 25**

### **HELICOPTER LANDING AREAS**

#### **25.1 *General Requirements***

- (1) Vessels shall comply with the requirements of Annex H and those of the Administration.

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## **CHAPTER 26**

### **OPERATIONAL READINESS, MAINTENANCE AND INSPECTIONS**

#### **26.1 *General Requirements***

- (1) Vessels shall comply with the requirements of Annex I and those of the Administration.

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## **CHAPTER 27**

### **MEDICAL CARE AND CARRIAGE OF MEDICAL STORES**

#### **27.1 *General Requirements***

- (1) Vessels shall carry medical stores as required by Annex J and the Administration.

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## **CHAPTER 28**

### **SHIP-SHORE TRANSFER OF PERSONNEL**

#### **28.1 *General Requirements***

- (1) Vessels shall comply with the requirements of Annex K and those of the Administration.

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## **CHAPTER 29**

### **LIST OF CERTIFICATES TO BE ISSUED**

#### **29.1 *General Requirements***

- (1) Vessels shall have the certificates listed in Annex M issued.

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## **CHAPTER 30**

### **SURVEY, CERTIFICATION AND ACCIDENT INVESTIGATIONS**

#### **30.1    *General Requirements***

- (1)       Vessels shall comply with the requirements of Annex N and those of the Administration.

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## **CHAPTER 31**

### **INTERNATIONAL SHIP AND PORT FACILITY CODE**

#### **31.1 *General Requirements***

- (1) All vessels of 500GT and over shall comply with the IMO's International Ship and Port Facility Security Code (ISPS Code).

*Red Ensign Group Yacht Code  
Part A*