

# Bahamas Passenger Yacht Code

Version 1.1

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## FOREWORD

This Foreword is provided for explanatory purposes and is not part of the Code provisions.

This Code of Practice (“the Code” or “BPYC”) is based upon and provides for an equivalent level of safety to the Yacht Code – Part B that was developed jointly by the UK Red Ensign Group. The Bahamas Maritime Authority wishes to acknowledge and thank the UK Red Ensign Group for their permission to base this Code upon the Red Ensign Group Yacht Code and their cooperation in formulating this Code.

The **Bahamas Maritime Authority** (“BMA”) is the Administration that manages The Bahamas Ship Register on behalf of the Government of the Commonwealth of The Bahamas, whose flag the vessel is entitled to fly.

Vessels are required to comply with the Merchant Shipping Regulations of The Bahamas which are relevant to the class of vessel to which they belong. Yachts in commercial or non-commercial use for sport or pleasure do not fall naturally into a single class and, in any case, prescribed merchant ship safety standards may be incompatible with the safety needs particular to yachts.

The Code specifically applies 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

Charter Yachts which are 24 metres and above in load line length<sup>1</sup>, in commercial use for sport or pleasure, do not carry cargo and do not carry more than 12 passengers shall comply with the Bahamas Large Yacht Code (BLYC).

This Code is an equivalence under the provisions of Article 8 of the International Convention on Load Lines, 1966, Regulations 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 Global Integrated Shipping Information System (GISIS) at <https://gisis.imo.org> (registration required).

The Code sets required standards of safety, security and pollution prevention which are appropriate to the size of the yacht. The standards applied are either set by the relevant international conventions or equivalent standards where it is not reasonable or practicable to comply. The standards adopted are judged to be at least equivalent in their effect to those required by the international conventions which apply to a particular vessel.

The BMA may consider a specific alternative equivalent standard to any standard required by the Code. Applications which justify either an alternative or exemption from a specific requirement of the Code can be made to the BMA.

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<sup>1</sup> or, if built before 21 July 1968, 150 gross tons and above according to the tonnage measurement regulations applying at that date

Compliance with the standards required by the Code will entitle a vessel to be issued with the certification required by the international conventions applicable to the vessel, upon satisfactory completion of the corresponding surveys and inspections.

The certificates demanded by the international conventions which apply to the vessels covered by the Code are summarised in section 31.

When equipment manufactured in accordance with a recognised International standard is required by the Code, the BMA may accept existing equipment that can be shown to be of an equivalent standard and which does not increase the risk to the ship or its crew and passengers. When such equipment is replaced, the replacement should conform to the standard required by the Code.

It is recognised that the Code may be required to be revised in the light of experience gained in its application. Section 1.3 makes provision for this.

Any suggestions for amendments, clarifications or additions may be sent to [yachts@bahamasmaritime.com](mailto:yachts@bahamasmaritime.com) with the subject "BPYC Change Request".

## **1 APPLICATION AND INTERPRETATION**

### **1.1 Purpose**

1.1.1 The purpose of The Bahamas Passenger Yacht Code (“the Code”), is to provide design criteria, construction standards and other safety measures for yachts carrying no more than 36 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**

- 1.2.1 This Code applies only to pleasure yachts engaged on international voyages whilst carrying more than 12 but not more than 36 passengers with a maximum number of persons on board not more than 200 and which do not carry cargo.
- 1.2.2 Subject to 1.7.1, 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.
- 1.2.3 Subject to Section 1.2.4, 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.
- 1.2.4 Any ship, whenever built, which is converted to a passenger yacht, or undergoes repairs, alterations and modifications which substantially alter the dimensions of the ship or the passenger accommodation spaces, or substantially increase the ship’s service life, shall be treated as a new passenger yacht constructed on the date on which such conversion, repairs, alterations or modifications commenced.
- 1.2.5 In the case of an existing vessel which does not comply fully with the Code safety standards but for which the Code standards are reasonable and practicable, the BMA shall give consideration to a proposal from the Company to phase in requirements within an agreed time scale not exceeding 18 months.
- 1.2.6 The table in Appendix 1 sets out the general relationships between the type of pleasure yacht, its area of operation and the applicable standards with respect to Life Saving Appliances and stability.

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

1.3.1 The content of the Code shall be reviewed periodically by the BMA to ascertain if amendments to it are required.

**1.4 Amendments to International Conventions and Related Instruments**

1.4.1 Where the relevant provisions of SOLAS or ILLC apply in part but some provisions have been modified then the text of all of that Part of the Convention has been incorporated into the body text of the Code for consistency and ease of reference. To readily determine what is “new” drafting and what, in essence, are unmodified Convention provisions, then in the body text of the Code:

- .1 modified or alternative provisions are shown, *in italics*; and
- .2 unchanged Convention provisions are shown in plain text.

1.4.2 The wording of some of the unchanged Convention provisions has been adjusted, but the actual provisions remain unchanged and so the body text is in plain text.

**1.5 International Conventions and related Instruments**

1.5.1 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 passenger ship. This is subject to any express provision to the contrary in the Code.

**1.6 Area of Operation**

1.6.1 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 PY-L1 or PY-L2 have been included.

1.6.2 Yachts which intend to operate in Polar Regions shall meet requirements of the Code, The IMO Polar Code and those of a Recognised Organisation appropriate to the intended area of operation.

**1.7 Vessels certified to Equivalent Passenger Yacht Codes**

1.7.1 Vessels, the keels of which were laid or were at a similar stage of construction before 01 January 2021 and which have been or are currently under survey to equivalent Passenger Yacht Codes, as specified in a Marine Notice, shall continue to be considered under the standards in force at the time of initial survey with the exception of the following which shall comply with this edition of the Code by the first annual survey after 01 January 2021:

- .1 Section 3 for Application of International Conventions and national legislation;
- .2 Section 13.17 for Emergency training & drills;
- .3 Section 14.11 for Emergency training & drills;
- .4 Section 16 for Radiocommunications;
- .5 Section 17 for safety of navigation;
- .6 Section 20 for Accommodation and recreational facilities;
- .7 Section 22 for protection of personnel;
- .8 Section 23 for Ship-shore transfer of personnel;
- .9 Section 24 for international safety management;
- .10 Section 25 for maritime security;

- .11 Section 26 for Manning, certification and hours of work;
- .12 Section 27 for Medical care and carriage of medical stores;
- .13 Section 28 for Operational readiness, maintenance and inspections;
- .14 Section 30 for Survey, certification and accident investigation
- .15 Section 31 for certificates to be issued; and
- .16 Section 32.2 for Requirements for vessels carrying more than 120 persons.

1.7.2 Vessels, the keels of which were laid or were at a similar stage of construction on or after the 01 January 2021, shall comply with this edition of the code in its entirety.

**1.8 Interpretation**

1.8.1 Where a question of interpretation of any part of this Code arises, which cannot be resolved by a delegated authority and the Company for a vessel, a decision on the interpretation may be obtained on written application to the BMA.

**1.9 Equivalent Arrangements**

1.9.1 Proposals for the application of alternative standards considered to be at least equivalent to the requirements of the Code shall be submitted to the BMA for approval.

1.9.2 Deviations from the requirements of the Code may be considered by the BMA, provided that the equivalence:

- .1 is based on the underlying Convention requirements;
- .2 incorporates increased requirements to balance deficiencies and thereby provide an equivalent level of safety to the section concerned;
- .3 meets the intent of the requirements concerned and the objectives of the section;
- .4 incorporates any specific requirements in the section’s ‘Additional Equivalence Considerations’ section; and where necessary;
  - i. has successfully undergone testing to the satisfaction of the BMA; or
  - ii. has successfully undergone, an engineering analysis, evaluation and approval by the BMA.

**1.10 Alternative Design and Arrangements**

*1.10.1. Purpose*

1.10.1.1 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 sections containing provisions for Alternative Design and Arrangements may utilise such provisions outlined in this Section.

*1.10.2. General*

1.10.2.1 Design and arrangements may deviate from the requirements of this Code, provided that the alternative design and arrangements meet the intent of the requirements concerned, the section’s objectives and functional requirements where provided, and provide an equivalent level of safety to the section concerned. Alternative design and arrangements

shall be based on the underlying Convention requirements and follow the BMA's alternative design and arrangement procedures.

- 1.10.2.2. When alternative design or arrangements deviate from the prescriptive requirements of this Code, an engineering analysis, evaluation and approval of the design and arrangements shall be carried out in accordance with this Section.
- 1.10.3. *Engineering analysis*
- 1.10.3.1. The engineering analysis shall be prepared and submitted to the BMA, based on the guidelines<sup>2</sup> and shall include, as a minimum, the following engineering analysis elements:
- .1 determination of the ship type, machinery, electrical installations and space(s) concerned;
  - .2 identification of the prescriptive requirement(s) with which the machinery and electrical installations will not comply;
  - .3 identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognized engineering or industry standards;
  - .4 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;
  - .5 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;
  - .6 technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and
  - .7 risk assessment based on identification of the potential faults and hazards associated with the proposal.
- 1.10.4. *Evaluation of the alternative design and arrangements*
- 1.10.4.1. The engineering analysis required in Section 1.10.3 shall be evaluated and approved by the BMA, taking into account the guidelines.
- 1.10.4.2. A copy of the documentation, as approved by the BMA, indicating that the alternative design and arrangements comply with this Section, shall be carried onboard the ship.

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

1.10.5. *Exchange of information*

1.10.5.1. The BMA shall communicate to the IMO pertinent information concerning approved alternative design and arrangements for circulation to all Contracting Governments.

1.10.6. *Re-evaluation due to change of conditions*

1.10.6.1. 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 BMA.

**1.11 Exemptions**

1.11.1 Exemptions shall be granted only by the BMA.

1.11.2 Applications for exemption shall be made to the BMA and be supported by justification for the exemption.

1.11.3 The granting of exemptions shall be limited by the extent to which International Conventions allow and shall be regarded as exceptional.



**2 DEFINITIONS**

2.1 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 should be taken from meanings given within the International Conventions).

2.2 Except where the context otherwise requires, throughout the Code the terms “yacht”, “ship” and “vessel” are synonymous.

2.3 The following definitions apply to this 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 min
class "A-30"	30 min
class "A-15"	15 min
class "A-0"	0 min
  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

<i>"Administration"</i>	with regards to this Code means: <ol style="list-style-type: none"><li>1. the BMA;</li><li>2. the Government of the State whose flag the ship is entitled to fly; or</li><li>3. a Recognised Organisation who has been delegated the responsibilities</li></ol>
<i>"Aft terminal"</i>	means the aft limit of the subdivision length
<i>"Aft perpendicular"</i>	means the perpendicular taken at the after end of length (L)
<i>"Amidship"</i>	means at the middle of the length (L)
<i>"Aiming Circle"</i>	(for helicopter operations - touchdown/positioning marking) means the aiming point for a normal landing, so designed that the pilot's seat can be placed directly above it in any direction with assured main and tail rotor clearances
<i>"Annual Inspection"</i>	means an inspection conducted on behalf of the BMA by an Authorised Surveyor to verify compliance with this Code. On completion of the inspection a Bahamas Certificate of Inspection will be issued
<i>"Approved"</i>	in respect of materials or equipment means approved by the BMA or approved by an Administration or organisation that is formally recognised by the BMA under the guidance within <a href="#">BMA Information Bulletin No 71</a>
<i>"Authorised surveyor"</i>	means a surveyor who by reason of professional qualifications, practical experience and expertise is authorised by the BMA to carry out the survey required for the vessel
<i>"Aviation fuel"</i> <i>(also known as "Jet A1 Fuel"</i> <i>and "Kerosene")</i>	means a fuel for modern jet and turboprop engines. It consists primarily of hydrocarbon compounds, but other additives are present to increase safety. International regulations stipulate uniform standards for the quality and composition of kerosene

*“Aviation Inspection Body (AIB)”*

means a body delegated the responsibility of inspecting helicopter landing areas by the BMA. The verification process will include inspection, certification and, where necessary, the application of appropriate operational limitations. Such Bodies will be recognised as having the necessary competencies by a Bahamas Recognised Organisation or directly by the BMA

*“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 225oC above the original temperature, within the time listed below:
 

class "B-15"	15 min
class "B-0"	0 min
3. they are constructed as to be capable of preventing the passage of flame to the end of the first half hour of the standard fire test; and
4. the Administration 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.

*“BMA”*

means the Bahamas Maritime Authority

*“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

<i>"Bulletin"</i>	means a Bulletin published by the BMA that advises owners, masters, other seafarers and other interested parties of advice that may assist in the interpretation or implementation of legislation applicable to Bahamian registered vessels. It includes reference to any subsequent Bulletin amending or replacing the original that is considered by the BMA to be relevant
<i>"Buoyant lifeline"</i>	means a line complying with the requirements of the IMO International Life-Saving Appliances Code
<i>"Cargo"</i>	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 on board the vessel
<i>"Central control station"</i>	means a control station in which the following control and indicator functions are centralised – <ol style="list-style-type: none"> <li>1. fixed fire detection and fire alarm systems;</li> <li>2. automatic sprinkler, fire detection and fire alarm systems;</li> <li>3. fire door indicator panels;</li> <li>4. fire door closure;</li> <li>5. watertight door indicator panels;</li> <li>6. watertight door closures;</li> <li>7. ventilation fans;</li> <li>8. general/fire alarms;</li> <li>9. communication systems including telephones; and</li> <li>10. microphones to public address systems.</li> </ol>
<i>"Charter Yacht"</i>	means any yacht engaged in trade, which is not a Private Yacht or a passenger ship
<i>"Classification Society"</i>	means a "Recognised Organisation"
<i>"Code"</i>	means The Bahamas Yacht Code
<i>"Combustible material"</i>	means any material other than a non-combustible material
<i>"Continuous "B" class ceilings or linings"</i>	means those "B" class ceilings or linings which terminate at an "A" or "B" class division

<i>"Continuously manned central control station"</i>	means a central control station which is continuously manned by a responsible member of the crew
<i>"COLREGs"</i>	means the Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREG 72), as applicable for vessels the keels of which are laid on or after 01 January 2021
<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>"Company"</i>	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
<i>"D-value"</i>	means the largest overall dimension of a helicopter when rotors are turning. This dimension will normally be measured from the most forward position of the main rotor tip path plane to the most rearward position of the tail rotor tip path plane (or the most rearward extension of the fuselage in the case of Fenestron or Notar tails)
<i>"D-circle"</i>	means a circle, usually imaginary unless a helicopter landing area itself is circular, the diameter of which is the D-Value of the largest helicopter the landing area is intended to serve. This will not be the case for landing areas of less than 1D width. For landing areas of less than 1D width, the edges of the imaginary D circle, may extend beyond the edge of the load bearing area by up to 0.085D on either side at the mid-point
<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>	means the deepest loaded draught as per the all seasons Load Line assigned to the vessel

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

*"Draught" or (d)* means the vertical distance from the keel line at mid-length to the waterline in question

*"Efficient"* 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

*"Embarkation ladder"* 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

*"Embarkation station"* 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

*"Engaged in trade"* means, for the purposes of the Code, the carriage of passengers for reward or remuneration under a charter or hire agreement

*"Emergency source of electrical power"* Means:

- .1 for 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;
- .2 for all other vessels, the emergency source of electrical power required by SOLAS II-1/42.

*"Emergency switchboard"* means 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

*"Engaged in trade"* Means, for the purposes of the Code, the carriage of passengers for reward or remuneration under a charter or hire agreement

*“EPIRB”*

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 BMA to be relevant, and is capable of:

1. floating free and automatically activating if the ship sinks;
2. being manually activated; and
3. being carried by one person.

*“Existing vessel”*

means any vessel; the keel of which was laid or the construction or lay-up was started before 01 January 2021

*“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:

- .1 “automatic fire damper” is a fire damper that closes independently in response to exposure to fire products;
- .2 “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
- .3 “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

<i>"Fire Test Procedures Code"</i>	means the International Code for Application of Fire Test Procedures as adopted by the Maritime Safety Committee of the IMO by resolution MSC.61(67), 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
<i>"flashpoint"</i>	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
<i>"Float free launching"</i>	means that method of launching a liferaft whereby the liferaft is automatically released from a sinking ship and is ready for use, complying with the LSA Code
<i>"FOD"</i>	Means foreign object debris
<i>"Forward perpendicular"</i>	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
<i>"Freeboard"</i>	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
<i>"Freeboard deck"</i>	Means, subject to paragraphs .1 to .4 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 – <ol style="list-style-type: none"> <li>1. 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;</li> <li>2. At the option of the Company and subject to the approval of the BMA, a lower deck may be designated as the freeboard deck provided it is a complete and permanent deck continuous in a fore</li> </ol>



and aft direction at least between the machinery space and peak bulkheads and continuous athwartships, provided that 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;

3. 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. 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 paragraph 7.2.1 of 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

*“Helideck” or “Helicopter Landing Area”*

means a purpose-built helicopter landing area located on a ship including all structure, fire-fighting appliances and other equipment necessary for the safe operation of helicopters

<i>"Helicopter Landing Area Certificate (HLAC)"</i>	means a certificate issued by an AIB to confirm the helideck and associated facilities meet the minimum requirements of the Code
<i>"Helicopter Landing Area Technical Certificate (HLATC)"</i>	means a certificate issued by an AIB to confirm the helideck and associated facilities meet the minimum physical characteristics required in accordance with the Code
<i>"High Speed Craft Code"</i>	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
<i>"ICAO"</i>	means the International Civil Aviation Organization
<i>"ICLL"</i>	means the International Convention on Load Lines, 1966, as amended, as applicable for vessels the keels of which are laid on or after 01 January 2020
<i>"ILO"</i>	means the International Labour Organization
<i>"Immersion suit"</i>	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
<i>"IMO"</i>	means the International Maritime Organization, a specialised agency of the United Nations devoted to maritime affairs
<i>"Inflatable lifejacket"</i>	means a lifejacket complying with the requirements of the LSA Code
<i>"Information Notice"</i>	means a Notice published by the BMA that provides information and/or guidance on Bahamas legislation and BMA requirements. It includes reference to any subsequent Notice amending or replacing the original that is considered by the BMA to be relevant
<i>"Intact Stability Code, 2008"</i>	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

*“Instructions for onboard maintenance”*

means the instructions complying with the requirements of SOLAS III/Part B – Life Saving Appliances and Arrangements, Regulation 36

*“Keel line”*

means a line parallel to the slope of the keel passing amidships through-

- .1 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
- .2 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 mm, 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 3m

*“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 3m

*“Level 1”*

The area between ‘L1’ and ‘L2’

*“Level 2”*

The area between ‘L2’ and ‘L3’

*“Landing area”*

means the 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 the LSA Code
<i>"Lifejacket"</i>	means a lifejacket complying with the requirements of the LSA Code
<i>"Liferaft"</i>	means a liferaft complying with the requirements of the 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 the LSA Code
<i>"LOS"</i>	means Limited Obstacle Sector. This is the 150° sector within which obstacles may be permitted, provided the height of the obstacles is limited
<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 will 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 BMA may define the limits of the machinery rooms
<i>"Machinery spaces"</i>	means 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: <ol style="list-style-type: none"><li>1. internal combustion machinery used for main propulsion; or</li><li>2. 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</li><li>3. any oil-fired boiler or oil fuel unit, or any oil-fired equipment other than boilers, such as inert gas generators, incinerators, etc.</li></ol>
<i>"Main source of electrical power"</i>	means 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>	means 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>“Major conversion”</i>	means a conversion of a vessel: .1 that substantially alters the dimensions of a vessel; .2 which changes the type of the vessel; .3 the intent of which in the opinion of the BMA is substantially to prolong its life; .4 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>“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>“Marine Notice”</i>	means a Notice published by the BMA that provides instructions related to Bahamas legislation and BMA requirements. It includes reference to any subsequent Notice amending or replacing the original that is considered by the BMA to be relevant
<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>“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 the keels of which are laid on or after 01 January 2021

<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 of either one or more power units
<i>“Moulded depth”</i>	<p>means, subject to paragraphs .1 to .3 below, the vertical distance measured from the top of the keel to the top of the freeboard deck beam at side, provided that-</p> <ul style="list-style-type: none"> <li>.1 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;</li> <li>.2 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</li> <li>.3 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</li> </ul>
<i>“Multihull vessel”</i>	means a 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 areas
<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>“New vessel”</i>	means a vessel to which this Code applies, the keel of which was laid or the construction or lay up was started on or after 01 January 2021
<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>"Not readily ignitable"</i>	means that the surface thus described will not continue to burn for more than 20 seconds after removal of a suitable impinging test flame
<i>"Occasional worker"</i>	As defined in section 14
<i>"Officer"</i>	means <ul style="list-style-type: none"> <li>.1 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</li> <li>.2 any other seafarer considered by the Company to be an officer</li> </ul>
<i>"OFS"</i>	means the Obstacle-Free Sector. This is a 210° sector, extending outwards to a distance that will allow for an unobstructed departure path appropriate to the helicopter that the landing area is intended to serve, within which no obstacles above helideck level are permitted
<i>"Oil fuel unit"</i>	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>
<i>"Over-side working systems"</i>	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
<i>"Partial subdivision draft" or "(d<sub>p</sub>)"</i>	means the light service draft plus 60% of the difference between the light service draft and the Design Waterline draft
<i>"Passenger"</i>	As defined in section 14
<i>"Passenger ship"</i>	means a ship carrying more than 12 passengers



*“Passenger charter yacht (PCY)”* means a yacht engaged in trade carrying more than 12 but not more than 36 passengers, which is engaged in international and unrestricted voyages.

*“Passenger private yacht (PPY)”* means a yacht not engaged in trade carrying more than 12 but not more than 36 passengers, which is engaged in international and unrestricted voyages.

*“Passenger Private Yacht Restricted Charter (PPYRC)”* means a Passenger Private Yacht restricted to charters for not more than 84 days per calendar year and:

- .1 has a minimum load line length of 18 metres; and
- .2 is restricted to operating in forecast or actual wind of a maximum Beaufort Force 4 for a motor yacht or Beaufort Force 6 for a sailing yacht; and
- .3 remains within 60 nautical miles of a safe haven\*

\* the BMA may permit operation on specified routes up to 90 nautical miles

*“Passenger yacht 1 (PY-L1)”* means a passenger yacht, either charter or private, engaged on a prescribed international voyage

*“Passenger yacht 2 (PY-L2)”* means a passenger yacht, either charter or private, engaged on voyages in wind and weather conditions not exceeding Wind Scale 6 and Sea State 5 on the Beaufort scale and during which the ship is-

- (a) not more than 20 nautical miles from land; and
- (b) not more than 60 nautical miles from a port or place in which the passengers and crew could be placed in safety

*“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

*“Position 1”* means upon freeboard decks and raised quarterdecks, or other exposed decks<sup>3</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

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<sup>3</sup> “Exposed decks” include top decks of superstructures, deckhouses, companionways and other similar deck structures

<i>"Position 2"</i>	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
<i>"Positive stability"</i>	means the ability of a ship to return to its original position after the removal of a heeling moment, which is obtained with a positive metacentric height (GM)
<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 1,000 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 body which has been authorised by the BMA under a written agreement to undertake statutory surveys

and issue statutory Certificates on the BMA's behalf and is listed in [Marine Notice 02](#)

*"Recovery time for a rescue boat"*

means the time required to raise the boat to a position where persons onboard can disembark to the deck of the ship and includes the time required to make preparations for recovery onboard the rescue boat such as passing and securing a painter, connecting the rescue boat to the launching appliance, and the time to raise the rescue boat provided that recovery time does not include the time needed to lower the launching appliance into position to recover the rescue boat

*"Recreational diving system"*

means any system or equipment using, creating or storing compressed gas of any type to aid or facilitate recreational underwater activities

*"Recreational fire appliances"*

means heating or cooking appliances with open flames such as fireplaces, charcoal galley ovens, barbecues, spit roasts and fire pits

*"Rescue boat"*

means a boat complying with the requirements of the LSA Code and designed to rescue persons in distress and for marshalling liferafts

*"Restricted fire risk article"*

means any of the following articles:

- a) case furniture such as desks, wardrobes, dressing tables, bureaux, dressers, constructed entirely of approved non-combustible materials, except that a combustible veneer not exceeding 2 mm may be used on the working surface of such articles;
- b) free-standing furniture such as chairs, sofas, tables, constructed with frames of non-combustible materials;
- c) draperies, curtains and other suspended textile materials that have qualities of resistance to the propagation of flame not inferior to those of wool having a mass of mass 0.8 kg/m<sup>2</sup>, this being determined in accordance with the Fire Test Procedures Code;
- d) upholstered furniture that has qualities of resistance to the ignition and propagation of flame, this being

determined in accordance with the Fire Test Procedures Code; and

- e) bedding components that have qualities of resistance to the ignition and propagation of flame, this being determined in accordance with the Fire Test Procedures Code.

*"Retro-reflective material"* means a material which reflects in the opposite direction a beam of light directed on it

*"Rocket parachute flare"* means a pyrotechnic signal complying with the requirements of the LSA Code

*"Safe haven"* 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

*"Sailing vessel"* means a vessel designed to carry sail, whether as a sole means of propulsion or as a supplementary means

*"Sail training vessel"* means a sailing vessel which, at the time, is being used either:

1. to provide instruction in the principles of responsibility, resourcefulness, loyalty and team endeavour and to advance education in the art of seamanship; or
2. to provide instruction in navigation and seamanship for yachtsmen

*"Sauna"* 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

*"Seafarer"* includes every person (except Occasional Workers and pilots) employed or engaged in any capacity onboard a ship

*"Sea Area A1"* 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 DSC alerting is available
<i>“Sea Area A3”</i>	means an area, excluding sea areas A1 and A2, within the coverage of an INMARSAT geostationary satellite 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 the LSA Code
<i>“Self-igniting light”</i>	means a light complying with the requirements of the LSA Code
<i>“Service spaces”</i>	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
<i>“Ships constructed”</i>	means ships the keels of which are laid or which are at a similar stage of construction
<i>“Similar stage of construction”</i>	means at a stage which: <ul style="list-style-type: none"> <li>.1 construction identifiable with a specific vessel begins; and</li> <li>.2 assembly of that vessel, comprising at least 50 tonnes or 1% of the estimated mass of all structural material has commenced; or</li> <li>.3 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</li> </ul>
<i>“SLA”</i>	means Safe Landing Area for helicopter operations, which is the area bounded by the perimeter line and perimeter lighting. The construction of the OFS and LOS segments (see section 15) should ensure that the main rotor will not risk conflict with obstacles when the nose of the helicopter is butted-up to, but not projecting over, the perimeter line. Thus the pilot, when landing in unusual circumstances, has confidence that he can touch down provided that all wheels are within the SLA and the nose of the helicopter is

not projecting over the nearest perimeter line ahead. However, only correct positioning over the aiming circle (see 'Aiming Circle' above) will ensure proper clearance with respect to physical obstacles, provision of ground effect, and provision of adequate passenger access/egress

*"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

*"Social guest"*

means a person who has been invited on board the yacht by the owner for which no consideration is given

*"SOLAS"*

means the International Convention for the Safety of Life at Sea, 1974, as amended, as applicable for vessels the keels of which are laid on or after 01 July 2019

*"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 the LSA Code

<i>"SOLAS B Pack"</i>	means a liferaft emergency pack complying with the requirements of the 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- <ul style="list-style-type: none"> <li>.1 1.8 metres for vessels up to 75 metres in length;</li> <li>.2 2.3 metres for vessels of 125 metres or more in length; and</li> <li>.3 superstructure heights for vessels of intermediate lengths shall be obtained by interpolation</li> </ul>
<i>"Statement of Compliance"</i>	means a certificate that is issued where compliance to the associated standards is voluntary and the standards have been substantially met
<i>"STCW"</i>	means the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended, as applicable for vessels the keels of which are laid on or after 01 July 2019
<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

*“Superstructure”*

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)

*“Survival craft”*

means a craft capable of sustaining the lives of persons in distress from the time of abandoning the ship, including liferafts, MES & lifeboats

*“Tender poles”*

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

*“To sea”*

means beyond any smooth water or partially smooth water limits which may have been designated by The BMA. In the event that no such areas have been designated, then it means that the vessel is considered to have proceeded to sea upon leaving the immediate confines of a designated harbour

*“Training manual”*

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

*“Training vessel”*

means a vessel which may be either a sailing or motor vessel, which is operated to provide:

1. Instruction in the principles of responsibility, resourcefulness, loyalty and team endeavour; and/or
2. Instruction in navigation and seamanship, marine engineering or other shipboard related skills.

The vessel must be properly and safely manned at all times, both at sea and, if necessary, in port, by a sufficient number of experienced and competent personnel to ensure that trainees, as defined in section 14, are adequately supervised giving particular consideration to the number, age and sex of the trainees.

All training shall be properly organised with clearly detailed objectives and outcomes.

Training organisations wishing to operate training vessels carrying more than 12 trainees shall apply to the BMA



<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 BMA to be relevant from time to time
<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 will 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

*“Yacht”*

For the purposes of this Code, a yacht means either a passenger charter yacht or a passenger private yacht as defined above

*“Yacht Notice”*

means a Notice published by the BMA that provides instructions related to Bahamas legislation and BMA requirements for Yachts. It includes reference to any subsequent Notice amending or replacing the original that is considered by the BMA to be relevant

### **3 INTERNATIONAL AND BAHAMAS LEGISLATION**

#### **3.1 Conventions - General**

3.1.1 Every vessel to which this Code applies shall comply with the relevant provisions of applicable Conventions (as amended), including but not necessarily limited to this section, to the extent to which it is applied by the BMA.

#### **3.2 Convention on the International Regulations for Preventing Collisions at Sea, 1972, as amended (COLREG)**

3.2.1 Navigation lights and shapes shall comply with the applicable provisions of COLREG, including the following provisions-

- .1 all navigation lights shall be provided with main and emergency power supply;
- .2 all navigation lights required to be shown whilst underway are required to be duplicated in accordance with IMO Resolution MSC.253(83)<sup>4</sup> as may be amended from time to time; and
- .3 approved LED Lights may be used providing the lights meet the technical specifications of COLREG.

#### **3.3 International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, as amended (MARPOL)**

3.3.1 Vessels shall comply with all of the requirements of MARPOL as prescribed by the BMA. For vessels under 400GT it is the owner's responsibility to comply with local Administration/port state requirements and for dealing with oily bilge water retention etc.

3.3.2 Every ship of 100GT and above, and every ship which is certified to carry 15 persons or more, shall carry a garbage management plan which shall include the written procedures agreed for collection, storage, processing and disposal of garbage; and a garbage record book recording disposal and incineration, as outlined in regulation 9 of Annex V of MARPOL.

3.3.3 Special local requirements may exist in national sea areas, ports and harbours. The attention of owners/operators is drawn to the need to comply with local requirements as appropriate.

#### **3.4 Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001, as amended (AFS 2001)**

3.4.1 This Convention applies to every ship of 400GT and above

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<sup>4</sup> See MSC.253(83) - Adoption of the Performance Standards for Navigation Lights, Navigation Light Controllers and Associated Equipment - (Adopted on 8 October 2007).

- 3.5 Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004, as amended (BWM 2004)**
- 3.5.1 Vessels that use water for ballasting purposes are required to comply with the BWM Convention<sup>5</sup>.
- 3.6 Convention on Civil Liability for Bunker Oil Pollution Damage, 2001**
- 3.6.1 Ships of 1,000GT and above are required to carry an appropriate level of insurance covering liability for costs arising from pollution damage following a bunker oil spill from the ship.
- 3.6.2 As evidence that adequate insurance cover is in place the owner or operator of the ship is required to carry a Certificate to this effect issued by the BMA<sup>6</sup>.
- 3.6.3 The BMA shall issue such a Bunkers Certificate only where it is satisfied that the insurance cover provided is acceptable.
- 3.7 Nairobi International Convention on the Removal of Wrecks, 2007**
- 3.7.1 Ships of 300 gross tonnage and above are required to carry an appropriate level of insurance covering liability for costs arising from the costs of wreck removal.
- 3.7.2 As evidence that adequate insurance cover is in place the owner or operator of the ship is required to carry a Certificate to this effect issued by the BMA<sup>7</sup>.
- 3.7.3 The BMA will issue such a Wreck Removal Convention Certificate only where it is satisfied that the insurance cover provided is acceptable.
- 3.8 The Maritime Labour Convention, 2006 (MLC)**
- 3.8.1 Relevant Conventions of the International Labour Organisation (ILO), including but not necessarily limited to The Maritime Labour Convention, 2006 (ILO).
- 3.9 The Polar Code**
- 3.9.1 The Polar Code applies to ships operating in polar waters as per SOLAS Chapter XIV and the Polar Code<sup>8</sup>.
- 3.9.2 Ships constructed before 1 January 2017 shall meet the relevant requirements of SOLAS Chapter XIV and the Polar Code by the first intermediate or renewal survey, whichever occurs first, after 1 January 2018.

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<sup>5</sup> See [BMA Information Bulletin No.165](#)

<sup>6</sup> See [BMA Information Bulletin No.112](#)

<sup>7</sup> See [BMA Information Bulletin No.157](#)

<sup>8</sup> See [BMA Information Bulletin No.167](#)

3.9.3 Every ship to which this sub-section applies shall have onboard a valid Polar Ship Certificate.

### **3.10 Ships using low-flashpoint fuels**

3.10.1 The International Code of Safety for Ships using Gases or other Low Flashpoint Fuels (IGF) Code shall apply to ships using low-flashpoint fuels:

- .1 for which the building contract is placed on or after 01 January 2017;
- .2 in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 01 July 2017; or
- .3 the delivery of which is on or after 01 January 2021.

3.10.2 Seafarers working in ships subject to the IGF Code shall receive appropriate training and certification<sup>9</sup>.

### **3.11 Health and Safety**

3.11.1 Working practices shall take account of the ILO publication "Accident Prevention on Board Ship", as may be amended from time to time.

### **3.12 Bahamas Legislation**

3.12.1 In applying the provisions of the Code due regard shall be taken of applicable Bahamas legislation and BMA requirements.

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<sup>9</sup> See [BMA Information Bulletin No.162](#)

## **4 CONSTRUCTION & STRENGTH**

### **4.1 Strength of Ship and Subdivision - General**

4.1.1 *The general structural strength of the ship shall be adequate for the draft corresponding to the freeboard assigned.*

4.1.2 *A weather deck shall be fitted throughout the length of the vessel and be of adequate strength to withstand the sea and weather conditions likely to be encountered.*

4.1.3 *The ship shall in any case be constructed in accordance with the requirements of the Code and it shall comply with the Intact Stability Code 2008 or with intact stability standards acceptable to the BMA.*

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

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

4.1.6 *The Table in Appendix 1 summarises the stability provisions applicable to the various categories of Passenger Yacht.*

4.1.7 In addition to the requirements contained elsewhere in this Code, a ship to which the Code applies shall be designed, constructed, maintained and assigned a Class Notation as a passenger ship in compliance with the structural, mechanical and electrical requirements of a Recognised Organisation

### **4.2 Application of SOLAS Provisions - General**

4.2.1 *Except where provided otherwise in this Section, all new vessels to which this Code applies shall be required to meet the applicable requirements of SOLAS II-1.*

4.2.2 *The damage stability requirements in SOLAS II-1, Parts B-1 through B-4 of those amendments shall apply to all ships, provided that for vessels up to 80 metres length 'L' (i.e. Load Line length), the BMA may permit the use of SOLAS 90 Deterministic methodology, in lieu of sections 11.4 and 11.5 (see sections 11.12-11.16).*

4.2.3 *For ships of 1,600 gross tonnage and above, SOLAS II-1 Part A-1 Regulation 3-12 on the protection against noise and the Code on noise levels onboard ships, adopted by the Maritime Safety Committee by resolution MSC.337(91), as may be amended by the IMO shall apply. For*

*the purpose of this section, although the Code on noise levels onboard ships is treated as a mandatory instrument, recommendatory parts as specified in chapter I of the Code shall be treated as non-mandatory.*

### **4.3 Double Bottoms**

4.3.1 Subject to paragraphs 4.3.1.1 to 4.3.1.4, a double bottom shall be fitted extending from the collision bulkhead to the afterpeak bulkhead, as far as this is practicable and compatible with the design and proper working of the ship:

- .1 *in ships of 50 metres and upwards but less than 61 metres in length a double bottom shall be fitted at least from the machinery space to the forepeak bulkhead, or as near thereto as practicable;*
- .2 *in ships of 61 metres and upwards but less than 76 metres in length a double bottom shall be fitted at least outside the machinery space, and shall extend to the fore and after peak bulkheads, or as near thereto as practicable;*
- .3 *subject to section 4.3.1.4, in ships of 76 metres in length and upwards, a double bottom shall be fitted amidships, and shall extend to the fore and after peak bulkheads, or as near thereto as practicable; and*
- .4 *for vessels assessed in accordance with the probabilistic means in accordance with Parts B-1 through B-4 of SOLAS, where it is deemed that the installation of a double bottom is impracticable in accordance with section 4.3.1.3, the vessel shall be able to demonstrate compliance with the enhanced survivability criteria defined in section 11.17 of the Code, following the occurrence of bottom damage in the area concerned.*

4.3.2 Where a double bottom is required to be fitted the inner bottom shall be continued out to the ship's sides in such a manner as to protect the bottom to the turn of the bilge; such protection shall be deemed satisfactory if the inner bottom is not lower at any part than a plane parallel with the keel line and which is located not less than a vertical distance  $h$  measured from the keel line, as calculated by the formula:

$$h = B/20,$$

provided that in no case is the value of  $h$  to be less than 760 millimetres and need not be taken as more than 2,000 millimetres.

4.3.3 Small wells constructed in the double bottom in connection with drainage arrangements of storage spaces, etc., shall not extend downward more than necessary, provided that:

- .1 a well extending to the outer bottom is, however, permitted at the after end of the shaft tunnel;
- .2 other wells (e.g., for lubricating oil under main engines) may be permitted by the BMA if satisfied that the arrangements give protection equivalent to that afforded by a double bottom complying with this regulation; and
- .3 in no case shall the vertical distance from the bottom of such a well to a plane coinciding with the keel line be less than 500 millimetres.

- 4.3.4 A double bottom need not be fitted in way of watertight tanks, including dry tanks of moderate size, provided the safety of the ship is not impaired in the event of bottom or side damage.
- 4.3.5 Any part of a passenger ship that is not fitted with a double bottom in accordance with Sections 4.3.1 or 4.3.4 shall be capable of withstanding bottom damages, as specified in section 4.3.7, in that part of the ship.
- 4.3.6 In the case of unusual bottom arrangements in a passenger ship it shall be demonstrated that the ship is capable of withstanding bottom damages as specified in section 4.3.7.
- 4.3.7 Compliance with Sections 4.3.5 or 4.3.6 shall be achieved by demonstrating that  $s_i$ , when calculated in accordance with section 11.7 is not less than 1 for all service conditions when subject to a bottom damage assumed at any position along the ship's bottom in accordance with the following conditions and with an extent specified in section 4.3.2 for the affected part of the ship:
- .1 Flooding of such spaces shall not render emergency power and lighting, internal communication, signals or other emergency devices inoperable in other parts of the ship.
  - .2 Assumed extent of damage shall be as follows:

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

- .3 If any damage of a lesser extent than the maximum damage specified in section 4.3.7.2 would result in a more severe condition, such damage shall be considered.
- 4.3.8 In case of large lower compartments in passenger ships-
- .1 the BMA may require an increased double bottom height of not more than  $B/10$  or 3 metres, whichever is less, measured from the keel line;
  - .2 alternatively, bottom damages may be calculated for these areas, in accordance with section 4.3.7, but assuming an increased vertical extent.



**4.4 Construction of Watertight Bulkheads**

- 4.4.1 Each watertight subdivision bulkhead, whether transverse or longitudinal, shall be constructed having scantlings as specified in section 2, in the definition for “watertight”, and in all cases, watertight subdivision bulkheads shall be capable of supporting at least the pressure due to a head of water up to the bulkhead deck.
- 4.4.2 Steps and recesses in watertight bulkheads shall be as strong as the bulkhead at the place where each occurs.

**4.5 Initial Testing of Watertight Bulkheads, etc.**

- 4.5.1 Testing of watertight spaces not intended to hold by filling them with water is not compulsory but where such testing is not carried out:
- .1 a hose test shall be carried out where practicable;
  - .2 this test shall be carried out in the most advanced stage of the fitting out of the ship;
  - .3 where a hose test is not practicable because of possible damage to machinery, electrical equipment insulation or outfitting items, it may be replaced by a careful visual examination of welded connections, supported where deemed necessary by means such as a dye penetrant test or an ultrasonic leak test or an equivalent test; and
  - .4 in any case a thorough inspection of the watertight bulkheads shall be carried out.
- 4.5.2 The forepeak, double bottom (including duct keels) and inner skins shall be tested with water to a head corresponding to the requirements of section 4.4.1.
- 4.5.3 Tanks which are intended to hold liquids, and which form part of the watertight subdivision of the ship, shall be tested for tightness and structural strength with water to a head corresponding to its design pressure and the water head is in no case to be less than the top of the air pipes or to a level of 2.4 metres above the top of the tank, whichever is the greater.
- 4.5.4 The tests referred to in 4.5.2 and 4.5.3 are for the purpose of ensuring that the subdivision structural arrangements are watertight and are not to be regarded as a test of the fitness of any compartment for the storage of oil fuel or for other special purposes for which a test of a superior character may be required depending on the height to which the liquid has access in the tank or its connections.

**4.6 Peak and Machinery Space Bulkheads, Shaft Tunnels, etc.**

- 4.6.1 A collision bulkhead shall be fitted which shall be watertight up to the bulkhead deck and this bulkhead shall be located at a distance from the forward perpendicular of not less than  $0.05L$  or 10 metres, whichever is the less, and, except as may be permitted by the BMA, not more than  $0.08L$  or  $0.05L + 3$  metres, whichever is the greater.

- 4.6.2 Where any part of the ship below the waterline extends forward of the forward perpendicular, e.g., a bulbous bow, the distances stipulated in 4.6.1 shall be measured from a point either-
- .1 at the mid-length of such extension;
  - .2 at a distance  $0.015L$  forward of the forward perpendicular; or
  - .3 at a distance 3 metres forward of the forward perpendicular, whichever gives the smallest measurement.
- 4.6.3 The bulkhead may have steps or recesses provided they are within the limits prescribed in 4.6.1 or 4.6.2.
- 4.6.4 No doors, manholes, access openings, ventilation ducts or any other openings shall be fitted in the collision bulkhead below the bulkhead deck.
- 4.6.5 The collision bulkhead shall comply with the following provisions-
- .1 except as provided in 4.6.5.2, the collision bulkhead may be pierced below the bulkhead deck by not more than one pipe for dealing with fluid in the forepeak tank, provided that the pipe is fitted with a screw-down valve capable of being operated from above the bulkhead deck, the valve chest being secured inside the forepeak to the collision bulkhead, provided that:
    - i. the BMA may, however, authorise the fitting of this valve on the after side of the collision bulkhead where that the valve is readily accessible under all service conditions and the space in which it is located is not a storage space;
    - ii. all valves shall be of steel, bronze or other approved ductile material; and
    - iii. valves of ordinary cast iron or similar material are not acceptable.
  - .2 If the forepeak is divided to hold two different kinds of liquids the BMA may allow the collision bulkhead to be pierced below the bulkhead deck by two pipes, each of which is fitted as required by 4.6.5.1, provided the BMA is satisfied that there is no practical alternative to the fitting of such a second pipe and that, having regard to the additional subdivision provided in the forepeak, the safety of the ship is maintained.
- 4.6.6 Where a long forward superstructure is fitted:
- .1 the collision bulkhead shall be extended weathertight to the deck next above the bulkhead deck;
  - .2 the extension need not be fitted directly above the bulkhead below provided it is located within the limits prescribed in 4.6.1 or 4.6.2 and that the part of the deck which forms the step is made effectively weathertight; and
- 4.6.7 The number of openings in the extension of the collision bulkhead above the freeboard deck shall be restricted to the minimum compatible with the design and normal operation of the ship and all such openings shall be capable of being closed weathertight.

4.6.8 Bulkheads shall be fitted separating the machinery space accommodation spaces forward and aft and made watertight up to the bulkhead deck and in passenger ships an afterpeak bulkhead shall also be fitted and made watertight up to the bulkhead deck, provided that the afterpeak bulkhead may, however, be stepped below the bulkhead deck, providing the degree of safety of the ship as regards subdivision is not thereby diminished.

4.6.9 In all cases stern tubes shall be enclosed in watertight spaces of moderate volume and the stern gland shall be situated in a watertight shaft tunnel or other watertight space separate from the stern tube compartment and of such volume that, if flooded by leakage through the stern gland, the bulkhead deck shall not be immersed.

#### **4.7 Asbestos Containing Materials**

4.7.1 As per SOLAS II-1/3-5, the installation of materials that contain asbestos ("Asbestos containing materials"/"ACMs") has been prohibited, except for some vanes, joints and insulation, since 01 July 2002 and any installation of ACMs has been prohibited, without exceptions, since 01 January 2011.

2. Ships built before 01 July 2002 are allowed to have ACMs on board. However, the ACMs are only allowed as long as they do not pose a risk to the crew's health. The crew should be aware of the dangers of asbestos and should know how to deal with asbestos in case disturbance of the ACMs cannot be avoided .

3. Despite the clear and unambiguous prohibition of ACMs, asbestos is still found on various locations on board ships. During inspections, ACM has been found in such places as fire blankets, joints and insulation materials, types of sealants, friction material for brakes, wall and ceiling coverings, cords, remnants, electric fuses, etc. Moreover, ships that initially were free of asbestos appear to have asbestos on board as a result of repairs at shipyards and/or of purchasing spare parts at a later stage.

4. When asbestos is detected on board, in contravention of SOLAS regulation II-1/3-5, action should be taken by the Company to have it removed. The removal – by professional asbestos removal companies – should take place within a time frame of 3 years from the date when the contravention is found.

5. Recognised Organisations may apply to the BMA for authorisation to issue an exemption for a maximum period of 3 years from the date of the ACM being discovered. The crew should be made aware of which components contain asbestos and provided with relevant instructions and equipment to protect them from asbestos exposure.

#### **4.8 Additional Equivalence Considerations**

4.8.1 *None*

## 5 WEATHERTIGHT INTEGRITY

### 5.1 Construction and Initial Testing of Watertight Doors, Sidescuttles, etc.

5.1.1 In all ships:

- .1 the design, materials and construction of all watertight doors, sidescuttles, gangway and stores loading ports, valves, pipes, and rubbish-chutes referred to in these regulations shall be to the satisfaction of the BMA;
- .2 such valves, doors and mechanisms shall be suitably marked to ensure that they may be properly used to provide maximum safety; and
- .3 the frames of vertical watertight doors shall have no groove at the bottom in which dirt might lodge and prevent the door closing properly.

5.1.2 In all ships:

- .1 watertight doors shall be tested by water pressure to a head of water they might sustain in a final or intermediate stage of flooding;
- .2 where testing of individual doors is not carried out because of possible damage to insulation or outfitting items, testing of individual doors may be replaced by a prototype pressure test of each type and size of door with a test pressure corresponding at least to the head required for the intended location provided that:
  - i. the prototype test shall be carried out before the door is fitted;
  - ii. the installation method and procedure for fitting the door onboard shall correspond to that of the prototype test; and
  - iii. when fitted onboard, each door shall be checked for proper seating between the bulkhead, the frame and the door.

### 5.2 Construction and Initial Testing of Watertight Decks, Trunks, etc.

5.2.1 Watertight decks, trunks, tunnels, duct keels and ventilators shall-

- .1 *be of the same strength as watertight bulkheads at corresponding levels and the means used for making them watertight, and the arrangements adopted for closing openings in them, shall be to the satisfaction of the BMA and in all cases, shall be provided with open/close indication at the navigating position;*
- .2 watertight ventilators and trunks shall be carried at least up to the bulkhead deck;

5.2.2 where a ventilation trunk passing through a structure penetrates the bulkhead deck, the trunk shall be capable of withstanding the water pressure that may be present within the trunk, after having taken into account the maximum heel angle allowable during intermediate stages of flooding, in accordance with section 11.7.

5.2.3 after completion, a hose or flooding test shall be applied to watertight decks and a hose test to watertight trunks, tunnels and ventilators.

- 5.3 Openings in Watertight Bulkheads below the Bulkhead Deck**
- 5.3.1 The number of openings in watertight bulkheads shall be reduced to the minimum compatible with the design and proper working of the ship, satisfactory means shall be provided for closing these openings.
- 5.3.2 Watertight bulkhead integrity shall be maintained in accordance with the following provisions:
- .1 where pipes, scuppers, electric cables, etc., are carried through watertight bulkheads, arrangements shall be made to ensure the watertight integrity of the bulkheads;
  - .2 valves not forming part of a piping system shall not be permitted in watertight bulkheads; and
  - .3 lead or other heat sensitive materials shall not be used in systems which penetrate watertight bulkheads, where deterioration of such systems in the event of fire would impair the watertight integrity of the bulkheads.
- 5.3.3 *No doors, manholes, or access openings are permitted in watertight transverse bulkheads dividing a storage space from an adjoining storage space, except as provided in section 5.3.9.*
- 5.3.4 Subject to section 5.3.10:
- .1 not more than one door, apart from the doors to shaft tunnels, may be fitted in each watertight bulkhead *per deck* within spaces containing the main and auxiliary propulsion machinery including boilers serving the needs of propulsion;
  - .2 where two or more shafts are fitted, the tunnels shall be connected by an intercommunicating passage;
  - .3 there shall be only one door between the machinery space and the tunnel spaces where two shafts are fitted and only two doors where there are more than two shafts;
  - .4 all these doors shall be of the sliding type and shall be so located as to have their sills as high as practicable; and
  - .5 the hand gear for operating these doors from above the bulkhead deck shall be situated outside the spaces containing the machinery.
- 5.3.5 Watertight doors shall comply with the following general provisions:
- .1 watertight doors, except as provided in section 5.3.9, shall be power-operated sliding doors complying with the requirements of section 5.3.7 capable of being closed simultaneously from the central operating console at the navigation bridge in not more than 60 seconds with the ship in the upright position; and
  - .2 the means of operation whether by power or by hand of any power-operated sliding watertight door shall be capable of closing the door with the ship listed to 15° either way and consideration shall also be given to the forces which may act on either side of the door as may be experienced when water is flowing through the opening applying a static head equivalent to a water height of at least 1 metre above the sill on the centreline of the door;

- .3 watertight doors and their controls, including hydraulic piping and electric cables shall comply with the following provisions
- i. the controls shall be kept as close as practicable to the bulkhead in which the doors are fitted, in order to minimise the likelihood of them being involved in any damage which the ship may sustain; and
  - ii. the positioning of watertight doors and their controls shall be such that if the ship sustains damage within one fifth of the breadth of the ship, as defined in Section 2 such distance being measured at right angles to the centreline at the level of the deepest subdivision draught,
  - iii. the operation of the watertight doors clear of the damaged portion of the ship is not impaired.
- 5.3.6 All power-operated sliding watertight doors shall-
- .1 be provided with means of indication which shall show at all remote operating positions whether the doors are open or closed; and
  - .2 have their remote operating positions only at the navigation bridge as required by section 5.3.7.1.v and at the location where hand operation above the bulkhead deck is required by section 5.3.7.1.iv.
- 5.3.7 Watertight doors shall comply with the following provisions:
- .1 Each power-operated sliding watertight door shall:
    - i. have a vertical or horizontal motion;
    - ii. subject to section 5.3.10, be normally limited to a maximum clear opening width of 1.2 metres; provided that the BMA may permit larger doors only to the extent considered necessary for the effective operation of the ship provided that other safety measures, including the following, are taken into consideration-
      - a. special consideration shall be given to the strength of the door and its closing appliances in order to prevent leakages; and
      - b. the door shall be located inboard the damage zone B/5;
    - iii. be fitted with the necessary equipment to open and close the door using electric power, hydraulic power, or any other form of power that is acceptable to the BMA;
    - iv. be provided with an individual hand-operated mechanism such that it shall be possible to open and close the door by hand at the door itself from either side, and in addition, close the door from an accessible position above the bulkhead deck with an all round crank motion or some other movement providing the same degree of safety acceptable to the BMA and the direction of rotation or other movement shall be clearly indicated at all operating positions; the time necessary for the complete closure of the door, when operating by hand gear, shall not exceed 90 seconds with the ship in the upright position;

- v. be provided with controls for opening and closing the door by power from both sides of the door and also for closing the door by power from the central operating console at the navigation bridge;
  - vi. be provided with an audible alarm in accordance with the following provisions:
    - a. it shall be distinct from any other alarm in the area;
    - b. it shall sound whenever the door is closed remotely by power and shall sound for at least 5 seconds but no more than 10 seconds before the door begins to move and shall continue sounding until the door is completely closed; provided that in the case of remote hand operation it is sufficient for the audible alarm to sound only when the door is moving; and
    - c. additionally, in passenger areas and areas of high ambient noise the BMA may require the audible alarm to be supplemented by an intermittent visual signal at the door;
  - vii. have an approximately uniform rate of closure under power and the closure time, from the time the door begins to move to the time it reaches the completely closed position shall in no case be less than 20 seconds or more than 40 seconds with the ship in the upright position;
- .2 The electrical power required for:
- i. power-operated sliding watertight doors shall be supplied from the emergency switchboard either directly or by a dedicated distribution board situated above the bulkhead deck;
  - ii. the associated control, indication and alarm circuits shall be supplied from the emergency switchboard either directly or by a dedicated distribution board situated above the bulkhead deck and be capable of being automatically supplied by the transitional source of emergency electrical power required by Regulation 42 of Chapter II-1 D of SOLAS, in accordance with Section 5 of this Code, in the event of failure of either the main or emergency source of electrical power.
- .3 Power-operated sliding watertight doors shall have either:
- i. a centralised hydraulic system complying with the following provisions:
    - a. two independent power sources each consisting of a motor and pump capable of simultaneously closing all doors;
    - b. having, for the whole installation, hydraulic accumulators of sufficient capacity to operate all the doors at least three times, i.e. closed-open-closed, against an adverse list of 15°;
    - c. the operating cycle referred to in Section b. above shall be capable of being carried out when the accumulator is at the pump cut-in pressure;
    - d. the fluid used in the system shall be chosen considering the temperatures liable to be encountered by the installation during its service;

- e. the power operating system shall be designed to minimise the possibility of having a single failure in the hydraulic piping adversely affect the operation of more than one door;
- f. the hydraulic system shall be provided with a low-level alarm for hydraulic fluid reservoirs serving the power-operated system and a low gas pressure alarm or other effective means of monitoring loss of stored energy in hydraulic accumulators; and
- g. the alarm referred to in Section f. above shall be audible and visual and shall be situated on the central operating console at the navigation bridge;

**OR**

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

**OR**

- iii. an independent electrical system and motor for each door complying with the following provisions:
  - a. each power source shall consist of a motor capable of opening and closing the door;
  - b. the power source shall be capable of being automatically supplied by the transitional source of emergency electrical power as required by Regulation 42 of Chapter II-1 D of SOLAS, in accordance with Section 5 of this Code, in the event of failure of either the main or emergency source of electrical power and with sufficient capacity to operate the door at least three times, i.e. closed-open-closed, against an adverse list of 15°;
- iv. For the systems specified in sections 5.3.7.3.i, 5.3.7.3.ii and 5.3.7.3.iii, provision shall be made as follows:
  - a. power systems for power-operated watertight sliding doors shall be separate from any other power system; and



- b. a single failure in the electric or hydraulic power-operated systems excluding the hydraulic actuator shall not prevent the hand operation of any door.
- .4 control handles shall be provided at each side of the bulkhead at a minimum height of 1.6 metres above the floor and shall be so arranged as to enable persons passing through the doorway to hold both handles in the open position without being able to set the power closing mechanism in operation accidentally and the direction of movement of the handles in opening and closing the door shall be in the direction of door movement and shall be clearly indicated;
- .5 as far as practicable, electrical equipment and components for watertight doors shall be situated above the bulkhead deck and outside hazardous areas and spaces.
- .6 the enclosures of electrical components necessarily situated below the bulkhead deck shall provide suitable protection against the ingress of water<sup>10</sup>.
- .7 electric power, control, indication and alarm circuits shall be protected against fault in such a way that a failure in one door circuit shall not cause a failure in any other door circuit. Short circuits or other faults in the alarm or indicator circuits of a door shall not result in a loss of power operation of that door and arrangements shall be such that leakage of water into the electrical equipment located below the bulkhead deck shall not cause the door to open.
- .8 the power operating or control system of a power-operated sliding watertight door shall comply with the following provisions-
  - i. a single electrical failure in the power operating or control system of a power-operated sliding watertight door shall not result in a closed door opening;
  - ii. the availability of the power supply shall be continuously monitored at a point in the electrical circuit as near as practicable to each of the motors required by section 5.3.7; and
  - iii. the loss of any such power supply shall activate an audible and visual alarm at the central operating console at the navigation bridge.

5.3.8 The central operating console at the navigation bridge shall comply with the following provisions:

- .1 it shall have a "master mode" switch with two modes of control as follows-
  - i. a "local control" mode which shall allow any door to be locally opened and locally closed after use without automatic closure; and

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<sup>10</sup> Refer to publication IEC 60529 (2003)-

(a) electrical motors, associated circuits and control components; protected to IPX 7 standard;  
 (b) door position indicators and associated circuit components; protected to IPX 8 standard; and  
 (c) door movement warning signals; protected to IPX 6 standard

Other arrangements for the enclosures of electrical components may be fitted provided the Administration is satisfied that an equivalent protection is achieved. The water pressure IPX 8 shall be based on the pressure that may occur at the location of the component during flooding for a period of 36 hours.

- ii. a "doors closed" mode which shall automatically close any door that is open;
- .2 the "doors closed" mode shall automatically close any door that is open and permit doors to be opened locally and shall automatically re-close the doors upon release of the local control mechanism.
- .3 the "master mode" switch shall normally be in the "local control" mode.
- .4 the "doors closed" mode shall only be used in an emergency or for testing purposes; and
- .5 special consideration shall be given to the reliability of the "master mode" switch.
- .6 the console shall be:
  - i. be provided with a diagram showing the location of each door, with visual indicators to show whether each door is open or closed;
  - ii. be fitted with a red light indicating that a door is fully open and a green light indicating that door is fully closed and when a door is closed remotely the red indicating light shall indicate the intermediate position by flashing
- .7 the indicating circuit shall be independent of the control circuit for each door; and
- .8 it shall not be possible to remotely open any door from the central operating console.

5.3.9 *If the BMA is satisfied that the fitting of watertight doors in watertight bulkheads dividing storage between deck spaces is essential then such doors, of satisfactory construction, may be fitted in accordance with the following provisions:*

- .1 such doors may be hinged, rolling or sliding doors but shall not be remotely controlled;
- .2 they shall be fitted at the highest level and as far from the shell plating as practicable, but in no case shall the outboard vertical edges be situated at a distance from the shell plating which is less than one fifth of the breadth of the ship, as defined in Section 2, such distance being measured at right angles to the centreline at the level of the deepest subdivision draught;
- .3 should any such doors be accessible during the voyage, they shall be fitted with a device which prevents unauthorised opening; and
- .4 when it is proposed to fit such doors, the number and arrangements shall receive the special consideration of the BMA.

5.3.10 Portable plates on bulkheads shall not be permitted except in machinery spaces and where they are permitted shall be subject to the following conditions-

- .1 the BMA may permit not more than one power-operated sliding watertight door in each watertight bulkhead *per deck* larger than those specified in section 5.3.7.1.ii to be substituted for these portable plates, provided these doors are intended to remain closed during navigation except in case of urgent necessity at the discretion of the master; and

- .2 such doors need not meet the requirements of section 5.3.7.1.iv regarding complete closure by hand-operated gear in 90 seconds.

5.3.11 Where trunkways or tunnels for access from crew accommodation to other spaces, for piping, or for any other purpose are carried through watertight bulkheads, they shall comply with the following provisions-

- .1 they shall watertight and in accordance with the requirements of section 5.2;
- .2 the access to at least one end of each such tunnel or trunkway, if used as a passage at sea, shall be through a trunk extending watertight to a height sufficient to permit access above the bulkhead deck;
- .3 the access to the other end of the trunkway or tunnel may be through a watertight door of the type required by its location in the ship;
- .4 such trunkways or tunnels shall not extend through the first subdivision bulkhead abaft the collision bulkhead;
- .5 where it is proposed to fit tunnels piercing watertight bulkheads, these shall receive the special consideration of the BMA; and
- .6 where trunkways in connection with refrigerated spaces and ventilation or forced draught trunks are carried through more than one watertight bulkhead, the means of closure at such openings shall be operated by power and be capable of being closed from a central position situated above the bulkhead deck.

#### **5.4 Openings in the Shell Plating below the Bulkhead Deck**

- 5.4.1 The number of openings in the shell plating shall be reduced to the minimum compatible with the design and proper working of the ship.
- 5.4.2 The arrangement and efficiency of the means for closing any opening in the shell plating shall be consistent with its intended purpose and the position in which it is fitted and generally to the satisfaction of the BMA.
- 5.4.3 No sidescuttle or window shall be fitted in such a position that its sill is below a line drawn parallel to the freeboard deck at side and having its lowest point 2.5% of the breadth of the ship above the deepest subdivision load line, or 500 millimetres, whichever is the greater.
- 5.4.4 *Notwithstanding the requirements of section 5.15 all sidescuttles, the sills of which are below the bulkhead deck, as permitted by 5.4.3 shall be such of construction, and subject to strict procedures, as shall effectively prevent any person opening them without the sanction of the master.*
- 5.4.5 The number of scuppers, sanitary discharges and other similar openings in the shell plating shall be reduced to the minimum either by making each discharge serve for as many as possible of the sanitary and other pipes, or in any other satisfactory manner.

- 5.4.6 All inlets and discharges in the shell plating shall be fitted with efficient and accessible arrangements for preventing the accidental admission of water into the ship.
- 5.4.7 Subject to the requirements of the ILLC, and except as provided in 5.4.9, each separate discharge led through the shell plating from spaces below the margin line shall comply with the following provisions-
- .1 the discharge shall be provided with either one automatic non-return valve fitted with a positive means of closing it from above the bulkhead deck or with two automatic non-return valves without positive means of closing, provided that the inboard valve is situated above the deepest subdivision load line and is always accessible for examination under service conditions; and
  - .2 where a valve with positive means of closing is fitted, the operating position above the bulkhead deck shall always be readily accessible and means shall be provided for indicating whether the valve is open or closed.
- 5.4.8 The requirements of the ILLC shall apply to discharges led through the shell plating from spaces above the margin line.
- 5.4.9 *Machinery room main and auxiliary sea inlets and discharges in connection with the operation of machinery shall be fitted with readily accessible valves between the pipes and the shell plating or between the pipes and fabricated boxes attached to the shell plating and the valves shall be provided with indicators showing whether they are open or closed: the location of the controls of such valves shall be so sited as to allow adequate time for operation in case of influx of water to the space, having regard to the time likely to be required in order to reach and operate such controls. If the level to which the space could become flooded with the ship in the fully loaded condition so requires, arrangements shall be made to operate the controls from a position above such level: provided that in continuously Manned Machinery Spaces the valves may be controlled locally but they shall also be provided with indicators showing whether they are open or closed.*
- 5.4.10 All shell fittings, valves and pipes required by this Section shall comply with the following provisions:
- .1 shell fittings and valves shall be of steel, bronze or other approved ductile material;
  - .2 valves of ordinary cast iron or similar material are not acceptable;
  - .3 pipes shall be of steel or other equivalent material to the satisfaction of the BMA.
- 5.4.11 *Ports fitted below the margin line shall be of sufficient strength and shall be effectively closed and secured watertight before the ship leaves port, and shall be kept closed during navigation.*
- 5.4.12 Such ports shall in no case be so fitted as to have their lowest point below the deepest subdivision load line.

- 5.4.13 *The inboard opening of each ash-chute, rubbish-chute, etc., shall be fitted with an efficient cover.*
- 5.4.14 *If the inboard opening is situated below the margin line, the cover shall be watertight, and in addition an automatic non-return valve shall be fitted in the chute in an easily accessible position above the deepest subdivision load line and when the chute is not in use both the cover and the valve shall be kept closed and secured.*
- 5.4.15 *Underwater lights and associated penetrations fitted in the hull shall be approved by the Recognised Organisation.*
- 5.4.16 *In applying this section due regard shall be given to section 5.15 of the Code.*
- 5.5 Shell Openings Below the bulkhead Deck**
- 5.5.1 *Garages and other compartment(s) below the bulkhead deck, provided for recreational, storing 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) up to 600mm above the deck, other than sliding watertight doors.*
- 5.5.2 *Access openings in the sides of ships below the freeboard deck shall be fitted with doors so designed as to ensure the same watertightness and structural integrity as the surrounding shell plating and*
- .1 *unless otherwise approved by the BMA, these openings shall open outwards; and*
  - .2 *the number of such openings shall be the minimum compatible with the design and proper working of the ship.*
- 5.5.3 *Unless otherwise permitted by the BMA, the lower edge of openings referred to in Section 5.5.2 shall not be below a line drawn parallel to the freeboard deck at side, which is at its lowest point at least 230 millimetres above the waterline corresponding to the deepest permitted operational draft.*
- 5.5.4 *Where a shell door provided in accordance with the provisions of this section cannot be tested watertight under a head of water in accordance with section 4.4.1 then the requirements applicable to flush hatches in section 5.10.4 shall apply.*
- 5.5.5 *Means shall be provided to prevent the unauthorised use of the doors locally through provision of secondary or remote control at a continuously manned station, through an interlock, dual control process or procedure.*
- 5.5.6 *Critical equipment such as for the system for securing of the hull opening shall have a Liquid ingress protection of level 5 (e.g. IP 65) in accordance with the International Protection Marking, IEC standard 60529 or equivalent.*

**5.6 Internal Watertight Integrity above the Bulkhead Deck**

- 5.6.1 The BMA may require that all reasonable and practicable measures shall be taken to limit the entry and spread of water above the bulkhead deck in accordance with the following provisions-
- .1 such measures may include partial bulkheads or webs;
  - .2 when partial watertight bulkheads and webs are fitted on the bulkhead deck, above or in the immediate vicinity of watertight bulkheads, they shall have watertight shell and bulkhead deck connections so as to restrict the flow of water along the deck when the ship is in a heeled damaged condition;
  - .3 where the partial watertight bulkhead does not line up with the bulkhead below, the bulkhead deck between shall be made effectively watertight; and
  - .4 where openings, pipes, scuppers, electric cables etc. are carried through the partial watertight bulkheads or decks within the immersed part of the bulkhead deck, arrangements shall be made to ensure the watertight integrity of the structure above the bulkhead deck<sup>11</sup>.
- 5.6.2 All openings in the exposed weather deck shall have coamings of ample height and strength and shall be provided with efficient means for expeditiously closing them weathertight. Freeing ports, open rails and scuppers shall be fitted as necessary for rapidly clearing the weather deck of water under all weather conditions.
- 5.6.3 The open end of air pipes terminating within a superstructure shall:
- .1 be at least 1 metre above the waterline when the ship heels to an angle of 15°, or the maximum angle of heel during intermediate stages of flooding, as determined by direct calculation, whichever is the greater;
  - .2 alternatively, air pipes from tanks other than oil tanks may discharge through the side of the superstructure; and
  - .3 the provisions of this paragraph are without prejudice to the provisions of the ILLC.
- 5.6.4 Sidescuttles, gangway, stores loading and fuelling ports and other means for closing openings in the shell plating above the bulkhead deck shall be of efficient design and construction and of sufficient strength having regard to the spaces in which they are fitted and their positions relative to the deepest subdivision draught.
- 5.6.5 *In applying the provisions of this section due regard shall be given to section 5.15.*

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<sup>11</sup> Refer to the Guidance notes on the integrity of flooding boundaries above the bulkhead deck of passenger ships for proper application of regulations II-1/8 and 20, paragraph 1, of SOLAS, as amended (MSC/Circ.541, as may be amended).

**5.7 Periodical Operation and Inspection of Watertight doors, etc.**

- 5.7.1 Drills for the operating of watertight doors, sidescuttles, valves and closing mechanisms of scuppers, ash-chutes and rubbish-chutes shall take place weekly. In ships in which the voyage exceeds one week in duration a complete drill shall be held before leaving port, and others thereafter at least once a week during the voyage.
- 5.7.2 All watertight doors, both hinged and power operated, in watertight bulkheads, in use at sea, shall be operated daily.
- 5.7.3 The watertight doors and all mechanisms and indicators connected therewith, all valves, the closing of which is necessary to make a compartment watertight, and all valves the operation of which is necessary for damage control cross connections shall be periodically inspected at sea at least once a week.
- 5.7.4 A record of all drills and inspections required by this Section shall be entered in the log-book with an explicit record of any defects which may be disclosed.

**5.8 Prevention and Control of Water Ingress, etc.**

- 5.8.1 All watertight doors shall be kept closed during navigation provided that-
- .1 they may be opened during navigation as specified in 5.8.3 and 5.8.4;
  - .2 watertight doors of a width of more than 1.2 metres in machinery spaces as permitted by section 5.3.10 may only be opened in the circumstances detailed in that regulation; and
  - .3 any door which is opened in accordance with this paragraph shall be ready to be immediately closed.
- 5.8.2 Watertight doors located below the bulkhead deck having a maximum clear opening width of more than 1.2 metres shall be kept closed when the ship is at sea, except for limited periods when absolutely necessary as determined by the BMA.
- 5.8.3 A watertight door may be opened during navigation to permit the passage of passengers or crew, or when work in the immediate vicinity of the door necessitates it being opened provided that the door shall be immediately closed when transit through the door is complete or when the task which necessitated it being open is finished.
- 5.8.4 Certain watertight doors may be permitted to remain open during navigation under the following conditions-
- .1 only if considered absolutely necessary; that is, being open is determined essential to the safe and effective operation of the ship's machinery or to permit passengers normally unrestricted access throughout the passenger area;
  - .2 such determination shall be made by the BMA only after careful consideration of the impact on ship operations and survivability; and
  - .3 a watertight door permitted to remain thus open shall be clearly indicated in the ship's stability information and shall always be ready to be immediately closed.

- 5.8.5 Portable plates on bulkheads and power-operated sliding doors permitted in machinery spaces in accordance with section 5.3.10 shall be subject to the following provisions-
- .1 portable plates shall always be in place before the ship leaves port, and shall not be removed during navigation except in case of urgent necessity at the discretion of the master;
  - .2 the necessary precautions shall be taken in replacing portable plates to ensure that the joints are watertight; and
  - .3 power-operated sliding watertight doors permitted in machinery spaces shall be closed before the ship leaves port and shall remain closed during navigation except in case of urgent necessity at the discretion of the master.
- 5.8.6 Watertight doors fitted in watertight bulkheads dividing storage between deck spaces in accordance with section 5.3.9 shall be closed before the voyage commences and shall be kept closed during navigation; the time of opening such doors in port and of closing them before the ship leaves port shall be entered in the Official Log Book Part 2.
- 5.8.7 Gangway, stores and fuelling ports fitted below the bulkhead deck shall be effectively closed and secured watertight before the ship leaves port, and shall be kept closed during navigation.
- 5.8.8 The following doors, located above the bulkhead deck, shall be closed and locked before the ship proceeds on any voyage and shall remain closed and locked until the ship is at its next berth-
- .1 doors in the shell or the boundaries of enclosed superstructures;
  - .2 *garage doors fitted in positions as indicated in 5.8.8.1;*
  - .3 doors in the collision bulkhead; and
  - .4 other shell openings forming an alternative closure to those defined in 5.8.8.1 to 5.8.8.3 inclusive.
- 5.8.9 *Notwithstanding the requirements of 5.8.8.1 and 5.8.8.4, the BMA may authorise that particular doors can be opened at the discretion of the master, if necessary for the operation of the ship or the embarking and disembarking of passengers and appropriate recreational activities when the ship is at safe anchorage and provided that the safety of the ship is not impaired.*
- 5.8.10 The master shall ensure that an effective system of supervision and reporting of the closing and opening of the doors referred to in 5.8.8 is implemented.
- 5.8.11 The master shall ensure, before the ship proceeds on any voyage, that an entry in the log-book is made of the time of the last closing of the doors specified in 5.8.12 and the time of any opening of particular doors in accordance with 5.8.13.
- 5.8.12 Hinged doors, portable plates, sidescuttles, gangway, stores loading and bunkering ports and other openings, which are required by this Section to be kept closed during



navigation, shall be closed before the ship leaves port and the time of closing and the time of opening (where permissible under the Code) shall be recorded in such log-book as may be prescribed by the BMA.

- 5.8.13 Where in a between-decks, the sills of any of the sidescuttles referred to in section 5.4.4 are below a line drawn parallel to the bulkhead deck at side and having its lowest point 1.4 metres plus 2.5% of the breadth of the ship above the water when the ship departs from any port-
- .1 all the sidescuttles in that between-decks shall be closed watertight and locked before the ship leaves port;
  - .2 they shall not be opened before the ship arrives at the next port;
  - .3 in the application of this paragraph the appropriate allowance for fresh water may be made when applicable;
  - .4 the time of opening such sidescuttles in port and of closing and locking them before the ship leaves port shall be entered in such log-book as may be prescribed by the BMA; and
  - .5 for any ship that has one or more sidescuttles so placed that the requirements of this Section would apply when it was floating at its deepest subdivision draught, the BMA may indicate the limiting mean draught at which these sidescuttles shall have their sills above the line drawn parallel to the bulkhead deck at side, and having its lowest point 1.4 metres plus 2.5% of the breadth of the ship above the waterline corresponding to the limiting mean draft, and at which it shall therefore be permissible to depart from port without previously closing and locking them and to open them at sea on the responsibility of the master during the voyage to the next port; in tropical zones as defined in the ILLC, this limiting draught may be increased by 0.3 metres.
- 5.8.14 Sidescuttles and their deadlights which shall not be accessible during navigation shall be closed and secured before the ship leaves port.
- 5.8.15 *If stores are carried in spaces fitted with sidescuttles then those sidescuttles and their deadlights shall be closed watertight and locked before the stores are shipped and such closing and locking shall be recorded in such log-book as may be prescribed by the BMA.*
- 5.8.16 When a rubbish chute, etc., is not in use, both the cover and the valve required by 5.4.14 shall be kept closed and secured.
- 5.9 Doors and Openings above the Weather Deck**
- 5.9.1 All access openings in bulkheads at ends of enclosed superstructures shall be fitted with weathertight doors of steel or other equivalent material, permanently and strongly attached to the bulkhead, and framed, stiffened and fitted so that the whole structure is of equivalent strength to the un-pierced bulkhead; the means for securing these doors weathertight shall consist of gaskets and clamping devices or other equivalent means

which shall be permanently attached to the bulkhead or to the doors themselves, and the doors shall be so arranged that they can be operated from both sides of the bulkhead.

- 5.9.2 Unless otherwise permitted by the BMA, doors shall be hinged at the forward edge and open outwards to provide additional security against the impact of the sea; *alternative closing arrangements 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.*
- 5.9.3 Except as otherwise provided in this Section, the height of sills of access openings in bulkheads at ends of enclosed superstructures shall be at least 380 millimetres above the deck.
- 5.9.4 Portable sills shall generally be avoided provided that where the fitting of a sill in accordance with Section 5.9.3 proves impracticable, portable sills may be fitted on the following conditions:
- .1 they shall be installed before the ship leaves port; and
  - .2 they shall be gasketed and fastened by closely spaced through bolts or other equivalent arrangement.
- 5.9.5 Where the requirements of section 12.2.2 are applicable further reductions in sill heights may be permitted provided that the BMA is satisfied that the safety of the ship is not impaired in any sea conditions and the safety of the ship shall be assumed not to be impaired if the vessel can comply with the enhanced survivability standard as defined in section 11.17 with the watertight compartment to which the door leads flooded.
- 5.9.6 Machinery space openings in Position 1 or 2 shall be properly framed and efficiently enclosed by steel or equivalent casings of ample strength and where machinery casings are not protected by other structures, their strength and protection arrangements shall be specially considered.
- 5.9.7 Access openings in the casings referred to in Section 5.9.6:
- .1 shall be fitted with doors complying with the requirements of Section 5.9.1, the sills of which shall be at least 600 millimetres above the deck if in Position 1, and at least 380 millimetres above the deck if in Position 2;
  - .2 other openings in such casings shall be fitted with equivalent covers, permanently attached in their proper positions; and
  - .3 *where the provision of fixed sills as required in this section proves impracticable, consideration may be given to the provision of portable sills, subject to the requirements of Section 5.9.4.*
- 5.9.8 Coamings of any fiddley, funnel or machinery space ventilator in an exposed position on the freeboard deck or superstructure deck shall be as high above the deck as reasonable and practicable provided that, subject to section 5.9.9, ventilators necessary to

continuously supply the machinery space shall have coamings of sufficient height to comply with section 5.12.5, without having to fit weathertight closing appliances.

5.9.9 Where due to size of vessel or nature of the design compliance with the coaming heights required by Section 5.9.8 for ventilators necessary to continuously supply the machinery space proves impracticable, reduced coaming heights may be accepted subject to the following:

- .1 *the ventilators are:*
  - i. *fitted with louvres and other such devices to prevent water ingress; and*
  - ii. *provided with permanently attached closing appliances.*
- .2 *the ventilators and supply system is so designed to ensure that an adequate uninterrupted supply of ventilation can be maintained with the weather side closed off.*
- .3 *the vessel can comply with the enhanced survivability standard as specified in section 11.17, with the machinery space flooded.*

5.9.10 Fiddle openings shall be fitted with strong covers of steel or other equivalent material permanently attached in their proper positions and capable of being secured weathertight.

## **5.10 Hatchways and Coamings**

5.10.1 All hatchways in Positions 1 and 2 shall:

- .1 be fitted with hatch covers of steel or other equivalent material;
- .2 have hatch covers which shall be weathertight and fitted with gaskets and clamping devices;
- .3 have means for securing and maintaining weathertightness which shall be to the satisfaction of the BMA;
- .4 have arrangements which ensure that the weathertightness can be maintained in any sea conditions, and for this purpose tests for weathertightness shall be required at the initial survey and may be required at renewal and annual surveys or at more frequent intervals; and
- .5 shall be so designed to comply with strength and securing requirements as defined in Regulation 16 of the ILLC.

5.10.2 The coamings of hatchways shall be of substantial construction in accordance with their position, and their height above the deck shall be at least as follows-

- .1 600 millimetres if in Position 1; and
- .2 450 millimetres if in Position 2.

5.10.3 In the case of hatchways which comply with regulation 16 of the ILLC, the height of these coamings may be reduced, or the coamings omitted entirely, on condition that the BMA is satisfied that the safety of the ship is not thereby impaired in any sea conditions.

- 5.10.4 *Where flush deck hatches or hatches without any coamings are provided the arrangements shall comply with the following functional requirements-*
- .1 *the hatch cover shall be watertight and meet the strength requirements of Regulation 16 of the ILLC;*
  - .2 *the local deck strength shall be locally increased to avoid deformation;*
  - .3 *the hatch shall be closed at sea and marked accordingly and shall be provided with open/close indication at the navigating position;*
  - .4 *the means of securing shall be designed so as to maintain watertight integrity;*
  - .5 *the space to which the hatch leads shall be provided with low and high level bilge alarms; and*
  - .6 *the vessel can comply with the enhanced survivability standard as defined in Section 11.17 with the watertight compartment to which the hatch leads flooded.*
  - .7 *where the hatch is provided for infrequent or emergency use only and is not used when at sea, paragraph 5.10.4.6 need not be complied with.*
- 5.10.5 *Hatches which are designated for escape purposes shall comply with the following requirements:*
- .1 *they shall be provided with covers which can be opened from either side and in the direction of escape they are able to be opened without a key;*
  - .2 *all handles on the inside shall be non-removable; and*
  - .3 *an escape hatch shall be readily identified and easy and safe to use, having due regard to its position.*
- 5.11 Miscellaneous Openings in Freeboard and Superstructure Decks**
- .1 *Openings in freeboard and superstructure decks shall be designed to comply with Regulation 18 of the ILLC.*
  - .2 *Where compliance with paragraph 5.11.1 proves impracticable alternative arrangements for closure and coaming heights may be considered subject to the vessel being able to comply with the enhanced survivability standard in section 11.17 with the watertight compartment to which the opening leads flooded.*
- 5.12 Ventilators**
- 5.12.1 Ventilators in Position 1 and Position 2 to spaces below the freeboard deck or decks of enclosed superstructures shall be of substantial construction of steel or equivalent material and:
- .1 ventilators in Position 1 shall have coamings of a height of at least 900 millimetres above the deck;
  - .2 ventilators in Position 2 shall have coamings of a height of at least 760 millimetres above the deck; and
  - .3 where the coaming of any ventilator exceeds 900 millimetres in height it shall be specially supported.

- 5.12.2 Ventilator openings shall be provided with weathertight closing appliances of steel or equivalent or have equivalent means of preventing ingress of water and the means of closing shall –
- .1 in ships of less than 100 metres in length, be permanently attached to each of the ventilators; and
  - .2 in ships of 100 metres or more in length, if not permanently attached to the ventilator the means of closing shall conveniently stowed near the ventilators to which they shall be fitted.
- 5.12.3 Where due to ship design and arrangements compliance with Sections 5.12.1 and 5.12.2 is not practicable, lesser heights for ventilator coamings, fitted with weathertight closing appliances, may be permitted by the BMA in combination with other suitable arrangements to ensure an uninterrupted, adequate supply of ventilation to the spaces.
- 5.12.4 In exposed locations, the height of coamings shall be increased as required to the satisfaction of the BMA.
- 5.12.5 Subject to the meeting the requirements for fire protection contained in Section 6, ventilators:
- .1 in Position 1, the coamings of which extend to more than 4.5 metres above the deck; and
  - .2 in Position 2, the coamings of which extend to more than 2.3 metres above the deck, need not be fitted with closing arrangements unless specifically required by the BMA.
- 5.12.6 *Permanently attached means of weathertight closure required by 5.12.2 and 5.12.3 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<sup>12</sup>.*
- 5.13 Air Pipes**
- 5.13.1 Subject to the provisions of section 5.6.3, where air pipes to ballast and other tanks extend above the freeboard or superstructure decks, the exposed parts of the pipes shall be of substantial construction and the height of the air pipe from the deck to the point where water may have access to the space below shall be at least 760 millimetres on the freeboard deck and 450 millimetres on the superstructure deck.
- 5.13.2 Where these heights may interfere with the working of the ship, a lower height may be approved, provided that the BMA is satisfied that the closing arrangements and other circumstances justify a lower height.

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<sup>12</sup> Weathertightness tested in accordance with Section 8.1.1 of ISO 14884:2015 or IACS UR S14 - Testing Procedures of Watertight Compartments, Section 4.4.3

5.13.3 Air pipes shall be provided with automatic closing devices.

5.13.4 In applying this section due regard shall be given to section 5.6.3 of the Code.

## **5.14 Scuppers, Inlets and Discharges**

5.14.1 Subject to 5.14.2, scuppers, inlets and discharges are to comply with the requirements of the ILLC and with section 5.4 of the Code.

5.14.2 *Where the provision of an automatic non return valve for an underwater exhaust is impracticable, this may be omitted subject to the following requirements:*

- .1 *the discharge pipe shall be-*
  - i. *of substantial thickness as defined in Recognised Organisation Rules; and in no case shall the thickness of the pipe be less than that required for the shell plating in this location; and*
  - ii. *provided with a positive means of closure, fitted as close to the shell outlet as practicable and operable from an accessible location above the bulkhead deck,*
- .2 *the substantial thickness portion of the discharge shall extend from the shell outlet to a height of not less than 1000 millimetres above the deepest waterline from the valve location;*
- .3 *the positive means of closure required in paragraph 5.14.2.1.ii shall be designed and installed so as to be readily accessible for routine inspection and maintenance. and*
- .4 *low and high level bilge alarms shall be fitted in way of the exhaust discharge to provide early warning of water ingress into the hull.*

## **5.15 Glazed Openings**

### *General*

5.15.1 Glazed openings & Skylights shall:

- .1 be made from toughened safety glass. In case of chemically toughened glass, it shall be qualified by testing in accordance with EN 1288-3, based on the requirements given in ISO 11336-1. Regular inspections of the glazed openings, with particular reference to the surface condition, shall form part of the operational procedures and annual surveys;
- .2 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;
- .3 be attached to the ship in such a manner, that they are capable of fulfilling their role in the application of ICLL requirements;
- .4 follow the requirements of Section 8 where they are for glazed openings in the navigating position;
- .5 not be fitted in the hull in the way of the machinery space; and
- .6 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.

- 5.15.2 When glazed openings are fitted by bonding the following provisions shall be observed:
- .1 proposals shall include measures to ensure the integrity of the bond line taking into account environmental and ageing effects;
  - .2 arrangements shall be such that glazed openings and doors cannot fall from their mounting should the bond line fail or due to the effects of fire when required to be fire rated.
- 5.15.3 Where glazed openings protect buoyant volumes, they shall be designed using the pressure heads derived from a recognised International Standard such as ISO 5780 or ISO 11336-1.
- 5.15.4 Where glazed openings with an area exceeding 0.16 m<sup>2</sup> are fitted in the buoyant part of the hull within Level 1, the vessel shall meet the enhanced survivability standard as set out in Section 11.17 of the Code, with the watertight compartment behind the glazed opening assumed flooded and in all such cases the arrangements shall comply with all other applicable provisions of this section.
- 5.15.5 Where glazed openings do not protect buoyant volumes, they shall be designed using the pressure heads rules of a Recognised Organisation or a recognised International Standard such as ISO 11336-1.

*Deadlights*

- 5.15.6 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.
- 5.15.7 Deadlights 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.

*Storm Covers*

- 5.15.8 Storm covers shall be required in the following locations, where deadlights are not already required by 5.15.6:
- .1 glazed openings in the front and sides of Level 1;
  - .2 glazed openings in the front of Level 2; and
  - .3 where storm covers are interchangeable between port and starboard, a minimum of 50% of each size shall be provided;
- 5.15.9 Where required by 5.15.8, 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.
- 5.15.10 A- and B-Class cabin bulkheads and doors are accepted in place of deadlights or storm covers fitted to glazed openings in the following locations:

- .1 in Levels 1 and 2 when above the buoyant part of the hull and separating side glazed openings from a direct access leading below; and
- .2 in Level 2 when considered buoyant in the stability calculations.

*Skylights*

- 5.15.11 Fixed or opening skylights shall:
- .1 have a glazing thickness appropriate to their size and position as required for glazed openings;
  - .2 be provided with protection from mechanical damage to the skylight load-bearing glazing in any position;
  - .3 except where the arrangements comply with 5.15.12, 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
  - .4 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.
- 5.15.12 The BMA may permit the storm covers specified in 5.15.11.3 to be omitted provided the glazing meets 5.15.9.

*Strength*

- 5.15.13 Glazed openings, together with 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>13</sup>.
- 5.15.14 Where the glazing material, glazing thickness, or fixing of the glazed opening do not meet the requirements of a recognised standard<sup>14</sup> they may be tested<sup>15</sup>, to the satisfaction of the BMA, in accordance with the following provisions:
- .1 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
  - .2 the testing shall be witnessed by a Recognised Organisation.

**5.16 Garbage Chutes etc.**

- 5.16.1 Where a garbage chute is fitted, two gate valves controlled from the working deck of the chute instead of the non-return valve with a positive means of closing from a position

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<sup>13</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

<sup>14</sup> For example ISO 11336-1 Large yachts – Strength, weathertightness and watertightness of glazed openings

<sup>15</sup> For example hydrostatic testing of the windows and frames or ISO 11336-1 Large yachts – Strength, weathertightness and watertightness of glazed openings



above the freeboard deck are acceptable provided they comply with the following requirements:

- .1 the lower gate valve shall be controlled from a position above the freeboard deck and an interlock system between the two valves shall be arranged;
- .2 subject to .3, the inboard end shall be located above the waterline formed by an 8.5° heel to port or starboard at a draft corresponding to the lowest operational freeboard, but not less than 1,000 millimetres above that waterline;
- .3 where the inboard end exceeds 0.01L above the waterline defined in .2, valve control from the freeboard deck is not required, provided the inboard gate valve is always accessible under service conditions; and
- .4 alternatively, the upper and lower gate valves may be replaced by a hinged weathertight cover at the inboard end of the chute together with a discharge flap, arranged with an interlock so that the discharge flap cannot be operated until the hopper cover is closed.

5.16.2 The entire chute, including the cover, shall be constructed of material of substantial thickness.

5.16.3 The controls for the gate valves and/or hinged covers shall be clearly marked: **"Keep closed when not in use"**.

5.16.4 Where the inboard end of the chute is below the freeboard deck then-

- .1 the inboard end hinged cover/valve shall be watertight;
- .2 the valve shall be a screw-down non-return valve fitted in an easily accessible position above the deepest load line; and
- .3 The screw-down non-return valve shall be controlled from a position above the bulkhead deck and provided with open/closed indicators and the valve control shall be clearly marked: **"Keep closed when not in use"**.

## **5.17 Spurling Pipes and Cable Lockers**

5.17.1 Spurling pipes and cable lockers shall be watertight up to the deck exposed to weather.

5.17.2 Where means of access are provided, they shall be closed by a substantial cover and secured by closely spaced bolts.

5.17.3 Spurling pipes through which anchor cables are led shall be provided with permanently attached closing appliances to minimise water ingress.

## **5.18 Protection of the Crew**

5.18.1 The deckhouses used for the accommodation of the crew shall be constructed to an acceptable level of strength.

5.18.2 Guard rails or bulwarks shall be fitted around all exposed decks and the height of the bulwarks or guard rails shall be at least 1 metre from the deck, provided that where this

height would interfere with the normal operation of the ship, a lesser height may be approved provided that the BMA is satisfied that adequate protection is provided.

- 5.18.3 Guard rails fitted on superstructure and freeboard decks shall have at least three courses such that the opening below the lowest course of the guard rails shall not exceed 230 millimetres and the other courses shall be not more than 380 millimetres apart.
- 5.18.4 In the case of ships with rounded gunwales the guard rail supports shall be placed on the flat of the deck.
- 5.18.5 In other locations, guardrails with at least two courses shall be fitted.
- 5.18.6 Guard rails shall comply with the vessel's Recognised Organisation construction requirements or the following provisions-
- .1 fixed, removable or hinged stanchions shall be fitted about 1.5 metres apart and removable or hinged stanchions shall be capable of being locked in the upright position;
  - .2 at least every third stanchion shall be supported by a bracket or stay;
  - .3 where necessary for the normal operation of the ship, steel wire ropes may be accepted in lieu of guard rails and such wires shall be made taut by means of turnbuckles; and
  - .4 where necessary for the normal operation of the ship, chains fitted between two fixed stanchions and/or bulwarks are acceptable in lieu of guard rails.
  - .5 *a combination of bulwarks and guardrails shall be permitted providing that bulwarks comply with applicable freeing port area requirements.*
- 5.18.7 Satisfactory means for safe passage (in the form of guard rails, lifelines, 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 any other spaces used in the essential operation of the ship.
- 5.18.8 *Where the function of the vessel would be impeded by the provision of bulwarks and/or guard rails complying with 5.18.2 to 5.18.6, alternative proposals detailed to provide equivalent safety for persons on deck shall be submitted to the BMA for approval where recognised national or international standards may be accepted as equivalence.*
- 5.18.9 *The structural strength of any bulwarks or guardrails shall comply with the requirements of a Recognised Organisation or recognised international standard as appropriate to the vessel and its areas of operation.*

## **5.19 Reduced Sill Heights and Coaming** (summary of requirements from earlier sections)

- 5.19.1 *A reduction in door sill height is allowed to the satisfaction of the BMA in accordance with section 5.9.5, provided that the vessel has increased freeboard in accordance section 12.2.2 and can comply with the enhanced survivability standard as defined in section 11.17, with the watertight compartment to which the door leads flooded in accordance with 5.19.4.*
- 5.19.2 *Flush hatches are allowed in accordance with section 5.10.4, including, but not limited to, that the vessel can comply with the enhanced survivability standard as defined in Section 11.17, with the watertight compartment to which the hatch leads flooded in accordance with 5.19.4.*
- 5.19.3 *Miscellaneous Openings in Freeboard and Superstructure Decks may have reduced coamings considered in accordance with section 5.11.2 subject to the vessel being able to comply with the enhanced survivability standard in section 11.17, with the watertight compartment to which the opening leads flooded in accordance with 5.19.4.*
- 5.19.4 *Where compliance with the enhanced survivability standard in section 11.17, with the watertight compartment to which the opening leads flooded is required, the compartment supplied by the opening shall be assumed to be flooded to the outside waterline. With the compartment flooded the vessel shall be shown to meet the criteria set out in Section 11.17.*

## **5.20 Additional Equivalence Considerations**

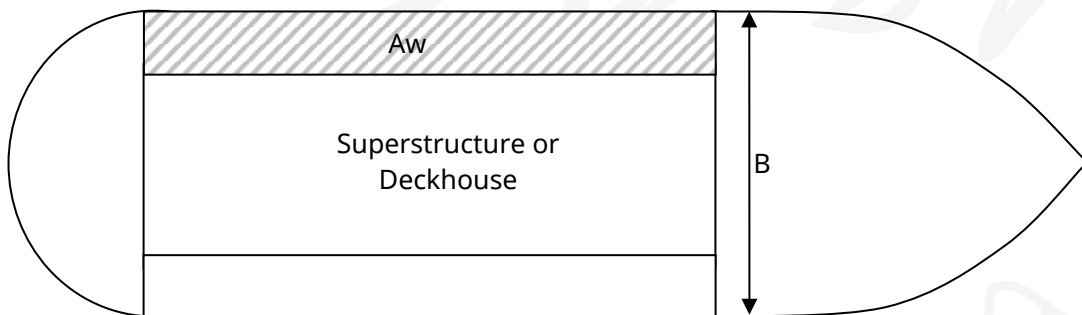
- .1 *Openings to be kept closed at sea*
- .2 *Enhanced Bilge Pumping capacity and additional bilge alarms*
- .3 *Compliance with enhanced stability if not already a requirement (see Section 11.17)*
- .4 *Provision of dorade boxes or baffle systems to prevent direct ingress of water*
- .5 *Alternative ventilation for use in bad weather*
- .6 *Consideration of downflooding angle and reduced risk of green sea loads, i.e. protected position*
- .7 *Enhanced survey inspection regime*
- .8 *Operational Limitations*
- .9 *Consideration shall be given to the provision of operational instructions to the Master as to when deadlights shall be applied to portlights.*

**6 WATER FREEING ARRANGEMENTS**

**6.1 General Requirements**

6.1.1 *The standards for water freeing arrangements shall comply with the ILLC as far as it is reasonable and practicable to do so on any weather decks in the forward quarter and up to position 2 elsewhere and in any case the intention shall be to achieve a standard of safety which is at least equivalent to the standard of the ILLC to the satisfaction of the BMA given the design and use of the vessel.*

6.1.2 *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:*



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

Where:

$FP_{REQ}$  = Freeing port area required

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

$B$  = Full beam at deck,

6.1.3 *In individual cases, when the BMA considers that the requirements of the ILLC with respect to freeing port areas cannot be met, the BMA may consider and approve alternative arrangements to achieve adequate safety standards which may take account of a reduced permeability and volume of a well.*

6.1.4 *For a Passenger Yacht 2 (PY-L2) the requirement for the minimum freeing port area for a forward or after well as determined in accordance with Section 6.1.2 may be reduced by a form factor equal to the ratio of:*

$$\frac{A_w}{L_w \times B_w}$$

where:

$A_w$  = Actual area of the well;

$L_w$  = Overall length of the well;

$B_w$  = Maximum breadth of the well; and

*Dimensions are measured at half the height of the bulwark above the deck of the well,*

*provided that*

- i. the maximum reduction shall not exceed 50%;*
- ii. the stability requirements for the yacht are maintained with all the wells flooded to any level up to the height of the bulwark; and*
- iii. the freeing port area provided is sufficient to allow the well to drain in less than three minutes.*

**6.2 Recesses**

6.2.1 Any recess in the weather deck shall be of weathertight construction and shall be self-draining under all normal conditions of heel and trim of the vessel; a swimming pool or spa bath, open to the elements, shall be treated as a recess.

6.2.2 *The means of drainage provided shall be capable of efficient operation when the vessel is heeled to an angle of 10°.*

6.2.3 *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 draft and means shall be provided to prevent the backflow of sea water into the recess.*

6.2.4 *Where it is not practical to provide drainage which meets the requirements of 6.2.2 and 6.2.3, alternative safety measures may be proposed for approval by the BMA, provided that 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)**

6.3.1 All swimming pools shall have their effect on intact and damage stability considered taking into account the mass of water and its free surface effect.

6.3.2 If there are loading conditions where swimming pools shall be emptied in order to comply with stability requirements<sup>16</sup> of Section 11, these loading conditions shall be placed in a separate section of the approved stability booklet with the following note added:

**In this loading condition the vessel may not have its [swimming pool] [spa bath] [jacuzzi] full, due to insufficient stability**

6.3.3 All loading conditions included in the approved stability book shall be shown to meet the damage stability requirements of Section 11.

<sup>16</sup> In evaluating intact stability compliance, the effects of spill out of swimming pool contents may be taken into account

**6.4 Additional Equivalence Considerations**

- 6.4.1 Freeing arrangements may take account of a reduced permeability and volume of the well, when compared to a full size well.
  
- 6.4.2 For existing vessels, the BMA 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.

## 7 MACHINERY INSTALLATIONS

### 7.1 Machinery Installations

7.1.1 Every ship to which this Code applies shall also comply with the applicable requirements of SOLAS Chapter II-1, Part C, with respect to machinery installations.

7.1.2 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 BMA.

7.1.3 Vessels with garage spaces shall have the space's drainage or bilge system 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>17</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 BMA. Such information shall be included in the stability book.

### 7.2 Periodically Unattended Machinery Spaces

7.2.1 *Whilst nothing in this Code precludes ships to which the Code applies from being optionally compliant with the requirements for periodically Unmanned Machinery Spaces (UMS), such a ship shall not operate in this mode whilst in service as a Code vessel, provided that when on transitional voyages without passengers such ships may operate in the UMS mode subject to the approval of the BMA.*

7.2.2 Every ship to which this Code applies, and which complies with the periodically unattended machinery space standards in accordance with 7.2.1 shall also comply with the applicable requirements of Chapter II-1, Part E of SOLAS, with respect to electrical installations.

### 7.3 Additional Equivalence Considerations

7.3.1 *None*

### 7.4 Alternative Design and Arrangements

7.4.1 *Vessels may follow Section 1.10 on Alternative Design and Arrangements for this section as allowed by SOLAS II-1 Regulation 55.*

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<sup>17</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

## **8 ELECTRICAL INSTALLATIONS**

### **8.1 Electrical Installations**

8.1.1 Every ship to which this Code applies shall also comply with the applicable requirements of SOLAS Chapter II-1, Part D, with respect to electrical installations for passenger ships.

8.1.2 *Where batteries are used for propulsion and/or electric power supply purpose during ship operations, the design and operation of the battery system shall consider the guidelines provided in Section 34.*

### **8.2 Additional Equivalence Considerations**

8.2.1 *None*

### **8.3 Alternative Design and Arrangements**

8.3.1 *Vessels may follow Section 1.10 on Alternative Design and Arrangements for this section as allowed by SOLAS II-1 Regulation 55.*



## **9 STEERING GEAR**

### **9.1 General Requirements**

9.1.1 For existing and new vessels, the steering gear and its installation shall meet the standards of SOLAS II-1/Part C - Machinery installations for passenger ships.

### **9.2 Additional Equivalence Considerations**

9.2.1 None

### **9.3 Alternative Design and Arrangements**

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

## 10 BILGE PUMPING

### 10.1 General Requirements

10.1.1 For existing and new vessels, the bilge pumping arrangement and its installation shall meet the standards of SOLAS II-1/Part C - Machinery installations for passenger ships.

### 10.2 Additional Equivalence Considerations

10.2.1 None

### 10.3 Alternative Design and Arrangements

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

## **11 STABILITY**

### **11.1 General**

- 11.1.1 This section deals with the standards for both intact and damaged stability.
- 11.1.2 An intact stability standard proposed for assessment of a vessel type not covered by the standards defined in the Code shall be submitted to a Recognised Organisation or the BMA for approval at the earliest opportunity.
- 11.1.3 If used, permanent ballast should be located in accordance with a plan approved by the BMA and in a manner that prevents shifting of position. Permanent ballast should not be removed from the yacht or relocated within the yacht without the approval of the BMA. Permanent ballast particulars should be noted in the yacht's stability booklet. Attention should be paid to local or global hull strength requirements from the fitting of additional ballast.
- 11.1.4 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 and Information<sup>18</sup>**

- 11.2.1 Every ship to which this Code applies shall be inclined upon its completion and the elements of its stability determined.
- 11.2.2 Where any alterations are made to a ship so as to materially affect the stability information supplied to the master-
- .1 amended stability information shall be provided;
  - .2 if necessary the ship shall be re-inclined; and
  - .3 the ship shall be re-inclined if anticipated deviations exceed one of the values specified in Section 11.2.3.1.
- 11.2.3 At periodical intervals not exceeding five years, a lightweight survey shall be carried out on all passenger ships to verify any changes in lightship displacement and longitudinal centre of gravity.
- 11.2.3.1 The ship shall be re-inclined whenever, in comparison with the approved stability information, a deviation from the lightship displacement exceeding 2% or a deviation of the longitudinal centre of gravity exceeding 1% of  $L_s$  is found or anticipated<sup>19</sup>.

<sup>18</sup> Refer to the Code on Intact Stability for All Types of Ships covered by IMO Instruments, adopted by the IMO by MSC.267(85)

<sup>19</sup> Refer to IMO Circular MSC/Circ.1158 Stability information for passenger ships and cargo ships - Lightweight check

11.2.4 *In applying this section due regard shall be given to the Intact Stability Code 2008 as defined in Section 2 of this Code.*

### **11.3 Stability Information to be supplied to the Master<sup>20</sup>**

11.3.1 The master shall be supplied with such stability information satisfactory to the BMA as is necessary to enable him by rapid and simple processes to obtain accurate guidance as to the stability of the ship under varying conditions of service and a copy of the stability information shall be furnished to the BMA.

11.3.2 Information shall be provided to the master-

- .1 in a form that is approved by the BMA or a Recognised Organisation; and
- .2 such information, and loading information also related to ship strength when required under Section 11.3.1, shall be carried onboard at all times together with evidence that the information has been approved by the BMA.

11.3.3 The information shall include-

- .1 curves or tables of minimum operational metacentric height (*GM*) versus draught which assures compliance with the relevant intact and damage stability requirements, alternatively corresponding curves or tables of the maximum allowable vertical centre of gravity (*KG*) versus draught, or with the equivalents of either of these curves;
- .2 instructions concerning the operation of cross-flooding arrangements; and
- .3 all other data and aids which might be necessary to maintain the required intact stability and stability after damage.

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

11.3.5 For ships which have to fulfil the stability requirements of Part II of this section, information referred to in Section 11.3.2 is determined from considerations related to the subdivision index, in the following manner-

- .1 minimum required *GM* (or maximum permissible vertical position of centre of gravity *KG*) for the three draughts  $d_s$ ,  $d_p$  and  $d_l$  are equal to the *GM* (or *KG* values) of corresponding loading cases used for the calculation of survival factor  $s_i$ ;
- .2 for intermediate draughts, values to be used shall be obtained by linear interpolation applied to the *GM* value only between the deepest subdivision draught and the partial subdivision draught and between the partial load line and the light service draught respectively. Intact stability criteria shall also be taken into account by retaining for each draft the maximum among minimum

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<sup>20</sup> Refer also to the Guidelines for the preparation of intact stability information (MSC/Circ.456) and the revised guidance to the master for avoiding dangerous situations in following and quartering seas (MSC.1/Circ.1228)

required *GM* values or the minimum of maximum permissible *KG* values for both criteria; and  
 .3 if the subdivision index is calculated for different trims, several required *GM* curves shall be established in the same way.

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

11.3.7 In applying this section due regard shall be given to the Intact Stability Code as defined in section 2 of this Code.

**11.4 Required Subdivision Index R<sup>21</sup>**

11.4.1 The subdivision of a ship is considered sufficient if the attained subdivision index *A*, determined in accordance with section 11.5, is not less than the required subdivision index *R* calculated in accordance with this regulation and if, in addition, the partial indices *A<sub>s</sub>*, *A<sub>p</sub>* and *A<sub>i</sub>* are not less than 0.9*R* for passenger ships.

11.4.2 For all passenger ships to which the damage stability requirements of this Section apply, the degree of subdivision to be provided shall be determined by the required subdivision index *R*, as follows-

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

where:

$$N = N1 + 2N2;$$

*N1* = number of persons for whom lifeboats are provided<sup>22</sup>; and

*N2* = number of persons (including officers and crew) the ship is permitted to carry in excess of *N1*.

11.4.3 Where the conditions of service are such that compliance with Section 11.4.2 on the basis of *N = N1 + 2N2* is impracticable and where the BMA considers that a suitably reduced degree of hazard exists<sup>23</sup>, a lesser value of *N* may be taken but in no case shall the value be less than *N = N1 + N2*.

<sup>21</sup> The Maritime Safety Committee, in adopting the regulations contained in parts B to B-4 of SOLAS, as amended, invited Administrations to note that the regulations shall be applied in conjunction with the explanatory notes developed by the IMO as set out in Resolution MSC.281(85) in order to ensure their uniform application

<sup>22</sup> Where enhanced survivability is relied upon, *N1* shall be deemed to include all persons onboard

<sup>23</sup> Regarding the term "reduced degree of hazard", the following interpretation shall be applied in accordance with Regulation 6.2.4 of the above mentioned Resolution MSC.281(85)-

*"A lesser value of N, but in no case less than N = N1 + N2, may be allowed at the discretion of the Administration for passenger ships, which, in the course of their voyages, do not proceed more than 20 miles from the nearest land."*

**11.5 Attained Subdivision Index A**

11.5.1 The attained subdivision index  $A$  is obtained by the summation of the partial indices  $A_s$ ,  $A_p$  and  $A_i$ , (weighted as shown) calculated for the draughts  $d_s$ ,  $d_p$  and  $d_i$  defined in Section 2 in accordance with the following formula-

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

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

$$A = \sum p_i s_i$$

where:

$i$  represents each compartment or group of compartments under consideration;  
 $p_i$  accounts for the probability that only the compartment or group of compartments under consideration may be flooded, disregarding any horizontal subdivision, as defined in section 11.6; and  
 $s_i$  accounts for the probability of survival after flooding the compartment or group of compartments under consideration, and includes the effect of any horizontal subdivision, as defined in section 4.8.

11.5.3 In the calculation of  $A$ -

- .1 the level trim shall be used for the deepest subdivision draught and the partial subdivision draught;
- .2 the actual service trim shall be used for the light service draught; and
- .3 if in any service condition, the trim variation in comparison with the calculated trim is greater than 0.5% of  $L_s$ , one or more additional calculations of  $A$  shall be submitted for the same draughts but different trims so that, for all service conditions, the difference in trim in comparison with the reference trim used for one calculation shall be less than 0.5% of  $L_s$ .

11.5.4 When determining the positive righting lever ( $GZ$ ) of the residual stability curve, the displacement used shall be that of the intact condition; that is, the constant displacement method of calculation shall be used.

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

- 11.5.6 Wherever wing compartments are fitted-
- .1 contribution to the summation indicated by the formula shall be taken for all cases of flooding in which wing compartments are involved;
  - .2 additionally, cases of simultaneous flooding of a wing compartment or group of compartments and the adjacent inboard compartment or group of compartments, but excluding damage of transverse extent greater than one half of the ship breadth  $B$ , may be added; and
  - .3 for the purpose of this regulation, transverse extent is measured inboard from ship's side, at right angle to the centreline at the level of the deepest subdivision draught.
- 11.5.7 In the flooding calculations carried out according to the regulations:
- .1 only one breach of the hull and only one free surface need to be assumed; and
  - .2 the assumed vertical extent of damage is to extend from the baseline upwards to any watertight horizontal subdivision above the waterline or higher.
- provided however, if a lesser extent of damage shall give a more severe result, such extent shall be assumed.
- 11.5.8 If pipes, ducts or tunnels are situated within the assumed extent of damage, arrangements shall be made to ensure that progressive flooding cannot thereby extend to compartments other than those assumed flooded. However, the BMA may permit minor progressive flooding if it is demonstrated that its effects can be easily controlled and the safety of the ship is not impaired.
- 11.6 Calculation of the Factor  $p_i$**
- 11.6.1 The factor  $p_i$  for a compartment or group of compartments shall be calculated in accordance with this section using the following notations:
- $j$  = the aftmost damage zone number involved in the damage starting with No.1 at the stern;
- $n$  = the number of adjacent damage zones involved in the damage;
- $k$  = is the number of a particular longitudinal bulkhead as barrier for transverse penetration in a damage zone counted from shell towards the centre line; the shell has  $k = 0$ ;
- $x_1$  = the distance from the aft terminal of  $L_s$  to the aft end of the zone in question;
- $x_2$  = the distance from the aft terminal of  $L_s$  to the forward end of the zone in question;
- $b$  = the mean transverse distance in metres measured at right angles to the centreline at the deepest subdivision load line between the shell and an assumed vertical plane extended between the longitudinal limits used in calculating the factor  $p_i$  and which is a tangent to, or common with, all or part of the outermost portion of the longitudinal bulkhead under consideration; this vertical plane shall be so orientated that the mean transverse distance to the shell is a maximum, but not more than twice the least distance between the plane and the shell; if the upper part of a longitudinal bulkhead is below the

deepest subdivision load line the vertical plane used for determination of  $b$  is assumed to extend upwards to the deepest subdivision waterline; in any case,  $b$  is not to be taken greater than  $B/2$ .

If the damage involves a single zone only:

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

If the damage involves two adjacent zones:

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

If the damage involves three or more adjacent zones:

$$p_i = p(x1_j, x2_{j+n-1}) \cdot [r(x1_j, x2_{j+n-1}, b_k) - r(x1_j, x2_{j+n-1}, b_{k-1})] - p(x1_j, x2_{j+n-2}) \cdot [r(x1_j, x2_{j+n-2}, b_k) - r(x1_j, x2_{j+n-2}, b_{k-1})] - p(x1_{j+1}, x2_{j+n-1}) \cdot [r(x1_{j+1}, x2_{j+n-1}, b_k) - r(x1_{j+1}, x2_{j+n-1}, b_{k-1})] + p(x1_{j+1}, x2_{j+n-2}) \cdot [r(x1_{j+1}, x2_{j+n-2}, b_k) - r(x1_{j+1}, x2_{j+n-2}, b_{k-1})]$$

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

11.6.2

The factor  $p(x1, x2)$  shall be calculated according to the following formulae:

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

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

When  $L_s \leq L^*$ :

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

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

$$b_{12} = b_0$$

When  $L_s > L^*$ :

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



$$J_k^* = \frac{J_m^*}{2} + \frac{1 - \sqrt{1 + (1 - 2p_k)b_0J_m^* + \frac{1}{4}b_0^2J_m^{*2}}}{b_0}$$

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

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

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

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

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

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

The non-dimensional damage length:

$$J = \frac{(x_2 - x_1)}{L_s}$$

The normalised length of a compartment or group of compartments  $J_n$  shall be taken as the lesser of  $J$  and  $J_m$

11.6.3 Where neither limit of the compartment or group of compartments under consideration coincides with the aft or forward terminals:

$J \leq J_k$ :

$$p(x_1, x_2) = p_1 = \frac{1}{6}J^2(b_{11}J + 3b_{12})$$

$J > J_k$ :

$$p(x_1, x_2) = p_2 = -\frac{1}{3}b_{11}J_k^3 + \frac{1}{2}(b_{11}J - b_{12})J_k^2 + b_{12}J_k - \frac{1}{3}b_{21}(J_n^3 - J_k^3) + \frac{1}{2}(b_{21}J - b_{22})(J_n^2 - J_k^2) + b_{22}J(J_n - J_k)$$

11.6.4 Where the aft limit of the compartment or group of compartments under consideration coincides with the aft terminal or the forward limit of the compartment or group of compartments under consideration coincides with the forward terminal:

$J \leq J_k$ :

$$p(x_1, x_2) = \frac{1}{2}(p_1 + J)$$

$J > J_k$ :

$$p(x_1, x_2) = \frac{1}{2}(p_2 + J)$$

11.6.5 Where the compartment or groups of compartments considered extends over the entire subdivision length ( $L_s$ ):

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

11.6.6 The factor  $r(x1,x2,b)$  shall be determined by the following formulae:

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

where:

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

and

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

11.6.7 Where the compartment or groups of compartments considered extends over the entire subdivision length ( $L_s$ ):

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

11.6.8 Where neither limits of the compartment or group of compartments under consideration coincides with the aft or forward terminals:

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

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

11.6.9 Where the aft limit of the compartment or group of compartments under consideration coincides with the aft terminal or the forward limit of the compartment or group of compartments under consideration coincides with the forward terminal:

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

**11.7 Calculation of the Factor  $s_i$**

11.7.1 The factor  $s_i$  shall be determined for each case of assumed flooding, involving a compartment or group of compartments, in accordance with the following notations and the provisions in this section, where:

- $\theta_e$  is the equilibrium heel angle in any stage of flooding, in degrees;
- $\theta_v$  is the angle, in any stage of flooding, where the righting lever becomes negative, or the angle at which an opening incapable of being closed weathertight becomes submerged;
- $GZ_{max}$  is the maximum positive righting lever, in metres, up to the angle  $\theta_v$ ;
- Range* is the range of positive righting levers, in degrees, measured from the angle  $\theta_e$ ; the positive range shall be taken up to the angle  $\theta_v$ ;
- Flooding stage* is any discrete step during the flooding process, including the stage before equalisation (if any) until final equilibrium has been reached.

11.7.2 The factor  $s_i$  for any damage case at any initial loading condition,  $d_i$ , shall be obtained from the formula-

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

where-

$s_{\text{intermediate},i}$  is the probability to survive all intermediate flooding stages until the final equilibrium stage, and is calculated in accordance with 11.7.3;

$s_{\text{final},i}$  is the probability to survive in the final equilibrium stage of flooding, calculated in accordance with 11.7.4; and

$s_{\text{mom},i}$  is the probability to survive heeling moments, and is calculated in accordance with 11.7.5.

11.7.3 The factor  $s_{\text{intermediate},i}$  shall be taken as the least of the s-factors obtained from all flooding stages including the stage before equalisation, if any, and shall be calculated as follows-

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

where:

$GZ_{\text{max}}$  is not to be taken as more than 0.05 metres and  $\text{Range}$  as not more than 7°;

$s_{\text{intermediate}} = 0$ , if the intermediate heel angle exceeds 15°; and

the time for equalisation shall not exceed 10 minutes where cross-flooding fittings are required.

11.7.4 The factor  $s_{\text{final},i}$  shall be obtained from the formula-

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

where:

$GZ_{\text{max}}$  is not to be taken as more than 0.12 metres;

$\text{Range}$  is not to be taken as more than 16°;

$K = 1$  if  $\theta_e \leq \theta_{\text{min}}$ ;

$K = 0$  if  $\theta_e \geq \theta_{\text{max}}$ ;

$$K = \sqrt{\frac{\theta_{\text{max}} - \theta_e}{\theta_{\text{max}} - \theta_{\text{min}}}}$$

where:

$\theta_{\text{min}}$  is 7° for passenger ships; and

$\theta_{\text{max}}$  is 15° for passenger ships.

11.7.5 The factor  $s_{\text{mom},i}$  shall be calculated at the final equilibrium from the formula-

$$s_{\text{mom},i} = \frac{(GZ_{\text{max}}) \cdot \text{Displacement}}{M_{\text{heel}}}$$

where:

$\text{Displacement}$  is the intact displacement at the subdivision draught;

$M_{\text{heel}}$  is the maximum assumed heeling moment as calculated in accordance with section 4.1; and

$$S_{mom,i} \leq 1.$$

11.7.6 The heeling moment  $M_{heel}$  shall be calculated as follows-

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

11.7.7  $M_{passenger}$  is the maximum assumed heeling moment resulting from movement of passengers, and shall be obtained as follows-

.1 by the formula

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

Where:

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

$B$  is the beam of the ship.

.2 alternatively, the heeling moment may be calculated assuming the passengers are distributed with 4 persons per square metre on available deck areas towards one side of the ship on the decks where muster stations are located and in such a way that they produce the most adverse heeling moment and in doing so, a weight of 75 kg per passenger shall be assumed.

11.7.8  $M_{wind}$  is the maximum assumed wind moment acting in a damage situation calculated in accordance with the following formula-

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

where:

$P = 120 \text{ N/m}^2$ ;

$A =$  projected lateral area above waterline;

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

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

11.7.9  $M_{Survivalcraft}$  is the maximum assumed heeling moment due to the launching of all fully loaded davit-launched survival craft on one side of the ship and it shall be calculated using the following assumptions-

- .1 all lifeboats and rescue boats fitted on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out fully loaded and ready for lowering;
- .2 for lifeboats which are arranged to be launched fully loaded from the stowed position, the maximum heeling moment during launching shall be taken;
- .3 a fully loaded davit-launched liferaft attached to each davit on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out ready for lowering;
- .4 persons not in the life-saving appliances which are swung out shall not provide either additional heeling or righting moment; and

- .5 life-saving appliances on the side of the ship opposite to the side to which the ship has heeled shall be assumed to be in a stowed position.
- 11.7.10 Unsymmetrical flooding shall be kept to a minimum consistent with the efficient arrangements in accordance with the following provisions-
- .1 where it is necessary to correct large angles of heel, the means adopted shall, where practicable, be self-acting, but in any case where controls to equalisation devices are provided they shall be operable from above the bulkhead deck;
  - .2 these fittings together with their controls shall be acceptable to the BMA<sup>24</sup> and suitable information concerning the use of equalisation devices shall be supplied to the master of the ship;
  - .3 tanks and compartments taking part in such equalisation shall be fitted with air pipes or equivalent means of sufficient cross-section to ensure that the flow of water into the equalisation compartments is not delayed.
- 11.7.11 In all cases,  $s_i$  shall be taken as zero in those cases where the final waterline, taking into account sinkage, heel and trim, immerses-
- .1 the lower edge of openings through which progressive flooding may take place and such flooding is not accounted for in the calculation of factor  $s_i$ ; such openings shall include air-pipes, ventilators and openings which are closed by means of weathertight doors or hatch covers; and
  - .2 any part of the bulkhead deck in passenger ships considered a horizontal evacuation route for compliance with Chapter II-2 of SOLAS.
- 11.7.12 The factor  $s_i$  shall be taken as zero if, taking into account sinkage, heel and trim, any of the following occur in any intermediate stage or in the final stage of flooding-
- .1 immersion of any vertical escape hatch in the bulkhead deck intended for compliance with Chapter II-2 of SOLAS;
  - .2 any controls intended for the operation of watertight doors, equalisation devices, valves on piping or on ventilation ducts intended to maintain the integrity of watertight bulkheads from above the bulkhead deck become inaccessible or inoperable; and
  - .3 immersion of any part of piping or ventilation ducts carried through a watertight boundary that is located within any compartment included in damage cases contributing to the attained index  $A$ , if not fitted with watertight means of closure at each boundary,

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<sup>24</sup> Reference is made to the Recommendation on a standard method for evaluating cross-flooding arrangements in passenger ships, adopted by the IMO by Resolution MSC.245(83), as may be amended

provided however that where compartments assumed flooded due to progressive flooding are taken into account in the damage stability calculations multiple values of  $S_{intermediate,i}$  may be calculated assuming equalisation in additional flooding phases.

11.7.13 Except as provided in section 11.7.12.1, openings closed by means of watertight manhole covers and flush scuttles, small watertight hatch covers, remotely operated sliding watertight doors, side scuttles of the non-opening type as well as watertight access doors and hatch covers required to be kept closed at sea need not be considered.

11.7.14 Where horizontal watertight boundaries are fitted above the waterline under consideration the  $s$ -value calculated for the lower compartment or group of compartments shall be obtained by multiplying the value as determined in section 11.7.2 by the reduction factor  $v_m$  according to section 11.7.15, which represents the probability that the spaces above the horizontal subdivision shall not be flooded.

11.7.15 The factor  $v_m$  shall be obtained from the formula:

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

Where:

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

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

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

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

$d$  is the draft in question as defined in section 2; and

$x_1$  and  $x_2$  represent the terminals of the compartment or group of compartments considered in section 11.6.

11.7.16 The factors  $v(H_{j,n,m}, d)$  and  $v(H_{j,n,m-1}, d)$  shall be obtained from the formulae-

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

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

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

in all other cases,

where-

$v(H_{j,n,m}, d)$  shall be taken as 1, if  $H_m$  coincides with the uppermost watertight boundary of the ship within the range  $(x_{1(j)} \cdots x_{2(j+n-1)})$  and

$v(H_{j,n,0}, d)$  shall be taken as 0;

and in no case is  $v_m$  to be taken as less than zero or more than 1.

11.7.17 In general, each contribution  $dA$  to the index  $A$  in the case of horizontal subdivisions is obtained from the formula:

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

where

$v_m$  the  $v$ -value calculated in accordance with section 11.6.15;

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

**11.8 Permeability**

11.8.1 For the purpose of the subdivision and damage stability calculations of the regulations, the permeability of each compartment or part of a compartment shall be as follows:

SPACE	PERMEABILITY
Appropriated to stores.	0.60
Occupied by accommodation.	0.95
Occupied by machinery.	0.85
Void spaces.	0.95
<i>Spaces similar to dry cargo spaces such as storage spaces and the like.</i>	0.95
Intended for liquid.	0.0 or 0.95 (Whichever results in the more severe requirement)

11.8.2 Other figures for permeability may be used if substantiated by calculations.

**11.9 Requirements Concerning Passenger Ship Stability Carrying more than 36 Persons**

11.9.1 A passenger ship intended to carry 36 or more persons shall be capable of withstanding damage along the side shell to an extent specified in 11.9.2 and compliance with this section shall be achieved by demonstrating that  $s_i$ , as defined in section 11.7.2, is not less than 0.9 for the three loading conditions on which is based the calculation of the subdivision index.

11.9.2 The damage extent to be assumed when demonstrating compliance with section 11.9.1, shall be dependent on both  $N$  and  $L_s$ , as defined section 11.4.2 respectively, such that:

- .1 the vertical extent of damage is to extend from the ship’s moulded baseline to a position up to 12.5 metres above the position of the deepest subdivision draft as defined in section 2 unless a lesser vertical extent of damage were to give a lower value of  $s_i$ , in which case this reduced extent shall be used;
- .2 where 200 persons are carried, a damage length of 0.0215  $L_s$  but not less than 3 metres shall be assumed , in conjunction with a penetration inboard of 0.0651B

- but not less than 0.75 metres measured inboard from the ship side, at right angles to the centreline at the level of the deepest subdivision draught;
- .3 the damage length shall be assumed at any position along the shell side between transverse watertight bulkheads provided that the distance between two adjacent transverse watertight bulkheads is not less than the assumed damage length; if the distance between adjacent transverse watertight bulkheads is less than the assumed damage length, only one of these bulkheads shall be considered effective for the purpose of demonstrating compliance with section 11.9.1;
- .4 where 36 persons are carried, a damage length of  $0.015L_s$  but not less than 3 metres shall be assumed, in conjunction with a penetration inboard of  $0.05B$  but not less than 0.75 metres; and
- .5 where more than 36, but fewer than 200 persons are carried the values of damage length and penetration inboard, used in the determination of the assumed extent of damage, shall be obtained by linear interpolation between the values of damage length and penetration which apply for ships carrying 36 persons and 200 persons as specified in sections 11.9.2.4 and 11.9.2.2.

## **11.10 Damage Control Information<sup>25</sup>**

- 11.10.1 There shall be permanently exhibited, or readily available on the navigation bridge, for the guidance of the officer in charge of the ship-
- .1 plans showing clearly for each deck and storage space the boundaries of the watertight compartments, the openings therein with the means of closure and position of any controls thereof, and the arrangements for the correction of any list due to flooding;
- .2 booklets containing the aforementioned information shall be made available to the officers of the ship.
- 11.10.2 Watertight doors in passenger ships permitted to remain open during navigation shall be clearly indicated in the ship's stability information.
- 11.10.3 General precautions to be included shall consist of a listing of equipment, conditions, and operational procedures, considered by the BMA to be necessary to maintain watertight integrity under normal ship operations.
- 11.10.4 Specific precautions to be included shall consist of a listing of elements (i.e. closures, security of stores, sounding of alarms, etc.) considered by the BMA to be vital to the survival of the ship, passengers and crew.

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<sup>25</sup> Refer to the Guidelines for damage control plans contained in MSC.1/Circular.1245 - Guidelines for Damage Control Plans and Information to the Master (as may be amended from time to time)



- 11.10.5 In case of ships to which damage stability requirements of Part II of this Section apply, damage stability information shall provide the master with a simple and easily understandable way of assessing the ship's survivability in all damage cases involving a compartment or group of compartments.
- 11.11 Loading of Passenger Ships**
- 11.11.1 On completion of loading of the ship-
- .1 the master shall, prior to the ship's departure, determine the ship's trim and stability and also ascertain and record that the ship is in compliance with stability criteria in relevant regulations; and
  - .2 the determination of the ship's stability shall always be made by calculation provided that the BMA may accept the use of an electronic loading and stability computer or equivalent means for this purpose.
- 11.11.2 Water ballast shall not in general be carried in tanks intended for oil fuel provided that in ships in which it is not practicable to avoid putting water in oil fuel tanks, oily-water separating equipment to the satisfaction of the BMA shall be fitted, or other alternative means, such as discharge to shore facilities, acceptable to the BMA shall be provided for disposing of the oily-water ballast.
- 11.11.3 The provisions of this section are without prejudice to the provisions of MARPOL.

**ALTERNATIVE SUBDIVISION AND STABILITY STANDARDS FOR PASSENGER YACHTS NOT EXCEEDING 80 METRES IN LENGTH (L) WHERE COMPLIANCE WITH REGULATIONS 6 AND 7 OF SOLAS II-1 PART B PROVES IMPRACTICABLE<sup>26</sup>**

**11.12 Floodable Length**

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

11.12.2 *In a ship with a continuous bulkhead deck, the floodable length at a given point is the maximum portion of the length of the ship, having its centre at the point in question, which can be flooded under the definite assumptions set forth in section 11.13 without the ship being submerged beyond the margin line.*

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

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

**11.13 Permeability**

11.13.1 *The definite assumptions referred to in section 11.12 relate to the permeability of the spaces below the margin line.*

11.13.2 *In determining the floodable length, a uniform average permeability shall be used throughout the whole length of each of the following portions of the ship below the margin line-*

- .1 *the machinery room;*
- .2 *the portion forward of the machinery room; and*
- .3 *the portion abaft the machinery room.*

11.13.3 *The uniform average permeability throughout the machinery room shall be determined from the formula-*

$$85 + 10 \frac{a - c}{v}$$

*where-*

*a = the volume of the passenger spaces;*

*c = the volume of between-deck spaces below the margin line within the limits of the machinery room which are appropriated to stores; and*

<sup>26</sup> To use this Part of the Code, compliance with regulation 6 and 7 of SOLAS II-1 Part B-1 shall be confirmed to be impracticable for the vessel arrangement due to its size. This shall be in the form of a statement from the Naval Architect following consideration that SOLAS II-1 PART B-1 was not developed for vessels of this size.

*v = the whole volume of the machinery room below the margin line.*

11.13.4 *Where it is shown to the satisfaction of the BMA that the average permeability as determined by detailed calculation is less than that given by the formula, the detailed calculated value may be used and for the purpose of such calculation, the permeability of passenger spaces shall be taken as 95, that of all store spaces as 60, and that of double bottom, oil fuel and other tanks at such value as may be approved in each case.*

11.13.5 *Except as provided in 11.13.6, the uniform average permeability throughout the portion of the ship forward of or abaft the machinery room shall be determined from the formula-*

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

*where-*

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

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

11.13.6 *In the case of unusual arrangements the BMA may allow, or require, a detailed calculation of average permeability for the portions forward of or abaft the machinery room and for the purpose of such calculation, the permeability of passenger spaces shall be taken as 95, that of spaces containing machinery as 85, that of all store spaces as 60, and that of double bottom, oil fuel and other tanks at such value as may be approved in each case.*

11.13.7 *Where a between-deck compartment between two watertight transverse bulkheads contains any passenger or crew space, the whole of that compartment, less any space completely enclosed within permanent steel bulkheads and appropriated to other purposes, shall be regarded as passenger space.*

**11.14 Permissible Length of Compartments**

**General**

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

**Factor of subdivision**

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

11.14.3 *The factor of subdivision shall depend on the length of the ship, and for a given length shall vary according to the nature of the service for which the ship is intended and it shall decrease in a regular and continuous manner-*

- .1 as the length of the ship increases, and
- .2 from a factor A, to a factor B.

11.14.4 The variations of the factors A and B shall be expressed by the following formulae (1) and (2) where L is the length of the ship as defined in Section 2:

(1)  $A = \frac{58.2}{L-60} + 0.18$  (where L=131 metres and above)

(2)  $B = \frac{30.3}{L-42} + 0.18$  (where L=79 metres and above)

**Criterion of Service**

11.14.5 For a ship of given length the appropriate factor of subdivision shall be determined by the criterion of service numeral (hereinafter called the criterion numeral) as given by the following formulae (3) and (4) where-

$C_s$  = the criterion numeral;

L = the length of the ship (metres), as defined in Section 2;

M = the volume of the machinery room (cubic metres), as defined in Section 2, with the addition thereto of the volume of any permanent oil fuel bunkers which may be situated above the inner bottom and forward of or abaft the machinery room;

P = the whole volume of the passenger spaces below the margin line (cubic metres); and

$P_1 = KN$

Where:

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

$K = 0.056L$

(3)  $C_s = 72 \frac{M + 2P_1}{V + P_1 - P}$  (where  $P_1$  is greater than P)

(4)  $C_s = 72 \frac{M + 2P}{V}$  (in other cases)

11.14.6 Where the value of KN is greater than the sum of P and the whole volume of the actual passenger spaces above the margin line, the figure to be taken as  $P_0$  is that sum or two-thirds KN, whichever is the greater.

11.14.7 For ships not having a continuous bulkhead deck the volumes shall be taken up to the actual margin lines used in determining the floodable lengths.

**Rules for Subdivision of Ships other than those covered by 11.14.14 (Special Subdivision Standards)**

11.14.8 The subdivision abaft the forepeak of ships of 131 metres in length and upwards having a criterion numeral of 23 or less shall be governed by the factor A given by formula (1); of those having a criterion numeral of 123 or more by the factor B given by formula (2); and of those having a criterion numeral between 23 and 123 by the factor F obtained by linear interpolation between the factors A and B, using the formula-

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

- 11.14.9 *Nevertheless, where the criterion numeral is equal to 45 or more and simultaneously the computed factor of subdivision as given by formula (5) is 0.65 or less, but more than 0.5, the subdivision abaft the forepeak shall be governed by the factor 0.5.*
- 11.14.10 *Where the factor F is less than 0.4 and it is shown to the satisfaction of the BMA to be impracticable to comply with the factor F in a machinery compartment of the ship, the subdivision of such compartment may be governed by an increased factor, which, however, shall not exceed 0.4.*
- 11.14.11 *The subdivision abaft the forepeak of ships of less than 131 metres but not less than 79 metres in length having a criterion numeral equal to S, where-*
- $$S = \frac{3.574 - 25L}{13}$$
- shall be governed by the factor unity; of those having a criterion numeral of 123 or more by the factor B given by the formula (2); of those having a criterion numeral between S and 123 by the factor F obtained by linear interpolation between unity and the factor B using the formula-*
- (6) 
$$F = 1 - \frac{(1-B)(C_s - S)}{123 - S}$$
- 11.14.12 *The subdivision abaft the forepeak of ships of less than 131 metres but not less than 79 metres in length and having a criterion numeral less than S, and of ships of less than 79 metres in length shall be governed by the factor unity, unless, in either case, it is shown to the satisfaction of the BMA to be impracticable to comply with this factor in any part of the ship, in which case the BMA may allow such relaxation as may appear to be justified, having regard to all the circumstances.*
- 11.14.13 *The provisions of 11.14.12 shall apply also to ships of whatever length, which are certified to carry a number of passengers exceeding 12 but not exceeding:*
- $$\frac{L^2}{650} \text{ or } 36, \text{ whichever is less.}$$

**Special Subdivision Standards for Ships complying with Section 13.19.2**

- 11.14.14 *In the case of ships complying with section 13.19.2 the subdivision abaft the forepeak shall be governed by a factor of 0.5 or by the factor determined according to 11.14.5 to 11.14.13, if less than 0.5.*
- 11.14.15 *In the case of such ships of less than 91.5 metres in length, if the BMA is satisfied that compliance with such factor would be impracticable in a compartment, it may allow the length of that compartment to be governed by a higher factor provided the factor used is the lowest that is practicable and reasonable in the circumstances.*
- 11.14.16 *The special provisions regarding permeability given in section 11.13.2 shall be employed when calculating the floodable length curves.*

- 11.14.17 *Where the BMA is satisfied that, having regard to the nature and conditions of the intended voyages, compliance with the other provisions of this Section and Sections 13 and 14 is sufficient, the requirements of section 11.14.16 need not be complied with.*
- 11.15 Special Requirements concerning Subdivision**
- 11.15.1 *Where in a portion or portions of a ship the watertight bulkheads are carried to a higher deck than in the remainder of the ship and it is desired to take advantage of this higher extension of the bulkheads in calculating the floodable length, separate margin lines may be used for each such portion of the ship provided that-*
- .1 *the sides of the ship are extended throughout the ship's length to the deck corresponding to the upper margin line and all openings in the shell plating below this deck throughout the length of the ship are treated as being below a margin line, for the purposes of paragraph; and*
  - .2 *the two compartments adjacent to the "step" in the bulkhead deck are each within the permissible length corresponding to their respective margin lines, and, in addition, their combined length does not exceed twice the permissible length based on the lower margin line.*
- 11.15.2 *A compartment may exceed the permissible length determined in accordance with section 11.14 provided the combined length of each pair of adjacent compartments to which the compartment in question is common does not exceed either the floodable length or twice the permissible length, whichever is the less.*
- 11.15.3 *If one of the two adjacent compartments is situated inside the machinery room, and the second is situated outside the machinery room, and the average permeability of the portion of the ship in which the second is situated differs from that of the machinery room, the combined length of the two compartments shall be adjusted to the mean average permeability of the two portions of the ship in which the compartments are situated.*
- 11.15.4 *Where the two adjacent compartments have different factors of subdivision, the combined length of the two compartments shall be determined proportionately.*
- 11.15.5 *In ships of 100 metres in length and upwards, one of the main transverse bulkheads abaft the forepeak shall be fitted at a distance from the forward perpendicular which is not greater than the permissible length.*
- 11.15.6 *A main transverse bulkhead may be recessed provided that all parts of the recess lie inboard of vertical surfaces on both sides of the ship, situated at a distance from the shell plating equal to one fifth the breadth of the ship, as defined in Section 2, and measured at right angles to the centreline at the level of the deepest subdivision load line. Any part of a recess which lies outside these limits shall be dealt with as a step, in accordance with 11.15.7.*

- 11.15.7 *A main transverse bulkhead may be stepped provided that it meets one of the following conditions-*
- .1 the combined length of the two compartments, separated by the bulkhead in question, does not exceed either 90% of the floodable length or twice the permissible length, except that, in ships having a factor of subdivision greater than 0.9, the combined length of the two compartments in question shall not exceed the permissible length;*
  - .2 additional subdivision is provided in way of the step to maintain the same measure of safety as that secured by a plane bulkhead; and*
  - .3 the compartment over which the step extends does not exceed the permissible length corresponding to a margin line taken 76 millimetres below the step.*
- 11.15.8 *Where a main transverse bulkhead is recessed or stepped, an equivalent plane bulkhead shall be used in determining the subdivision.*
- 11.15.9 *If the distance between two adjacent main transverse bulkheads, or their equivalent plane bulkheads, or the distance between the transverse planes passing through the nearest stepped portions of the bulkheads, is less than 3 metres plus 3% of the length of the ship, or 11 metres, whichever is the less, only one of these bulkheads shall be regarded as forming part of the subdivision of the ship in accordance with the provisions of section 11.14.*
- 11.15.10 *Where a main transverse watertight compartment contains local subdivision and it can be shown to the satisfaction of the BMA that, after any assumed side damage extending over a length of 3 metres plus 3% of the length of the ship, or 11 metres, whichever is the less, the whole volume of the main compartment shall not be flooded, a proportionate allowance may be made in the permissible length otherwise required for such compartment and in such a case the volume of effective buoyancy assumed on the undamaged side shall not be greater than that assumed on the damaged side.*
- 11.15.11 *Where the required factor of subdivision is 0.5 or less, the combined length of any two adjacent compartments shall not exceed the floodable length.*
- 11.16 Stability in Damaged Condition**
- 11.16.1 *Sufficient intact stability shall be provided in all service conditions so as to enable the ship to withstand the final stage of flooding of any one main compartment which is required to be within the floodable length.*
- 11.16.2 *Where two adjacent main compartments are separated by a bulkhead which is stepped under the conditions of section 11.15.7.2 the intact stability shall be adequate to withstand the flooding of those two adjacent main compartments.*
- 11.16.3 *Where the required factor of subdivision is 0.5 or less but more than 0.33 intact stability shall be adequate to withstand the flooding of any two adjacent main compartments.*

- 11.16.4 *Where the required factor of subdivision is 0.33 or less the intact stability shall be adequate to withstand the flooding of any three adjacent main compartments.*
- 11.16.5 *The requirements of 11.16.1 to 11.16.4 shall be determined by calculations which are in accordance with 11.16.11, 11.16.12 and 11.16.14 respectively and which take into consideration the proportions and design characteristics of the ship and the arrangement and configuration of the damaged compartments and in making these calculations the ship shall be assumed in the worst anticipated service condition as regards stability.*
- 11.16.6 *Where it is proposed to fit decks, inner skins or longitudinal bulkheads of sufficient tightness to seriously restrict the flow of water, the BMA shall be satisfied that proper consideration is given to such restrictions in the calculations.*
- 11.16.7 *The stability required in the final condition after damage, and after equalization where provided, shall be such that the positive residual righting lever curve shall have a minimum range of 15° beyond the angle of equilibrium provided that this range may be reduced to a minimum of 10°, in the case where the area under the righting lever curve is that specified in Section 11.16.8, increased by the ratio-*  

$$15/\text{range}$$
*where the range is expressed in degrees.*
- 11.16.8 *The area under the righting lever curve shall be at least 0.015 metre-radians, measured from the angle of equilibrium to the lesser of-*  
 .1 *the angle at which progressive flooding occurs; or*  
 .2 *22° (measured from the upright) in the case of one-compartment flooding, or 27° (measured from the upright) in the case of the simultaneous flooding of two or more adjacent compartments.*
- 11.16.9 *A residual righting lever shall be obtained within the range of positive stability, taking into account the greatest of the following heeling moments-*  
 .1 *the crowding of all passengers towards one side;*  
 .2 *the launching of all fully loaded davit-launched survival craft on one side; and*  
 .3 *due to wind pressure,*  
*as calculated by the formula-*  

$$GZ \text{ (in metres) } = (\text{Heeling moment/Displacement}) + 0.04,$$
*provided that in no case is the righting lever to be less than 0.1 metres.*
- 11.16.10 *For the purpose of calculating the heeling moments in 11.16.9, the following assumptions shall be made-*  
 .1 *moments due to crowding of passengers allowing-*  
 i. *four persons per square metre;*  
 ii. *a mass of 75 kg for each passenger,*



- iii. a vertical centre of gravity of seated passengers is 0.3 m above seat.
- iv. a vertical centre of gravity of standing passengers is 1.0 m above deck.

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

*.2 moments due to launching of all fully loaded davit-launched survival craft on one side under the following conditions:*

- i. *all lifeboats and rescue boats fitted on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out fully loaded and ready for lowering;*
- ii. *for lifeboats which are arranged to be launched fully loaded from the stowed position, the maximum heeling moment during launching shall be taken;*
- iii. *a fully loaded davit-launched liferaft attached to each davit on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out ready for lowering;*
- iv. *persons not in the life-saving appliances which are swung out shall not provide either additional heeling or righting moment; and*
- v. *life-saving appliances on the side of the ship opposite to the side to which the ship has heeled shall be assumed to be in a stowed position;*

*.3 moments due to wind pressure where-*

- i. a wind pressure of 120 N/m<sup>2</sup> to be applied;
- ii. the area applicable shall be the projected lateral area of the ship above the waterline corresponding to the intact condition; and
- iii. the moment arm shall be the vertical distance from a point at one half of the mean draught corresponding to the intact condition to the centre of gravity of the lateral area;

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

**11.16.11** *For the purpose of making damage stability calculations the volume and surface permeabilities shall be in general as follows-*

<b>Space</b>	<b>Permeability %</b>
<i>Appropriated to stores</i>	<i>60</i>
<i>Occupied by accommodation</i>	<i>95</i>
<i>Occupied by machinery</i>	<i>85</i>
<i>Intended for liquids</i>	<i>0 or 95 (whichever results in the more severe requirements)</i>

*provided that higher surface permeabilities shall be assumed in respect of spaces which, in the vicinity of the damage waterplane, contain no substantial quantity of accommodation or machinery and spaces which are not generally occupied by any substantial quantity of stores.*

- 11.16.12 *The assumed extent of damage shall be as follows-*
- .1 *in the longitudinal extent, 3 metres plus 3% of the length (L) of the ship, or 11 metres, whichever is the less, provided that where the required factor of subdivision is 0.33 or less the assumed longitudinal extent of damage shall be increased as necessary so as to include any two consecutive main transverse watertight bulkheads;*
  - .2 *in the transverse extent (measured inboard from the ship's side, at right angles to the centreline at the level of the deepest subdivision load line) a distance of one fifth of the breadth of the ship, as defined in Section 2; and*
  - .3 *in the vertical extent: from the base line upwards without limit;*
  - .4 *provided that if any damage of lesser extent than that indicated in this paragraph would result in a more severe condition regarding heel or loss of metacentric height, such damage shall be assumed in the calculations.*
- 11.16.13 *The following provisions apply with respect to unsymmetrical flooding:*
- .1 *Such flooding shall be kept to a minimum consistent with efficient arrangements;*
  - .2 *where it is necessary to correct large angles of heel, the means adopted shall, where practicable, be self-acting, but in any case where controls to cross-flooding fittings are provided they shall be operable from above the bulkhead deck;*
  - .3 *the cross-flooding fittings, together with their controls, shall be acceptable to the BMA;*
  - .4 *the maximum angle of heel after flooding but before equalisation shall not exceed 15°;*
  - .5 *where cross-flooding fittings are required the time for equalisation shall not exceed 15 minutes; and*
  - .6 *suitable information concerning the use of cross-flooding fittings shall be supplied to the master of the ship<sup>27</sup>.*
- 11.16.14 *The final conditions of the ship after damage and, in the case of unsymmetrical flooding, after equalization measures have been taken shall be as follows-*
- .1 *in the case of symmetrical flooding there shall be a positive residual metacentric height of at least 50 millimetres as calculated by the constant displacement method;*
  - .2 *in the case of unsymmetrical flooding, the angle of heel for one-compartment flooding shall not exceed 7° and for the simultaneous flooding of two or more adjacent compartments, a heel of 12° may be permitted by the BMA; and*
  - .3 *in no case shall the margin line be submerged in the final stage of flooding and if it is considered that the margin line may become submerged during an intermediate stage of flooding, the BMA may require such investigations and arrangements as it considers necessary for the safety of the ship.*
- 11.16.15 *The master of the ship shall be supplied with the data necessary to maintain sufficient intact stability under service conditions to enable the ship to withstand the critical damage ad in the*

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<sup>27</sup> Refer to the Recommendation on a standard method for establishing compliance with the requirements for cross-flooding arrangements in passenger ships adopted by the IMO by resolution A.266(VIII).

*case of ships requiring cross-flooding the master of the ship shall be informed of the conditions of stability on which the calculations of heel are based and be warned that excessive heeling might result should the ship sustain damage when in a less favourable condition.*

- 11.16.16 *The data referred to in 11.16.15 to enable the master to maintain sufficient intact stability shall include information which indicates the maximum permissible height of the ship's centre of gravity above keel (KG), or alternatively the minimum permissible metacentric height (GM), for a range of draughts or displacements sufficient to include all service conditions and the information shall show the influence of various trims taking into account the operational limits*
- 11.16.17 *Datum draught marks shall be provided at the bow and stern, port and starboard, in accordance with the following provisions-*
- .1 they shall be adequate for assessing the condition and trim of the vessel;*
  - .2 the draught marks may be single datum lines;*
  - .3 the marks shall be permanent and easily read but need not be of contrasting colour to the hull;*
  - .4 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; and*
  - .5 in the case where the draught marks are not located where they are easily readable or operational constraints for a particular trade make it difficult to read the draft marks, then the ship shall also be fitted with a reliable draught indicating system by which the bow and stern draughts can be determined.*
- 11.16.18 *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 and the position of the marks shall be verified at initial placement by the BMA or the vessel's Assigning Authority.*
- 11.16.19 *Where a reliable draught indicating system is fitted as required by 11.16.17.5 consideration may be given to dispensing with the provision of draught marks.*
- 11.16.20 *On completion of loading of the ship and prior to its departure, the master shall determine the ship's trim and stability and also ascertain and record that the ship is in compliance with the approved stability criteria and the determination of the ship's stability shall always be made by calculation, provided that the BMA may accept the use of an electronic loading and stability computer or equivalent means for this purpose.*
- 11.16.21 *No relaxation from the requirements for damage stability may be considered by the BMA unless it is shown that the intact metacentric height in any service condition necessary to meet these requirements is excessive for the service intended.*
- 11.16.22 *Relaxations from the requirements for damage stability shall be permitted only in exceptional cases and subject to the condition that the BMA shall be satisfied that the proportions, arrangements and other characteristics of the ship are the most favourable to stability after damage which can practically and reasonably be adopted in the particular circumstances.*

**ADDITIONAL PROVISIONS FOR VESSELS PERMITTED TO CARRY DAVIT LAUNCHED LIFERAFTS AND MARINE EVACUATION SYSTEMS IN LIEU OF LIFEBOATS****11.17 Enhanced Survivability****11.17.1**

*In addition to meeting the requirements of SOLAS II-1 Part B-1 Regulation 6 and 7 and the requirements of 11.2 to 11.9 or 11.12 to 11.16, as appropriate, the following additional requirements shall be met in all loading conditions following the flooding of any two adjacent compartments-*

- .1 Except where Section 11.17.1.2 applies, in the final stage of flooding and also after equalisation measures, if any have been taken shall be as follows-*
  - i. the residual stability shall be such that any angle of equilibrium does not exceed 7° from the upright, the resulting righting lever (GZ) curve has a range to down-flooding of at least 7° beyond any angle of equilibrium; and*
  - ii. the residual stability shall be such that the vessel has a positive GZ of not less than 0.05 metres and a GM of not less than 0.05 metres; and*
  - iii. the margin line shall not be immersed in the final stage of flooding except where 11.17.1.2 is complied with,*
- .2 the BMA may permit the margin line to be immersed in the final stage of flooding provided that the following conditions are satisfied-*
  - i. with the exception of Section 11.17.1.1.iii, all other provisions of this section are complied with in full;*
  - ii. no progressive flooding can occur;*
  - iii. no escape routes, muster stations or survival craft locations are immersed;*
  - iv. all essential services, such as survival craft launching appliances, emergency generators, bilge systems, firefighting systems and communications are available at all stages of flooding; and*
  - v. no controls intended for the operation of watertight doors, equalisation devices, or valves on piping or on ventilation ducts intended to maintain the integrity of watertight bulkheads from above the bulkhead deck, become inaccessible or inoperable,*
- .3 in intermediate stages of flooding the angle of heel shall not exceed 20° and the maximum GZ shall be at least 0.03 metres and the range of positive righting levers shall be at least 5° and progressive flooding is not to take place within this positive range; and*
- .4 for the purposes of this section damage shall be assumed to occur anywhere in the length of the vessel.*

**11.17.2** *The assumed extent of damage shall be as follows-*

- .1 in the longitudinal extent, 3 metres plus 3% of the length (L) of the ship but need not exceed 10% of length, or 11 metres, whichever is the less, provided that where the required factor of subdivision is 0.33 or less the assumed longitudinal extent of damage shall be increased as necessary so as to include any two consecutive main transverse watertight bulkheads;*

- .2 *in the transverse extent (measured inboard from the ship's side, at right angles to the centreline at the level of the deepest subdivision load line) a distance of one fifth of the breadth of the ship, as defined in Section 2; and*
- .3 *in the vertical extent: from the base line upwards without limit, provided that if any damage of lesser extent than that indicated in this paragraph would result in a more severe condition regarding heel or loss of metacentric height, such damage shall be assumed in the calculations.*

**11.18 Maximum Floodable Length for vessels of 80 metres in length and above**

11.18.1 *Vessels to which this section applies, over 80 metres in length, and assessed in accordance SOLAS II-1 Part B-1 Regulation 6 and 7, shall additionally meet the requirements for floodable length as defined in Section 11.12 of the Code.*

**11.19 Additional Equivalence Considerations**

11.19.1 *None*

## 12 FREEBOARD

### 12.1 General

- 12.1.1 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)<sup>28</sup>.
- 12.1.2 Vessels shall comply with ICLL for the assignment of a freeboard mark which corresponds to the deepest loading condition included in the stability information booklet for the vessel.
- 12.1.3 The freeboard assigned shall be compatible with the strength of hull structure, intact and damage stability requirements for the vessel, and is to ensure minimum bow height requirements of the International Convention on Load Lines (1966) are met.
- 12.1.4 The Assigning Authority shall provide the Company 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 Application

- 12.2.1 Subject to meeting the requirements of section 5.18 (Protection of the Crew), relaxations from these requirements may be granted to a ship to which a greater than minimum freeboard is assigned on condition that the BMA is satisfied with the safety conditions provided.
- 12.2.2 Where the assigned summer freeboard is increased such that the resulting draft is not more than that corresponding to a minimum summer freeboard for the same ship, but with an assumed freeboard deck located a distance below the actual freeboard deck at least equal to the standard superstructure height, the conditions of assignment in accordance with the ILLC, as applicable, to the actual freeboard deck may be as required for a superstructure deck.

### 12.3 Assigning, Marking and Recording of Subdivision Load Lines

- 12.3.1 In order that the required degree of subdivision shall be maintained a load line corresponding to the approved subdivision draught shall be assigned and marked on the ship's sides;
- 12.3.2 Subject to 12.3.3, the subdivision load lines assigned and marked shall be recorded in the Passenger Ship Safety Certificate, and shall be distinguished by the notation P1 for the principal passenger service configuration, and P2, P3, etc., for the alternative

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<sup>28</sup> For the purpose of Section 12, the 1966 version of the International Convention on Load Lines shall be applied and not as amended

configurations and the principal passenger configuration shall be taken as the mode of operation in which the required subdivision index R shall have the highest value.

- 12.3.3 *Where assessed using the deterministic means in accordance with Part VI of this Section, the subdivision load lines assigned and marked shall be recorded in the Passenger Ship Safety Certificate and shall be distinguished by the notation C.1 for the principal passenger condition and C.2, C.3, etc., for the alternative conditions.*
- 12.3.4 The freeboard corresponding to each of these load lines shall be measured at the same position and from the same deck line as the freeboards determined in accordance with the ILLC. (See also section 12.4 and 12.5)
- 12.3.5 The freeboard corresponding to each approved subdivision load line and the service configuration, for which it is approved, shall be clearly indicated on the Passenger Ship Safety Certificate.
- 12.3.6 In no case shall any subdivision load line mark be placed above the deepest load line in salt water as determined by the strength of the ship or the ILLC.
- 12.3.7 Whatever may be the position of the subdivision load line marks, a ship shall in no case be loaded so as to submerge the load line mark appropriate to the season and locality as determined in accordance with the ILLC.
- 12.3.8 A ship shall in no case be so loaded that when it is in salt water the subdivision load line mark appropriate to the particular voyage and service configuration is submerged.
- 12.4 Subdivision and Load Line Mark**
- 12.4.1 *The line which indicates the subdivision and load line assigned in accordance with Section 4 and this Section shall be the horizontal line which passes through the centre of the ring shown in figure 12.1.*

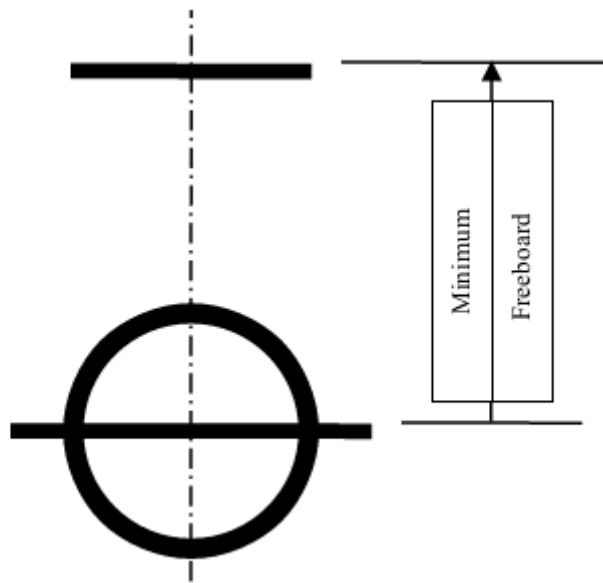


Figure 12.1 - Illustration of minimum freeboard mark and not the actual markings required

Note: Distance measured from the top edge of the deck line to the top edge of the line bisecting the ring.

- 12.4.2 The Subdivision and load line mark shall consist of a ring 300 millimetres in outside diameter and 25 millimetres wide which is intersected by a horizontal line 450 millimetres in length and 25 millimetres in breadth, the upper edge of which passes through the centre of the ring; the centre of the ring shall be placed amidships and at a distance measured vertically below the upper edge of the deck line equal to the assigned freeboard measured vertically below the upper edge of the deck as illustrated in Figure 12.1.
- 12.4.3 *Subject to Sections 12.4.4 and 12.4.5, the deck line is a horizontal line 300 millimetres in length and 25 millimetres in breadth which shall be marked amidships on each side of the ship with its upper edge normally passing through the point where the continuation outwards of the upper surface of the freeboard deck intersects the outer surface of the shell, provided that the deck line may be placed with reference to another fixed point on the ship on condition that the freeboard is correspondingly corrected.*
- 12.4.4 *Where the upper edge of the deck line coincides with a readily identifiable structural feature such as the actual deck at the side amidships, that structural feature may be utilised as the deck line providing it is clearly identified as such in the International Load Line Certificate;*
- 12.4.5 *Any other readily identifiable line or structure at the side amidships above or below the deck line position may be similarly utilised as the deck line providing it is clearly identified as such in the International Load Line Certificate and the freeboard is correspondingly corrected.*



- 12.4.6 The location of the reference point and the identification of the freeboard deck shall in all cases be indicated on the International Load Line Certificate.
- 12.4.7 In no case shall any subdivision load line mark be placed above the deepest load line in salt water as determined by the strength of the ship or this Section.
- 12.4.8 *The ring, lines and letters shall –*
- .1 *be painted or otherwise permanently affixed to the hull;*
  - .2 *be of a contrasting colour to the hull; and*
  - .3 *where the marks are bonded to the hull provision shall be made to replace the marks, in the event of bond line failure, with the vessel afloat.*
- 12.4.9 The subdivision and load line assigned and marked shall be recorded in the Passenger Yacht Safety Certificate.
- 12.4.10 A ship shall in no case be so loaded that when it is in salt water the subdivision and load line mark is submerged.
- 12.4.11 *In applying this section due regard shall also be had to the requirement for draft marks as set out in section 11.16.17.*
- 12.5 Mark of Assigning Authority**
- 12.5.1 The mark of the Authority by whom the load lines are assigned may be indicated alongside the load line ring above the horizontal line which passes through the centre of the ring, or above and below it and the 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.
- 12.5.2 The International Load Line Certificate shall not be delivered to the ship until the officer or surveyor acting under the provisions of Article 13 of the ILLC has certified that the marks are correctly and permanently indicated on the ship's sides.
- 12.6 Additional Equivalence Considerations**
- .1 *Openings to be kept closed at sea*
  - .2 *Enhanced Bilge Pumping capacity and additional bilge alarms*
  - .3 *Compliance with enhanced stability if not already a requirement (see Section 11.17)*
  - .4 *Provision of dorade boxes or baffle systems to prevent direct ingress of water*
  - .5 *Alternative ventilation for use in bad weather*
  - .6 *Consideration of downflooding angle and reduced risk of green sea loads, i.e. protected position*
  - .7 *Enhanced survey inspection regime*
  - .8 *Operational Limitations*
  - .9 *Consideration shall be given to the provision of operational instructions to the Master as to when deadlights shall be applied to portlights.*

## **13 LIFESAVING APPLIANCES AND ARRANGEMENTS**

### **13.1 Application**

13.1.1 SOLAS regulations *referenced in this Section apply to ships to which this Code applies in the same way as they apply to passenger ships.*

### **13.2 General Requirements**

13.2.1 Except as provided in 13.2.5 and 13.2.6, life-saving appliances, communication equipment and arrangements required by this Section shall be approved by the BMA.

13.2.2 Before giving approval to life-saving appliances and arrangements, the BMA shall ensure that such life-saving appliances and arrangements-

- .1 are tested, to confirm that they comply with the requirements of this Section and the LSA Code; or
- .2 have successfully undergone, to the satisfaction of the BMA, tests which are substantially equivalent to those specified.

13.2.3 Prior to giving approval to novel life-saving appliances or arrangements, the BMA shall ensure that such appliances or arrangements-

- .1 provide safety standards at least equivalent to the requirements of this Section and the LSA Code and have been evaluated and tested in accordance with the recommendations of the IMO; or
- .2 have successfully undergone, an engineering analysis, evaluation and approval in accordance with section 13.25.

13.2.4 Procedures adopted by the BMA for approval shall also include the conditions whereby approval would continue or would be withdrawn.

13.2.5 Prior to accepting life-saving appliances and arrangements that have not been previously approved by the BMA, the BMA shall be satisfied that life-saving appliances and arrangements comply with the requirements of this Section and the LSA Code.

13.2.6 Life-saving appliances required by this Section for which detailed specifications are not included in the LSA Code shall be to the satisfaction of the BMA.

### **13.3 Stowage of Survival Craft**

13.3.1 Each survival craft shall be stowed:

- .1 so that neither the survival craft nor its stowage arrangements shall interfere with the operation of any other survival craft or rescue boat at any other launching station;
- .2 as near the water surface as is safe and practicable and, in the case of a survival craft other than a liferaft intended for throw over board launching, in such a position that the survival craft in the embarkation position is not less than 2 metres above the waterline with the ship in the fully loaded condition under

unfavourable conditions of trim of up to 10° and listed up to 20° either way, or to the angle at which the ship's weatherdeck edge becomes submerged, whichever is less;

- .3 in a state of continuous readiness so that two crew members can carry out preparations for embarkation and launching in less than 5 minutes;
- .4 fully equipped as required by this Section and the LSA Code;
- .5 as far as practicable, in a secure and sheltered position and protected from damage by fire and explosion; and
- .6 in the case of survival craft for which approved launching devices are required, as close to accommodation and service spaces as possible.

13.3.2 Lifeboats for lowering down the ship's side shall be stowed as far forward of the propeller as practicable and where appropriate, the ship shall be so arranged that lifeboats, in their stowed positions, are protected from damage by heavy seas.

13.3.3 Lifeboats shall be stowed attached to launching appliances.

13.3.4 Every liferaft or group of liferafts, as the case may be, shall be stowed-

- .1 with its painter permanently attached to the ship;
- .2 with a float-free arrangement complying with the requirements of paragraph 4.1.6 of the LSA Code so that each floats free and, if inflatable, inflates automatically when the ship sinks; and
- .3 so as to permit manual release of one raft or container at a time from their securing arrangements.

13.3.5 Davit-launched liferafts shall be stowed within reach of the lifting hooks, unless some means of transfer is provided which is not rendered inoperable within the limits of 10° trim and 20° list either way, or by ship motion or power failure.

**13.4 Stowage of Rescue Boats**

13.4.1 Rescue boats shall be stowed-

- .1 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;
- .2 in a position suitable for launching and recovery;
- .3 so that neither the rescue boat nor its stowage arrangements shall interfere with the operation of any survival craft at any other launching station;
- .4 if it is also a lifeboat, in compliance with the requirements of section 13.3; and
- .5 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.

**13.5 Marine Evacuation Systems**

13.5.1 Where Marine Evacuation Systems (MES) are installed, all such systems shall be of an approved type in compliance with LSA Code and comply with the following requirements:

- .1 Due consideration shall be given to the location and protection of MES stowage (a)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.
- .2 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 by Part 1, paragraph 12.6.1 of the LSA Code and in accordance with 13.2.3.
- .3 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 13.5.2 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.

13.5.2 Stowage of Marine Evacuation Systems shall comply with the following:

- .1 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.
- .2 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 13.5.1.3.
- .3 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.
- .4 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.
- .5 Where appropriate, the ship shall be so arranged that the Marine Evacuation Systems in their stowed positions are protected from damage by heavy seas.

13.5.3 Functional Requirements for Marine Evacuation Systems

- .1 MES shall be arranged such that liferafts may be securely attached to the platform and released from the platform by a person either in the liferaft or on the platform;
- .2 MES shall be capable of being deployed from the ship under unfavourable conditions of trim of up to 10° and list of up to 20° either way;

- .3 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 11.9
- .4 Any part requiring maintenance by the ship's crews shall be readily accessible and easily maintained.
- .5 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.
- .6 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. stowed with a float-free arrangement complying with the requirements of paragraph 4.1.6 of the LSA Code so that each floats free 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.

**13.6 Survival Craft Launching and Recovery Arrangements**

- 13.6.1 Subject to 13.6.2, launching and embarkation appliances complying with the requirements of section 6.1 of the LSA Code shall, unless expressly provided otherwise, be provided for all survival craft except those which are provided for use in conjunction with a marine evacuation system, complying with the requirements of section 6.2 of the LSA Code and stowed for launching directly from the stowed position under unfavourable conditions of trim of up to 10° and list of up to 20° either way.
- 13.6.2 13.6.1 shall not apply to vessels carrying survival craft and launching and embarkation appliances provided in accordance with the full provisions of Chapter III of SOLAS.
- 3.6.3 Each lifeboat shall be provided with an appliance which is capable of launching and recovering the lifeboat and in addition there shall be provision for hanging-off the lifeboat to free the release gear for maintenance.

- 13.6.4 Launching and recovery arrangements shall be such that the appliance operator on the ship is able to observe the survival craft at all times during launching and for lifeboats during recovery.
- 13.6.5 Only one type of release mechanism shall be used for similar survival craft carried on board the ship.
- 13.6.6 Preparation and handling of survival craft at any one launching station shall not interfere with the prompt preparation and handling of any other survival craft or rescue boat at any other station.
- 13.6.7 Falls, where used, shall be long enough for the survival craft to reach the water with the ship in its lightest seagoing condition, under unfavourable conditions of trim of up to 10° and list of up to 20° either way.
- 13.6.8 During preparation and launching, the survival craft, its launching appliance, and the area of water into which it shall be launched shall be adequately illuminated by lighting supplied from the emergency source of electrical power required by Regulation 42 of Chapter II-1 of SOLAS.
- 13.6.9 Means shall be available to prevent any discharge of water onto survival craft during abandonment.
- 13.6.10 If there is a danger of the survival craft being damaged by the ship's stabiliser wings, means shall be available, powered by an emergency source of energy, to bring the stabiliser wings inboard. Indicators operated by an emergency source of energy shall be available on the navigation bridge to show the position of the stabilizer wings.
- 13.6.11 If partially enclosed lifeboats complying with the requirements of section 4.5 of the LSA Code are carried, a davit span shall be provided, fitted with not less than two lifelines of sufficient length to reach the water with the ship in its lightest seagoing condition, under unfavourable conditions of trim of up to 10° and list of up to 20° either way.
- 13.6.12 *Survival craft and rescue boat launching appliances may deviate from the requirement of section 6.1.1.3 of the LSA Code, by permitting the use of stored electrical power, under the following provisions:*
- .1 All other applicable elements of the LSA Code and the Code are met;
  - .2 Each source of stored electrical power shall:
    - i. serve one launching appliance only during normal use;
    - ii. be configured to only be utilised by the launching appliance during an emergency, after the vessel's main and emergency power sources have failed;
    - iii. be suitable for use in the marine environment with appropriate rating given the location and redundancy of components;

- iv. be located in a space independent from any other sources of stored electrical power, protected from the effects of fire and flooding and in accordance with the vessel's Recognised Organisation rules;
  - v. be located in a space adjacent to the launching appliance it serves;
  - vi. have capacity to power the launching appliance during deployment of all the survival craft or rescue boat it serves twice (including the deployment of any covers, bulwarks or similar required for the operation of the appliance);
  - vii. be independently monitored and alarmed on the bridge, engine control room and safety centre; independently charged from the vessel's main and emergency power sources; and be able to power the launching appliance on the opposite side of the vessel if the local power required by .13.6.12.2.i fails.
- .3 The cabling serving each source of stored electrical power, and the cabling serving the launching appliance from the source of stored electrical power shall:
- i. be protected from the effects of fire and flooding throughout their length;
  - ii. not to be led through high risk spaces; and
  - iii. be independently run from the charging, cross powering, and powering cables.
- .4 Where a hydraulic system is driven by the source of stored electrical power, this shall:
- i. serve one launching appliance only;
  - ii. be located in a space independent from any other hydraulic systems serving launching appliances, protected from the effects of fire and flooding;
  - iii. be located in a space adjacent to the launching appliance it serves;
  - iv. be able to cross power the hydraulic system serving the launching appliance on the opposite side of the vessel; and
  - v. the stored electrical power shall be in compliance with section 13.6.12.2.
- .5 The maintenance of each source of stored electrical power shall:
- i. be in accordance with the manufacturer's instructions;
  - ii. be addressed in the vessels Safety Management System in accordance with the ISM Code section 10.3;
  - iii. include testing in accordance with either IEEE 450/1188/1106 as appropriate or another internationally recognised standard; and
  - iv. not exceed the service life given by the manufacturer.
- .6 Discharge capacity test shall be completed at delivery and as required thereafter in-line with the manufacturer's instructions;
- .7 A quantitative analysis shall be carried out as a part of a detailed assessment of all critical components to the acceptance of the BMA. As an example, the following may be performed:
- i. Quantitative analysis of fire risk within a space, supplemented by fire engineering analysis and/or fire testing where necessary (e.g., to assess consequences of a fire casualty on a system or system component);

- ii. Failure Mode Effect Analysis (FMEA) of a system or system component analyses in accordance with standard IEC 60812, *Analysis techniques for system reliability – Procedure for failure mode and effects analysis (FMEA)* or Annex 4 of the IMO High Speed Craft Code (Procedures for Failure Mode and Effects Analysis), would be acceptable; or
- iii. Detailed analysis of possibility of flooding of internal watertight compartments and of consequences of flooding on system components, given the location of the compartment and arrangement of piping within the compartment.

**13.7 Rescue Boat Embarkation, Launching and Recovery Arrangements**

- 13.7.1 The rescue boat embarkation and launching arrangements shall be such that the rescue boat can be boarded and launched in the shortest possible time.
- 13.7.2 If the rescue boat is one of the ship’s survival craft, the embarkation arrangements and launching station shall comply with the requirements of Sections 13.14 and 13.15.
- 13.7.3 Launching arrangements shall comply with the requirements of section 7.6, provided that all rescue boats shall be capable of being launched, where necessary utilising painters, with the ship making headway at speeds up to 5 knots in calm water.
- 13.7.4 Recovery time of the rescue boat shall be not more than 5 minutes in moderate sea conditions when loaded with its full complement of persons and equipment and where the rescue boat is also a lifeboat, this recovery time shall be possible when loaded with its lifeboat equipment and the approved rescue boat complement of at least six persons.
- 13.7.5 Rescue boat embarkation and recovery arrangements shall allow for safe and efficient handling of a stretcher case and foul weather recovery strops shall be provided for safety if heavy fall blocks constitute a danger.
- 13.7.6 *Each rescue boat carried shall be served by its own launching appliance*

**13.8 Survival Craft and Rescue Boat Embarkation Arrangements**

- 13.8.1 Survival craft embarkation arrangements shall be designed for-
  - .1 all lifeboats to be boarded and launched either directly from the stowed position or from an embarkation deck but not both; and
  - .2 davit-launched liferafts to be boarded and launched from a position immediately adjacent to the stowed position or from a position to which, in compliance with the requirements of section 13.3.5, the liferaft is transferred prior to launching.
- 13.8.2 Rescue boat arrangements shall be such that the rescue boat can be boarded and launched directly from the stowed position with the number of persons assigned to crew the rescue boat on board.



13.8.3 Notwithstanding the requirements of 13.8.1.1, if the rescue boat is also a lifeboat and the other lifeboats are boarded and launched from an embarkation deck, the arrangements shall be such that the rescue boat can also be boarded and launched from the embarkation deck.

13.8.4 The stowage height of a survival craft shall take into account the requirements of section 13.3.1.2, the escape provisions of Section 6.11, the size of the ship, and the weather conditions likely to be encountered in the vessel's intended area of operation; for davit-launched survival craft, the height of the davit head with the survival craft in embarkation position, shall, as far as practicable, not exceed 15 metres to the waterline when the ship is in its lightest seagoing condition.

**13.9 Communications**

*VHF Radiotelephone Apparatus*

13.9.1 At least 3 two-way VHF radiotelephone apparatus shall be provided on every ship which shall conform to performance standards not inferior to those adopted by the IMO<sup>29</sup>.

*Search and Rescue Locating Device*

13.9.2 At least one search and rescue locating device shall be carried on each side of every ship in accordance with the following provisions-

- .1 the search and rescue locating device shall be stowed in such locations that they can be rapidly placed in any survival craft or, alternatively, one transponder shall be stowed in each survival craft;
- .2 one of the search and rescue locating device may be the search and rescue locating device required by SOLAS IV/7.1.3; and
- .3 the search and rescue locating device shall conform to performance standards not inferior to those adopted by the IMO<sup>30</sup>

*Distress Flares*

13.9.3 Not less than 12 rocket parachute flares, complying with the requirements of section 3.1 of the LSA Code, shall be carried and shall be stowed on or near the navigation bridge.

*On board Communications and Alarm Systems*

13.9.4 An emergency means comprised of either fixed or portable equipment or both shall be provided for two-way communications between emergency control stations, muster and embarkation stations and strategic positions on board.

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<sup>29</sup> Refer to the Performance standards for survival craft two-way VHF radiotelephone apparatus, adopted by the IMO by Resolution A.809(19), as it may be amended, annex 1 or annex 2 as applicable.

<sup>30</sup> Refer to the Recommendation on performance standards for survival craft radar transponders for use in search and rescue operations, adopted by the IMO by resolution MSC.247(83) (A.802(19)), as amended) and the Recommendation on performance standards for survival craft AIS Search and Rescue transmitter (AIS SART), adopted by the IMO by resolution MSC.246(83).

*General Emergency Alarm*

- 13.9.5 A general emergency alarm system, complying with paragraph 7.2.1 of the LSA Code and with the following provisions, shall be provided on the navigation bridge and shall be used for summoning passengers and crew to muster stations and to initiate the actions included in the muster list-
- .1 the system shall be supplemented by either a public address system or other suitable means of communication;
  - .2 entertainment sound systems shall automatically be turned off when the general emergency alarm system is activated;
  - .3 the general emergency alarm system shall be audible throughout the ship and on all open decks; and
  - .4 on ships fitted with a marine evacuation system communication between the embarkation station and the platform or the survival craft shall be ensured.

*Public Address System*

- 13.9.6 All ships shall be fitted with a public address system in compliance with paragraph 7.2.1 of the LSA Code which shall-
- .1 be clearly audible above the ambient noise in all spaces, as prescribed by paragraph 7.2.2.1 of the LSA Code;
  - .2 be provided with an override function controlled from one location on the navigation bridge and such other places on board as the BMA deems necessary, so that all emergency messages shall be broadcast if any loudspeaker in the spaces concerned has been switched off, its volume has been turned down or the public address system is used for other purposes;
  - .3 have at least two loops which shall be sufficiently separated throughout their length and have two separate and independent amplifiers;
  - .4 be connected to the emergency source of electrical power required by Regulation 42.2.2 of Chapter II-1, Part D, of SOLAS; and
  - .5 be approved by the BMA having regard to the recommendations adopted by the IMO<sup>31</sup>.

**13.10 Personal Life Saving Appliances**

*Lifebuoy*

13.10.1 *Ships shall carry not less than the number of lifebuoy prescribed in the following table:*

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<sup>31</sup> Refer to MSC/Circ.808, Recommendation on performance standards for public address systems on passenger ships, including cabling

LIFEBUOYS AND ATTACHMENTS TO BE CARRIED	Gross Tonnage of Ship		
	Under 3,000	3,000 to 10,000	10,000 and above
Total minimum number of lifebuoys	8	12	18
Minimum number of lifebuoys to be fitted with self-igniting lights (LSA Code par.2.1.2)	4	6	9
Minimum number of lifebuoys provided with self-igniting lights and self-activating smoke signals (LSA Code par.2.1.3)	2	2	2
Minimum number of lifebuoys to be provided with buoyant line (LSA Code par.2.1.4)	2	2	2

13.10.2 *Lifebuoys which are fitted with self-igniting lights or with self-igniting lights and self-activating smoke signals shall not also be fitted with a line.*

13.10.3 *The lifebuoys fitted with self-igniting lights and with self-activating smoke signals shall capable of quick release from the navigation bridge.*

13.10.4 At least one lifebuoy on each side of the ship shall be fitted with a buoyant lifeline complying with the requirements of paragraph 2.1.4 of the LSA Code equal in length to not less than twice the height at which it is stowed above the waterline in the lightest seagoing condition, or 30 metres, whichever is the greater.

13.10.5 Lifebuoys shall be-

- .1 in compliance with paragraph 2.1.1 of the LSA Code; and
- .2 so distributed as to be readily available on both sides of the ship and as far as practicable on all open decks extending to the ship's side; at least one shall be placed in the vicinity of the stern; and
- .3 so stowed as to be capable of being rapidly cast loose, and not permanently secured in any way.

13.10.6 Each lifebuoy shall be marked in block capitals of the Roman alphabet with the name and port of registry of the ship on which it is carried.

*Lifejackets*

13.10.7 A lifejacket complying with the requirements of paragraph 2.2.1 or 2.2.2 of the LSA Code shall be provided for every person on board the ship and, in addition-

- .1 a number of lifejackets suitable for children equal to at least 10% of the number of passengers on board shall be provided or such greater number as may be required to provide a lifejacket for each child;

- .2 a sufficient number of lifejackets shall be carried for persons on watch and for use at remotely located survival craft stations and the lifejackets carried for persons on watch shall be stowed on the bridge, in the engine control room and at any other manned watch station, as the case may be;
  - .3 infant lifejackets shall be provided for each infant on board;
- 13.10.8 In addition to the lifejackets required by 13.10.7 an additional number of lifejackets for not less than 5% of the total number of persons onboard shall be carried and these lifejackets shall be stowed in conspicuous places on deck or at muster stations.
- 13.10.9 Lifejackets shall be so placed as to be readily accessible and their position shall be plainly indicated and where, due to the particular arrangements of the ship, the lifejackets provided in compliance with the requirements of 13.10.7 may become inaccessible, alternative provisions shall be made to the satisfaction of the BMA which may include an increase in the number of lifejackets to be carried.
- 13.10.10 Where lifejackets for passengers are stowed in staterooms which are located remotely from direct routes between public spaces and muster stations, the additional lifejackets for these passengers required under 13.10.9, shall be stowed either in the public spaces, the muster stations, or on direct routes between them provided that lifejackets shall be stowed so that their distribution and donning does not impede orderly movement to muster stations and survival craft embarkation stations.
- 13.10.11 The lifejackets used in totally enclosed lifeboats shall not impede entry into the lifeboat or seating, including operation of the seat belts in the lifeboat.

### *Immersion Suits*

- 13.10.12 *Restricted Passenger Charter Yacht and Passenger Yacht 2 (PY-L2) vessels need not carry immersion suits*
- 13.10.13 *For all other yachts which do not carry lifeboats an immersion suit<sup>32</sup> in compliance with paragraph 2.3 of LSA Code, of an appropriate size, shall be provided for every person on board. Immersion suits need not be required if the ship is constantly engaged on voyages in warm climates<sup>33</sup> where, in the opinion of the BMA, immersion suits are unnecessary.*
- 13.10.14 *Immersion suits shall be so placed as to be readily accessible and their position shall be plainly indicated.*

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<sup>32</sup> Refer to the Recommendation on performance standards for survival craft radar transponders for use in search and rescue operations, adopted by the IMO by resolution MSC.247(83) (A.802(19)), as amended) and the Recommendation on performance standards for survival craft AIS Search and Rescue transmitter (AIS SART), adopted by the IMO by resolution MSC.246(83)

<sup>33</sup> Refer to the Guidelines for assessment of thermal protection (MSC/Circ.1046)

**13.11 Muster List and Emergency Instructions**

- 13.11.1 Clear instructions on the procedures to be followed in the event of an emergency shall be provided for every person on board and these instructions shall be drawn up in the language or languages required by the ship's flag State and in the English language.
- 13.11.2 Muster lists and emergency instructions complying with the requirements of this section shall be exhibited in conspicuous places throughout the ship including the navigation bridge, engine-room and crew accommodation spaces.
- 13.11.3 Illustrations and instructions in appropriate languages shall be available in passenger cabins and be conspicuously displayed at muster stations and other passenger spaces to inform passengers of-
- .1 their muster station;
  - .2 the essential actions they shall take in an emergency; and
  - .3 the method of donning lifejackets.
- 13.11.4 The muster list shall specify-
- .1 details of the general emergency alarm and public address system prescribed by sections 13.9.5 and 13.9.6;
  - .2 the action to be taken by crew and passengers when this alarm is sounded; and
  - .3 how the order to abandon ship shall be given.
- 13.11.5 There shall be in place procedures in place for locating and rescuing passengers trapped in their staterooms
- 13.11.6 The muster list shall show the duties assigned to the different members of the crew including:
- .1 closing of the watertight doors, fire doors, valves, scuppers, sidescuttles, skylights, portholes and other similar openings in the ship;
  - .2 equipping of the survival craft and other life-saving appliances;
  - .3 preparation and launching of survival craft;
  - .4 general preparation of other life-saving appliances;
  - .5 muster of passengers;
  - .6 use of communication equipment;
  - .7 manning of fire parties assigned to deal with fires; and
  - .8 special duties assigned in respect to the use of fire-fighting equipment and installations.
- 13.11.7 The muster list shall also specify-
- .1 which officers are assigned to ensure that life-saving and fire appliances are maintained in good condition and are ready for immediate use;
  - .2 substitutes for key persons who may become disabled, taking into account that different emergencies may call for different actions; and

- .3 the duties assigned to members of the crew in relation to passengers in case of emergency, which duties shall include-
  - i. warning the passengers;
  - ii. seeing that they are suitably clad and have donned their lifejackets correctly;
  - iii. assembling passengers at muster stations;
  - iv. keeping order in the passageways and on the stairways and generally controlling the movements of the passengers; and
  - v. ensuring that a supply of blankets is taken to the survival craft.

13.11.8 The muster list shall be prepared before the ship proceeds to sea and if any changes in the crew subsequently take place which necessitate an alteration in the muster list, the master shall either revise the list or prepare a new list.

13.11.9 The format of the muster list used on passenger ships shall be approved by the BMA.

**13.12 Operating Instructions**

13.12.1 Posters or signs shall be provided on or in the vicinity of survival craft and their launching controls and shall-

- .1 illustrate the purpose of controls and the procedures for operating the appliance and give relevant instructions or warnings;
- .2 be easily seen under emergency lighting conditions; and
- .3 use symbols in accordance with the recommendations of the IMO<sup>34</sup>

**13.13 Manning of Survival Craft and Supervision**

13.13.1 There shall be a sufficient number of trained persons on board for mustering and assisting untrained persons.

13.13.2 There shall be a sufficient number of crew members, who may be deck officers or other appropriately certificated crew members, on board for operating the survival craft and launching arrangements required for abandonment by the total number of persons on board.

13.13.3 A deck officer or certificated person<sup>35</sup> shall be placed in charge of each survival craft to be used provided that the BMA, having due regard to the nature of the voyage, the number of persons onboard and the characteristics of the ship, may permit persons practised in the handling and operation of liferafts to be placed in charge of liferafts in lieu of persons

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<sup>34</sup> Refer to the Symbols related to life-saving appliances and arrangements adopted by the IMO by Resolution A.760(18), as amended by resolution MSC.82(70)

<sup>35</sup> This means a person who holds a certificate of proficiency in survival craft issued under the authority of, or recognised as valid by, the Administration in accordance with the requirements of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, in force; or a person who holds a certificate issued or recognised by the Administration of a State not a Party to that Convention for the same purpose as the convention certificate

qualified as above and in the case of lifeboats a second-in-command shall also be nominated.

13.13.4 The person in charge of each of the survival craft shall have a list of the survival craft crew and shall ensure that the crew under his command are acquainted with their duties and in the case of lifeboats the second-in-command shall also have a list of the lifeboat crew.

13.13.5 Every motorised survival craft shall have a person assigned who is capable of operating the engine and carrying out minor adjustments.

13.13.6 The master shall ensure the equitable distribution of appropriately certificated crew members, referred to in 13.13.1, 13.13.2 and 13.13.3, among the ship's survival craft.

#### **13.14 Survival Craft Muster Stations and Embarkation Arrangements**

13.14.1 Lifeboats and liferafts for which approved launching appliances are required shall be stowed as close to accommodation and service spaces as possible.

13.14.2 Muster stations shall-

- .1 be provided in the vicinity of and shall permit ready access to the embarkation stations;
- .2 have sufficient clear deck space to accommodate all persons (passengers and crew) assigned to muster at that station, with at least 0.35m<sup>2</sup> per person; and
- .3 have ample room for the marshalling and instruction of passengers.

13.14.3 Muster and embarkation stations shall-

- .1 be readily accessible from accommodation and work areas; and
- .2 be adequately illuminated by lighting supplied from the emergency source of electrical power required by Regulation 42 of Chapter II-1, Part D, of SOLAS.

13.14.4 Alleyways, stairways and exits giving access to the muster and embarkation stations shall be adequately lighted and such lighting shall also be capable of being supplied by the emergency source of electrical power by Regulation 42 of Chapter II-1, Part D, of SOLAS; also in addition to and as part of the markings required under section 14.10.18 routes to muster stations shall be indicated with the muster station symbol, intended for that purpose, in accordance with the recommendations of the IMO<sup>36 37</sup>.

13.14.5 Davit-launched survival craft muster and embarkation stations shall be so arranged as to enable stretcher cases to be placed in survival craft.

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<sup>36</sup> Refer to the Symbols related to life-saving appliances and arrangements adopted by the IMO by Resolution A.760(18), as amended by MSC.82(80), and to the Guidelines for the evaluation, testing and application of low-location lighting on passenger ships adopted by the IMO by Resolution A.752(18)

<sup>37</sup> Refer to the Revised Guidelines for Passenger Ship Safety Instructions MSC/Circ.699

13.14.6 Subject to 13.14.7 and 13.14.8, an embarkation ladder complying with paragraph 6.1.6 of the LSA Code, extending, in a single length, from the deck to the waterline in the lightest seagoing condition under unfavourable conditions of trim of up to 10° and a list of up to 20° either way shall be provided at each embarkation station or at every two adjacent embarkation stations for survival craft launched down the side of the ship.

13.14.7 The BMA may permit such ladders to be replaced by approved devices to afford access to the survival craft when waterborne, in which case there shall be at least one embarkation ladder on each side of the ship.

13.14.8 Where necessary, means shall be provided for bringing the davit-launched survival craft against the ship's side and holding them alongside so that persons can be safely embarked.

**13.15 Launching Stations**

13.15.1 Launching stations shall be in such positions as to ensure safe launching having particular regard to clearance from the propeller and steeply overhanging portions of the hull and so that, as far as possible, survival craft, can be launched down the straight side of the ship. If positioned forward, they shall be located abaft the collision bulkhead in a sheltered position and, in this respect; the BMA shall give special consideration to the strength of the launching appliance.

**13.16 Line Throwing Appliance**

13.16.1 A line-throwing appliance complying with the requirements of section 7.1 of the LSA Code shall be provided.

**13.17 Emergency Training and Drills**

13.17.1 See section 29 for requirements

**13.18 Frequency of Drills and Involvement of Crew and Passenger**

13.18.1 An abandon ship drill and fire drill shall take place weekly.

13.18.2 The entire crew need not be involved in every drill, but each crew member shall participate in an abandon ship drill and a fire drill each month.

13.18.3 Passengers shall be strongly encouraged to attend these drills.

**13.19 Survival Craft and Rescue Boats to be Carried**

*Survival Craft*

13.19.1 Passenger Yachts to which this Code applies shall carry survival craft in accordance with Appendix 1.



- 13.19.2 Where lifeboats are required in accordance with Appendix 1, a Passenger Yacht shall carry:
- .1 subject to 13.19.2.2 and 13.19.2.3, partially or totally enclosed lifeboats complying with paragraph 4.5 and 4.6 of the LSA Code on each side of such aggregate capacity as shall accommodate not less than 50% of the total number of persons on board;
  - .2 the BMA may permit the substitution of lifeboats by inflatable or rigid liferafts of equivalent total capacity provided that there shall never be less than sufficient lifeboats on each side of the ship to accommodate 37.5% of the total number of persons on board and that the liferafts, complying with paragraph 4.2 and 4.3 of the LSA Code, shall be served by launching appliances equally distributed on each side of the ship;
  - .3 A passenger Yacht of less than 500GT which carries less than 200 persons may carry 300% (150% on each side) inflatable or rigid liferafts complying with sections 4.2 or 4.3 of Chapter IV of the LSA Code providing are served by launching appliances equally distributed on each side of the ship and other applicable provisions of the relevant Conventions are complied with; and
  - .4 in addition, inflatable or rigid liferafts, complying with paragraph 4.2 and 4.3 of the LSA Code, of such aggregate capacity as shall accommodate at least 25% of the total number of persons on board or sufficient liferafts such that in the event of any one survival craft being lost or rendered unserviceable, sufficient aggregate capacity remains on each side of the ship to accommodate 50% of the total number of persons on board, whichever is the greater;
  - .5 the liferafts in 13.19.2.3 shall be served by at least one launching appliance on each side which may be those provided in compliance with the requirements of 13.19.2.2 or equivalent approved appliances capable of being used on both sides.
- 13.19.3 For vessels carrying Davit Launched Life Rafts (DLLRs) or a combination of DLLRs and Marine Evacuation Systems (MESs) the following shall apply:
- .1 *MESs are not permitted as the sole means of abandonment and in this regard the aggregate capacity of DLLRs each side of the ship shall be sufficient for not less than 100% of the total persons on board;*
  - .2 in the event of the loss of any one survival craft there shall be at least 100% capacity remaining on either side; and
  - .3 in all cases dry shod evacuation shall be required;
  - .4 DLLR are permitted as the sole means of abandonment.
- 13.19.4 Any Passenger Yacht to which this Code applies which operates in the Polar Regions shall carry life-saving appliances in accordance with the IMO Guidelines for Polar Regions in accordance with section 3.9.

*Rescue Boats*

13.19.5 Ships of 500GT and above shall carry at least one rescue boat complying with paragraph 5.1 of the LSA Code on each side of the ship.

13.19.6 Ships of less than 500GT shall carry at least one rescue boat complying with paragraph 5.1 of the LSA Code.

13.19.7 A lifeboat may be accepted as a rescue boat provided it also complies with the requirements for a rescue boat.

**13.20 Time to Launch Survival Craft**

13.20.1 All survival craft required to provide for abandonment by the total number of persons on board shall be capable of being launched with their full complement of persons and equipment within a period of 30 minutes from the time the abandon ship signal is given and after all persons have been assembled, with lifejackets donned.

**13.21 Marshalling of Liferrafts**

13.21.1 The number of lifeboats and rescue boats that are carried on ships shall be sufficient to ensure that in providing for abandonment by the total number of persons on board not more than six liferafts need be marshalled by each lifeboat or rescue boat.

**13.22 Decision Support System for Masters**

13.22.1 All ships shall be provided with a decision support system for emergency management on the navigation bridge.

13.22.2 The system shall, as a minimum, consist of a printed emergency plan or plans<sup>38</sup>. All foreseeable emergency situations shall be identified in the emergency plan or plans, including, but not limited to, the following main groups of emergencies-

- .1 fire;
- .2 damage to ship;
- .3 pollution;
- .4 unlawful acts threatening the safety of the ship and the security of its passengers and crew;
- .5 personnel accidents; and
- .6 emergency assistance to other ships.

13.22.3 The emergency procedures established in the emergency plan or plans shall provide decision support to masters for handling any combination of emergency situations.

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<sup>38</sup> Refer to the Guidelines for a structure of an integrated system of contingency planning for shipboard emergencies adopted by the IMO by resolution A.852(20)

- 13.22.4 The emergency plan or plans shall have a uniform structure and be easy to use.
- 13.22.5 Where applicable, the actual loading condition as calculated for the ship's voyage stability shall be used for damage control purposes.
- 13.22.6 In addition to the printed emergency plan or plans, the BMA may also accept the use of a computer-based decision support system on the navigation bridge which provides all the information contained in the emergency plan or plans, procedures, checklists, etc., which is able to present a list of recommended actions to be carried out in foreseeable emergencies.

**13.23 Information on Passengers**

- 13.23.1 Every ship shall have in place a system for counting all persons on board prior to departure. The system for counting all persons on board shall be approved by the BMA.
- 13.23.2 Details of persons who have declared a need for special care or assistance in emergency situations shall be recorded and communicated to the master prior to departure.
- 13.23.3 In addition, the names and gender of all persons on board, distinguishing between adults, children and infants shall be recorded for search and rescue purposes.
- 13.23.4 The information required by this section shall be kept ashore and made readily available to search and rescue services when needed.

**13.24 Recovery of persons from the water**

- 13.24.1 All ships shall have ship-specific plans and procedures for recovery of persons from the water, taking into account the guidelines developed by the IMO<sup>39</sup>. The plans and procedures shall identify the equipment intended to be used for recovery purposes and measures to be taken to minimize the risk to shipboard personnel involved in recovery operations.

**13.25 Alternative Design and Arrangements**

- 13.25.1 *Vessels may follow Section 1.10 on Alternative Design and Arrangements for this section as allowed by SOLAS III Regulation 38.*

**13.26 Additional Equivalence Considerations**

- 13.26.1 None

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<sup>39</sup> Refer to the Guidelines for the development of plans and procedures for recovery of persons from the water (MSC.1/Circ.1447)

## 14 FIRE SAFETY & STRUCTURAL FIRE PROTECTION

### 14.1 Fire Safety Objectives and Functional Requirements

#### *Fire Safety Objectives*

14.1.1 The fire safety objectives of this Section are to:

- .1 prevent the occurrence of fire and explosion;
- .2 reduce the risk to life caused by fire;
- .3 reduce the risk of damage caused by fire to the ship and the environment;
- .4 contain, control and suppress fire and explosion in the compartment of origin;  
and
- .5 provide adequate and readily accessible means of escape for passengers and crew.

#### *Functional Requirements*

14.1.2 In order to achieve the fire safety objectives set out in 14.1.1, the following functional requirements are embodied in the paragraphs of this section as appropriate:

- .1 division of the ship into main vertical and horizontal zones by thermal and structural boundaries;
- .2 separation of accommodation spaces from the remainder of the ship by thermal and structural boundaries;
- .3 restricted use of combustible materials;
- .4 detection of any fire in the zone of origin;
- .5 containment and extinction of any fire in the space of origin;
- .6 protection of means of escape and access for firefighting; and
- .7 ready availability of fire-extinguishing appliances (see section 15).

#### *Achievement of the Fire Safety Objectives*

14.1.3 The fire safety objectives set out in 14.1.1 shall be achieved by ensuring compliance with the prescriptive requirements specified in this Section, or by alternative design and arrangements which comply with section 14.18 and a ship shall be considered to meet the functional requirements set out in 14.1.2 and to achieve the fire safety objectives set out in 14.1.1 when either:

- .1 the ship's design and arrangements, as a whole, comply with the relevant prescriptive requirements in this Section;
- .2 the ship's design and arrangements, as a whole, have been reviewed and approved in accordance with section 14.18; or
- .3 part(s) of the ship's design and arrangements have been reviewed and approved in accordance with section 14.18 and the remaining parts of the ship comply with the relevant prescriptive requirements in this Section.

**14.2 Probability of Ignition***Purpose*

- 14.2.1 The purpose of this paragraph is to prevent the ignition of combustible materials or flammable liquids. For this purpose, the following functional requirements shall be met-
- .1 means shall be provided to control leaks of flammable liquids;
  - .2 means shall be provided to limit the accumulation of flammable vapours;
  - .3 the ignitability of combustible materials shall be restricted;
  - .4 ignition sources shall be restricted; and
  - .5 ignition sources shall be separated from combustible materials and flammable liquids.

*Arrangements for Oil Fuel, Lubrication Oil, other Flammable Oils and Gaseous Fuels*

- 14.2.2 The following limitations shall apply to the use of oil as fuel-
- .1 except as otherwise permitted by this paragraph, no oil fuel with a flashpoint of less than 60°C shall be used;
  - .2 in emergency generators, oil fuel with a flashpoint of not less than 43°C may be used;
  - .3 the use of oil fuel having a flashpoint of less than 60°C but not less than 43°C may be permitted (e.g. for feeding the emergency fire pump's engines and the auxiliary machines which are not located in the machinery spaces of category A) subject to the following-
    - i. fuel oil tanks except those arranged in double bottom compartments shall be located outside of machinery spaces of category A;
    - ii. provisions for the measurement of oil temperature are provided on the suction pipe of the oil fuel pump;
    - iii. stop valves and/or cocks are provided on the inlet side and outlet side of the oil fuel strainers; and
    - iv. pipe joints of welded construction or of circular cone type or spherical type union joint are applied as much as possible.
- 14.2.3 In a ship in which oil fuel is used, the arrangements for the storage, distribution and utilization of the oil fuel shall be such as to ensure the safety of the ship and persons onboard and shall at least comply with 14.2.4 through 14.2.22 inclusive.
- 14.2.4 As far as practicable, parts of the oil fuel system containing heated oil under pressure exceeding 0.18 N/mm<sup>2</sup> shall not be placed in a concealed position such that defects and leakage cannot readily be observed and the machinery spaces in way of such parts of the oil fuel system shall be adequately illuminated.
- 14.2.5 The ventilation of machinery spaces shall be sufficient under normal conditions to prevent accumulation of oil vapour.
- 14.2.6 Fuel oil, lubrication oil and other flammable oils shall not be carried in forepeak tanks.

- 14.2.7 The following provisions shall apply to the structure and location of oil fuel tanks-
- .1 as far as practicable, oil fuel tanks shall be part of the ship's structure and shall be located outside machinery spaces of category A;
  - .2 where oil fuel tanks, other than double bottom tanks, are necessarily located adjacent to or within machinery spaces of category A, at least one of their vertical sides shall be contiguous to the machinery space boundaries, and shall preferably have a common boundary with the double bottom tanks, and the area of the tank boundary common with the machinery spaces shall be kept to a minimum<sup>40</sup>; and
  - .3 where tanks are situated within the boundaries of machinery spaces of category A they shall not contain oil fuel having a flashpoint of less than 60°C. The use of free-standing oil fuel tanks shall be prohibited in category A machinery spaces.
- 14.2.8 No oil fuel tank shall be situated where spillage or leakage therefrom can constitute a fire or explosion hazard by falling on heated surfaces.
- 14.2.9 Oil fuel pipes, which, if damaged, would allow oil to escape from a storage, settling or daily service tank having a capacity of 500 litres and above situated above the double bottom, shall be provided with a remote means of closing as follows:
- .1 subject to 14.2.9.2 the tank 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;
  - .2 in the special case of deep tanks situated in any shaft or pipe tunnel or similar space, whilst valves on the tank shall be fitted, control in the event of fire may be effected by means of an additional valve on the pipe or pipes outside the tunnel or similar space, provided that if such an additional valve is fitted in the machinery space, it shall be operated from a position outside that space;
  - .3 the controls for remote operation of the valve for the emergency generator fuel tank shall be in a separate location from the controls for remote operation of other valves for tanks located in machinery spaces.
- 14.2.10 Safe and efficient means of ascertaining the amount of oil fuel contained in any oil fuel tank shall be provided.
- 14.2.11 Where sounding pipes are used-
- .1 they shall not terminate in any space where the risk of ignition of spillage from the sounding pipe might arise and in particular, they shall not terminate in passenger or crew spaces; and
  - .2 as a general rule they shall not terminate in machinery spaces provided that where the BMA considers that this requirement is impracticable, it may permit

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<sup>40</sup> Refer to *Unified interpretations of SOLAS chapter II-2 (MSC.1/Circ.1322)*.

termination of sounding pipes in machinery spaces on condition that all of the following requirements are met-

- i. an oil-level gauge is provided meeting the requirements of 14.2.12;
- ii. the sounding pipes terminate in locations remote from ignition hazards unless precautions are taken, such as the fitting of effective screens, to prevent the oil fuel in the case of spillage through the terminations of the sounding pipes from coming into contact with a source of ignition;
- iii. the terminations of the sounding pipes are fitted with self-closing blanking devices and with a small-diameter self-closing control cock located below the blanking device for the purpose of ascertaining, before the blanking device is opened, that oil fuel is not present; and
- iv. provisions are made so as to ensure that any spillage of oil fuel through the control cock involves no ignition hazard.

14.2.12 Other oil-level gauges may be used in place of sounding pipes provided such gauges shall not require penetration below the top of the tank and their failure or overfilling of the tanks shall not permit release of fuel.

14.2.13 The means prescribed in 14.2.12 which are acceptable to the BMA shall be maintained in the proper condition to ensure their continued accurate functioning in service.

14.2.14 Provisions shall be made to-

- .1 prevent overpressure in any oil tank or in any part of the oil fuel system, including the filling pipes served by pumps onboard; and
- .2 to ensure that air and overflow pipes and relief valves shall discharge to a position where there is no risk of fire or explosion from the emergence of oils and vapour and such pipes shall not lead into crew, machinery, passenger or similar spaces.

14.2.15 Oil fuel pipes and their valves and fittings shall conform to the following requirements-

- .1 they shall be of steel or other approved material provided that, subject to 14.2.15.2, restricted use of flexible pipes shall be permissible in positions where the BMA is satisfied that they are necessary;
- .2 flexible pipes permitted under 14.2.15.1, and their end attachments, shall be of approved fire-resisting materials of adequate strength and shall be constructed to the satisfaction of the BMA; and
- .3 where valves fitted to oil fuel tanks are subject to static pressure, steel or spheroidal-graphite cast iron may be accepted provided that ordinary cast iron valves may be used in piping systems where the design pressure is lower than 7 bar and the design temperature is below 60°C.

14.2.16 External high-pressure fuel delivery lines between the high-pressure fuel pumps and fuel injectors shall be protected with a jacketed piping system which-

- .1 shall incorporate an outer pipe into which the high-pressure fuel pipe is placed, forming a permanent assembly;

- .2 shall be capable of containing fuel from a high-pressure line failure; and
- .3 shall include a means for collection of leakages and be provided with an alarm in case of a fuel line failure.
- 14.2.17 Oil fuel lines shall-
- .1 not be located immediately above or near units of high temperature, including boilers, steam pipelines, exhaust manifolds, silencers or other equipment required to be protected as required by 14.2.21 and 14.2.22;
- .2 as far as practicable, be arranged so as to be far apart from hot surfaces, electrical installations or other sources of ignition;
- .3 be screened or otherwise suitably protected to avoid oil spray or oil leakage onto the sources of ignition; and
- .4 be arranged such that the number of joints in such piping systems shall be kept to a minimum.
- 14.2.18 Components of a diesel engine fuel system shall be designed considering the maximum peak pressure which shall be experienced in service, including any high-pressure pulses which are generated and transmitted back into the fuel supply and spill lines by the action of fuel injection pumps and connections within the fuel supply and spill lines shall be constructed having regard to their ability to prevent pressurized oil fuel leaks while in service and after maintenance.
- 14.2.19 In multi-engine installations which are supplied from the same fuel source, means of isolating the fuel supply and spill piping to individual engines shall be provided and such means of isolation shall not affect the operation of the other engines and shall be operable from a position not rendered inaccessible by a fire on any of the engines.
- 14.2.20 Where the BMA may permit the conveying of oil and combustible liquids through accommodation and service spaces, the pipes conveying oil or combustible liquids shall be of a material approved by the BMA having regard to the fire risk.
- 14.2.21 Surfaces with temperatures above 220°C which may be impinged as a result of a fuel system failure shall be properly insulated.
- 14.2.22 Precautions shall be taken to prevent any oil that may escape under pressure from any pump, filter or heater from coming into contact with heated surfaces.
- 14.2.23 The arrangements for the storage, distribution and utilisation of oil used in pressure lubrication systems shall be such as to ensure the safety of the ship and persons onboard and the arrangements made in machinery spaces of category A, and whenever practicable in other machinery spaces, shall at least comply with the provisions of 14.2.4, 14.2.8, 14.2.9, 14.2.10, 14.2.14, 14.2.15, 14.2.17, 14.2.21 and 14.2.22, provided that-



- .1 this does not preclude the use of sight-flow glasses in lubricating systems provided that they are shown by testing to have a suitable degree of fire resistance; and
- .2 sounding pipes may be authorised in machinery spaces and the requirements of 14.2.11.2.i and 14.2.11.2.iii need not be applied provided that that the sounding pipes are fitted with appropriate means of closure.
- 14.2.24 The provisions of 14.2.9 shall also apply to lubricating oil tanks having a capacity of 500 litres or more, storage tanks on which valves are closed during the normal operation mode of the ship, or where it is determined that an unintended operation of a quick-closing valve on the oil lubricating tank would endanger the safe operation of the main propulsion and essential auxiliary machinery.
- 14.2.25 The arrangements for the storage, distribution and utilisation of other flammable oils employed under pressure in power transmission systems, control and activating systems and heating systems shall-
- .1 be such as to ensure the safety of the ship and persons onboard;
- .2 shall be fitted with suitable oil collecting arrangements for leaks below hydraulic valves and cylinders;
- .3 where means of ignition are present, at least comply with the provisions of 14.2.8, 14.2.10, 14.2.17, 14.2.21, and 14.2.22, and with the provisions of 14.2.14 and 14.2.15 in respect of strength and construction.
- 14.2.26 *The arrangements for the storage, distribution and utilisation of fuels having a flashpoint of less than 60°C for use in vehicles and pleasure craft shall be such as to ensure the safety of the ship and persons onboard and such arrangements shall at least comply with the provisions of Section 33.5.*
- 14.2.27 In addition to the requirements of 14.2.2 to 14.2.26, the oil fuel and lubricating oil systems in a periodically unattended machinery space shall comply with the following-
- .1 where daily service oil fuel tanks are filled automatically, or by remote control, means shall be provided to prevent overflow spillages. Other equipment which treats flammable liquids automatically (e.g., oil fuel purifiers) which, whenever practicable, shall be installed in a special space reserved for purifiers and their heaters, shall have arrangements to prevent overflow spillages; and
- .2 where daily service oil fuel tanks or settling tanks are fitted with heating arrangements, a high temperature alarm shall be provided if the flashpoint of the oil fuel can be exceeded.
- 14.2.28 *Where 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 the fuel may entail, the safety of the ship and the persons*

*onboard is preserved and the installation shall be in accordance with recognised national or international standards acceptable to the BMA.*

- 14.2.29 *Storage lockers for gas cylinders shall be provided with-*
- .1 *effective ventilation;*
  - .2 *an outward-opening door accessible directly to the open deck;*
  - .3 *gas-tight boundaries, including doors and other means of closing any openings therein, which form boundaries between such lockers and adjoining spaces; and*
  - .4 *equipment and fittings which shall be certified as safe for the environment in which they are being used,*
- 14.2.30 *Spaces using gaseous fuel for heating, cooking or other purposes shall be provided with an effective power ventilation system which shall be in operation at all times when gas is being used in such spaces and means shall be provided on the navigation bridge to indicate any loss of the required ventilating capacity.*

*Miscellaneous Items of Ignition Sources and Ignitability*

- 14.2.31 Electric radiators, if used, shall be fixed in position and so constructed as to reduce fire risks to a minimum and no such radiators shall be fitted with an element so exposed that clothing, curtains, or other similar materials can be scorched or set on fire by heat from the element.
- 14.2.32 *Waste receptacles shall be constructed of non-combustible materials with no openings in the sides or bottom subject to the following-*
- .1 *plastic bins in galleys are for food waste only and shall be clearly marked in accordance with vessels Garbage Management Plan;*
  - .2 *plastic bins in galleys used for Glass and Tins only shall be suitably marked in accordance with the Garbage Management Plan and kept clear from any heat source; and*
  - .3 *fire retardant fibreglass bins are acceptable for general waste around the ship provided they are fitted with metal liners.*
- 14.2.33 In spaces where penetration of oil products is possible, the surface of insulation shall be impervious to oil or oil vapours.
- 14.2.34 *Notwithstanding 14.4.4 and 14.4.5 primary deck coverings, if applied within accommodation and service spaces, control stations, and cabin balconies shall be of approved material which shall not readily ignite, this being determined in accordance with the Fire Test Procedures Code.*

**14.3 Fire Growth Potential**

*Purpose*

- 14.3.1 The purpose of this paragraph is to limit the fire growth potential in every space of the ship and for this purpose, the following functional requirements shall be met-
- .1 means of control for the air supply to the space shall be provided;

- .2 means of control for flammable liquids in the space shall be provided; and
- .3 the use of combustible materials shall be restricted.

#### *Control of Air Supply and Flammable Liquid to the Space*

- 14.3.2 The main inlets and outlets of all ventilation systems shall be capable of being closed from outside the spaces being ventilated and the means of closing shall be easily accessible as well as prominently and permanently marked and shall indicate whether the shut-off is open or closed.
- 14.3.3 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 and this position shall not be readily cut off in the event of a fire in the spaces served.
- 14.3.4 Means of control shall be provided for opening and closure of skylights, closure of openings in funnels which normally allow exhaust ventilation and closure of ventilator dampers.
- 14.3.5 Means of control shall be provided for stopping ventilating fans in accordance with the following provisions-
  - .1 controls provided for the power ventilation serving machinery spaces shall be grouped so as to be operable from two positions, one of which shall be outside such spaces; and
  - .2 the means provided for stopping the power ventilation of the machinery spaces shall be entirely separate from the means provided for stopping ventilation of other spaces.
- 14.3.6 Means of control shall be provided for stopping forced and induced draught fans, oil fuel transfer pumps, oil fuel unit pumps, lubricating oil service pumps, thermal oil circulating pumps and oil separators (purifiers) provided that 14.3.7 and 14.3.8 need not apply to oily water separators.
- 14.3.7 The controls required in 14.3.4 to 14.3.6 and in 14.2.9 shall be located outside the space served so they shall not be cut off in the event of fire in that space.
- 14.3.8 The controls required in 14.3.4 to 14.3.7 and in sections 14.6.5 and 14.7.51 and the controls for any required fire-extinguishing system shall be situated at one control position or grouped in as few positions as possible to the satisfaction of the BMA and such positions shall have a safe access from the open deck.

#### *Additional Requirements for Means of Control in Periodically Unattended Machinery Spaces*

- 14.3.9 For periodically unattended machinery spaces, the BMA shall give special consideration to maintaining the fire integrity of the machinery spaces, the location and centralisation of the fire-extinguishing system controls, the required shutdown arrangements (e.g.,

ventilation, fuel pumps, etc.) and any additional fire-extinguishing appliances and other fire-fighting equipment and breathing apparatus that may be required and these requirements shall be at least equivalent to those of machinery spaces normally attended. (Note section 5.3.1 which prohibits unattended machinery space operations on Code vessels, except for specific voyages subject to BMA approval)

#### *Use of Non-Combustible Materials*

- 14.3.10 Insulating materials in spaces, other than in mail rooms, baggage rooms and refrigerated compartments of service spaces, shall be non-combustible provided that vapour barriers and adhesives used in conjunction with insulation, as well as the insulation of pipe fittings for cold service systems, need not be of non-combustible materials, but they shall be kept to the minimum quantity practicable and their exposed surfaces shall have low flame-spread characteristics.
- 14.3.11 All linings, grounds, draught stops and ceilings used internally or on open decks, bulkheads and overhangs shall be of non-combustible material except in saunas or refrigerated compartments of service spaces; partial bulkheads or decks used to subdivide a space for utility or artistic treatment shall also be of non-combustible materials.
- 14.3.12 Open decks, bulkheads and divisions of "A", "B" or "C" class in accommodation, service spaces and cabin balconies which are faced with combustible materials, facings, mouldings, decorations and veneers shall comply with the provisions of 14.3.13, 14.3.16, 14.3.17 and section 14.4, provided that natural hard wood decking, traditional wooden benches, wooden linings on bulkheads and ceilings are permitted in open decks and saunas and such materials need not be subject to the calculations prescribed in 14.3.13 and 14.3.16: *provided that where it is possible to readily direct a jet of water, for firefighting purposes, on to an open deck or cabin balcony from the deck immediately above, or adjacent, the restrictions on materials used bulkheads and divisions on such an open deck or balcony may be relaxed, except for open decks and cabin balconies adjacent to life saving appliances, as referred to in section 14.3.23, where an evaluation of the fire risk<sup>41</sup> shall be conducted and mitigation measures put in place to the satisfaction of the BMA;*
- 14.3.13 Combustible materials used on the surfaces and linings specified in 14.3.12, except for open decks, shall have a calorific value<sup>42</sup> not exceeding 45 MJ/m<sup>2</sup> of the area for the thickness used; provided that the requirements of this paragraph are not applicable to the surfaces of furniture fixed to linings or bulkheads.

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<sup>41</sup> Refer to MSC.1/Circ.1274 - Guidelines for Evaluation of Fire Risk of External Areas on Passenger Ships

<sup>42</sup> Refer to the recommendations published by the International Organization for Standardization, in particular publication ISO 1716:2002, *Determination of calorific potential*

- 14.3.14 *Subject to 14.3.15, furniture and furnishings on open decks, unless such open decks are protected by a fixed pressure water-spraying and fixed fire detection system and alarm system complying with the provisions of Fire Safety System Code, shall be restricted fire risk articles as defined in Section 2 of the Code.*
- 14.3.15 *Except for open decks adjacent to life saving appliances, as referred to in section 14.3.23, the furniture and furnishings on the open decks need not comply with section 14.3.14 provided it is possible to readily direct a jet of water, for firefighting purposes, on to such a deck from the deck immediately above or adjacent.*
- 14.3.16 Where combustible materials are used in the vessel interior in accordance with 14.3.12, they shall comply with the following requirements-
- .1 the total volume of combustible facings, mouldings, decorations and veneers in accommodation and service spaces shall not exceed a volume equivalent to 2.5 millimetres veneer on the combined area of the walls and ceiling linings. Furniture fixed to linings, bulkheads or decks need not be included in the calculation of the total volume of combustible materials; and
  - .2 in the case of ships fitted with an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code, the above volume may include some combustible material used for erection of "C" class divisions.
- 14.3.17 The following surfaces shall have low flame-spread characteristics in accordance with the Fire Test Procedures Code-
- .1 exposed surfaces in corridors and stairway enclosures and of bulkhead and ceiling linings in accommodation and service spaces (except saunas) and control stations;
  - .2 surfaces and grounds in concealed or inaccessible spaces in accommodation and service spaces and control stations; and
  - .3 exposed surfaces of cabin balconies except for natural hardwood decking systems: provided that this section need not apply where it is possible to readily direct a jet of water, for firefighting purposes, on to such a balcony from the deck immediately above or adjacent, and the balcony is not adjacent to life saving appliances;
- 14.3.18 *The BMA may relax the provisions of 14.3.17 in areas appropriated for the use of the owner and passengers, other than in relation to escape routes, stairway enclosures and corridors, provided that-*
- .1 *such owner and passenger spaces within such areas are individually bounded by divisions with fire integrity in accordance with Tables 14.1 and 14.2;*
  - .2 *the spaces are fitted with a fully addressable fire detection system and a fixed firefighting system complying with the relevant provision of the Fire Safety Systems Code;*

.3 *in all cases the BMA is consulted, either directly or through the vessel's Recognised Organisation and a detailed proposal with respect to the material to be used and its intended location is submitted as part of the consultation process;*

14.3.19 *In applying the provisions of 14.3.18, the overall fire, smoke and toxicity characteristics of the materials to be used may be taken into account as part of the overall assessment.*

14.3.20 Furniture within stairway enclosures shall be subject to the following provisions-

- .1 furniture in stairway enclosures shall-
  - i. be fixed and limited to no more than six seats on each deck in each stairway enclosure;
  - ii. be restricted fire risk *articles as defined in Section 2*; and
  - iii. not restrict the passenger escape route;
  - iv. provided that BMA may permit additional seating in the main reception area within a stairway enclosure if it is fixed, non-combustible and does not restrict the passenger escape route.
- .2 furniture shall not be permitted in passenger and crew corridors and stairs forming escape routes in cabin areas, provided that-
  - i. lockers of non-combustible material, providing storage for non-hazardous safety equipment required by this Section; and
  - ii. drinking water dispensers, ice cube machines, decorative flower or plant arrangements, statues or other objects of art such as paintings and tapestries;

may be permitted in corridors and stairways where these are fixed and do not restrict the width of the escape routes.

14.3.21 Subject to 14.3.22, furniture and furnishings on cabin balconies shall comply with sections 14.3.14.1 to 14.3.14.5, unless such balconies are protected by a fixed pressure water-spraying and fixed fire detection and fire alarm systems complying with the provisions of Fire Safety System Code.

14.3.22 *Except for open decks adjacent to life saving appliances, as referred to in section 14.3.23, the furniture and furnishings on the cabin need not comply with sections 14.3.14.1 to 14.3.14.5 provided it is possible to readily direct a jet of water, for fire-fighting purposes, on to such a deck from the deck immediately above or adjacent.*

14.3.23 *Furniture and furnishings on open decks adjacent to survival craft, rescue boats and their respective launching and embarkation stations, shall have their fire risk evaluated<sup>43</sup> and mitigation measures put in place to the satisfaction of the BMA. The following are considered as providing suitable mitigating measures to give a level of risk to be accepted:*

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<sup>43</sup> Refer to MSC.1/Circ.1274 - Guidelines for Evaluation of Fire Risk of External Areas on Passenger Ships

- .1 *The furniture and furnishings shall be restricted fire risk articles as defined in Section 2 of the Code ;*
- .2 *Use of upholstered furniture in accordance with Fire Test Procedures Code Part 8;*
- .3 *Local portable firefighting appliances for Class A fires;*
- .4 *Fixed fire detection and firefighting systems suitable for open decks;*
- .5 *Restricted use of non-fixed furnishing; and*
- .6 *Furniture not to be immediately adjacent to or proving storage for the Life-saving appliances.*

**14.4 Smoke Generation Potential and Toxicity**

*Purpose*

14.4.1 The purpose of this paragraph is to reduce the hazard to life from smoke and toxic products generated during a fire in spaces where persons normally work or live by limiting the quantity of smoke and toxic products released from combustible materials, including surface finishes, during a fire.

*Paints, Varnishes and other Finishes*

14.4.2 Paints, varnishes and other finishes used on exposed interior surfaces shall not be capable of producing excessive quantities of smoke and toxic products, this being determined in accordance with the Fire Test Procedures Code.

14.4.3 Paints, varnishes and other finishes used on exposed surfaces of cabin balconies, excluding natural hard wood decking systems, shall not be capable of producing excessive quantities of smoke and toxic products, this being determined in accordance with the Fire Test Procedures Code.

*Primary Deck Coverings*

14.4.4 Notwithstanding 14.2.34, primary deck coverings, if applied within accommodation and service spaces, control stations and on open decks shall be of approved material which shall not give rise to smoke or toxic or explosive hazards at elevated temperatures, this being determined in accordance with the Fire Test Procedures Code.

14.4.5 Notwithstanding 14.2.34 primary deck coverings on cabin balconies shall not give rise to smoke, toxic or explosive hazards at elevated temperatures, this being determined in accordance with the Fire Test Procedures Code.

**14.5 Detection and Alarm**

*Purpose*

14.5.1 The purpose of this paragraph is to detect a fire in the space of origin and to provide for alarm for safe escape and fire-fighting activity and for this purpose, the following functional requirements shall be met-

- .1 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;

- .2 manually operated call points shall be placed effectively to ensure a readily accessible means of notification; and
- .3 *fixed fire detection and fire alarm system installations shall be capable of remotely and individually identifying each detector and manually operated call point.*

*General Requirements*

- 14.5.2 A fixed fire detection and fire alarm system shall be provided in accordance with the provisions of this paragraph.
- 14.5.3 A fixed fire detection and fire alarm system and a sample extraction smoke detection system required in this paragraph and other paragraphs in this part shall be of an approved type and comply with the Fire Safety Systems Code.
- 14.5.4 Where a fixed fire detection and fire alarm system is required for the protection of spaces other than those specified in 14.5.9, at least one detector complying with the Fire Safety Systems Code shall be installed in each such space.

*Initial and Periodical Tests*

- 14.5.5 The function of fixed fire detection and fire alarm systems required by the relevant requirements of this Section shall be tested under varying conditions of ventilation after installation.
- 14.5.6 The function of fixed fire detection and fire alarm systems shall be periodically tested to the satisfaction of the BMA by means of equipment producing hot air at the appropriate temperature, or smoke or aerosol particles having the appropriate range of density or particle size, or other phenomena associated with incipient fires to which the detector is designed to respond.

*Protection of Machinery Spaces*

- 14.5.7 A fixed fire detection and fire alarm system shall be installed in-
  - .1 periodically unattended machinery spaces; and
  - .2 machinery spaces where-
    - i. the installation of automatic and remote control systems and equipment has been approved in lieu of continuous manning of the space; and
    - ii. the main propulsion and associated machinery, including the main sources of electrical power, are provided with various degrees of automatic or remote control and are under continuous manned supervision from a control room.
- 14.5.8 The fixed fire detection and fire alarm system required in 14.5.7.1 shall comply with the following:
  - .1 the detection system shall be so designed and the detectors so positioned as to detect rapidly the onset of fire in any part of those spaces and under any normal



- conditions of operation of the machinery and variations of ventilation as required by the possible range of ambient temperatures;
- .2 the detection systems using only thermal detectors shall not be permitted except in spaces of restricted height and where their use is appropriate;
  - .3 the detection system shall initiate local and remote audible and visual alarms distinct in both respects from the alarms of any other system not indicating fire, in sufficient places to ensure that the alarms are heard and observed on the navigation bridge or continuously manned central control station and by a responsible engineer officer.

#### *Protection of Accommodation and Service Spaces and Control Stations*

- 14.5.9 Smoke detectors shall be installed in all cabins, stairways, corridors and escape routes within accommodation spaces. Smoke detectors need not be fitted in private bathrooms and galleys. Detectors fitted in cabins, when activated, shall also be capable of emitting, or cause to be emitted, an audible alarm within the space where they are located; consideration shall also be given to the installation of special purpose smoke detectors within ventilation ducting.
- 14.5.10 *There shall be installed in every ship throughout each separate zone, whether vertical or horizontal, in all accommodation and service spaces, on cabin balconies in compliance with 14.5.17 and, where it is considered necessary by the BMA, in control stations, except spaces which afford no substantial fire risk such as void spaces and sanitary spaces, an automatic sprinkler, a fixed fire detection and fire alarm system of an approved type complying with the relevant requirements of the Fire Safety Systems Code and so installed and arranged as to protect such spaces.*
- 14.5.11 *The construction of ceilings and bulkheads shall be such that it shall be possible, without impairing the efficiency of the fire protection to detect any smoke originating in concealed and inaccessible places (requiring tools to access), except where in the opinion of the BMA there is no risk of fire originating in such places due to there being no ignition sources.*
- 14.5.12 *Manually operated call points complying with the Fire Safety Systems Code shall be installed throughout the accommodation spaces, service spaces, control stations and external deck areas such that:*
- .1 *one manually operated call point shall be located at each exit;*
  - .2 *manually operated call points shall be readily accessible in the corridors of each deck such that no part of the corridor is more than 20 metres from such a point; and*
  - .3 *manually operated call points shall be located on external decks where a source of ignition or fire risk is identified beneath an overhanging structure.*

*Fire Alarm Signalling Systems<sup>44</sup>*

- 14.5.13 *Ships shall at all times when at sea, or in port (except when out of service), be so manned or equipped as to ensure that any initial fire alarm is immediately received by a responsible member of the crew either:*
- .1 on the bridge; or*
  - .2 at the continuously manned control station should this station be in a location other than on the bridge; and*
  - .3 when more than 12 passengers are carried the navigation bridge shall be manned at all times.*
- 14.5.14 The control panel of fixed fire detection and fire alarm systems shall be designed on the fail-safe principle (e.g., an open detector circuit shall cause an alarm condition).
- 14.5.15 *The fixed fire detection and fire alarms system required by 14.5.10 shall comply with the following requirements-*
- .1 it shall be centralised in a continuously manned central control station, which may be the navigation bridge;*
  - .2 in addition, controls for fire pumps and emergency fire pumps, remote closing of the watertight and semi-watertight doors, fire doors, release of smoke from machinery spaces and shutting down the ventilation fans shall be centralised in the same location as that referred to in 14.5.15.1;*
  - .3 the ventilation fans shall be capable of reactivation by the crew at the continuously manned control station;*
  - .4 the control panels in the central control station shall be capable of indicating open or closed positions of watertight and semi-watertight doors, fire doors if required under 14.7.35, on or off status of the detectors, manual call points, alarms and fans;*
  - .5 the control panel shall be continuously powered and shall have an automatic change-over to standby power supply in case of loss of normal power supply; and*
  - .6 the control panel shall be powered from the main source of electrical power and the emergency source of electrical power.*
- 14.5.16 A special alarm, operated from the navigation bridge and fire control station, shall be fitted to summon the crew and this alarm may be part of the ship's general emergency alarm system and shall be capable of being sounded independently of the alarm to the passenger spaces.
- 14.5.17 A fixed fire detection and fire alarm system complying with the provisions of the Fire Safety Systems Code shall be installed on cabin balconies of ships when furniture and furnishings on such balconies are not *articles as defined in Section 2 of the Code*

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<sup>44</sup> Refer to the Code on Alerts and Indicators adopted by the IMO by Resolution A.1021(26).

## 14.6 Control of Smoke Spread

### *Purpose*

- 14.6.1 The purpose of this part is to control the spread of smoke in order to minimise the hazards from smoke by providing means for controlling smoke in atriums, control stations, machinery spaces and concealed spaces.

### *Protection of Control Stations outside Machinery Spaces*

- 14.6.2 Practicable measures shall be taken for control stations outside machinery spaces in order to ensure that ventilation, visibility and freedom from smoke are maintained within them so that, in the event of fire, the machinery and equipment contained therein may be supervised and continue to function effectively, such measures to include the provision of alternative and separate means of air supply arranged so that the air inlets of the two sources of supply shall be so disposed that the risk of both inlets drawing in smoke simultaneously is minimized; provided that, at the discretion of the BMA, such requirements need not apply to control stations situated on, and opening onto, an open deck or where local closing arrangements would be equally effective.
- 14.6.3 *The ventilation system serving safety centres may be derived from the ventilation system serving the navigation bridge, unless located in an adjacent main vertical zone.*

### *Release of Smoke from Machinery Spaces*

- 14.6.4 The provisions of Sections 14.6.5, 14.6.6 and 14.6.7 shall apply to machinery spaces of category A and, where the BMA considers it desirable, to other machinery spaces.
- 14.6.5 Means of control shall be provided for permitting the release of smoke, in the event of fire, from the space to be protected and, subject to the provisions of section 14.7.49, the normal ventilation systems may be acceptable for this purpose.
- 14.6.6 Means of control shall be provided for permitting the release of smoke and such controls shall be located outside the space served so that, in the event of fire in that space, they shall not be cut off.
- 14.6.7 The controls required by 14.6.6 shall be situated at one control position or grouped in as few positions as possible to the satisfaction of the BMA and such positions shall have a safe access from the open deck.

### *Draught Stops*

- 14.6.8 Air spaces enclosed behind ceilings, panelling or linings shall be divided by close-fitting draught stops spaced not more than 14 metres apart. In the vertical direction, such enclosed air spaces, including those behind linings of stairways, trunks, etc., shall be closed at each deck.

### *Smoke Extraction Systems in Atriums*

14.6.9 Atriums shall be equipped with a smoke extraction system, having fans sized such that that the entire volume within the space can be exhausted in 10 minutes or less, and which shall be activated by the required smoke detection system and be capable of manual control.

**14.7 Containment of Fire**

*Purpose*

14.7.1 The purpose of this part is to contain a fire in the space of origin by meeting the following functional requirements-

- .1 the ship shall be subdivided by thermal and structural boundaries;
- .2 thermal insulation of boundaries shall have due regard to the fire risk of the space and adjacent spaces;
- .3 the fire integrity of the divisions shall be maintained at openings and penetrations.

*Thermal and Structural Subdivision*

14.7.2 Ships shall be subdivided into spaces by thermal and structural divisions having regard to the fire risks of the spaces.

*Main Vertical Zones and Horizontal Zones*

14.7.3 The hull, superstructure and deckhouses in way of accommodation and service spaces shall be subdivided into main vertical zones by "A" class divisions and these divisions shall have insulation values in accordance with Tables 14.1 and 14.2.

14.7.4 The main vertical zones shall comply with the following provisions-

- .1 the bulkheads forming the boundaries of the main vertical zones above the bulkhead deck shall as far as practicable, be in line with watertight subdivision bulkheads situated immediately below the bulkhead deck;
- .2 the length and width of main vertical zones may be extended to a maximum of 48 metres in order to bring the ends of main vertical zones to coincide with watertight subdivision bulkheads or in order to accommodate a large public space extending for the whole length of the main vertical zone provided that the total area of the main vertical zone is not greater than 1,600 m<sup>2</sup> on any deck;
- .3 the length or width of a main vertical zone shall be the maximum distance between the furthestmost points of the bulkheads bounding it; and
- .4 main vertical zones may be stepped or may consist of one or more horizontal zones where it is impracticable from structural or design considerations to achieve compliance otherwise; in all cases however the BMA shall be satisfied that an equivalent level of safety and protection is achieved.

14.7.5 Bulkheads forming the boundaries of main vertical zones shall extend from deck to deck and to the shell or other boundaries.

14.7.6 Where a main vertical zone is subdivided by horizontal "A" class divisions into horizontal zones for the purpose of providing an appropriate barrier between a zone with sprinklers

and a zone without sprinklers, the divisions shall extend between adjacent main vertical zone bulkheads and to the shell or exterior boundaries of the ship and shall be insulated in accordance with the fire insulation and integrity values given in Table 14.2.

#### *Bulkheads within a Main Vertical Zone*

- 14.7.7 Bulkheads within accommodation and service spaces shall meet the requirements of 14.7.7.1 to 14.7.7.2 as appropriate taking into consideration guidelines developed by the IMO<sup>45</sup>-
- .1 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 Table 14.1; in addition, corridor bulkheads, where not required to be "A" class, shall be "B" class divisions which shall extend from deck to deck except:
    - i. where continuous "B" class ceilings or linings are fitted on both sides of the bulkhead, the portion of the bulkhead behind the continuous ceiling or lining shall be of material which, in thickness and composition, is acceptable in the construction of "B" class divisions, but which shall be required to meet "B" class integrity standards only in so far as is reasonable and practicable in the opinion of the BMA; and
    - ii. where, as shall normally be the case, the ship is protected by an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code, the corridor bulkheads may terminate at a ceiling in the corridor provided such bulkheads and ceilings are of "B" class standard in compliance with 14.7.10 and 14.7.11. All doors and frames in such bulkheads shall be of non-combustible materials and shall have the same fire integrity as the bulkhead in which they are fitted.
  - .2 *where "C" class divisions between similar purposed spaces are provided (sleeping/washing/dressing), these divisions do not need to be continuous and the group of spaces may be considered as one.*
- 14.7.8 Bulkheads required to be "B" class divisions, except corridor bulkheads as prescribed in Section 14.9.2, shall extend from deck to deck and to the shell or other boundaries; provided that where a continuous "B" class ceiling or lining is fitted on both sides of a bulkhead which is at least of the same fire resistance as the adjoining bulkhead, the bulkhead may terminate at the continuous ceiling or lining.

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<sup>45</sup> Refer to the Guidelines on fire safety construction in accommodation areas (MSC/Circ.917) for passenger ships carrying <36 passengers

*Fire Integrity of Bulkheads and Decks*

- 14.7.9 In addition to complying with the specific provisions for fire integrity of bulkheads and decks, the minimum fire integrity of bulkheads and decks shall be as prescribed in Tables 14.1 and 14.2.
- 14.7.10 The following requirements shall govern application of the Tables-
- .1 Tables 14.1 and 14.2 shall apply respectively to the bulkheads and decks separating adjacent spaces;
  - .2 For determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces-
    - i. such spaces are classified according to their fire risk as shown in paragraphs a. to j. below;
    - ii. where the contents and use of a space are such that there is a doubt as to its classification for the purpose of this paragraph, or where it is possible to assign two or more classifications to a space, it shall be treated as a space within the relevant category having the most stringent boundary requirements;
    - iii. smaller, enclosed rooms within a space that have less than 30% communicating openings to that space are considered separate spaces;
    - iv. the fire integrity of the boundary bulkheads and decks of such smaller rooms shall be as prescribed in Tables 14.1 and 14.2;
    - v. the title of each category is intended to be typical rather than restrictive; and
    - vi. the number in parentheses following each category refers to the applicable column or row in the Tables,
      - a. control stations (1):  
spaces containing emergency sources of power and lighting; wheelhouse and chartroom; spaces containing the ship's radio equipment; fire control stations; control room for propulsion machinery when located outside the machinery space; spaces containing centralised fire alarm equipment;
      - b. corridors (2):  
passenger and crew corridors and lobbies;
      - c. accommodation spaces (3):  
spaces as defined in Section 2 excluding corridors;
      - d. stairways (4):  
interior stairways; lifts; totally enclosed emergency escape trunks and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto (in this connection, a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door);
      - e. service spaces (low risk) (5):

lockers and store-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;

- f. machinery spaces of Category A (6):  
spaces as defined in Section 2;
- g. other machinery spaces (7):  
electrical equipment rooms (auto-telephone exchange, air-conditioning duct spaces); spaces as defined in Section 2 excluding machinery spaces of category A;
- h. service spaces (high risk) (9):  
galleys; pantries containing cooking appliances; paint lockers; lockers and store-rooms having areas of 4m<sup>2</sup> or more; spaces for the storage of flammable liquids; saunas and workshops other than those forming part of the machinery spaces;
- i. open decks (10):  
open deck spaces and enclosed promenades having little or no fire risk; enclosed promenades shall have no significant fire risk, meaning that furnishing shall be restricted to deck furniture; in addition, such spaces shall be naturally ventilated by permanent openings; air spaces (the space outside superstructures and deckhouses); and
- j. garage spaces (11):  
spaces as defined in Section 2.

- 14.7.11 In determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone or horizontal zone which is not protected by an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code or between such zones neither of which is so protected, the higher of the two values given in the tables shall apply.
- 14.7.12 In determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone or horizontal zone which is protected by an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code or between such zones both of which are so protected, the lesser of the two values given in the tables shall apply and where a zone with sprinklers and a zone without sprinklers meet within accommodation and service spaces, the higher of the two values given in the tables shall apply to the division between the zones.
- 14.7.13 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.
- 14.7.14 External boundaries which are required in Section 14.9.2 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles, provided that there is no requirement for such boundaries to have "A" class integrity. Similarly, in such

boundaries which are not required to have "A" class integrity, doors may be constructed of materials which are to the satisfaction of the BMA.

#### *Construction and Arrangement of Saunas*

- 14.7.15 The perimeter of the sauna shall be of "A" class boundaries and may include changing rooms, showers and toilets and the sauna shall be insulated to "A-60" standard against other spaces except those inside of the perimeter of the sauna and spaces of category (5), (7) and (10).
- 14.7.16 Bathrooms with direct access to saunas may be considered as part of them. In such cases, the door between sauna and the bathroom need not comply with fire safety requirements.
- 14.7.17 The traditional wooden lining on the bulkheads and ceiling are permitted in the sauna provided that:-
- .1 the ceiling above the oven shall be lined with a non-combustible plate with an air gap of at least 30 millimetres; and
  - .2 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).
- 14.7.18 The traditional wooden benches are permitted to be used in the sauna.
- 14.7.19 The sauna door shall open outwards by pushing.
- 14.7.20 Electrically heated ovens shall be provided with a timer.

#### *Protection of Stairways and Lifts in Accommodation Area*

- 14.7.21 Stairways shall be within enclosures formed of "A" class divisions, with positive means of closure at all openings, except that-
- .1 a stairway connecting only two decks need not be enclosed, provided the integrity of the deck is maintained by proper bulkheads or self-closing doors in one 'tween-deck space; when a stairway is closed in one 'tween-deck space, the stairway enclosure shall be protected in accordance with Table 14.2; and
  - .2 Stairways may be fitted in the open in a public space, provided they lie wholly within the public space.
- 14.7.22 Lift trunks shall be so fitted as to prevent the passage of smoke and flame from one deck to another and shall be provided with means of closing so as to permit the control of draught and smoke.
- 14.7.23 Machinery for lifts located within stairway enclosures shall be arranged in a separate room, surrounded by steel boundaries, provided that small passages for lift cables are permitted.



14.7.24 Lifts which open into spaces other than corridors, public spaces, special category spaces, stairways and external areas shall not open into stairways included in the means of escape.

14.7.25 Non-load bearing partial bulkheads which separate adjacent cabin balconies shall be capable of being opened by the crew from each side for the purpose of fighting fires.

*Protection of Atriums*

14.7.26 Atriums shall be within enclosures formed of "A" class divisions having a fire rating determined in accordance with Table 14.1.

14.7.27 Decks separating spaces within atriums shall have a fire rating determined in accordance with Table 14.2.

SPACES	SOLAS Ref No.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(9)	(10)	(11)
	▼▶										
Control stations	(1)	A-0 <sup>c</sup>	A-0	A-60	A-0	A-15	A-60	A-15	A-60	*	A-60
Corridors	(2)		C <sup>e</sup>	B-0 <sup>e</sup>	A-0 <sup>e</sup> B-0 <sup>e</sup>	B-0 <sup>e</sup>	A-60	A-0	A-15 A-0 <sup>d</sup>	*	A-30
Accommodation spaces	(3)			C <sup>e</sup>	A-0 <sup>a</sup> B-0 <sup>e</sup>	B-0 <sup>e</sup>	A-60	A-0	A-15 A-0 <sup>d</sup>	*	A-30 A-0 <sup>d</sup>
Stairways	(4)				A-0 <sup>a</sup> B-0 <sup>e</sup>	A-0 <sup>a</sup> B-0 <sup>e</sup>	A-60	A-0	A-15 A-0 <sup>d</sup>	*	A-30
Service spaces (low risk)	(5)					C <sup>e</sup>	A-60	A-0	A-0	*	A-0
Machinery spaces of Category A	(6)						*	A-0	A-60	*	A-60
Other machinery spaces	(7)							A-0 <sup>b</sup>	A-0	*	A-0
Service spaces (high risk)	(9)								A-0 <sup>b</sup>	*	A-30
Open decks	(10)									*	A-0
Garage spaces	(11)										A-30

**Table 14.1 – Fire integrity of bulkheads separating adjacent spaces**

SPACES BELOW ▼	SPACES ABOVE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(9)	(10)	(11)
	▶										
Control stations	(1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-60	*	A-60
Corridors	(2)	A-0	*	*	A-0	*	A-60	A-0	A-0	*	A-30
Accommodation spaces	(3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	*	A-30 A-0 <sup>d</sup>
Stairways	(4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	*	A-30
Service spaces (low risk)	(5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	*	A-0
Machinery spaces of Category A	(6)	A-60	A-60	A-60	A-60	A-60	*	A-60 <sup>f</sup>	A-60	*	A-60
Other machinery spaces	(7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
Service spaces (high risk)	(9)	A-60	A-30 A-0 <sup>d</sup>	A-30 A-0 <sup>d</sup>	A-30 A-0 <sup>d</sup>	A-0	A-60	A-0	A-0	*	A-30
Open decks	(10)	*	*	*	*	*	*	*	*	-	A-0
Garage spaces	(11)	A-60	A-30	A-30 A-0 <sup>d</sup>	A-30	A-0	A-60	A-0	A-30	A-0	A-30

**Table 14.2 – Fire integrity of decks separating adjacent spaces**

Notes: To be applied to both tables 14.1 and 14.2 as appropriate

- a For clarification as to which applies, see Sections 14.7.7 and 14.7.8 and 14.7.21 to 14.7.24
- b Where spaces are of the same numerical category and superscript "b" appears, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose (e.g., in category (9)). A galley next to a galley does not require a bulkhead, but a galley next to a paint room requires an "A-0" bulkhead.
- c Bulkheads separating the wheelhouse and chartroom from each other may have a "B-0" rating. No fire rating is required for those partitions separating the navigation bridge and the safety centre when the latter is within the navigation bridge.
- d See 14.7.11 and 14.7.12.
- e For the application of 14.7.3, "B-0" and "C", where appearing in Table 14.1, shall be read as "A-0".
- f Fire insulation need not be fitted if the machinery space in category (7), in the opinion of the BMA, has little or no fire risk.
- \* Where an asterisk appears in the Tables it indicates that-
  - .1 the division is required to be of steel or other equivalent material, but is not required to be of "A" class; however, where a deck, except in a category (10) space, is penetrated for the passage of electric cables, pipes and vent ducts, such penetrations shall be made tight to prevent the passage of flame and smoke;
  - .2 divisions between control stations (emergency generators) and open decks may have air intake openings without means for closure; unless a fixed gas fire-extinguishing system is fitted *in the control station*;
  - .3 for the application of Section 14.7.3, in Table 14.2, "A" class divisions shall be read as "A-0", except for category (10); and
  - .4 for windows and doors, Section 14.7.46 shall apply

### *Penetrations in Fire-Resisting Divisions and Prevention of Heat Transmission*

- 14.7.28 Where "A" class divisions are penetrated, such penetrations shall comply with the following provisions-
  - .1 subject to the provisions of 14.7.36, the penetrations shall be tested in accordance with the Fire Test Procedures Code;
  - .2 in the case of ventilation ducts, 14.7.56 and 14.7.68 shall apply;
  - .3 where a pipe penetration is made of steel or equivalent material having a thickness of 3 millimetres or greater and a length of not less than 900 millimetres (preferably 450 millimetres on each side of the division), and there are no openings, testing is not required but such penetrations shall be suitably insulated by extension of the insulation at the same level of the division being penetrated.
- 14.7.29 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, such penetrations shall comply with the following provisions-
  - .1 subject to the provisions of 14.7.69, arrangements shall be made to ensure that the fire resistance is not impaired;

- .2 pipes other than steel or copper that shall be protected by either-
- i. a fire-tested penetration device suitable for the fire resistance of the division pierced and the type of pipe used; or
  - ii. a steel sleeve, having a thickness of not less than 1.8 millimetres and a length of not less than 900 millimetres for pipe diameters of 150 millimetres or more and not less than 600 millimetres for pipe diameters of less than 150 millimetres (preferably equally divided to each side of the division). The pipe shall be connected to the ends of the sleeve by flanges or couplings; or the clearance between the sleeve and the pipe shall not exceed 2.5 millimetres; or any clearance between pipe and sleeve shall be made tight by means of non-combustible or other suitable material.
- 14.7.30 Uninsulated metallic pipes penetrating "A" or "B" class divisions shall be of materials having a melting temperature which exceeds 950°C for "A-0" and 850°C for "B-0" class divisions.
- 14.7.31 In approving structural fire protection details, the BMA shall have regard to the risk of heat transmission at intersections and terminal points of required thermal barriers. The insulation of a deck or bulkhead shall be carried past the penetration, intersection or terminal point for a distance of at least 450 millimetres in the case of steel and aluminium structures. If a space is divided with a deck or a bulkhead of "A" class standard having insulation of different values, the insulation with the higher value shall continue on the deck or bulkhead with the insulation of the lesser value for a distance of at least 450 millimetres.
- Protection of Openings in Fire-Resisting Divisions*
- 14.7.32 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.
- 14.7.33 The construction of doors and door frames in "A" class divisions, with the means of securing them when closed, shall comply with the following provisions-
- .1 the construction shall provide resistance to fire as well as to the passage of smoke and flame equivalent to that of the bulkheads in which the doors are situated, this being determined in accordance with the Fire Test Procedures Code;
  - .2 doors and door frames shall be constructed of steel or other equivalent material (for glass doors refer to 5.15.1);
  - .3 steel watertight doors need not be insulated;
  - .4 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;
  - .5 a non-combustible sill shall be installed under the door such that floor coverings do not extend beneath the closed door.
- 14.7.34 It shall be possible for each door to be opened and closed from each side of the bulkhead by one person only.

- 14.7.35 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:
- .1 the doors shall be self-closing and be capable of closing with an angle of inclination of up to 3.5° opposing closure;
  - .2 the approximate time of closure for hinged fire doors shall be no more than 40 seconds and no less than 10 seconds from the beginning of their movement with the ship in upright position. The approximate uniform rate of closure for sliding doors shall be of no more than 0.2 m/s and no less than 0.1 m/s with the ship in upright position;
  - .3 the doors, except those for emergency escape trunks, shall be capable of remote release from the continuously manned central control station, either simultaneously or in groups, and shall be capable of release also individually from a position at both sides of the door. Release switches shall have an on-off function to prevent automatic resetting of the system;
  - .4 hold-back hooks not subject to central control station release are prohibited;
  - .5 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;
  - .6 indication shall be provided at the fire door indicator panel in the continuously manned central control station whether each door is closed;
  - .7 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;
  - .8 local power accumulators for power-operated doors shall be provided in the immediate vicinity of the doors to enable the doors to be operated at least ten times (fully opened and closed) after disruption of the control system or central power supply using the local controls;
  - .9 disruption of the control system or central power supply at one door shall not impair the safe functioning of the other doors;
  - .10 remote-released sliding or power-operated doors shall be equipped with an alarm that sounds at least 5 seconds but no more than 10 seconds, after the door is released from the central control station and before the door begins to move and continues sounding until the door is completely closed;
  - .11 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;
  - .12 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;
  - .13 the components of the local control system shall be accessible for maintenance and adjusting;
  - .14 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 min, served by the power supply;
- ii. the power 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.

- 14.7.36 Where a space is protected by an automatic sprinkler fire detection and fire alarm system complying with the provisions of the Fire Safety Systems Code or fitted with a continuous "B" class ceiling, openings in decks not forming steps in main vertical zones nor bounding horizontal zones shall be closed reasonably tight and such decks shall meet the "A" class integrity requirements in so far as is reasonable and practicable in the opinion of the BMA.
- 14.7.37 The requirements for "A" class integrity of the outer boundaries of a ship shall not apply to-
- .1 glass partitions, windows and sidescuttles, provided that there is no requirement for such boundaries to have "A" class integrity in 14.7.46;
  - .2 exterior doors, except for those in superstructures and deckhouses facing life-saving appliances, embarkation and external assembly station areas, external stairs and open decks used for escape routes; and
  - .3 *stairway enclosure doors, glass doors and windows*
- 14.7.38 Except for watertight doors, weathertight doors, semi-watertight doors, doors leading to the open deck and doors which need to be reasonably gastight, all "A" class doors located in stairways, public spaces and main vertical zone bulkheads in escape routes shall be equipped with a self-closing hose port, the material, construction and fire resistance of which shall be equivalent to the door into which it is fitted, and the port shall be a 150 millimetres square clear opening with the door closed and shall be inset into the lower edge of the door, opposite the door hinges or, in the case of sliding doors, nearest the opening.
- 14.7.39 Ventilation ducts passing through main vertical zone divisions shall be kept to a minimum and where it is necessary that a such a duct passes through a main vertical zone division, a fail-safe automatic closing fire damper shall be fitted adjacent to the division complying with the following provisions-
- .1 the damper shall be capable of being manually closed from each side of the division;
  - .2 the operating position of the damper shall be readily accessible and be marked in red light-reflecting colour;
  - .3 the duct between the division and the damper shall be of steel or other equivalent material and, if necessary, insulated to comply with the requirements of 14.7.28; and

- .4 the damper shall be fitted on at least one side of the division with a visible indicator showing whether the damper is in the open position.

#### *Openings in "B" Class Divisions*

- 14.7.40 Doors and door frames in "B" class divisions and means of securing them shall provide a method of closure which shall have resistance to fire equivalent to that of the divisions, this being determined in accordance with the Fire Test Procedures Code provided that that ventilation openings may be permitted in the lower portion of such doors as follows-
- .1 where such opening is in or under a door the total net area of any such opening or openings shall not exceed 0.05 m<sup>2</sup>;
  - .2 alternatively, a non-combustible air balance duct routed between the cabin and the corridor, and located below the sanitary unit, is permitted where the cross-sectional area of the duct does not exceed 0.05m<sup>2</sup>;
  - .3 all ventilation openings shall be fitted with a grill made of non-combustible material;
  - .4 doors shall be non-combustible; and
  - .5 doors approved without the sill being part of the frame, shall be installed such that the gap under the door does not exceed 25 millimetres.
- 14.7.41 Cabin doors in "B" class divisions shall be of a self-closing type. Hold-back hooks are not permitted. *Other "B" Class doors may have holdbacks that are released remotely at the bridge and in the event of main power failure. Such doors with holdbacks shall have indication provided at the fire door indicator panel in the continuously manned central control station showing whether each door is closed.*
- 14.7.42 The requirements for "B" class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles. Similarly, the requirements for "B" class integrity shall not apply to exterior doors in superstructures and deckhouses. The BMA may permit the use of combustible materials in doors separating cabins from the individual interior sanitary spaces such as showers.
- 14.7.43 The following provisions apply to openings in "B" Class Divisions-
- .1 openings in decks not forming steps in main vertical zones nor bounding horizontal zones shall be closed reasonably tight and such decks shall meet the "B" class integrity requirements in so far as is reasonable and practicable in the opinion of the BMA; and
  - .2 openings in corridor bulkheads of "B" class materials shall be protected in accordance with the provisions of 14.7.7 and 14.7.8.

#### *Windows, Sidescuttles Weathertight and Watertight Doors*

- 14.7.44 Windows and sidescuttles in bulkheads within accommodation and service spaces and control stations other than those to which the provisions of 14.7.36 and 14.7.42 apply shall be so constructed as to preserve the integrity requirements of the type of bulkheads in

which they are fitted, this being determined in accordance with the Fire Test Procedures Code.

14.7.45 "A" class windows and sidescuttles in bulkheads separating accommodation and service spaces and control stations from weather shall be constructed with frames of steel or other suitable material and the glass shall be mechanically retained.

14.7.46 Windows and doors (except those leading from stairways), facing survival craft and escape slide, embarkation areas and windows situated below such areas shall have fire integrity at least equal to "A-0" class.

14.7.47 *Steel sliding watertight doors need not be insulated.*

#### *Protection of Openings in Machinery Spaces Boundaries*

14.7.48 The provision of 14.7.49 to 14.7.54 shall apply to machinery spaces of category A and, where the BMA considers it desirable, to other machinery spaces.

14.7.49 The number of skylights, doors, ventilators, openings in funnels to permit exhaust ventilation and other openings to machinery spaces shall be reduced to a minimum consistent with the needs of ventilation and the proper and safe working of the ship.

14.7.50 Skylights shall be of steel and shall not contain glass panels.

14.7.51 Means of control shall be provided for closing power-operated doors or actuating release mechanisms on doors other than power-operated watertight doors and such controls shall be located outside the space served so that they shall not be cut off in the event of fire in that place.

14.7.52 The means of control required in 14.7.51 shall be situated at one control position or grouped in as few positions as possible to the satisfaction of the BMA and such positions shall have safe access from the open deck.

14.7.53 Doors, other than power-operated watertight doors, shall be so arranged that positive closure is assured in case of fire in the space by power-operated closing arrangements or by the provision of self-closing doors capable of closing against an inclination of 3.5° opposing closure, and having a fail-safe hold-back arrangement; provided with a remotely operated release device; provided that doors for emergency escape trunks need not be fitted with a fail-safe hold-back facility and a remotely operated release device.

14.7.54 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.



### Ventilation Systems

- 14.7.55 Ventilation ducts, including single and double wall ducts, shall be of steel or equivalent material except flexible bellows of short length not exceeding 600 millimetres used for connecting fans to the ducting in air-conditioning rooms. Unless expressly provided otherwise in 14.7.60, any other material used in the construction of ducts, including insulation, shall also be non-combustible. However, short ducts, not generally exceeding 2 metres in length and with a free cross-sectional area<sup>46</sup> not exceeding 0.02 m<sup>2</sup>, need not be of steel or equivalent material, subject to the following conditions:
- .1 the ducts shall be made of non-combustible material, which may be faced internally and externally with membranes having low flame-spread characteristics and, in each case, a calorific value<sup>47</sup> not exceeding 45 MJ/m<sup>2</sup> of their surface area for the thickness used;
  - .2 the ducts are only used at the end of the ventilation device; and
  - .3 the ducts are not situated less than 600 millimetres, measured along the duct, from an opening in an "A" or "B" class division, including continuous "B" class ceiling.
- 14.7.56 The following arrangements shall be tested in accordance with the Fire Test Procedures Code-
- .1 fire dampers, including their relevant means of operation; and
  - .2 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 flanges or by welding.
- 14.7.57 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.
- 14.7.58 Ventilation ducts shall be provided with hatches for inspection and cleaning. The hatches shall be located near the fire dampers.
- 14.7.59 The main inlets and outlets of ventilation systems shall be capable of being closed from outside the spaces being ventilated. The means of closing shall be easily accessible as well as prominently and permanently marked and shall indicate the operating position of the closing device.

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<sup>46</sup> The term free cross-sectional area means, even in the case of a pre-insulated duct, the area calculated on the basis of the inner dimensions of the duct itself and not the insulation.

<sup>47</sup> Refer to the recommendations published by the International Organization for Standardization, in particular publication ISO 1716:2002, Reaction to the fire tests for building products – Determination of the heat of combustion

- 14.7.60 Combustible gaskets in flanged ventilation duct connections are not permitted within 600 millimetres of openings in "A" or "B" class divisions and in ducts required to be of "A" class construction.
- 14.7.61 Ventilation openings or air balance ducts between two enclosed spaces shall not be provided except as permitted by 14.7.40.
- 14.7.62 The ventilation systems for machinery spaces of category A, *garage* spaces and galleys shall, in general, be separated from each other and from the ventilation systems serving other spaces. However, the galley ventilation systems need not be completely separated from other ventilation systems but may be served by separate ducts from a ventilation unit serving other spaces. In such a case, an automatic fire damper shall be fitted in the galley ventilation duct near the ventilation unit.
- 14.7.63 Ducts provided for the ventilation of machinery spaces of category A, galleys and *garage* spaces shall not pass through accommodation spaces, service spaces, or control stations unless they comply with 14.7.65.
- 14.7.64 Ducts provided for the ventilation of accommodation spaces, service spaces or control stations shall not pass through machinery spaces of category A, galleys and *garage* spaces, unless they comply with 14.7.65.
- 14.7.65 As permitted by Sections 14.7.63 and 14.7.64 ducts shall be either:
- .1 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>;
  - .2 suitably supported and stiffened;
  - .3 fitted with automatic fire dampers close to the boundaries penetrated; and
  - .4 insulated to "A-60" class standard from the boundaries of the spaces they serve to a point at least 5 m beyond each fire damper;
- or
- .5 constructed of steel in accordance with Sections 14.7.65.1 and 14.7.65.2; and
  - .6 insulated to "A-60" class standard throughout the spaces they pass through, except for ducts that pass through the following spaces:
    - i. Sanitary and similar spaces such as:
      - a. communal sanitary facilities, showers, baths, water closets, etc;
      - b. small laundry rooms;
      - c. indoor swimming pool area;
      - d. isolated pantries containing no cooking appliances in accommodation spaces;
      - e. private sanitary facilities shall be considered a portion of the space in which they are located.

- ii. Tanks, voids and auxiliary machinery spaces having little or no fire risk such as:
  - a. water tanks forming part of the ship's structure;
  - b. voids and cofferdams;
- iii. auxiliary machinery space which do not contain machinery having a pressure lubrication system and where storage of combustibles is prohibited, such as:
  - a. ventilation and air-conditioning rooms;
  - b. windlass room;
  - c. steering gear room;
  - d. stabilizer equipment room;
  - e. electrical propulsion motor room;
  - f. rooms containing section switchboards and purely electrical equipment other than oil-filled electrical transformers (above 10 kVA);
  - g. shaft alleys and pipe tunnels;
  - h. spaces for pumps and refrigeration machinery (not handling or using flammable liquids).
- iv. closed trunks serving the spaces listed above;
- v. other closed trunks such as pipe and cable trunks.

14.7.66 For the purposes of Sections 14.7.65.4 and 14.7.65.6, 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>48</sup>.

14.7.67 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 14.7.65.1 and 14.7.65.2 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.

14.7.68 Ducts passing through "A" class divisions shall meet the following requirements:

- .1 where a thin plated duct with a free cross sectional area equal to, or less than, 0.02m<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

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<sup>48</sup> Sketches of such arrangements are contained in the Unified Interpretations of SOLAS chapter II-2 (MSC.1/Circ.1276)

- bulkhead or, in the case of a deck, wholly laid on the lower side of the decks penetrated;
- .2 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
- .3 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 14.7.65.1 and 14.7.65.2. 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.

- 14.7.69 Ventilation ducts with a free cross-sectional area exceeding 0.02 m<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.
- 14.7.70 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.
- 14.7.71 When passing through accommodation spaces or spaces containing combustible materials, the exhaust ducts from galley ranges shall be constructed in accordance with 14.7.65.1 and 14.7.65.2. Each exhaust duct shall be fitted with:
1. a grease trap readily removable for cleaning;
  - .2 an automatically and remotely operated fire damper located in the lower end of the duct at the junction between the duct and the galley range hood and, in

- addition, a remotely operated fire damper in the upper end of the duct close to the outlet of the duct;
- .3 arrangements, operable from within the galley, for shutting off the exhaust and supply fans; and
  - .4 fixed means for extinguishing a fire within the duct<sup>49</sup>

14.7.72 Exhaust ducts from laundries shall be fitted with:

1. filters readily removable for cleaning purposes;
2. a fire damper located in the lower end of the duct which is automatically and remotely operated;
3. remote-control arrangements for shutting off the exhaust fans and supply fans from within the space and for operating the fire damper mentioned in 14.7.72.2; and
4. suitably located hatches for inspection and cleaning.

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

14.7.73 Construction and Arrangement of Steam Rooms shall meet the following requirements:

1. The perimeter of the steam room may include changing rooms, showers and toilets.
- .2 Bathrooms with direct access to suite may be considered as part of it. In such cases, the door between suite and the bathroom need not comply with fire safety requirements.
- .3 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. 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, and pipes leading to the discharge nozzles shall be lagged.
- .4 All spaces within the perimeter shall be protected by a fire detection and alarm system.

#### *Construction and Arrangement of Cinemas and Projector Rooms*

14.7.74 Construction and arrangement of cinemas and projector rooms shall meet the following requirements:

- .1 *have their category of space agreed with the BMA given the varied technical options for these spaces;*
- .2 *in deciding the category of space, consideration shall be given to the generation of heat and the grouping of large quantities of electrical items;*
- .3 *the perimeter of the cinema or projector rooms may include reception areas and toilets;*

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<sup>49</sup> Refer to the recommendations published by the International Organization for Standardization, in particular publication ISO 15371:2009, Ships and marine technology – Fire-extinguishing systems for protection of galley cooking equipment

**14.8 Structural Integrity***Purpose*

- 14.8.1 The purpose of this paragraph is to maintain structural integrity of the ship, preventing partial or whole collapse of the ship structures due to strength deterioration by heat. For this purpose, materials used in the ships' structure shall ensure that the structural integrity is not degraded due to fire.

*Material of Hull, Superstructures, Structural Bulkheads, Decks and Deckhouses*

- 14.8.2 The hull, superstructures, structural bulkheads, decks and deckhouses shall be constructed of steel or other equivalent material and for the purpose of applying the definition of steel or other equivalent material the "applicable fire exposure" shall be according to the integrity and insulation standards given in Tables 14.1 and 14.2; for example, where divisions such as decks or sides and ends of deckhouses are permitted to have "B-0" fire integrity, the "applicable fire exposure" shall be half an hour.

*Structure of Aluminium Alloy*

- 14.8.3 Unless otherwise specified in 14.8.2, in cases where any part of the structure is of aluminium alloy, the following shall apply-
- .1 the insulation of aluminium alloy components of "A" or "B" class divisions, except structure which, in the opinion of the BMA, is non-load-bearing, shall be such that the temperature of the structural core does not rise more than 200°C above the ambient temperature at any time during the applicable fire exposure to the standard fire test; and
  - .2 special attention shall be given to the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas, and "A" and "B" class divisions to ensure-
    - i. that for such members supporting lifeboat and liferaft areas and "A" class divisions, the temperature rise limitation specified in 14.8.3.1 above shall apply at the end of one hour; and
    - ii. that for such members required to support "B" class divisions, the
    - iii. temperature rise limitation specified in 14.8.3.1 shall apply at the end of half an hour.

*Machinery Spaces of Category A*

- 14.8.4 Subject to 14.8.5, the boundaries of all machinery spaces of category A, including crowns and casings, shall be of steel construction and shall be insulated as required by Tables 14.1 and 14.2 as appropriate.
- 14.8.5 The BMA may permit the boundaries of Category A machinery spaces, including crowns and casings, to be constructed of aluminium provided that-

- .1 the space is provided with an equivalent water-mist fire-extinguishing system complying with MSC/Circ.1165<sup>50</sup> that shall provide total flooding of the space in the event of a fire in that space; and
- .2 the space is provided with a fixed local application fire-extinguishing system of the water-mist type in accordance with MSC/Circ.913<sup>51</sup>, MSC/Circ.1082<sup>52</sup> and MSC.1/Circ.1276<sup>53</sup>, applicable to machinery spaces of any size; and
- .3 the space and the divisions forming the crowns and casings shall be constructed and insulated to "A-60" class standard on both sides as demonstrated by a fire test conducted in accordance with the relevant provisions of the Fire Test Procedures Code; and
- .4 where the hull forms part of the boundary of the machinery space then the internal surface of the hull shall be insulated in accordance with Section(c) down to at least 450millimetres below the line of the lightest sea-going draft.

14.8.6 The floor plating of normal passageways in machinery spaces of Category A shall be constructed of steel.

*Materials of overboard fittings*

14.9.7 Materials readily rendered ineffective by heat shall not be used for overboard scuppers, sanitary discharges, and other outlets which are close to the waterline and where the failure of the material in the event of fire would give rise to danger of flooding.

**14.9 Notification of Crew and Passengers**

*Purpose*

14.9.1 The purpose of this paragraph is to notify crew and passengers of a fire for safe evacuation. For this purpose, a general emergency alarm system and a public address system shall be provided.

*General Emergency Alarm System*

14.9.2 A general emergency alarm system required by section 13.9.5 shall be used for notifying crew and passengers of a fire.

*Public Address Systems*

14.9.3 A public address system or other effective means of communication complying with the requirements of Section 13.9.6 shall be available throughout the accommodation, service spaces, control stations and open decks.

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<sup>50</sup> Revised Guidelines for the approval of Equivalent Water-Based Fire Extinguishing Systems for Machinery Spaces and Cargo Pump-Rooms, as further amended by MSC.1/Circ.1237

<sup>51</sup> Guidelines for the Approval of Fixed Water-Based Local Application Fire-Fighting Systems for use in Category A Machinery Spaces

<sup>52</sup> Unified Interpretations of the Guidelines for Approval of Fixed Water-Based Local Application Fire-Fighting Systems (MSC/Circ.913)

<sup>53</sup> Unified Interpretations of SOLAS Chapter II-2

**14.10 Means of Escape***Purpose*

- 14.10.1 The purpose of this paragraph 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-
- .1 safe escape routes shall be provided;
  - .2 escape routes shall be maintained in a safe condition, clear of obstacles; and
  - .3 additional aids for escape shall be provided as necessary to ensure accessibility, clear marking, and adequate design for emergency situations.

*General Requirements*

- 14.10.2 Unless expressly provided otherwise in this paragraph, at least two widely separated and ready means of escape shall be provided from all spaces or groups of spaces.
- 14.10.3 Lifts shall not be considered as forming one of the means of escape as required by this paragraph.

*Means of Escape from Control Stations, Accommodation Spaces and Service Spaces*

- 14.10.4 Stairways and ladders shall be so arranged as to provide ready means of escape to the lifeboat and liferaft embarkation deck from passenger and crew accommodation spaces and from spaces in which the crew is normally employed, other than machinery spaces.
- 14.10.5 A corridor, lobby, or part of a corridor from which there is only one route of escape shall be prohibited, provided that-
- .1 dead-end corridors used in service areas which are necessary for the practical utility of the ship, such as fuel oil stations and athwartship supply corridors, shall be permitted where such dead-end corridors are separated from crew accommodation areas and are inaccessible from passenger accommodation areas; and
  - .2 a part of a corridor that has a depth not exceeding its width is considered a recess or local extension and is permitted.
- 14.10.6 All stairways in accommodation and service spaces and control stations shall be of steel frame construction except where the BMA sanctions the use of other equivalent material.
- 14.10.7 If a radiotelegraph station has no direct access to the open deck, two means of escape from, or access to, the station shall be provided, one of which may be a porthole or window of sufficient size or other means to the satisfaction of the BMA.
- 14.10.8 Doors in escape routes shall, in general, open in way of the direction of escape, except that-
- .1 individual cabin doors may open into the cabins in order to avoid injury to persons in the corridor when the door is opened; and



.2 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.

14.10.9 Below the bulkhead deck, two means of escape, at least one of which shall be independent of watertight doors, shall be provided from each watertight compartment or similarly restricted space or group of spaces; provided that, exceptionally, the BMA may dispense with one of the means of escape for crew spaces that are entered only occasionally and where the required escape route is independent of watertight doors.

14.10.10 Where the BMA has granted dispensation under the provisions of 14.10.9, this sole means of escape shall provide safe escape and stairways shall not be less than 800 millimetres in clear width with handrails on both sides.

14.10.11 Above the bulkhead deck there shall be at least two means of escape from each main vertical zone or similarly restricted space or group of spaces, at least one of which shall give access to a stairway forming a vertical escape.

14.10.12 *Stairway enclosures including "horizontal stairways" in accommodation and service spaces shall comply with the following provisions-*

- .1 they shall have direct access from the corridors and be of a sufficient area to prevent congestion, having in view the number of persons likely to use them in an emergency;
- .2 within the perimeter of such stairway enclosures, only public toilets and lockers of non-combustible material providing storage for non-hazardous safety equipment are permitted;
- .3 direct access to the stairway enclosures shall be permitted only from the following spaces-
  - i. public spaces;
  - ii. corridors;
  - iii. lifts;
  - iv. public toilets;
  - v. lockers of non-combustible material providing storage for non-hazardous safety equipment;
  - vi. other escape stairways required by 14.10.13; and
  - vii. external areas;
- .4 small corridors or "lobbies" used to separate an enclosed stairway from galleys or laundries may have direct access to the stairway provided they have a minimum deck area of 4.5 m<sup>2</sup>, a width of no less than 900 millimetres and contain a fire hose station.

- 14.10.13 At least one of the means of escape required by 14.10.9 and 14.10.11 shall consist of a readily accessible enclosed stairway which shall comply with the following provisions<sup>54</sup> -
- i. it shall provide continuous fire shelter from the level of its origin to the appropriate lifeboat and liferaft embarkation decks, or to the uppermost weather deck if the embarkation deck does not extend to the main vertical zone being considered;
  - ii. where the latter case in 14.10.13.i applies, direct access to the embarkation deck by way of external open stairways and passageways shall be provided and shall have emergency lighting in accordance with section 13.14.4 and slip-free surfaces underfoot; and
  - iii. boundaries facing external open stairways and passageways forming part of an escape route and boundaries in such a position that their failure during a fire would impede escape to the embarkation deck shall have fire integrity, including insulation values, in accordance with section 14.7.46.
- 14.10.14 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 14.1 and 14.2, as appropriate.
- 14.10.15 Stairways serving only a space and a balcony in that space shall not be considered as forming one of the required means of escape.
- 14.10.16 Each level within an atrium shall have two means of escape, one of which shall give direct access to an enclosed vertical means of escape meeting the requirements of 14.10.13.
- 14.10.17 The widths, number and continuity of escapes shall be in accordance with the requirements in the Fire Safety Systems Code.
- 14.10.18 *In addition to the emergency lighting supplied by the emergency source of electrical power, the means of escape, including stairways and exits, shall be provided with low location lighting systems as follows<sup>55</sup>*
- .1 *subject to .2 shall be marked by lighting or photoluminescent strip indicators placed not more than 300 millimetres above the deck at all points of the escape route including angles and intersections such that the marking enables passengers to identify the routes of escape and readily identify the escape exits;*
  - .2 *alternative means of achieving safe escape other than lighting and or photoluminescent strips may be considered by the BMA where such alternative*

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<sup>54</sup> Refer to Unified Interpretations of SOLAS Chapter II-2, the Fire Safety Systems Code, the Fire Test Procedures Code and Related Fire Test Procedures (MSC/Circular.1120)

<sup>55</sup> See also MSC/Circular.1168 - Interim Guidelines for the Testing, Approval and Maintenance of Evacuation Guidance Systems Used as an Alternative to Low-Location Lighting Systems

*provides the same level of efficiency the marking or alternative means of achieving escape shall enable passengers to identify the routes of escape and readily identify the escape exits;*

- .3 all electrically operated systems shall be operated from the navigation bridge or continuously manned Central Control Station and supplied by the emergency source of power;*
- .4 lighting shall be so arranged that the failure of any single component shall not result in the system or any part thereof being rendered ineffective;*
- .5 additionally, escape route signs and fire equipment location markings shall be of photoluminescent material or marked by lighting; and*
- .6 lighting or photoluminescent equipment used in compliance with this Section has been evaluated, tested and applied in accordance with the guidelines developed by the IMO<sup>56</sup>, or to an international standard acceptable to the BMA<sup>57</sup>.*

- 14.10.19 Cabin and stateroom doors shall not require keys to unlock them from inside the room. Neither shall there be any doors along any designated escape route which require keys to unlock them when moving in the direction of escape.
- 14.10.20 *Escape doors from public spaces that are normally latched shall be fitted with a means of quick release arrangement consisting of a door-latching mechanism incorporating a device that releases the latch upon the application of a force in the direction of escape flow; such quick release mechanisms shall be designed and installed to the satisfaction of the BMA<sup>58</sup>. Power operated sliding doors shall also comply with 14.7.35.8, 14.7.35.9, 14.7.35.10 and 14.7.35.14.*
- 14.10.21 At least two emergency escape breathing devices shall be carried in each main vertical zone.
- 14.10.22 Emergency escape breathing devices shall comply with the Fire Safety Systems Code. Spare emergency escape breathing devices shall be kept onboard.

*Means of Escape from Machinery Spaces*

- 14.10.23 Where the space is below the bulkhead deck, the two means of escape shall consist of either-
  - .1 two sets of steel ladders, as widely separated as possible, leading to doors in the upper part of the space, similarly separated and from which access is provided to the appropriate lifeboat and liferaft embarkation decks, provided that-

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<sup>56</sup> Refer to the Guidelines for the evaluation, testing and application of low-location lighting on passenger ships as adopted by the IMO by resolution A.752(18)

<sup>57</sup> Such as ISO 15370:2011 on Low-location lighting on passenger ships

<sup>58</sup> Further requirements for quick release mechanisms are provided for in SOLAS but are not applicable to yachts to which the Code applies due to the fact that the Code limits the total number of persons onboard to a maximum of 99 and hence the number of persons (passengers and crew) expected to be situated in such locations is limited.

- i. one of these ladders shall be located within a protected enclosure that satisfies category (4), as appropriate, from the lower part of the space it serves to a safe position outside the space;
  - ii. self-closing fire doors of the same fire integrity standards shall be fitted in the enclosure;
  - iii. the ladder shall be fixed in such a way that heat is not transferred into the enclosure through non-insulated fixing points; and
  - iv. the protected enclosure shall have minimum internal dimensions of at least 800 millimetres x 800 millimetres<sup>59</sup>, and shall have emergency lighting provisions; or
- .2 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.

14.10.24 Subject to 14.10.25, where the space is above the bulkhead deck, the two means of escape shall be as widely separated as possible and the doors leading from such means of escape shall be in a position from which access is provided to the appropriate lifeboat and liferaft embarkation decks and where such means of escape require the use of ladders, these shall be of steel.

14.10.25 The BMA may dispense with one of the means of escape required under 14.10.23 and 14.10.24 under the following conditions-

- .1 in a ship of less than 1,000 gross tonnage due regard being paid to the width and disposition of the upper part of the space;
- .2 *in a ship of 1,000 gross tonnage and above where either a door or a steel ladder provides a safe escape route to the embarkation deck, due regard being paid to the nature and location of the space and whether persons are normally employed in that space and a space may include a normally unattended auxiliary machinery space.*

14.10.26 Two means of escape shall be provided from a machinery control room located within a machinery space, at least one of which shall provide continuous fire shelter to a safe position outside the machinery space.

14.10.27 In the steering gear space, a second means of escape shall be provided when the emergency steering position is located in that space unless there is direct access to the open deck.

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<sup>59</sup> See MSC.1/Circ.1511 Unified Interpretations of SOLAS Regulations II-2/9 and II-2/13 for interpretation of clear width for escape trunks

- 14.10.28 On all ships, within the machinery spaces, emergency escape breathing devices which comply with the Fire Safety Systems Code shall be situated ready for use at easily visible places, which can be reached quickly and easily at any time in the event of fire and the number and location of such devices shall be to the satisfaction of the BMA and shall take into account the layout of the machinery spaces and the number of persons normally working in the spaces.
- 14.10.29 The number and location of the emergency escape breathing devices required under 14.10.28 shall be indicated in the fire control plan.
- 14.10.30 All inclined ladders/stairways fitted to comply with section 14.10.23 with open treads in machinery spaces being part of or providing access to escape routes but not located within a protected enclosure shall be made of steel. Such ladders/stairways shall be fitted with steel shields attached to their undersides, such as to provide escaping personnel protection against heat and flame from beneath.

*Escape from main workshops within machinery spaces*

- 14.10.31 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.

**14.11 Emergency Training and Drills**

- 14.11.1 See section 29 for requirements

**14.12 Operations**

*Purpose*

- 14.12.1 The purpose of this Section is to provide information and instructions for proper ship handling operations in relation to fire safety and for this purpose, fire safety operational booklets shall be provided onboard.
- 14.12.2 The required fire safety operational booklet shall contain the necessary information and instructions for the safe operation of the ship in relation to fire safety and the booklet shall include information concerning the crew's responsibilities for the general fire safety of the ship at all times.
- 14.12.3 The fire safety operational booklet shall be in the working language of the ship and shall be provided in each crew mess room and recreation room or in each crew cabin.
- 14.12.4 The fire safety operational booklet may be combined with the training manuals required in section 29.8

**14.13 Protection of Garage Spaces***Purpose*

14.13.1 *The purpose of this paragraph is to provide additional safety measures in order to address the fire safety objectives of this Section for ships fitted with garage spaces and for this purpose, the following functional requirements shall be met:*

- .1 fire protection systems shall be provided to adequately protect the ship from the fire hazards associated with garage spaces;*
- .2 sources of ignition shall be separated from garage spaces; and*
- .3 garage spaces shall be adequately ventilated.*

*Application*

14.13.2 *In addition to complying with the requirements of this Section, as appropriate, garage spaces shall also comply with the requirements of this section.*

*Measures*

14.13.3 *There shall be provided an effective power ventilation system sufficient to give at least 6 air changes per hour, except as provided in 14.13.21 where there shall be at least 10 air changes per hour, which shall comply with the following provisions-*

- .1 it shall be separate from other ventilation systems and shall be in operation at all times;*
- .2 ventilation ducts serving such spaces capable of being effectively sealed shall be separated for each such space; and*
- .3 the system shall be capable of being controlled from a position outside such spaces.*
- .4 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>60</sup>;*

14.13.4 *The ventilation system shall be such as to prevent air stratification and the formation of air pockets.*

14.13.5 *Means shall be provided on the navigation bridge to indicate any loss of the required ventilating capacity.*

14.13.6 *Arrangements shall be provided to permit a rapid shutdown and effective closure of the ventilation system from outside of the space in case of fire, taking into account the weather and sea conditions.*

14.13.7 *Ventilation ducts, including dampers, shall be made of steel and ventilation ducts that pass through other horizontal zones or machinery spaces shall be "A-60" class steel ducts.*

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<sup>60</sup> Refer to the revised design guidelines and operational recommendations for ventilation systems in ro-ro cargo spaces (MSC.1/Circ.1515)

- 14.13.8 *Permanent openings in the side plating, the ends or deckhead of the space shall be so situated that a fire in the garage space does not endanger stowage areas and embarkation stations for survival craft and rescue boats where no lifeboats are carried and accommodation spaces, service spaces and control stations in superstructures and deckhouses above the garage spaces.*
- 14.13.9 *Except as provided in 14.13.21, electrical equipment and wiring shall be of a type suitable for use in an explosive petrol and air mixture<sup>61</sup>.*
- 14.13.10 *Electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.*
- 14.13.11 *Other equipment which may constitute a source of ignition of flammable vapours shall not be permitted.*
- 14.13.12 *Smoking shall not be permitted and "No-Smoking" signs shall be prominently displayed.*
- 14.13.12 *Scuppers, piping and drainage connections for the space shall be non-combustible and shall not be led to machinery or other spaces where sources of ignition may be present.*
- 14.13.14 *Garage spaces are not to give direct access to any space other than a fuel store or lockers used within the space, unless provided with a lobby in accordance with the fire integrity requirements of Tables 14.1 and 14.2 (considered as a 'Corridor') and the provisions of section 3.6.1 with respect to Load Lines are also to be complied as with as applicable.*
- 14.13.15 *There shall be provided a fixed fire detection and fire alarm system complying with the requirements of the Fire Safety Systems Code and with the following provisions-*
- .1 the fixed fire detection system shall be capable of rapidly detecting the onset of fire;*
  - .2 the type of detectors and their spacing and location shall be to the satisfaction of the BMA, taking into account the effects of ventilation and other relevant factors; and*
  - .3 after being installed, the system shall be tested under normal ventilation conditions and shall give an overall response time to the satisfaction of the BMA.*
- 14.13.16 *Manually operated call points shall be spaced so that no part of the space is more than 20 metres from a manually operated call point, and one shall be placed close to each exit from such spaces.*
- 14.13.17 *The boundary bulkheads and decks of garage spaces shall have fire integrity in accordance with Tables 14.1 and 14.2.*

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<sup>61</sup> Refer to the recommendations of the International Electrotechnical Commission, in particular publication 60079

- 14.13.18 *Garage spaces shall be fitted with a fixed pressure water-spray fire-extinguishing system which shall comply with the Fire Safety Systems Code; provided that the BMA may permit the use of any other fixed fire-extinguishing system<sup>62</sup> that has been shown, by a full-scale test in conditions simulating a flowing petrol fire in a garage space or a ro-ro space, to be not less effective in controlling fires likely to occur in a garage space.*
- 14.13.19 *When fixed pressure water-spray fire-extinguishing systems are provided, in view of the serious loss of stability which could arise<sup>63</sup> due to large quantities of water accumulating on the deck or decks during the operation of the water-spraying system, the following arrangements shall be provided:*
- .1 in the spaces above the bulkhead deck, scuppers shall be fitted so as to ensure that such water is rapidly discharged directly overboard;*
  - .2 in the spaces below the bulkhead deck, the BMA may require additional pumping and drainage facilities and in such case-*
    - i. the drainage system shall be sized to remove no less than 125% of the combined capacity of both the water-spraying system pumps and the required number of fire hose nozzles; and*
    - ii. the drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls.*
- 14.13.20 *At least two portable foam fire extinguishers or equivalent shall be provided at each deck level in each garage space and at least one portable fire extinguisher shall be located at each access to such space.*
- 14.13.21 *Notwithstanding the provisions in 14.13.3 and 14.13.9, except for cases where passengers are allowed access to a garage space, the ventilation system may be so designed and operated as to provide continuous ventilation of the space at the rate of at least 10 air changes per hour subject to, any electrical equipment being of a type so enclosed and protected as to prevent the escape of sparks within a height of 450 millimetres from the deck.*
- 14.13.22 *Provision shall be made to ensure that vehicles, craft, recreational diving systems and ancillary equipment are securely fastened with due consideration being given to the motion of the Yacht and possible movement between components. The design of Diving equipment mounting and securing arrangements shall also consider mitigating the effects of heat transmission in the event of a fire in an adjacent space.*

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<sup>62</sup> Refer to revised Guidelines for the Design and Approval of Fixed Water-Based Fire-Fighting Systems for Ro-Ro Spaces and Special Category Spaces (MSC.1/Circular.1430)

<sup>63</sup> Attention is drawn to IMO Resolution MSC.256(84) and the associated Circular MSC/Circ.1320 (paragraphs 1.1.2 and 3.1.1), with respect to the drainage of fire fighting water from spaces above the bulkhead deck in passenger ships



**14.14 Safety Centre**

*Purpose*

14.14.1 The purpose of this regulation is to provide a space to assist with the management of emergency situations.

*Location and arrangement*

14.14.2 The safety centre shall either be a part of the navigation bridge or be located in a separate space adjacent to and having direct access to the navigation bridge, so that the management of emergencies can be performed without distracting watch officers from their navigational duties.

*Layout and ergonomic design*

14.14.3 The layout and ergonomic design of the safety centre shall take into account the guidelines developed by the IMO<sup>64</sup>, as appropriate.

*Communications*

14.14.4 Means of communication between the safety centre, the central control station, the navigation bridge, the engine control room, the storage room(s) for fire extinguishing system(s) and fire equipment lockers shall be provided.

*Control and monitoring of safety systems*

14.14.5 *Notwithstanding the requirements set out elsewhere in the Code, the full functionality (operation, control, monitoring or any combination thereof, as required) of the safety systems listed below shall be available from the safety centre if applicable:*

- .1 all powered ventilation systems;
- .2 fire doors;
- .3 general emergency alarm system;
- .4 public address system;
- .5 electrically powered evacuation guidance systems;
- .6 watertight and semi-watertight doors;
- .7 indicators for shell doors, loading doors and other closing appliances;
- .8 water leakage of inner/outer bow doors, stern doors and any other shell door;
- .9 television surveillance system;
- .10 fire detection and alarm system;
- .11 fixed fire-fighting local application system(s);
- .12 sprinkler and equivalent systems;
- .13 water-based systems for machinery spaces;
- .14 alarm to summon the crew;
- .15 atrium smoke extraction system;

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<sup>64</sup> Refer to Interim Clarifications of SOLAS Chapter II-2 Requirements Regarding Interrelation Between the Central Control Station, Navigation Bridge and Safety Centre (MSC.1/Circular.1368)

- .16 flooding detection systems; and
- .17 fire pumps and emergency fire pumps.

**14.15 Arrangements for Recreational Fire Appliances**

14.15.1 *'Recreational Fire Appliances' as defined in Section 2, shall meet the requirements of section 36.*

**14.16 Storage of Large Quantities of Petrol in Fixed Tanks**

14.16.1 This section shall be applied to dedicated petrol (gasoline) tanks used for refilling the yacht's tenders and jet skis, etc. located in a specially dedicated space. If such a petrol storage system is proposed, the safety considerations outlined in this section shall be met to the satisfaction of the BMA.

14.16.2 Storage tank design, construction and material shall be in accordance with the rules of a Recognised Organisation. Independent tanks shall be constructed of steel with no penetrations in bottom and sides.

14.16.3 Storage tanks shall be located in a dedicated gas tight compartment for that purpose only, except associated equipment for fuel transfer is allowed in this space.

- 14.16.4 Tanks may not be stored:
- .1 within category A machinery spaces;
  - .2 under sleeping accommodation;
  - .3 forward of the collision bulkhead;
  - .4 less than B/5 from ship side;
  - .5 less than 760 millimetres from bottom plating; and
  - .6 adjacent to the aft end.

14.16.5 Tanks shall be explosion protected, meeting Recognised Organisation rules, to ventilate the storage tanks to a safe location to the satisfaction of the BMA and to prevent the risk of overpressure and fire/explosion. A vapour recovery system is recommended.

14.16.6 Remote means of tank level monitoring shall be provided outside the tank space, with a high-level alarm to prevent overfilling of the tank. Gauge glasses are not permitted.

14.16.7 The space in which the tank is situated shall have gastight boundaries to adjacent spaces and be insulated to class "A-60".

14.16.8 The tank space fire detection shall be part of the vessel's addressable fire detection system.

14.16.9 The tank space fire suppression shall be fitted with a manual water spray system giving a coverage of 3.5 litre/m<sup>2</sup>/minute over the total area of deck, which may be taken from the fire main with the isolating valve located outside the space. An equivalent arrangement may be considered. Adequate provision shall be made for drainage of water introduced to

the space. This shall not lead to machinery or other spaces where a source of ignition may exist.

- 14.16.10 The tank space ventilation shall provide the following:
- .1 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>65</sup>;
  - .2 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);
  - .3 exhaust ducting shall be arranged to extract from the lower bilge area;
  - .4 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
  - .5 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.
- 14.16.11 The tank space ventilation outlet shall be located in a safe position and shall be fitted with a flame arrester in accordance with IMO MSC/Circ.677.
- 14.16.12 Tank space water drainage system shall be provided, sized to remove no less than 125% of the water capacity from the required fire-suppression systems, and shall not be connected to any other system. Alternatively, if stability requirements are still met in the event of the tank space being completely filled with water, the drainage system can be less than the capacity of the required fire suppression systems.
- 14.16.13 A suitable gas detection system shall be provided, with audible and visual alarm in the wheelhouse in each space through which petrol lines pass, including the tank space, in accordance with the Rules of a Recognised Organization.
- 14.16.14 Electrical equipment, including fixed and portable lighting, for use in the tank space and within the hazardous zone areas shall be kept to a minimum and shall be certified safe for petrol vapours.
- 14.16.15 Petrol system pipework shall:
- .1 be steel and enclosed within a gas tight steel box or pipe fitted with a leak detection system;
  - .2 if within a steel box/cofferdam, then the space shall have a petrol vapour gas detection system;
  - .3 not be led directly through accommodation or machinery spaces; and
  - .4 between storage tank, dispenser and bunker station be kept as short as possible.

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<sup>65</sup> Refer to the revised design guidelines and operational recommendations for ventilation systems in ro-ro cargo spaces (MSC.1/Circ.1515)

- 14.16.16 Any flexible piping, if required for flexible connections, shall conform to an appropriate standard, be certified for use with petrol (hydrocarbons), be kept as short as possible and be protected from inadvertent damage. Flexible piping shall be installed in a manner to allow access along its length. Proposals for a more extensive use of flexible piping shall be submitted to the BMA for approval on an individual basis.
- 14.16.17 Shore to vessel petrol bunker connections shall be of closed type and suitably grounded during bunkering operations.
- 14.16.18 At least two portable foam fire extinguishers or equivalent for petrol fires, of at least 9 litres capacity, shall be provided near the petrol dispenser.
- 14.16.19 At least two portable foam fire extinguishers or equivalent for petrol fires, of at least 9 litres capacity, shall be provided near the filling (bunker) station
- 14.16.20 Means shall be provided for leakage protection to contain and remove any leakages from the storage tanks, dispenser and bunker station equipment to a safe location, e.g. save-alls. The drainage system shall not be connected to any other onboard system.
- 14.16.21 Hazardous zone areas shall be provided in accordance with a Recognised Organisation's Rules, e.g. distance from the storage tank vent, dispenser and bunkering station to any sources of ignition.
- 14.16.22 Safety signage ("No Smoking" signs, etc.) shall be fixed or temporary safety signs shall be provided in accordance with recognised standards in all appropriate areas including, but not limited to:
- .1 bunkering
  - .2 dispensing
  - .3 tank storage
  - .4 vent outlets
- 14.16.23 Operational procedures shall be documented in the safety management system and enforced including, but not limited to:
- .1 Risk assessment carried out.
  - .2 Emergency procedures for various scenarios shall be developed and drilled, e.g. Shipboard Oil Pollution Emergency Plan (SOPEP) and bunkering and dispensing procedures.
  - .3 No storage within tank space.
  - .4 Regular tank space inspections for integrity/cleanliness.
  - .5 Tank space access hatch shall be kept closed except for entry.
  - .6 No unauthorised access to tank space.
  - .7 Entry into enclosed tank space procedures shall be enforced.
  - .8 No naked flames.

.9 No smoking.

**14.17 Additional Equivalence Considerations**

14.17.1 *None*

**14.18 Alternative Design and Arrangements**

14.18.1 *Vessels may follow Section 1.10 on Alternative Design and Arrangements for this section as allowed by SOLAS II-2 Regulation 17.*

**15 FIRE APPLIANCES****15.1 Water Supply**

- 15.1.1 Ships shall be provided with fire pumps, fire mains, hydrants and hoses complying with the applicable requirements of this paragraph.
- 15.1.2 Fire mains and hydrants shall comply with the following provisions-
- .1 materials readily rendered ineffective by heat shall not be used for fire mains and hydrants unless adequately protected;
  - .2 the fire main pipes and hydrants shall be so placed that the fire hoses may be easily coupled to them;
  - .3 the arrangement of pipes and hydrants shall be such as to avoid the possibility of freezing;
  - .4 suitable drainage provisions shall be provided for fire main piping; and
  - .5 isolation valves shall be installed for all open deck fire main branches used for purposes other than firefighting.
- 15.1.3 The arrangements for the ready availability of water supply shall be-
- .1 ships of 1,000GT and above such that at least one effective jet of water is immediately available from any hydrant in an interior location and so as to ensure the continuation of the output of water by the automatic starting of one required fire pump;
  - .2 ships of less than 1,000GT by automatic start of at least one fire pump or by remote starting from the navigation bridge of at least one fire pump. If the pump starts automatically or if the bottom valve cannot be opened from where the pump is remotely started, the bottom valve shall always be kept open; and
  - .3 if fitted with periodically unattended machinery space the BMA shall determine provisions for fixed water fire-extinguishing arrangements for such spaces equivalent to those required for normally attended machinery spaces.
- 15.1.5 The diameter of the fire main and water service pipes shall be sufficient for the effective distribution of the maximum required discharge from two fire pumps operating simultaneously.
- 15.1.6 Isolating valves, emergency fire pumps and their associated arrangements shall comply with the following provisions-
- .1 isolating valves which separate the section of the fire main within the machinery space containing the main fire pump or pumps from the rest of the fire main shall be fitted in an easily accessible and tenable position outside the machinery spaces;
  - .2 the fire main shall be so arranged that when the isolating valves are shut all the hydrants on the ship, except those in the machinery space referred to above, can be supplied with water by another fire pump or an emergency fire pump;

- .3 subject to 15.1.6.4, the emergency fire pump, its seawater inlet, and suction and delivery pipes and isolating valves shall be located outside the machinery space;
  - .4 if the arrangement referred to in 15.1.6.3 cannot be complied with, the sea chest may be fitted in the machinery space if the valve is remotely controlled from a position in the same compartment as the emergency fire pump and the suction pipe is as short as practicable; and
  - .5 short lengths of suction or discharge piping may penetrate the machinery space, provided such pipes-
    - i. are enclosed in a substantial steel casing or are insulated to "A-60" class standards;
    - ii. have substantial wall thickness, but in no case less than 11 millimetres; and
    - iii. shall be welded except for the flanged connection to the sea inlet valve.
- 15.1.7 A valve shall be fitted to serve each fire hydrant so that any fire hose may be removed while the fire pumps are in operation.
- 15.1.8 Relief valves shall be provided in conjunction with fire pumps if the pumps are capable of developing a pressure exceeding the design pressure of the water service pipes, hydrants and hoses. These valves shall be so placed and adjusted as to prevent excessive pressure in any part of the fire main system.
- 15.1.9 The number and position of hydrants shall be such that at least two jets of water not emanating from the same hydrant, one of which shall be from a single length of hose, may reach any part of the ship normally accessible, when the ship is being navigated, to the passengers or crew.
- 15.1.10 In addition to the requirements in 15.1.9, ships shall comply with the following:
  - .1 in the accommodation, service and machinery spaces, the number and position of hydrants shall be such that the requirements of section 15.1.9 may be complied with when all watertight doors and all doors in main vertical zone bulkheads are closed; and
  - .2 where access is provided to a machinery space of category A at a low level from an adjacent shaft tunnel, two hydrants shall be provided external to, but near the entrance to, that machinery space. Where such access is provided from other spaces, in one of those spaces two hydrants shall be provided near the entrance to the machinery space of category A. Such provision need not be made where the tunnel or adjacent spaces are not part of the escape route.
- 15.1.11 With the two pumps simultaneously delivering water through the nozzles specified in 15.2.5 to 15.2.7, with the quantity of water as specified in 15.1.5, through any adjacent hydrants, the following minimum pressures shall be maintained at all hydrants-

Gross tonnage	Minimum pressure
4,000 and upwards	0.40 N/mm <sup>2</sup>
Less than 4,000	0.30 N/mm <sup>2</sup>

provided that the maximum pressure at any hydrant shall not exceed that at which the effective control of a fire hose can be demonstrated.

15.1.12 Ships of 500GT and above shall be provided with at least one international shore connection complying with the Fire Safety Systems Code.

15.1.13 Facilities shall be available enabling such a connection to be used on either side of the ship.

15.1.14 *Sanitary, ballast, bilge or general service pumps may be accepted as fire pumps, provided that they are not normally used for pumping oil.*

15.1.15 Ships shall be provided with independently driven fire pumps as follows:

Gross tonnage	No. of pumps
4,000 and upwards	At least three
Less than 4,000	At least two

15.1.16 The arrangement of sea connections, fire pumps and their sources of power shall be as to ensure that:

- .1 in ships of 1,000GT and above, in the event of a fire in any one compartment, all the fire pumps shall not be put out of action; and
- .2 in ships of less than 1,000GT and above, if a fire in any one compartment could put all the pumps out of action, there shall be an alternative means consisting of an emergency fire pump complying with the provisions of the Fire Safety Systems Code with its source of power and sea connection located outside the space where the main fire pumps or their sources of power are located.

15.1.17 The space containing the emergency fire pump shall not be contiguous to the boundaries of machinery spaces of category A or those spaces containing main fire pumps; provided that where this is not practicable, the common bulkhead between the two spaces shall be insulated to a standard of structural fire protection equivalent to that required for a control station.

15.1.18 No direct access shall be permitted between the machinery space and the space containing the emergency fire pump and its source of power, provided that-

- .1 when this is impracticable, the BMA may accept an arrangement where the access is by means of an airlock with the door of the machinery space being of



- "A-60" class standard and the other door being at least steel, both reasonably gastight, self-closing and without any hold-back arrangements;
- .2 alternatively, the access may be through a watertight door capable of being operated from a space remote from the machinery space and the space containing the emergency fire pump and unlikely to be cut off in the event of fire in those spaces; and
- .3 a second means of access to the space containing the emergency fire pump and its source of power shall be provided.

15.1.19 Ventilation arrangements to the space containing the independent source of power for the emergency fire pump shall be such as to preclude, as far as practicable, the possibility of smoke from a machinery space fire entering or being drawn into that space.

15.1.20 The required fire pumps shall be capable of delivering for fire-fighting purposes a quantity of water not less than two thirds of the quantity required to be dealt with by the bilge pumps when employed for bilge pumping at the pressure specified in 15.1.11.

15.1.21 Each of the required fire pumps shall-

- .1 have a capacity not less than 80% of the total required capacity divided by the minimum number of required fire pumps, but in any case not less than 25 m<sup>3</sup>/h and each such pump shall in any event be capable of delivering at least the two required jets of water;
- .2 be capable of supplying the fire main system under the required conditions, and where more pumps than the minimum of required pumps are installed, such additional pumps shall have a capacity of at least 25m<sup>3</sup>/h and shall be capable of delivering at least the two jets of water required in 15.1.9.

## **15.2 Fire Hoses and Nozzles**

15.2.1 Fire hoses shall:

- .1 be of non-perishable material approved by the BMA;
- .2 be sufficient in length to project a jet of water to any of the spaces in which they may be required to be used;
- .3 each be provided with a nozzle and the necessary couplings;
- .4 where specified in this Section as "fire hoses", be kept ready for use in conspicuous positions near the water service hydrants or connections, together with any necessary fittings and tools; and
- .5 have a length of at least 10 metres, but not more than-
  - i. 15 metres in machinery spaces; and
  - ii. 20 metres in other spaces and open decks.

15.2.2 Unless one hose and nozzle is provided for each hydrant in the ship, there shall be complete interchangeability of hose couplings and nozzles.

- 15.2.3 Ships shall be provided with fire pumps, fire mains, hydrants and hoses complying with the applicable requirements of this section.
- 15.2.4 There shall be at least one fire hose for each of the hydrants required by 15.1.9 and 15.1.10 and these hoses shall be used only for the purposes of extinguishing fires or testing the fire-extinguishing apparatus at fire drills and surveys.
- 15.2.5 Standard nozzle sizes shall be 12 millimetres, 16 millimetres and 19 millimetres or as near thereto as possible provided that larger diameter nozzles may be permitted at the discretion of the BMA.
- 15.2.6 For accommodation and service spaces, a nozzle size greater than 12 millimetres need not be used.
- 15.2.7 For machinery spaces and exterior locations, the nozzle size shall be such as to obtain the maximum discharge possible from two jets at the pressure prescribed in 15.1.11 from the smallest pump, provided that a nozzle size greater than 19 millimetres need not be used.
- 15.2.8 Nozzles shall be of an approved dual-purpose type (i.e. spray/jet type) incorporating a shutoff.
- 15.3 Portable Fire extinguishers**
- 15.3.1 Portable fire extinguishers shall comply with the requirements of the Fire Safety Systems Code.
- 15.3.2 Accommodation spaces, service spaces and control stations shall be provided with portable fire extinguishers of appropriate types and in sufficient number to the satisfaction of the BMA; ships of 1,000GT and above shall carry at least five portable fire extinguishers.
- 15.3.3 One of the portable fire extinguishers intended for use in any space shall be stowed near the entrance to that space.
- 15.3.4 Carbon dioxide fire extinguishers shall not be placed in accommodation spaces. In control stations and other spaces containing electrical or electronic equipment or appliances necessary for the safety of the ship, fire extinguishers shall be provided whose extinguishing media are neither electrically conductive nor harmful to the equipment and appliances.
- 15.3.5 Fire extinguishers shall be situated ready for use at easily visible places, which can be reached quickly and easily at any time in the event of a fire, and in such a way that their serviceability is not impaired by the weather, vibration or other external factors and portable fire extinguishers shall be provided with devices which indicate whether they have been used.

- 15.3.6 Spare charges shall be provided for 100% of the first ten extinguishers and 50% of the remaining fire extinguishers capable of being recharged onboard provided that not more than sixty total spare charges are required; instructions for recharging shall be carried onboard.
- 15.3.7 For fire extinguishers which cannot be recharged onboard, additional portable fire extinguishers of the same quantity, type, capacity and number as determined in 15.3.6 above shall be provided in lieu of spare charges.
- 15.4 Fixed fire-extinguishing systems**
- 15.4.1 A fixed fire-extinguishing system required by 15.5.1 may be any of the following systems-
- .1 a fixed gas fire-extinguishing system complying with the provisions of the Fire Safety Systems Code;
  - .2 a fixed high-expansion foam fire-extinguishing system complying with the provisions of the Fire Safety Systems Code; and
  - .3 a fixed pressure water-spraying fire-extinguishing system complying with the provisions of the Fire Safety Systems Code.
- 15.4.2 Where a fixed fire-extinguishing system not required by this Section is installed, it shall meet the requirements of the relevant requirements of this Section and the Fire Safety Systems Code.
- 15.4.3 Fire-extinguishing systems using Halon 1211 (bromochlorodifluoromethane), Halon 1301 (bromotrifluoromethane), Halon 2402 (dibromotetrafluoroethane) and perfluorocarbons are not permitted.
- 15.4.4 Fire extinguishing systems using steam as a fire-extinguishing medium are not permitted.
- 15.4.5 Where a fixed gas fire-extinguishing system is used, openings which may admit air to, or allow gas to escape from, a protected space shall be capable of being closed from outside the protected space.
- 15.4.6 When the fire-extinguishing medium is stored outside a protected space the storage shall comply with the following provisions<sup>66</sup> -
- .1 the medium shall be stored in a room which is located behind the forward collision bulkhead, and is used for no other purposes;
  - .2 any entrance to such a storage room shall preferably be from the open deck and shall be independent of the protected space;

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<sup>66</sup> See also interpretation of SOLAS II-2 Regulation 10.4.3 in MSC/Circ.1120

- .3 where the storage space is located below deck, it shall be located no more than one deck below the open deck and shall be directly accessible by a stairway or ladder from the open deck;
  - .4 spaces which are located below deck or spaces where access from the open deck is not provided shall be fitted with a mechanical ventilation system designed to take exhaust air from the bottom of the space and shall be sized to provide at least 6 air changes per hour;
  - .5 access doors shall open outwards, and bulkheads and decks, including doors and other means of closing any opening therein, which form the boundaries between such rooms and adjacent enclosed spaces shall be gastight; and
  - .6 for the purpose of the application of tables 14.1 and 14.2, such storage rooms shall be treated as control stations.
- 15.4.7 Pumps, other than those serving the fire main, required for the provision of water for fire extinguishing systems required by this Section, their sources of power and their controls shall be installed outside the space or spaces protected by such systems and shall be so arranged that a fire in the space or spaces protected shall not put any such system out of action.
- 15.5 Fire-Extinguishing Arrangements in Machinery Spaces**
- 15.5.1 Machinery spaces of category A shall be provided with any one of the fixed fire extinguishing systems in 15.4.1 and in each case, if the engine-room and boiler room are not entirely separate, or if fuel oil can drain from the boiler room into the engine-room, the combined engine and boiler rooms shall be considered as one compartment.
- 15.5.2 There shall be provided in each Machinery space of category A:
- .1 at least one portable foam applicator unit complying with the provisions of the Fire Safety Systems Code;
  - .2 approved fire extinguishers, each of at least 45 litre capacity or equivalent, sufficient in number to enable foam or its equivalent to be directed onto any part of the fuel and lubricating oil pressure systems, gearing and other fire hazards;
  - .3 in addition, there shall be provided a sufficient number of portable foam extinguishers or equivalent which shall be so located that no point in the space is more than 10 metres walking distance from an extinguisher provided that there are at least two such extinguishers in each space.
- 15.5.3 Where, in the opinion of the BMA, a fire hazard exists in any machinery space for which no specific provisions for fire-extinguishing appliances are prescribed there shall be provided in, or adjacent to, that space such a number of approved portable fire extinguishers or other means of fire extinction as the BMA may deem sufficient.

- 15.5.4 Subject to 15.5.5, machinery spaces of category A of any size<sup>67</sup> shall, in addition to the fixed fire-extinguishing system required in 15.5.1, be protected by an approved type of fixed water-based or equivalent local application fire-extinguishing system, based on the guidelines developed by the IMO<sup>68</sup> and in the case of periodically unattended machinery spaces, the fire-extinguishing system shall have both automatic and manual release capabilities; in the case of continuously manned machinery spaces, the fire extinguishing system is only required to have a manual release capability.
- 15.5.5 *The BMA may dispense with the requirement for a local application fire extinguishing system as required in 15.5.4 in machinery spaces of category A of less than 500m<sup>3</sup> volume, taking into account the type of machinery installed in such space.*
- 15.5.6 Fixed local application fire-extinguishing systems are to protect areas such as the following without the necessity of engine shutdown, personnel evacuation, or sealing of the spaces:
- .1 the fire hazard portions of internal combustion machinery;
  - .2 boiler fronts;
  - .3 the fire hazard portions of incinerators; and
  - .4 purifiers for heated fuel oil.
- 15.5.7 Activation of any local application system shall comply with the following provisions-
- .1 activation shall give a visual and distinct audible alarm in the protected space and at continuously manned stations;
  - .2 the alarm shall indicate the specific system activated; and
  - .3 the system alarm requirements described within this Section are in addition to, and not a substitute for, the detection and fire alarm system required elsewhere in this Section.
- 15.6 Fire-Extinguishing Arrangements in Control Stations, Accommodation and Service Spaces**
- 15.6.1 An automatic sprinkler or water spray system shall be installed as required by section 14.5.10.
- 15.6.2 A fixed pressure water-spraying fire-extinguishing system complying with the provisions of the Fire Safety Systems Code shall be installed on cabin balconies of ships to which 14.3.14 applies; where furniture and furnishings on such balconies are not *restricted fire risk articles as defined in Section 2 of the Code* provided that this section need not apply where it is possible to readily direct a jet of water, for firefighting purposes, on to such a

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<sup>67</sup> Under SOLAS, this provision applies only to machinery spaces of Category A above 500m<sup>2</sup> in volume.

<sup>68</sup> Refer to the Guidelines for the approval of fixed water-based local application fire fighting systems for use in Category A machinery spaces (MSC/Circ.913).

balcony from the deck immediately above or adjacent and where such balcony is not adjacent to life saving appliances.

- 15.6.3 Paint lockers shall be protected by either-
- .1 a carbon dioxide system, designed to give a minimum volume of free gas equal to 40% of the gross volume of the protected space;
  - .2 a dry powder system, designed for at least 0.5 kg powder/m<sup>3</sup>;
  - .3 a water spraying or sprinkler system, designed for 5 ltrs/m<sup>2</sup>/min. Water spraying systems may be connected to the fire main of the ship; or
  - .4 a system providing equivalent protection, as determined by the BMA.
- and in all cases, the system shall be operable from outside the protected space.
- 15.6.4 Flammable liquid lockers shall be protected by an appropriate fire-extinguishing arrangement approved by the BMA.
- 15.6.5 For lockers of a deck area of less than 4m<sup>2</sup>, which do not give access to accommodation spaces, a portable carbon dioxide fire extinguisher sized to provide a minimum volume of free gas equal to 40% of the gross volume of the space may be accepted in lieu of a fixed system provided that-
- .1 a discharge port shall be arranged in the locker to allow the discharge of the extinguisher without having to enter the protected space;
  - .2 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.
- 15.6.6 Deep-fat cooking equipment installed in enclosed spaces or on open decks shall be fitted with the following-
- .1 an automatic or manual fire-extinguishing system tested to an international standard acceptable to the BMA<sup>69</sup>;
  - .2 a primary and backup thermostat with an alarm to alert the operator in the event of failure of either thermostat;
  - .3 arrangements for automatically shutting off the electrical power upon activation of the fire-extinguishing system;
  - .4 an alarm for indicating operation of the fire-extinguishing system in the galley where the equipment is installed; and
  - .5 controls for manual operation of the fire-extinguishing system which are clearly labelled for ready use by the crew.

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<sup>69</sup> Refer to the recommendations by the International Organization for Standardization, in particular publication ISO 15371:2009, "Fire-extinguishing systems for protection of galley cooking equipment"

**15.7 Fire-Fighter's Outfits****15.7.1** Types of fire-fighter's outfits-

- .1 Fire-fighter's outfits shall comply with the Fire Safety Systems Code; and
- .2 Self-contained compressed air breathing apparatus of fire-fighter's outfits shall comply with paragraph 2.1.2.2 of chapter 3 of the Fire Safety Systems Code.

**15.7.2** Ships shall carry-

- .1 at least two fire-fighter's outfits;
- .2 additionally, for every 80 metres, or part thereof, of the aggregate of the lengths of all passenger spaces and service spaces on the deck which carries such spaces or, if there is more than one such deck, on the deck which has the largest aggregate of such length:
  - i. two fire-fighter's outfits; and
  - ii. two sets of personal equipment, each set comprising the items stipulated in the Fire Safety Systems Code.

**15.7.3** The fire-fighter's outfits or sets of personal equipment shall be kept ready for use in an easily accessible location that is permanently and clearly marked and, where more than one fire-fighter's outfit or more than one set of personal equipment is carried, they shall be stored in widely separated positions.

**15.7.4** The BMA may require additional sets of personal equipment and breathing apparatus, having due regard to the size and layout of the ship.

**15.7.5** Two spare charges shall be provided for each required breathing apparatus. Ships that are equipped with suitably located means for fully recharging the air cylinders free from contamination need carry only one spare charge for each required apparatus.

**15.7.6** A minimum of two two-way portable radiotelephone apparatus for each fire party for firefighter's communication shall be carried onboard – these shall be of an explosion-proof type or intrinsically safe.

**15.8 Additional Equivalence Considerations**

**15.8.1** *None*

**16 RADIO**

**16.1 Radiocommunications**

16.1.1 *Every ship to which this Code applies shall comply with the applicable requirements of SOLAS Chapter IV.*

**16.2 Additional Equivalence Considerations**

16.2.1 *None*



**17 NAVIGATION EQUIPMENT****17.1 Safety of Navigation**

17.1.1 *Every ship to which this Code applies shall comply with the applicable requirements of SOLAS Chapter V.*

17.1.2 *Deviations from the requirements for navigation bridge windows of SOLAS V/22.1.9.1 may be considered by the BMA, provided that they:*

- .1 provide safety standards at least equivalent to the requirements of this Section;
- .2 meet the intent of the requirements concerned; and
- .3 where necessary, have successfully undergone testing to the satisfaction of the BMA; or
- .4 have successfully undergone, an engineering analysis, evaluation and approval.

**17.2 Additional Equivalence Considerations**

17.2.1 *None*

## 18 MISCELLANEOUS EQUIPMENT

### 18.1 Nautical Publications

18.1.1 Every vessel shall carry nautical charts and nautical publications to plan and display the ship's route for the intended voyage and to plot and monitor positions throughout the voyage.

18.1.2 Where this function is partly or fully filled by Electronic Chart Display and Information System (ECDIS), back-up arrangements to meet these functional requirements shall be provided as follows:

- .1 Vessels of 3,000 gross tonnage and upwards shall be fitted with an ECDIS in accordance with 17.5.2 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.
- .2 Vessels under 3,000 gross tonnage 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.

NOTE – if ECDIS is fitted onboard it shall be type approved.

18.1.3 Where paper charts are used in accordance with 18.1.2.1 and 18.1.2.2, 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 BMA having regard for the type of vessel and suitable lighting shall be over the table with red lights for night work.

### 18.2 Measuring Instruments

18.2.1 Every vessel shall carry a barometer. Every sailing vessel shall carry an anemometer and an inclinometer.

### 18.3 Signalling Lamp

18.3.1 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 section 18.4. A spare bulb shall be carried for the signalling lamp.

**18.4 Searchlight**

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

**18.6 Vessel IMO Number**

18.6.1 Vessels of 300GT and above shall be permanently marked externally with the vessel's IMO number. This number shall be visible on either side of the hull or on the stern or on a horizontal surface visible from the air.

**18.7 Portable Atmosphere Testing Instrument or Instruments**

18.7.1 Every vessel 500GT and above shall carry an appropriate portable atmosphere testing instrument or instruments<sup>70</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>71</sup>.

18.7.2 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.

18.7.3 Vessels under 500GT where enclosed spaces are accessible to the crew, shall comply with Section 18.7.1.

**18.8 Additional Equivalence Considerations**

18.8.1 None

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<sup>70</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>71</sup> Refer to the Revised recommendations for entering enclosed spaces aboard ships (resolution A.1050(27))

## **19 ANCHORS AND CABLES**

### **19.1 Equipment**

- 19.1.1 Vessels will be considered to have adequate equipment if fitted out in accordance with standards for such equipment, set by a Recognised Organisation and holding relevant Class notation.
- 19.1.2 Vessels not equipped in accordance with section 19.1.1 may be specially considered by the BMA, provided full information is submitted for approval.
- 19.1.3 All vessels shall have at least 2 anchors. The anchors may be secured for sea but shall be available for use at short notice and anchors shall be available for immediate use during coastal and port transits. Any powered deployment system shall be connected to an emergency power supply or be capable of being manually operated.

### **19.2 Additional Equivalence Considerations**

- 19.2.1 None.

## 20 ACCOMMODATION AND RECREATIONAL FACILITIES

### 20.1 ILO Maritime Labour Convention

20.1.1 Ships constructed on or after 20 August 2013 shall be constructed, certificated and operated under the provisions of the MLC for passenger ships.

20.1.2 Ships constructed before 20 August 2013 shall comply with a relevant standard acceptable to the BMA.

## 21 ENVIRONMENTAL PROTECTION

### 21.1 General Requirements

- 21.1.1 A vessel complying with the Code shall meet international, national, regional and local requirements for the prevention of marine pollution which are applicable to the area in which the vessel is operating.
- 21.1.2 It is the responsibility owner/managing agent to ensure that the vessel is properly equipped and maintained to meet the relevant requirements.
- 21.1.3 It is also the responsibility of the owner/managing agent to ensure that a charterer of a vessel receives up-to-date and adequate information on prevention of pollution in the area in which the charterer intends to operate. The information may include the need to seek advice from local or harbour authorities, for which contact points shall be given.
- 21.1.4 The disposal of ship generated waste to port reception facilities is usually regulated. Vessels shall ensure they manage their wastes in a sustainable manner and fulfil the applicable requirements of any regulations.
- 21.1.5 Yachts shall not pollute the sea with oil or oil based products, sewage or garbage.

### 21.2 International Convention for the Prevention of Pollution from Ships (MARPOL)

#### 21.2.1 *Annex I - Oil*

- 21.2.1.1 Yachts of 400 gross tonnage and above are required to be surveyed and to hold an International Oil Pollution Prevention (IOPP) Certificate in compliance with MARPOL Annex I and maintain on board an Oil Record Book Part I.

#### 21.2.2 *Annex III – Harmful Substances in Packaged Form*

- 21.2.2.1 Yachts shall not carry harmful substances in packaged form.
- 21.2.2.2 Harmful substances in packaged form in ship's stores, carried for use during the voyage, are permitted but shall be appropriately used and stowed.
- 21.2.2.3 Material Safety Data Sheets shall be available for all harmful substances carried on board and appropriate personal protective equipment shall be carried in sufficient quantities to safely handle those substances.

#### 21.2.1 *Annex IV - Sewage*

- 21.2.1.1 Yachts certified to carry more than 15 persons, **OR** of 400 gross tonnage and above, shall be surveyed and provided with an International Sewage Pollution Prevention Certificate.
- 21.2.1.2 If the vessel is not fitted with an approved sewage treatment system, the provision of holding tanks of sufficient capacity to store wastewater for discharge to shore facilities may be needed for a vessel to comply.
- 21.2.1.3 If sewage holding tanks are fitted, they shall be constructed with a sloping bottom arranged such that the outlet is at the lowest point. Ventilation arrangements shall be

routed well clear of accommodation and sleeping quarters. Outlets from ventilation shall not be near ventilation or machinery inlets and shall not pose a danger to other vessels alongside. Tanks shall be manufactured from material not susceptible to corrosion in anaerobic decomposition conditions.

### 21.2.2 *Annex V - Garbage*

21.2.2.1 The disposal of garbage into the sea is prohibited. All yachts shall comply with the provisions of MARPOL Annex V on discharge of garbage into the sea.

21.2.2.2 All yachts shall display placards which notify the crew and passengers of the discharge requirements of regulations 3, 4, 5 and 6 of MARPOL Annex V.

21.2.2.3 Yachts certified to carry 15 or more persons, **OR** of 100 gross tonnage and above, shall carry a Garbage Management Plan in accordance with Regulation 10 of MARPOL Annex V.

21.2.2.4 Yachts certified to carry 15 or more persons engaged on voyages outside The Bahamas **OR** of 400 gross tonnage and above, shall maintain records in a Garbage Record Book Part I as described in Regulation 10 of MARPOL Annex V.

21.2.2.5 Arrangements for the retention of garbage on board and for discharge to shore facilities shall be provided. Arrangements shall be varied as necessary to comply with special requirements which may be applied by authorities in the area in which a vessel operates.

### 21.2.3 *Annex VI - Air Pollution*

21.2.3.1 Yachts shall comply with the provisions of MARPOL Annex VI unless expressly provided otherwise.

21.2.3.2 Yachts of 400 gross tonnage and above are required to be surveyed and to hold an International Air Pollution Prevention (IAPP) Certificate and an International Energy Efficiency Certificate (IEEC) in compliance with MARPOL Annex VI.

21.2.3.3 All diesel engines with an output of more than 130kW<sup>72</sup>, installed on or after 01 January 2000, shall be certified in accordance with the NOx Technical Code and provided with an Engine International Air Pollution prevention (EIAPP) Certificate and an approved Technical File.

21.2.3.4 A marine diesel engine installed on a yacht of 500 gross tonnage and above on or after 01 January 2021 shall comply with the Tier III NOx requirements specified in Regulation 13 of MARPOL Annex VI. However, compliance with Tier III requirements is only required for yachts that intend to enter a NOx Emission Control Area.

## 21.3 **Antifouling Paints**

21.3.1 The International Anti-Fouling System Convention (AFS Convention) applies to all vessel types operating in the marine environment, irrespective of tonnage, including every yacht.

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<sup>72</sup> Approximately 177 horsepower

- 21.3.2 Yachts of less than 400 gross tonnage are not required to have an International Anti-fouling System Certificate, however, evidence that the type of anti-fouling coating used is compatible with the AFS Convention shall be carried onboard.
- 21.3.3 The AFS Convention prohibits the use of environmentally harmful organotin compounds (for example tributyltin) in antifouling paints and prevents the possible use in the future of other harmful substances in anti-fouling systems.
- 21.4 Ballast Water**
- 21.4.1 The Ballast Water Management Convention<sup>73</sup> (BWM Convention) applies to all vessels designed or constructed to carry ballast water of any kind, whether sea water or fresh water. Please refer to [BMA Information Bulletin No. 165](#).
- 21.4.2 Yachts of 400 gross tonnage and above that use water for ballasting are required to be surveyed and hold an International Ballast Water Management Certificate.

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<sup>73</sup> The International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004



## **22 PROTECTION OF PERSONNEL**

### **22.1 General Requirements**

22.1.1 Vessels shall comply with the requirements of this section.

### **22.2 Deckhouses and Superstructures**

22.2.1 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 Guard Rails**

22.3.1 Bulwarks and/or guardrails on all accessible decks shall be 1000 mm high except that on vessels built to pre-1966 Load Line Convention standards 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.

22.3.2 Satisfactory means (in the form of guard rails, life lines, gangways or under-deck 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 craft.

22.3.3 Where the function of the vessel would be impeded by the provision of bulwarks and/or guard rails complying with section 22.3.1, alternative proposals detailed to provide equivalent safety for persons on deck shall be submitted to the BMA for approval, where recognised national or international standards may be accepted as equivalence.

22.3.4 The structural strength of any bulwarks or guardrails shall comply with the requirements of a Recognised Organisation, or a recognised international standard as appropriate to the vessel and its area of operation.

### **22.4 Noise**

22.4.1 Unless the BMA deems that compliance with a particular provision is unreasonable or impractical, all new vessels of 1,600GT and above shall be constructed to reduce onboard noise and to protect personnel from 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.

22.4.2 New vessels under 1,600GT shall meet the requirements of the Code on Noise Levels onboard Ships so far as is reasonable and practicable.

- 22.4.3 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.
- 22.4.4 For safe navigation, it is important that sound signals and VHF communications can be heard, at the navigating position in normal operating conditions.
- 22.4.5 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.
- 22.4.6 For machinery spaces which are not intended to be continuously manned or are attended for short periods only, the recommended limits are 110dB(A).
- 22.4.7 The limits have been set from hearing damage risk considerations and the use of suitable ear protectors.
- 22.4.8 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).
- 22.5 Safe Work Aloft, Over-side, and on the Bowsprit of Sailing Vessels**
- 22.5.1 When access to the rig, bowsprit, or over-side working is required, provision shall be made to enable people to work safely, in accordance with recognised national or international standards.
- 22.5.2 The arrangements provided for accessing rigging shall be based on established safe working practices for the type of vessel. The arrangements may include but not be limited to:
- .1 safety nets below the bowsprit;
  - .2 safety grab rails or jackstays (metal or wire) fixed along the bowsprit to act as handholds and strong points for safety harnesses;
  - .3 mandatory use of safety harnesses aloft, over-side, and for work on the bowsprit;
  - .4 sufficient footropes and horses in wire (or rope) permanently rigged to enable seafarers to stand on them whilst working out on the yards or on the bowsprit;
  - .5 safety jackstays (metal or wire) fixed along the top of the yards, to provide handholds and act as strong points for safety harnesses;
  - .6 means of safely climbing aloft, such as:
    - i. fixed metal steps or ladders attached to the mast; or
    - ii. traditional ratlines (rope) or, rattling bars (wood/steel), fixed across the shrouds to form a permanent ladder.
- 22.5.3 Safe means of external access to all parts of the vessel shall be made available where crew are expected to work through Over-side Working Systems in accordance with section 35.

- 22.5.4 Equipment manufacturers of Over-side Working Systems and ship builder instructions and guidance on their installation, use, maintenance, inspection and testing shall be followed at all times.
- 22.5.5 The mast and other spaces requiring access via ladders shall include continuous fall protection measures to protect personnel when ascending or descending ladders.
- 22.5.6 New vessels shall have "External Access Plans" showing locations and loads for all elements of the Over-side Working Systems in accordance with section 35 approved by a Recognised Organisation.
- 22.6 Personal Clothing**
- 22.6.1 It shall be the responsibility of the Company/Master to advise that the following requirements for items of personal clothing shall be met:
- .1 Each person onboard a vessel shall have protective clothing appropriate to the prevailing air and sea temperatures.
  - .2 Each person onboard a vessel shall have footwear having non-slip soles, to be worn onboard.
- 22.7 Lifts (Elevators)**
- 22.7.1 Personnel lift (elevator) installations shall be appropriately designed and constructed, installed and tested by a competent person.
- 22.7.2 Designs shall be submitted at an early stage of construction. Recognised international standards such as EN 81-1/EN81-2 shall be considered but the following gives a minimum standard that shall be provided:
- .1 For vessels of 500 GT and above structural fire protection requires lift shafts to be within an "A" class division. Where the lift shaft is fitted within a stairway enclosure there is no need for "A" class divisions between the lift and the staircase;
  - .2 Construction and installation for marine use shall be supported by a certificate from a Recognised Organisation or manufacturer and include a relevant load test;
  - .3 Lift shall comprise an enclosed capsule;
  - .4 A suitable means of escape from the capsule and lift shaft shall be provided;
  - .5 Mains and emergency power to be provided, where necessary to comply with item .4;
  - .6 Emergency lighting to be provided;
  - .7 An internal alarm and telephone to be provided;
  - .8 Normal operation shall ensure lift only stops at each deck; and
  - .9 "Not to be used in case of fire" sign shall be posted within.

- 22.7.3 Reference standards include:
- .1 BS EN 81 series – Safety rules for the construction and installation of lifts;
  - .2 ASME Elevator Code A.17.1
  - .3 BS 5655 series – Lifts and service lifts

**22.8 Man-riding cranes****22.8.1 Design**

22.8.1.1 In order for deck cranes or other lifting appliances, other than those covered by section 7, to be man-riding, they shall be certified as such through compliance with a recognised national or international standard to the satisfaction of the BMA.

**22.8.2 Testing and Maintenance**

22.8.2.1 Annual and 5 Yearly Testing and maintenance of man-riding cranes shall be in accordance with original manufacturer's instructions.

**22.8.3 Operations**

22.8.3.1 Operations of the man-riding cranes and other lifting appliances shall:

- .1 be in accordance with the original equipment manufacturer's operating instructions
- .2 be within any restrictions set by the original equipment manufacturer or Recognised Organisation approving the equipment
- .3 Operating instructions shall be posted locally to any controls along with any restrictions

**22.9 Additional Equivalence Considerations**

22.9.1 None

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

### **23.1 Tenders**

- 23.1.1 When a vessel carries a rigid or inflatable tender, it shall be fit for its intended use, regularly inspected by the owner/managing agent, and maintained in a safe condition.
- 23.1.2 Safety equipment shall be provided in the tender as appropriate to its intended range and area of operation.
- 23.1.3 Each tender shall be clearly marked with the number of persons (mass 75 kilograms) that it can safely carry, and the name of the parent vessel.
- 23.1.4 In the case of petrol-engine tenders, operation shall be in accordance with the manufacturer's instructions with due consideration to the safety requirements for the carriage of petrol contained in each part of the Code.
- 23.1.5 Where more than 12 passengers are carried by the tenders, the IMO guidelines for passenger ship tenders MSC.1/Circ.1417 shall be followed.
- 23.1.6 All tenders, when fitted with remote throttle controls, shall be fitted with a kill cord, to be used at all times during navigation. A spare kill cord shall also be carried on board.

### **23.2 Pilot Boarding Arrangements:**

- 23.2.1 Boarding arrangements provided for pilots shall have due regard for SOLAS V/23 and IMO Resolution A.1045(27) "Pilot transfer arrangements", International Maritime Pilots' Association (IMPA) recommendations, or any documents replacing them taking into consideration any national requirements.

### **23.3 Gangways, Passerelles, and Accommodation Ladders**

- 23.3.1 A safe means of access shall be provided at all times when in port, either deployed or available for deployment. If the safe means of access is not deployed, there shall be a means provided for communication between those on the quay and those onboard and in all circumstances a safe means of access shall be provided for any persons embarking or disembarking on the ship.
- 23.3.2 Access equipment and immediate approaches to it shall be adequately illuminated.
- 23.3.3 Equipment used to provide access shall also meet the standards or requirements set out in international standards<sup>74</sup> and applicable national legislation.

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<sup>74</sup> Refer to MSC.1/Circular.1331, Guidelines for construction, installation, maintenance and inspection/survey of means of embarkation and disembarkation

- 23.3.4 When provided, gangways, passerelles, and accommodation ladders shall be manufactured to a recognised national or international standard, and be clearly marked with the manufacturer's name, the model number, the maximum design angle of use and the maximum safe loading (by number of persons and by total weight). Side screens or handrail(s) shall be provided on both sides.
- 23.3.5 Where gangways, passerelles or ladders do not comply with national or international standards, a manufacturer's test load certificate shall be provided. Alternatively, practical tests may be carried out to the satisfaction of the BMA. In all cases the maximum design angle, maximum number of persons, and the maximum total weight shall be clearly marked, and shall be used in accordance with the manufacturer's instructions.
- 23.3.6 Access equipment and immediate approaches to it shall be adequately illuminated.
- 23.3.7 Reference standards include:
- IMO MSC.1/Circ.1331 – Guidelines for Construction, Installation, Maintenance and Inspection/Survey of Means of Embarkation and Disembarkation;
  - ISO 7061:1993 - Shipbuilding - Aluminium shore gangways for seagoing vessels;
  - ISO 5488:1979 - Shipbuilding - Accommodation ladders.

**23.4 Submersible Craft**

- 23.4.1 Submersible Craft carried on yachts shall comply with the standards of the BMA<sup>75</sup> and:
- .1 they shall be constructed and maintained in accordance with the rules of a Recognised Organisation, applicable national regulations and be suitable for the intended use;
  - .2 supporting equipment shall be constructed and maintained in accordance with the rules of the Recognised Organisation responsible for certificating the submersible, as well as applicable Bahamas legislation. The maximum safe working load of the equipment and maximum sea state in which the craft may be launched shall be stated;
  - .3 a safety management system which may be separate from any system operated by the parent vessel, including an Operations Manual, shall be in place, and subject to annual audit;
  - .4 following satisfactory survey and audit, certification for safety of submersible craft and its support equipment shall be issued, and is subject to annual survey;

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<sup>75</sup> Refer to [BMA Information Bulletin No.159](#)

- .5 maintenance shall be carried out by the manufacturer or an organisation or person accepted by the BMA at intervals specified by the manufacturer; and
- .6 operating crew shall have adequate theoretical and practical training for the type of submersible craft onboard and have demonstrated the ability to operate it.



**24 SAFETY MANAGEMENT (ISM CODE)**

**24.1 General Requirements**

24.1.1 Every vessel to which this Code applies shall comply with the applicable requirements of SOLAS Chapter IX and the ISM Code.

**24.2 Additional Requirements**

24.1.2 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.

24.1.1 Every vessel to which this Code applies shall comply with the applicable requirements of SOLAS Chapter XI-1.

**24.3 Additional Equivalence Considerations**

24.3.1 None



**25 SECURITY (ISPS CODE)**

**25.1 General Requirements**

25.1.1 Every vessel to which this Code applies shall comply with the applicable requirements of SOLAS Chapter XI-2 and the ISPS Code.

**25.2 Additional Equivalence Considerations**

25.2.1 None

## 26 MANNING, CERTIFICATION AND HOURS OF WORK

### 26.1 Passengers

26.1 "Passenger" means any person carried in a ship except:

- .1 "Seafarers" as defined in section 2;
- .2 "Occasional Workers" as described in 26.2;
- .3 a person on board the ship either in pursuance of the obligation laid upon the master to carry shipwrecked, distressed or other persons, or by reason of any circumstances that neither the master nor the owner nor the charterer (if any) could have prevented; and
- .4 a child under one year of age.

### 26.2 Occasional Workers

26.2.1 It is not unusual for vessels to carry occasional additional staff, working in service for the owner or charterer for example, a nanny, masseuse or bodyguard. If the individual normally works on shore and is only on board for a short period of time, with no emergency duties, they may not fall within the definition of a "seafarer" for the purposes of the MLC. In such cases, these occasional workers shall:

- .1 have no emergency duties;
- .2 for their own protection, and the safety of other members of the crew, shall have familiarisation training on board such that they are capable of being self-sufficient in an emergency;
- .3 have a berth and access to mess areas and sanitary facilities of a standard which are in accordance with the crew accommodation standards applicable to the keel laying date of the yacht for existing yachts. For yachts with a keel laid after 20 August 2013 they shall be in accordance with MLC standards as laid out in Section 21, 21A & 21B for Part A yachts and Section 9 for Part B yachts or equivalent provisions provided for by the BMA;
- .4 be at least 16 years of age;
- .5 be medically fit to carry out their duties and to be self-sufficient in an emergency, although a seafarer's medical fitness certificate is not required;
- .6 have a contract of employment, providing equivalent protection to that available under the MLC, taking into account their duties, pattern of working, normal place of work, and other relevant factors. It is recommended that the contract make reference to working in some capacity onboard the named yacht - this could be an addendum to the employee's shore-based contract;
- .7 shall not be required to meet the cost of food or medical care onboard, or of their travel back from the vessel to their normal place of work/home; and
- .8 be trained to ensure their own health and safety onboard.

26.2.2 If any of the above criteria are not met or cannot be demonstrated to the satisfaction of the BMA, the individual shall be considered a passenger.

26.2.3 The Declaration of Maritime Labour Compliance (DMLC) Part II for the vessel shall include information on any roles onboard which shall be treated as occasional workers, how frequently such workers shall be onboard and for how long. It shall explain how the shipowner ensures that the above conditions are met for any occasional crew who are not seafarers. If the arrangements are persistently or frequently invoked for the same workers, the individuals shall be considered seafarers and full MLC requirements shall be applied.

26.2.4 Every person working on the vessel shall be included on the list of crew unless they are treated as passengers. The Master shall therefore include occasional workers on the crew list named as such (or simply 'nanny' or 'bodyguard').

### 26.3 Trainees

26.3.1 A trainee **SHALL**:

- .1 be engaged for the sole purpose of:
  - i. obtaining instruction in the principles of responsibility, resourcefulness, loyalty and team endeavour; and/or
  - ii. instruction in navigation and seamanship, marine engineering, or other shipboard related skills;
- .2 be considered to form part of a "trainee voyage crew";
- .3 participate in the operation of the vessel to the best of his or her ability; and
- .4 be not less than twelve (12) years old.

26.3.1 A trainee **SHALL NOT**:

- .1 be part of the crew for the purpose of safe manning or have any safety critical duties;
- .2 have any employment contract or any employment relationship with the owner or operator of the vessel;
- .3 receive any remuneration for his or her activities on board;
- .4 be considered to be a seafarer for the purpose of MLC, 2006, as amended; and
- .5 be considered as a passenger\*.

\* Note – the fact that a trainee or trainees may contribute towards the cost of their welfare whilst on board should not imply that they are passengers.

### 26.4 Safe Manning

26.4.1 *General*

26.4.1.1 All yachts to which this Code applies shall carry, in addition to the master, a sufficient number of qualified deck and engineer officers, together with a sufficient number of appropriately qualified ratings, to ensure that the yacht can at all times be operated safely, with respect to the safety of the yacht and all persons onboard, the protection of the marine environment and maritime security.

26.4.2 *Principles of Safe Manning*

26.4.2.1 In assessing the appropriate safe manning level for a yacht due regard shall be given to:

- .1 IMO Resolution A.1047(27) (as amended from time to time) which defines the principles of safe manning necessary to ensure the safe operation of ship and the prevention of pollution of the marine environment;
- .2 The Bahamas Yacht Code or Bahamas Passenger Yacht Code, as applicable;
- .3 applicable international conventions, including STCW and the MLC; and
- .4 Bahamas legislation relating to Safe Manning Certification, Hours of Work and Rest and related matters.

26.4.3 *Responsibility for Safe Manning:*

26.4.3.1 It is the responsibility of the owner, master and operators of yachts to ensure that at all times the vessel is safely manned and operated in compliance with the standards of safety, marine environment protection and security set out in the various applicable international Conventions, Codes and Bahamas legislation and in accordance with any Minimum Safe Manning Document or similar certification in force with respect to the ship.

26.4.3.2 In particular, yachts shall have a dedicated person on watch whilst any passengers are on board.

26.4.3.3 In assessing the appropriate level of manning for a yacht the following factors, in addition to those in 26.4.2 are among those which shall be taken into account-

- .1 the size, type and complexity of the yacht and its equipment;
- .2 type and size of the yacht's main propulsion and auxiliary machinery;
- .3 the area and type of operation in which the yacht shall be engaged including-
  - i. likely navigational and other hazards to be encountered;
  - ii. frequency of port calls;
  - iii. density of traffic; and
  - iv. the demands on the master, officers and crew in the normal day to day running of the yacht over and above safety and marine environmental protection considerations;
- .4 the need to mount safe navigational and engine watches at sea, at anchor and in port;
- .5 peak workloads;
- .6 the need to provide statutory periods of rest;
- .7 on-board maintenance requirements;
- .8 on-board mooring and unmooring arrangements;
- .9 emergency situations and procedures including the mustering and evacuation of passengers;
- .10 compliance with the yacht's Safety Management System;
- .11 compliance with Maritime Security requirements; and
- .12 Minimum Safe Manning Document.

- 26.4.3.4 SOLAS requires that vessels of 500GT and above, excluding pleasure vessels not engaged in trade, carry a Minimum Safe Manning Document. Owners and operators of vessels below 500GT, or those of 500GT and above solely engaged for pleasure, may also choose to hold a Minimum Safe Manning Document. This shall allow the owner to consider a ‘range and risk’ approach when determining manning levels.
- 26.4.3.5 In the event of any change in equipment, construction or use of the vessel, which may affect the safe manning level, the owner or operator shall make an application for the issue of a new Minimum Safe Manning Document.
- 26.4.3.6 The Minimum Safe Manning Document of a vessel may be withdrawn if an owner or operator fails to submit a new proposal where a vessel changes trading area(s), construction, machinery or equipment, or operation and/or method of maintenance have changed, or a vessel persistently fails to comply with the hours of rest requirements.
- 26.4.4 *Application for a Minimum Safe Manning Document:*
- 26.4.4.1 Vessels to which the Code applies shall be in possession of a Minimum Safe Manning Document which signifies that the BMA has approved the minimum manning levels for the yacht.
- 26.4.4.2 Application for a Minimum Safe Manning Document shall be made to the BMA, in accordance with [BMA Information Bulletin No.115](#), by the owner or operator of the yacht or a person duly authorised to act in this regard and the application shall present a clear rationale on which the proposed manning is based, including-
- .1 an explanation of how the proposed manning has been determined;
  - .2 Confirmation that the assessment has taken account, as a minimum, of all the relevant guidelines as set out in this section;
  - .3 how the requirements relating to hours of work and rest shall be complied with; and
  - .4 details of the yacht in terms of its size, layout, equipment propulsion and auxiliary machinery and other such relevant factors affecting manning levels<sup>76</sup>
- 26.4.4.3 More than one proposal for safe manning for the same yacht may be submitted to take account of differing operational patterns or a variation in the number of passengers carried.
- 26.4.5 *Qualifications and Training:*
- 26.4.5.1 In general terms the master and officers serving on a yacht to which this Code applies shall be certificated in accordance with the relevant provisions of the STCW provided that

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<sup>76</sup> To effectively convey the general layout and equipment of the yacht, including mooring and un-mooring arrangements, appropriate plans shall be submitted which shall include a General Arrangement Plan

for private passenger yachts in accordance with the Bahamas Passenger Yacht Code, and Bahamas Yacht Code yachts under 3000 GT, appropriate Yacht qualifications may be accepted by the BMA.

- 26.4.5.2 Any person employed or engaged in any capacity onboard a seagoing ship to which this Code applies, other than a seafarer employed or engaged as such in accordance with 26.4.3.1, shall be deemed to be a passenger unless such person has satisfactorily undergone familiarisation training and instruction in accordance with the Code to the STCW<sup>77</sup> and is in possession of appropriate documentation attesting to the satisfactory completion of such familiarisation training and instruction.
- 26.4.5.3 Any seafarer employed or engaged in any capacity onboard a seagoing ship to which this Code applies, on the business of that ship as part of the ship’s complement with designated safety or pollution prevention duties in the operation of the ship shall, in addition to the familiarisation training referred to in subsection 26.4.5.2 and before being assigned to any shipboard duties, have received basic safety training and instruction in accordance with the Code to the STCW<sup>78</sup> and be in possession of appropriate documentation attesting to the satisfactory completion of such training and instruction.
- 26.4.5.4 The number of trained persons shall always be sufficient to assist the total number of passengers who may be onboard at any one time.

**26.5 Medical Fitness**

- 26.5.1 All seafarers serving onboard vessels to which the Code applies shall be in possession of a valid Medical Fitness Certificate issued or recognised by the BMA.

**26.6 Schedule of Duties**

- 26.6.1 The Master shall ensure that a schedule of duties is drawn up setting out the hours of work and rest periods for each of the crew. The table or schedule shall show:
  - .1 the schedule of duties at sea and duties in port; and
  - .2 the minimum hours of rest as defined by the MLC.
- 26.6.2 In devising the schedule, operators shall take account of factors such as:
  - .1 nature of the operation;
  - .2 type and size of vessel;
  - .3 construction and technical equipment of the vessel;
  - .4 manning levels and changes in crew numbers due to crew changes and sickness;
  - .5 the maximum period of continuous watchkeeping;
  - .6 minimum rest periods;

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<sup>77</sup> See Section A-VI/1 of Part A of the Code to the STCW paragraph 1  
<sup>78</sup> See Section A-VI/1 of Part A of the Code to the STCW paragraph 2

- .7 total workload;
- .8 compliance with the ISPS Code as applicable; and
- .9 the seriousness of irregular working hours and their contribution to causing fatigue and the importance of scheduling reasonably stable working hours.

26.6.3 Changes shall not be made to the schedule of duties unless they can be justified by substantially altered work patterns or other significant factors.

26.6.4 Where it is known that a vessel engages in an irregular pattern or that working hours are unlikely to be uniform, this can be taken into account when considering the schedule.

26.6.5 It is not necessary to draw up a new schedule of duties for each voyage, so long as it is applicable to the voyage in question and the composition of the crew for whom it was originally intended has not changed.

26.6.6 A copy of the schedule shall be made available to all members of the crew.

**26.7 Hours of Work and Rest:**

26.7.1 All members of the yacht’s complement, including the Master, shall have minimum rest periods and maximum periods on duty (emergencies excepted) in accordance with the provisions of the STCW, MLC and national legislation.

26.7.2 Owners and operators of yachts shall ensure that the master, officers and ratings do not work more hours than is safe in relation to the performance of their duties and the safety of the ship. The master shall ensure that suitable arrangements are in place with respect to the assignment of duties - manning levels shall therefore be such as to ensure that the master, officers and crew are afforded the opportunity to take the minimum rest periods.

26.7.3 The time and place of rest periods shall be such as to ensure that such periods can be taken in a suitable environment conducive to achieving effective rest.

26.7.4 Further guidance about fitness for duty is contained in section B-VIII/1 of the STCW.

*26.7.5 Minimum Hours of Rest*

26.7.5.1 The owner/operator or Master shall ensure that the crew are provided with at least the minimum hours of rest. These shall not be less than:

- .1 10 hours in any 24-hour period; and
- .2 77 hours in any seven-day period.

26.7.5.2 Hours of rest may be divided into no more than 2 periods; one of which shall be at least 6 hours long, and the interval in between shall not exceed 14 hours.

26.7.5.3 It is expected that as far as practicable the Master shall arrange for conducting emergency drills such as musters, fire-fighting and abandon vessel drills in a way which

minimises the disturbance to rest periods and provide compensatory rest for seafarers whose normal rest is disturbed by call-outs for drills.

26.7.6 *Records*

26.7.6.1 A record of the actual hours of work performed by the individual seafarer shall be maintained onboard, in order to verify that the minimum periods of rest required under applicable international instruments and national legislation have been complied with.

26.7.6.2 The master or authorised person is responsible for ensuring that records of hours of rest are maintained for each of the crew serving on the vessel. Each record shall be endorsed by the master or authorised person and the seafarer. A copy shall be retained by the seafarer.

26.7.6.3 In an emergency, or when unforeseen events occur, changes may be unavoidable. In these cases, records shall reflect all deviations from the schedule.

26.7.6.4 All records shall be kept for a minimum of 12 months and shall be available for inspection at any time. Checking of the vessel’s records may be carried out by the BMA as part of the normal routine of vessel inspection and shall include a check that the appropriate schedules are available, and records maintained

26.7.7 *Exceptions for Emergencies*

26.7.7.1 Situations may arise in which a seafarer may be required to work during scheduled hours of rest. These include emergencies which threaten the safety of the vessel or put life at risk. In these circumstances, the limits may be exceeded provided compensatory arrangements are subsequently made to avoid fatigue.

26.7.8 *On-Call Time*

26.7.8.1 Where a seafarer’s normal period of rest onboard a vessel is disturbed by a callout he/she shall have adequate compensatory rest.

**26.8 Personal Watercraft**

26.8.1 Operators are reminded that operation of personal watercraft shall comply with the applicable legislation of the State in whose waters they are being operated.



**27****MEDICAL CARE AND CARRIAGE OF MEDICAL STORES****27.1 Medical Care for Seafarers**

- 27.1.1 The requirements for onboard health and medical care set out in this section include standards for measures aimed at providing seafarers with health protection and medical care as comparable as possible to that which is generally available to workers ashore.
- 27.1.2 The health protection and medical care shall in principle be provided at no cost to the seafarers.
- 27.1.3 The employer and master shall ensure that all seafarers are covered by adequate measures providing for health protection and medical care, including essential dental and optical care which-
- .1 ensure the application to seafarers of any general provisions on occupational health protection and medical care relevant to their duties, as well as special provisions specific to work onboard ship;
  - .2 give seafarers the right to visit a qualified medical doctor or dentist without delay in ports of call, where practicable;
  - .3 ensure that seafarers are given health protection and medical care as comparable as possible to that which is generally available to workers ashore, including prompt access to the necessary medicines, medical equipment and facilities for diagnosis and treatment and to medical information and expertise;
  - .4 give seafarers the right to visit a qualified medical doctor or dentist without delay in ports of call, where practicable;
  - .5 are not limited to treatment of sick or injured seafarers but include measures of a preventative character such as health promotion and health education programmes; and
  - .6 minimise the risk of infection and ensure appropriate preventative measures such as immunisation are taken.

**27.2 Carriage of Doctors or Medically Trained Personnel**

- 27.2.1 Ships carrying 100 or more persons and undertaking international voyages in excess of 600 miles shall carry a qualified medical doctor who is responsible for providing medical care.
- 27.2.2 In yachts not required to carry a doctor the master shall ensure that any medical attention or treatment administered onboard to any person is given either by the master or under his supervision by a person so appointed by him for the purpose provided that the person so appointed shall have received medical training to an appropriate level in accordance with the STCW Convention.

**27.3 Medical Advice**

- 27.3.1 All ships shall carry a complete and up-to-date list of radio stations through which medical advice can be obtained; and if equipped with a system of satellite communication, carry an up-to-date and complete list of coast earth stations through which medical advice can be obtained.
- 27.3.2 Seafarers with responsibility for medical care or medical first aid onboard shall be instructed in the use of the ship's medical guide and the medical section of the most recent edition of the International Code of Signals so as to enable them to understand the type of information needed by the advising doctor as well as the advice received.

**27.4 Provision of On-board Medical Care**

- 27.4.1 The carriage of medical stores and equipment as provided for in this section is designed to provide an appropriate level of primary care for all persons onboard pending, where necessary, the provision of shore based medical services.

**27.5 Medical Cabinet**

- 27.5.1 A cabinet or other suitable facility for storing medicines and other medical stores shall be provided and the cabinet, shall be well ventilated and fitted in a place in the crew area of the ship which is-
- .1 always dry;
  - .2 readily accessible from (but not sited in) the permanent or temporary hospital; and
  - .3 not subject to abnormal heat.
- 27.5.2 The medical cabinet shall be provided with the following-
- .1 an outer door with an efficient lock;
  - .2 where controlled drugs shall be stored, an inner cupboard fitted with a door and a lock which cannot be opened by the same key as the lock to the outer door;
  - .3 suitable arrangements for the storage of the medicines, medical stores and associated measuring devices; and
  - .4 a dispensing counter with a surface that can be easily kept clean.
- 27.5.3 The medical cabinet shall be lit by an electric light (which may be inside or immediately outside it) which enables the contents to be clearly seen.

**27.6 Carriage of Medical Stores**

- 27.6.1 The ship shall carry onboard medical stores and equipment as specified by the BMA in Marine Notice 41.
- 27.6.2 All medical stores required to be kept onboard ship shall conform to the standards and requirements of the IMO/ILO/WHO International Medical Guide for Ships (latest edition).

- 27.6.3 The medicine chest and its contents, as well as the medical equipment and medical guide carried onboard, shall be properly maintained and inspected at regular intervals, not exceeding 12 months, by a competent person or authority, who shall ensure that the labelling, expiry dates and conditions of storage of all medicines and directions for their use are checked and all equipment functioning as required.
- 27.7 Carriage of Medical Guides**
- 27.7.1 The ship shall carry guides as to the use of medical stores specified in 27.6 including, in particular, instructions for the use of antidotes.

## 28 OPERATIONAL READINESS, MAINTENANCE AND INSPECTIONS

### 28.1 Life-Saving Appliances and Arrangements

#### 28.1.1 *Operational Readiness*

28.1.1.1 Before the ship leaves port and at all times during the voyage, all life-saving appliances shall be in working order and ready for immediate use.

#### 28.1.2 *Maintenance of Life Saving Appliances*

28.1.2.1 Maintenance, testing and inspections of life-saving appliances shall be carried out based on IMO requirements<sup>79</sup> and in a manner having due regard to ensuring reliability of such appliances.

28.1.2.2 Instructions for on-board maintenance of life-saving appliances complying with 28.1.10 shall be provided and maintenance shall be carried out accordingly.

28.1.2.3 The BMA may accept, in compliance with the requirements of 28.1.2.2, a shipboard planned maintenance programme, which includes the items covered in the list required in accordance with 28.1.10.

#### 28.1.3 *Maintenance of Falls*

28.1.3.1 Falls used in launching shall be inspected periodically with special regard for areas passing through sheaves and renewed when necessary due to deterioration of the falls or at intervals of not more than 5 years, whichever is the earlier.

#### 28.1.4 *Spares and Repair Equipment*

28.1.4.1 Spares and repair equipment shall be provided for life-saving appliances and their components which are subject to excessive wear or consumption and shall be replaced regularly.

#### 28.1.5 *Weekly Tests and Inspections*

28.1.5.1 The following tests and inspections shall be carried out weekly and a report on them shall be entered in the log-book:

- .1 all survival craft, rescue boats and launching appliances shall be visually inspected to ensure that they are ready for use and the inspection shall include, but not be limited to, the condition of hooks, their attachment

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<sup>79</sup> Refer to the Guidelines for periodic servicing and maintenance of lifeboats, launching appliances and onload release gear MSC.402(96)

- to the lifeboat and the confirmation that the on-load release gear has been properly and completely reset;
- .2 all engines in lifeboats and rescue boats shall be run for a total period of not less than 3 minutes, provided the ambient temperature is above the minimum temperature required for starting and running the engine and during this period of time it shall be demonstrated that the gear box and gear box train are engaging satisfactorily;
  - .3 if the special characteristics of an outboard motor fitted to a rescue boat would not allow it to be run for a period of 3 minutes other than with its propeller submerged, a suitable water supply may be provided; and
  - .4 the general emergency alarm shall be tested.

#### 28.1.6 *Monthly Tests and Inspections*

28.1.6.1 The following tests and inspections shall be carried out monthly and a report on them shall be entered in the log-book:

- .1 all lifeboats, except free-fall lifeboats, shall be turned out from their stowed position, without any persons onboard, if weather and sea conditions so allow; and
- .2 inspection of the life-saving appliances, including lifeboat equipment, shall be carried out using the checklist required by subsection 28.1.10 to ensure that they are complete and in good order.

#### 28.1.7 *Servicing of Life Saving Appliances and Systems*

28.1.7.1 Every inflatable liferaft, inflatable lifejacket, marine evacuation system and inflated rescue boat shall be serviced:

- .1 at intervals not exceeding 12 months, provided where in any case this is impracticable, the BMA may extend this period to 17 months; and
- .2 at an approved servicing station which is competent to service them, maintains proper servicing facilities and uses only properly trained personnel<sup>80</sup>.

28.1.7.2 The BMA allows extended service intervals on new and novel inflatable liferaft arrangements on the following conditions-

- .1 the new and novel liferaft arrangement has proved to maintain the same standard, as required by testing procedure, during extended service intervals.
- .2 the liferaft system shall be checked onboard by certified personnel at intervals set out in 28.1.6.1.2.

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<sup>80</sup> Refer to the Recommendation on conditions for the approval of servicing stations for inflatable liferafts, adopted by the IMO by Resolution A.761(18), as amended by MSC.55(66).

- .3 service at intervals not exceeding five years shall be carried out in accordance with the recommendations of the IMO<sup>81</sup>.

28.1.7.4 All repairs and maintenance of inflated rescue boats shall be carried out in accordance with the manufacturer's instructions; emergency repairs may be carried out onboard the ship; however, permanent repairs shall be effected at an approved servicing station.

28.1.8 *Servicing of Life Saving Appliances and Systems*

28.1.8.1 Hydrostatic release units, other than disposable hydrostatic release units, shall be serviced-

- .1 at intervals not exceeding 12 months, provided where in any case this is impracticable, the BMA may extend this period to 17 months<sup>82</sup>; and
- .2 at a servicing station which is competent to service them, maintains proper servicing facilities and uses only properly trained personnel.

28.1.9 *Periodic Servicing of Launching Appliances and on-Load Release Gear*

28.1.9.1 Launching appliances shall be-

- .1 maintained in accordance with instructions for on-board maintenance as required by 28.1.10.
- .2 subject to a thorough examination at the annual surveys required by SOLAS I/7 or 8, as applicable; and
- .3 upon completion of the examination referred to in paragraph .2 above, subjected to a dynamic test of the winch brake at maximum lowering speed and the load to be applied shall be the mass of the survival craft or rescue boat without persons onboard, provided that, at intervals not exceeding five years, the test shall be carried out with a proof load equal to 1.1 times the weight of the survival craft or rescue boat and its full complement of persons and equipment.

28.1.9.2 Lifeboat or rescue boat on-load release gear shall be-

- .1 maintained in accordance with instructions for on-board maintenance as required by 28.1.10;
- .2 subject to a thorough examination and operational test during the annual surveys required by SOLAS I/7 or 8, as applicable; and
- .3 operationally tested under a load of 1.1 times the total mass of the boat when loaded with its full complement of persons and equipment

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<sup>81</sup> Refer to the Recommendation on conditions for the approval of servicing stations for inflatable liferafts, adopted by the IMO by Resolution A.761(18), as amended by MSC.55(66). Account shall also be taken of the service period for the equipment recommended by the manufacturer

<sup>82</sup> Refer to MSC/Circ.955, Servicing of life-saving appliances and Radiocommunication equipment under the harmonized system of survey and certification (HSSC).

whenever the release gear is overhauled provided that such overhauling and tests shall be carried out at least once every five years<sup>83</sup>.

**28.1.10** *Instructions for on-board maintenance*

**28.1.10.1** Instructions for on-board maintenance of life-saving appliances shall be easily understood, illustrated wherever possible, and, as appropriate, shall include the following for each appliance-

- .1 a checklist for use when carrying out the inspections required by 28.1.6.1.2;
- .2 maintenance and repair instructions;
- .3 a schedule of periodic maintenance;
- .4 a diagram of lubrication points with the recommended lubricants;
- .5 a list of replaceable parts;
- .6 a list of sources of spare parts; and
- .7 a log for records of inspections and maintenance.

**28.1.11** *Rotational Deployment of Marine Evacuation Systems*

**28.1.11.1** In addition to or in conjunction with the servicing intervals of marine evacuation systems required by 28.1.7.1.2, each marine evacuation system shall be deployed<sup>84</sup> from the ship on a rotational basis at intervals shall be agreed by the BMA provided that each system shall be deployed at least once every six years.

**28.1.12** *Marking of Stowage Locations*

**28.1.12.1** Containers, brackets, racks, and other similar stowage locations for life-saving equipment, shall be marked with symbols in accordance with the recommendations of the IMO<sup>85</sup>, indicating the devices stowed in that location for that purpose and where more than one device is stowed in that location, the number of devices shall also be indicated.

**28.2 Construction - Fire protection, fire detection and fire extinguishing**

**28.2.1** *Purpose*

**28.2.1.1** The purpose of this section is to maintain and monitor the effectiveness of the fire safety measures the ship is provided with. For this purpose, the following functional requirements shall be met:

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<sup>83</sup> Refer to the Recommendation on testing of life-saving appliances, adopted by the IMO by resolution A.689(17). For life-saving appliances installed onboard on or after 1 July 1999, refer to the Revised Recommendations on testing of life-saving appliances, adopted by the IMO by resolution MSC.81(70)

<sup>84</sup> Results of MES rotational deployments shall be reported to the Administration as per [BMA Information Bulletin No.174 - Marine Evacuation Systems](#)

<sup>85</sup> Refer to the Symbols related to life-saving appliances and arrangements, adopted by the IMO by Resolution A.760(18), as amended by MSC.82(70).

- .1 fire protection systems and fire-fighting systems and appliances shall be maintained ready for use; and
- .2 fire protection systems and fire-fighting systems and appliances shall be properly tested and inspected.

28.2.2 *General Requirements*

28.2.2.1 At all times while the ship is in service, the requirements of section 28 shall be complied with. A ship is not in service when:

- .1 it is in for repairs or lay-up (either at anchor or in port) or in dry-dock;
- .2 it is declared not in service by the owner or the owner's representative; or
- .3 there are no passengers onboard.

28.2.2.3 The following fire protection systems shall be kept in good order so as to ensure their required performance if a fire occurs-

- .1 structural fire protection, including fire-resisting divisions, and protection of openings and penetrations in these divisions;
- .2 fire detection and fire alarm systems; and
- .3 means of escape systems and appliances.

28.2.2.4 Fire-fighting systems and appliances shall be kept in good working order and readily available for immediate use. Portable extinguishers which have been discharged shall be immediately recharged or replaced with an equivalent unit.

28.2.2.5 Maintenance, testing and inspections shall be carried out based on the guidelines developed by the IMO<sup>86</sup> and in a manner having due regard to ensuring the reliability of fire-fighting systems and appliances.

28.2.2.6 The maintenance plan shall be kept on board the ship and shall be available for inspection whenever required by the BMA.

28.2.2.7 The maintenance plan, which may be computer based, shall include at least the following fire protection systems and fire-fighting systems and appliances, where installed:

- .1 fire mains, fire pumps and hydrants, including hoses, nozzles and international shore connections;
- .2 fixed fire detection and fire alarm systems;
- .3 fixed fire-extinguishing systems and other fire-extinguishing appliances;

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<sup>86</sup> Refer to the revised guidelines for the on maintenance and inspection of fire protection systems and appliances (MSC.1/Circ.1432).



- .4 automatic sprinkler, fire detection and fire alarm systems;
- .5 ventilation systems, including fire and smoke dampers, fans and their controls;
- .6 emergency shutdown of fuel supply;
- .7 fire doors, including their controls;
- .8 general emergency alarm systems;
- .9 emergency escape breathing devices;
- .10 portable fire extinguishers, including spare charges; and
- .11 firefighter's outfits.

**29 EMERGENCY TRAINING AND DRILLS****29.1 Life-Saving Appliances and Arrangements****29.1.1 Duties, Musters and Briefings**

29.1.1.1 On a ship engaged on a voyage where passengers are scheduled to be onboard for more than 24 hours, musters of newly embarked passengers shall take place prior to or immediately upon departure. Passengers shall be instructed in the use of the lifejackets and the action to take in an emergency.

29.1.1.2 Whenever new passengers embark, a passenger safety briefing shall be given immediately before departure, or immediately after departure. The briefing shall be made by means of an announcement, in one or more languages likely to be understood by the passengers. The announcement shall be made on the ship's public address system, or by other equivalent means likely to be heard at least by the passengers who have not yet heard it during the voyage. The briefing may be included in the muster required by 29.1.1.1. Information cards or posters or video programmes displayed on ships video displays may be used to supplement the briefing but may not be used to replace the announcement.

29.1.1.3 The briefings referred to in 29.1.1.2 may be delivered using alternative communication methods of conveying the required information, provided that such alternative is at least as effective.

29.1.1.4 Crew members with enclosed space entry or rescue responsibilities shall participate in an enclosed space entry and rescue drill to be held onboard the ship at least once every two months. It is recommended that seafarers should be provided with the necessary training, instructions and information on entry into dangerous spaces<sup>87</sup>.

**29.1.2 Emergency Drills**

29.1.2.1 Drills shall, as far as practicable, be conducted as if there were an actual emergency.

29.1.2.2 Every crew member shall participate in at least one abandon ship drill and one fire drill every month and:

- .1 where more than 25% of the crew have not participated in abandon ship and fire drills onboard that particular ship in the previous month the drills of the crew shall take place within 24 hours of the ship leaving a port;

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<sup>87</sup> Please refer to ILO Accident Prevention on Board Ship section 10.11.3

- .2 where a ship enters service for the first time, after modification of a major character or when a new crew is engaged, the drills shall be held before the vessel sails, provided that the BMA may accept other arrangements that are at least equivalent where this is impracticable.
- 29.1.2.3 Each abandon ship drill shall include-
- .1 summoning of passengers and crew to muster stations with the general emergency alarm followed by drill announcement on the public address or other communication system and ensuring that they are made aware of the order to abandon ship;
  - .2 reporting to stations and preparing for the duties described in the muster list;
  - .3 checking that passengers and crew are suitably dressed;
  - .4 checking that lifejackets are correctly donned;
  - .5 lowering of at least one lifeboat after any necessary preparation for launching;
  - .6 starting and operating the lifeboat engine;
  - .7 operation of davits used for launching liferafts;
  - .8 a mock search and rescue of passengers trapped in their staterooms; and
  - .9 instruction in the use of radio life-saving appliances.
- 29.1.2.4 Different lifeboats shall, as far as practicable, be lowered in compliance with the requirements of 29.2.3.5, at successive drills.
- 29.1.2.5 Except as provided in 29.2.6, each lifeboat shall be launched, and manoeuvred in the water by its assigned operating crew, at least once every three months during an abandon ship drill.
- 29.1.2.6 The BMA may allow ships operating on short international voyages not to launch the lifeboats on one side if their berthing arrangements in port and their trading patterns do not permit launching of lifeboats on that side, provided that all such lifeboats shall be lowered at least once every three months and launched at least annually.
- 29.1.2.7 As far as is reasonable and practicable, rescue boats other than lifeboats which are also rescue boats, shall be launched each month with their assigned crew aboard and manoeuvred in the water and in any case this requirement shall be complied with at least once every three months.
- 29.1.2.8 If lifeboat and rescue boat launching drills are carried out with the ship making headway, such drills shall, because of the dangers involved, be practiced in

sheltered waters only and under the supervision of an officer experienced in such drills.

- 29.1.2.9 If a ship is fitted with marine evacuation systems-
- .1 drills shall include exercising of the procedures required for the deployment of such a system up to the point immediately preceding actual deployment;
  - .2 this aspect of drills shall be augmented by regular instruction using the on-board training aids in the use of the system; and
  - .3 every system party member shall, as far as practicable, be further trained by participation in a full deployment of a similar system into water, either onboard a ship or ashore, at intervals of not more than three years; provided that this training can be associated with the rotational deployments required by 28.1.11.
- 29.1.2.10 Emergency lighting for mustering and abandonment shall be tested at each abandon ship drill
- 29.1.3 *Fire Drills.*
- 29.1.3.1 Fire drills shall be planned in such a way that due consideration is given to regular practice in the various emergencies that may occur.
- 29.1.3.2 Each fire drill shall include-
- .1 reporting to stations and preparing for the duties;
  - .2 starting of a fire pump, using at least the two required jets of water to show that the system is in proper working order;
  - .3 checking of fireman's outfit and other personal rescue equipment;
  - .4 checking of relevant communication equipment;
  - .5 checking the operation of watertight doors, fire doors, fire dampers and main inlets and outlets of ventilation systems in the drill area; and
  - .6 checking the necessary arrangements for subsequent abandoning of the ship.
- 29.1.3.3 The equipment used during drills shall immediately be brought back to its fully operational condition and any faults and defects discovered during the drills shall be remedied as soon as possible.

- 29.1.4 *Enclosed space entry and rescue drills*
- 29.1.4.1 Enclosed space entry and rescue drills shall be planned and conducted in a safe manner, taking into account, as appropriate, the guidance provided in the recommendations developed by the IMO<sup>88</sup>.
- 29.1.4.2 Each enclosed space entry and rescue drill shall include:
- .1 checking and use of personal protective equipment required for entry;
  - .2 checking and use of communication equipment and procedures;
  - .3 checking and use of instruments for measuring the atmosphere in enclosed spaces;
  - .4 checking and use of rescue equipment and procedures; and
  - .5 instructions in first aid and resuscitation techniques.
- 29.1.5 *Damage control drills*
- 29.1.5.1 Damage control drills in accordance with SOLAS II-1/19-1 shall take place at least once every 3 months on all passenger ships constructed on or after 01 January 2009<sup>89</sup>.
- 29.1.6 *On-board Training and Instructions*
- 29.1.6.1 On-board training in the use of the ship's life-saving appliances, including survival craft equipment, and in the use of the ship's fire-extinguishing appliances shall:
- .1 be given as soon as possible but not later than two weeks after a crew member joins the ship. If the crew member is on a regularly scheduled rotating assignment to the ship, such training shall be given not later than two weeks after the time of first joining the ship;
  - .2 include instructions in the use of the ship's fire-extinguishing appliances, life-saving appliances, and in survival at sea, which shall be given at the same interval as the drills;
  - .3 Incorporate individual instruction covering different parts of the ship's life-saving and fire-extinguishing appliances, such that all the ship's life-saving and fire-extinguishing appliances shall be covered within any period of two months.
- 29.1.6.2 Every crew member shall be given instructions which shall include but not necessarily be limited to:
- .1 the operation and use of the ship's inflatable liferafts;
  - .2 the problems of hypothermia, first-aid treatment for hypothermia and other appropriate first-aid procedures;

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<sup>88</sup> See IMO Resolution A.1050(27) – Revised Recommendations for Entering Enclosed Spaces Aboard Ships

<sup>89</sup> Retroactive application as per SOLAS II-1/1.1.2.2

- .3 any special instructions necessary for use of the ship's life-saving appliances in severe weather and severe sea conditions;
- .4 the operation and use of fire-extinguishing appliances; and
- .5 risks associated with enclosed spaces and onboard procedures for safe entry into such spaces which shall take into account, as appropriate, the guidance provided in recommendations developed by the IMO<sup>90</sup>.

29.1.6.3 On-board training in the use of davit-launched liferafts shall take place at intervals of not more than 4 months on every ship fitted with such appliances. Whenever practicable this shall include the inflation and lowering of a liferaft. This liferaft may be a designated liferaft intended for training purposes only, which is not part of the ship's life-saving equipment; such a designated liferaft shall be conspicuously marked.

29.1.7 *Records*

29.1.7.1 The date when musters are held, details of abandon ship drills and fire drills, enclosed space entry and rescue drills, drills of other life-saving appliances and onboard training shall be recorded in the Official Log Book. If a full muster, drill or training session is not held at the appointed time, an entry shall be made in the Official Log Book stating the circumstances and the extent of the muster, drill or training session held.

29.1.8 *Training Manual and On-board Training Aids*

29.1.8.1 A training manual complying with the requirements contained in subsections 29.1.8.2 to 29.1.8.4 shall be provided in each crew mess room and recreation room or in each crew cabin.

29.1.8.2 Subject to subsection 29.8.3, the training manual, which may comprise several volumes, shall contain instructions and information, in easily understood terms, illustrated wherever possible, on the life-saving appliances provided in the ship and on the best methods of survival.

29.1.8.3 Any part of such information as is contained in the manual may be provided in the form of audio-visual aids in lieu of the manual.

29.1.8.4 The following shall be explained in detail in the manual or through the audio-visual aids, as the case may be:

- .1 donning of lifejackets, immersion suits and anti-exposure suits, as appropriate;
- .2 muster at the assigned stations;

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<sup>90</sup> See IMO Resolution A.1050(27) – Revised Recommendations for Entering Enclosed Spaces Aboard Ships

- .3 boarding, launching, and clearing the survival craft and rescue boats, including, where applicable, use of marine evacuation systems;
- .4 method of launching from within the survival craft;
- .5 release from launching appliances;
- .6 methods and use of devices for protection in launching areas, where appropriate;
- .7 illumination in launching areas;
- .8 use of all survival equipment;
- .9 use of all detection equipment;
- .10 with the assistance of illustrations, the use of radio lifesaving appliances;
- .11 use of drogues;
- .12 use of engine and accessories;
- .13 recovery of survival craft and rescue boats including stowage and securing;
- .14 hazards of exposure and the need for warm clothing;
- .15 best use of the survival craft facilities in order to survive;
- .16 methods of retrieval, including the use of helicopter rescue gear (slings, baskets, stretchers), breeches-buoy and shore life-saving apparatus and ship's line-throwing apparatus;
- .17 all other functions contained in the muster list and emergency instructions; and
- .18 instructions for emergency repair of the life-saving appliances.

29.1.8.5 Every ship fitted with a marine evacuation system shall be provided with on-board training aids in the use of the system.

29.18.6 The training manual shall be written in English and, where the working language of the crew is not English, in such working language as appropriate.

**29.2 Construction - Fire protection, fire detection and fire extinction**

*29.2.1 Instructions, On-board Training and Drills:*

29.2.1.1 The purpose of this section is to mitigate the consequences of fire by means of proper instructions for training and drills of persons onboard in correct procedures under emergency conditions and for this purpose, the crew shall have the necessary knowledge and skills to handle fire emergency cases, including passenger care.

29.2.1.2 Crew members shall receive instruction on fire safety onboard the ship.

29.2.1.3 Crew members shall receive instructions on their assigned duties.

- 29.2.1.4 Parties responsible for fire extinguishing shall be organised and such parties shall have the capability to complete their duties at all times while the ship is in service.
- 29.2.1.5 Crew members shall be trained to be familiar with the arrangements of the ship as well as the location and operation of any fire-fighting systems and appliances that they may be called upon to use.
- 29.2.1.6 Training in the use of the emergency escape breathing devices shall be considered as part of on-board training.
- 29.2.1.7 Performance of crew members assigned fire-fighting duties shall be periodically evaluated by conducting on-board training and drills to identify areas in need of improvement, to ensure competency in fire-fighting skills is maintained, and to ensure the operational readiness of the fire-fighting organisation.
- 29.2.1.8 On-board training in the use of the ship's fire-extinguishing systems and appliances shall be planned and conducted in accordance with the provisions of 29.5.1.
- 29.2.1.9 Fire drills shall be conducted and recorded in accordance with the provisions of section 29.1.3.1 to 29.1.3.3 & 29.1.8.1.
- 29.2.1.10 A training manual shall be provided in each crew mess room and recreation room or in each crew cabin.
- 29.2.1.11 The training manual shall be written in the working language of the ship.
- 29.2.1.12 The training manual, which may comprise several volumes, shall contain the instructions and information required in 29.1.2.9 in easily understood terms and illustrated wherever possible; any part of such information may be provided in the form of audio-visual aids in lieu of the manual.
- 29.2.1.13 The training manual shall explain the following in detail-
- .1 general fire safety practice and precautions related to the dangers of smoking, electrical hazards, flammable liquids and similar common shipboard hazards;
  - .2 general instructions on fire-fighting activities and fire-fighting procedures, including procedures for notification of a fire and use of manually operated call points;
  - .3 meanings of the ship's alarms;
  - .4 operation and use of fire-fighting systems and appliances;
  - .5 operation and use of fire doors;



- .6 operation and use of fire and smoke dampers; and
- .7 escape systems and appliances.

- 29.2.1.14 General arrangement plans<sup>91</sup> shall be permanently exhibited for the guidance of the ship's officers, showing clearly for each deck the control stations, the various fire sections enclosed by "A" class divisions, the sections enclosed by "B" class divisions together with particulars of the fire detection and fire alarm systems, the sprinkler installation, the fire-extinguishing appliances, means of access to different compartments, decks, etc., and the ventilating system, including particulars of the fan control positions, the position of dampers and identification numbers of the ventilating fans serving each section; provided that as an alternative, at the discretion of the BMA, the aforementioned details may be set out in a booklet, a copy of which shall be supplied to each officer, and one copy shall at all times be available onboard in an accessible position and in any case plans and booklets shall be kept up to date; any alterations thereto shall be recorded as soon as practicable and the description in such plans and booklets shall be in English.
- 29.2.1.15 A duplicate set of fire control plans or a booklet containing such plans shall be permanently stored in a prominently marked weathertight enclosure outside the deckhouse for the assistance of shore-side fire-fighting personnel<sup>92</sup>.
- 29.2.1.17 An onboard means of recharging breathing apparatus cylinders used during drills shall be provided or a suitable number of spare cylinders shall be carried onboard to replace those used.

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<sup>91</sup> Refer to Graphical symbols for fire control plans, adopted by the IMO by Resolution A.654(16) and Resolution A.952(23) - Graphical Symbols for Shipboard Fire Control Plans for ships constructed on or after 01 January 2004.

<sup>92</sup> Refer to the Guidance concerning the location of fire control plans for assistance of shoreside fire-fighting personnel (MSC/Circ.451).

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

### **30.1 Survey and Certification**

30.1.1 All ships covered by this Code are required to be surveyed and certified in accordance with the applicable requirements of the survey guidelines under the IMO Harmonized System of Survey and Certification adopted by resolution A.1140(31) as applicable to passenger ships.

30.1.2 In particular, an inspection of the outside of the vessel's bottom shall take place annually, with two inspections in dry-dock in the five-year validity period of the Load Line Certificate and not more than 36 months between inspections in dry-dock. The BMA will consider applications to reduce the number of inspections in dry-dock from two to one<sup>93</sup>. In such cases, the interval between consecutive inspections in dry-dock shall not exceed 60 months.

30.1.2 Statutory certification and services may be undertaken by:

- .1 surveyors of the BMA; or
- .2 surveyors of a Recognised Organisation appointed by the BMA.

30.1.3 All requests for survey and certification shall be made to the BMA or the appropriate Recognised Organisation where such surveys are delegated.

### **30.2 Use of a Recognised Organisation**

30.2.1 Authorised Recognised Organisations are aware of the extent to which responsibility has been delegated to issue International Convention Certificates. International Conventions give specific discretion to the BMA to either make exemptions or accept equivalent equipment or arrangements. The formal agreement between the BMA and its Recognised Organisations governs the relationship between the two parties.

### **30.3 Use of a Recognised Organisation Surveyor to act on the behalf of the BMA**

30.3.1 An exclusive surveyor from a Recognised Organisation, proposed by them, may be appointed to act on behalf of the BMA in cases when it is impracticable for a surveyor of the BMA to make the visit necessary for the survey.

30.3.2 When a Recognised Organisation surveyor is so appointed, actions taken shall be under direct instruction of the BMA. The BMA shall provide the appointed surveyor with detailed guidance on the scope of survey and report required.

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<sup>93</sup> Please refer to [BMA Information Bulletin No,73](#)

**30.4 Accident Investigations**

- 30.4.1 The BMA is obliged to investigate accidents or incidents in which a vessel registered in The Bahamas is involved, in accordance with the requirements of the International Conventions. In addition to this legal requirement, the BMA may investigate any incidents where there may be important safety lessons to be learned<sup>94</sup>.
- 30.4.2 It is an offence for the vessel's master, skipper or owner not to inform the BMA of a reportable accident immediately<sup>95</sup> after it occurs and to provide details so that an assessment of its seriousness can be made quickly. The BMA shall appoint a suitable investigator whenever an investigation is required. The BMA will receive the investigator's report of the investigation and shall deal with the follow up action.
- 30.4.3 The BMA is mandated to conduct an investigation into any very serious marine casualty occurring on any ships to which the IMO Casualty Investigation Code applies<sup>96</sup>. Such an investigation may assist in determining what changes in the content of this Code may be desirable. Casualty investigations are carried out in accordance with the IMO Casualty Investigation Code and Bahamas legislation.
- 30.4.4 All very serious marine casualties in accordance with the IMO definition are reported to IMO by the BMA.

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<sup>94</sup> Please refer to [BMA Information Bulletin No.4](#)

<sup>95</sup> Within 4 hours of occurrence

<sup>96</sup> The full title of the Casualty Investigation Code is "Code of International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Incident".

**31 CERTIFICATES TO BE ISSUED**

**31.1 General**

31.1.1 Every vessel to which this Code applies shall be certificated in accordance with the relevant provisions of the applicable Conventions (as amended). This shall include as a guide, but not necessarily limited to those listed in this section.

31.1.2 Certificates shown in blue are issued by the BMA. Other certificates are issued by the BMA or a Recognised Organisation acting on its behalf.

**31.2 Certificates to be issued to all vessels**

- .1 [Certificate of Registry](#)
- .2 International Tonnage Certificate
- .3 [Bahamas Passenger Yacht Certificate of Compliance](#)
- .4 Certificate of Classification
- .5 Passenger Ship (Yacht) Safety Certificate and Form P
- .6 Statement of Operational Limitations
- .7 International Load Line Certificate
- .8 Load Line Conditions of Assignment
- .9 International Sewage Pollution Prevention Certificate (when more than 15 persons are carried onboard)
- .10 [Minimum Safe Manning Document](#)
- .11 Antifouling Systems, Owners Declaration (<400GT)
- .12 EIAPP Certificates / NOx Technical Files (for each engine with a power output of more than 130kW built after 01 January 2000)
- .13 [Ship Radiocommunications Licence<sup>97</sup>](#)
- .14 International Ballast Water Management Certificate/Statement (if applicable)

**31.3 Additional certificates to be issued to vessels of 300 GT and above**

- .1 [Wreck Removal Insurance Certificate](#)

**31.4 Additional certificates to be issued to vessels of 400 GT and above**

- .1 International Oil Pollution Prevention Certificate and Record
- .2 International Sewage Pollution Prevention Certificate
- .3 International Air Pollution Prevention Certificate and Record
- .4 International Energy Efficiency Certificate
- .5 Antifouling Systems Certificate

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<sup>97</sup> Issued by BMA on behalf of The Bahamas Utilities Regulation and Competition Authority (URCA)

**31.5****Additional certificates to be issued to vessels of 500 GT and above**

- .1 ISM Safety Management Certificate
- .2 International Ship Security Certificate
- .3 [Continuous Synopsis Record file](#)
- .4 Maritime Labour Convention (MLC) Certificate (including [DMLC Part I](#) and DMLC Part II)

**31.6****Additional certificates to be issued to vessels of 1,000 GT and above**

- .1 [Civil Liability Certificate for Bunker Oil Pollution Damage \(Bunkers Convention\)](#)

**32 YACHT TYPE SPECIFIC REQUIREMENTS**

**32.1 Requirements for Sailing Vessels**

*32.1.1 General*

32.1.1.1 Sailing vessels as defined in Section 2 shall comply with the provisions of this section of the Code.

*32.1.2 Application*

11.2.1 As per Section 2, a sailing vessel is a vessel designed to carry sail, whether as a sole means of propulsion or as a supplementary means.

*32.1.3 Operating Restrictions*

32.1.3.1 The vessel's "Statement of Operational Limitations" shall give the maximum wind speed or 'Derived Heel Angle' and reference the vessel's 'Sailing Operations Manual'

32.1.3.2 Any applicable rig limitations shall also be listed on the statement.

*32.1.4 Water Freeing Arrangements*

32.1.4.1 Where the solid bulwark height does not exceed 150 millimetres, specific freeing ports, as defined section 6, are not required.

*32.1.5 Intact Stability*

32.1.5.1 The 'down-flooding angle' is the angle of heel causing immersion of the lower edge of openings having an aggregate area, in square meters, greater than:-

$$\frac{\Delta}{1500}$$

where:

$\Delta$  = vessels displacement in tonnes

32.1.5.2 Vessels shall comply with the appropriate parts of section 4 regarding intact stability in full.

32.1.5.3 Current Sections 4,5,11 and 12 requirements are to be assessed without accounting for the added windage of the sails. Vessels with lifting keels, shall meet the requirements of Sections 4,5,11 and 12 in the most onerous condition.

32.1.5.4 Asymmetric ballasting is not permitted whilst sailing

*32.1.6 Intact Stability Monohulls*

32.1.6.1 Curves of static stability (GZ curves) for at least the Loaded Departure with 100% consumables and the Loaded Arrival with 10% consumables shall be produced.

32.1.6.2 The GZ curves required by 32.1.6.1 shall have a positive range of not less than 90°, where the 'Sail Area Displacement Ratio' is greater than 10 calculated as follows:

$$\frac{A_{sails}}{\nabla^{(2/3)}}$$

where:

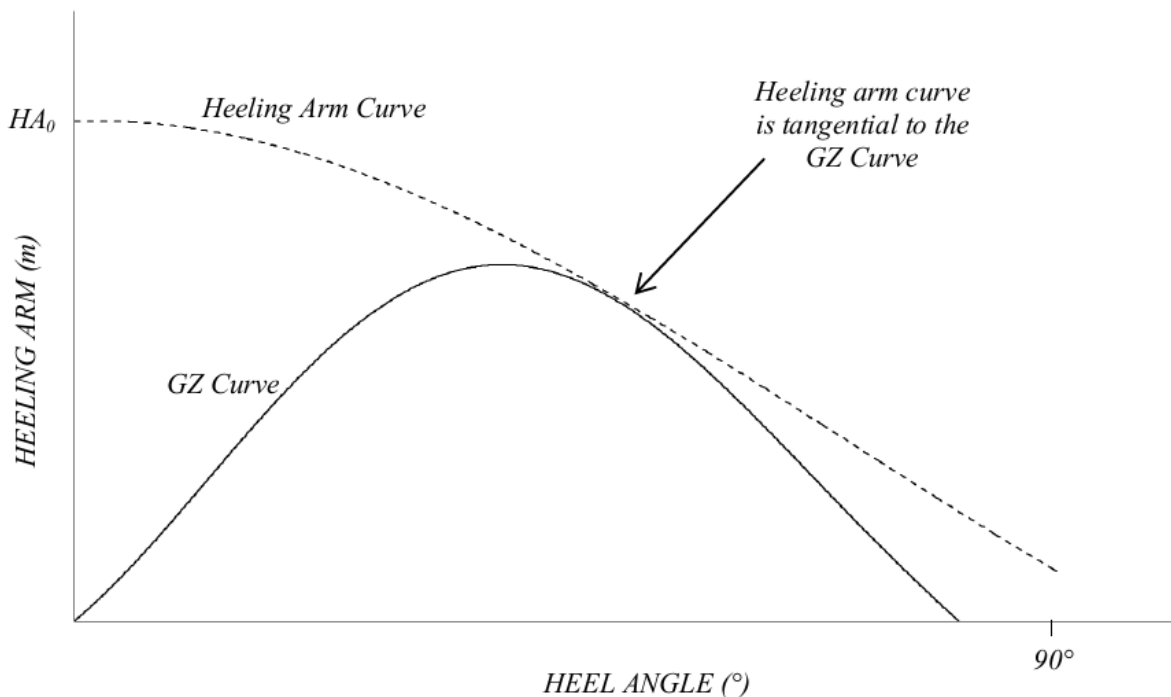
$\nabla$  = Vessel displacement in metres cubed (m<sup>3</sup>);

$A_{sails}$  = is the area of the full upwind sail plan, including sail overlaps in square meters (m<sup>2</sup>)

32.1.6.3

For vessels where the ‘Sail Area Displacement Ratio’ is less than 10 calculated as per 32.1.6.2, where a range of less than 90° exists, the wind speed required to capsize shall be calculated to be more than 38 knots as follows:

The heel angle resulting from a steady wind heeling moment corresponds to the intersection of the righting and heeling arm curves, so the heeling arm at the point of capsize is defined where the heeling arm curve is tangential to the GZ curve.



The heeling arm curve is defined by the formula:

$$HA_{\theta} = HA_0(\cos \theta)^{1.3}$$

where:

$HA_{\theta}$  = Heeling arm at any given angle  $\theta$

$HA_0$  = Heeling arm at 0°

V is calculated by the formula:

$$V \times 0.514 = v = \sqrt{\left( \frac{\Delta \times g \times HA_0}{0.5\rho(A_{sails}h_{sails}C_{sails} + A_{hull}h_{hull}C_{hull})} \right)}$$

where:

V = Apparent wind speed in knots

v = Apparent wind speed in metres per second (m/s)

ρ = Density of Air (assumed to be 1.222 kg/m<sup>3</sup>)

g = Gravitational Acceleration 9.81 m/s<sup>2</sup>

Δ = Vessel displacement in kilograms (kg)

A<sub>sails</sub> = is the area of the full upwind sail plan, including sail overlaps in square meters (m<sup>2</sup>)

h<sub>sails</sub> = is the height of the centroid of the sail plan above half the draft in meters (m)

C<sub>sails</sub> = is the maximum sail heeling force coefficient, assumed to be 1.75 (unless proven otherwise)

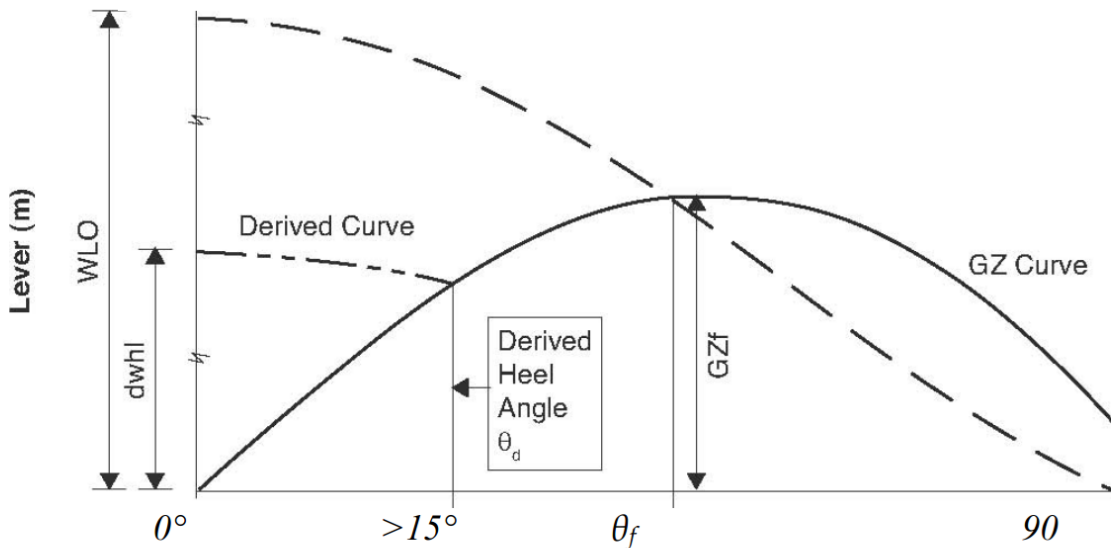
A<sub>hull</sub> = is the profile area of the hull and superstructure in square meters (m<sup>2</sup>)

h<sub>hull</sub> = is the height of the centroid of the hull and superstructure area above half the draft in meters (m)

C<sub>hull</sub> = is the hull heeling force coefficient, assumed to be 1.0 (unless proven otherwise)

32.1.6.4

In addition to the requirements of 32.1.6.2 or 32.1.6.3, the angle of steady heel shall 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 32.1.6.1.



Where

dwhl = the derived wind heeling lever at any angle  $\theta^\circ = 0.5 \times WLO \times \text{Cos}^{1.3}\theta$

and

$$WLO = \frac{GZ_f}{\text{Cos}^{1.3}\theta_f}$$



Noting that:

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

$GZ_f$  = is the lever of the vessel's GZ at the downflooding angle  $\theta_f$  or  $60^\circ$ , whichever is least.

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

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

$$\frac{\Delta}{1500}$$

where  $\Delta$  = vessel displacement in tonnes

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.

If, 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.

Provided the vessel complies with the requirements of 32.1.6.1 to 32.1.6.4 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  $60^\circ$ .

**32.1.7** *Damage Stability*

**32.1.7.1** The maximum assumed wind force ( $M_{wind}$ ) acting in a damage situation as per 11.7.8 shall be calculated so that the 'projected lateral area above the waterline' (A), includes all running/standing rigging sail controls and spars.

**32.1.7.2** The projected lateral area in 11.16.10.3 is to include all running/standing rigging sail controls and spars.

**32.1.7.3** Where applicable, the requirements of sections 11.17 and 11.18 shall be met whilst under a moment due to wind pressure as calculated by 11.16.10.3.

**32.1.7.4** In order to eliminate the wind heeling moment from the sails in case of damage, 32.1.18.1 shall be complied with.

**32.1.8** *Equipment Numeral*

- 32.1.8.1 When calculating the equipment numeral, sailing vessels shall take into account the additional windage effect of the masts and rigging.
- 32.1.8.2 Typically, for square rigged sailing vessels, experience based guidance on approximate increase in anchor mass and cable strength required is:
- .1 for vessels up to 50 meters in length, typically 50% above the requirements for a typical motor vessel having the same total longitudinal profile area of hull and superstructure as the square rigged sailing vessel under consideration; and
  - .2 for vessels 100 meters in length and above, typically 30% above the requirements for a typical motor vessel having the same total longitudinal profile area of hull and superstructure as the square rigged sailing vessel under consideration.
  - .3 for a square rigged sailing vessel of between 50 and 100 metres in length the increase shall be obtained by linear interpolation.
- 32.1.9 *Machinery and Electrical Installations*
- 32.1.9.1 Lighting supplied by the emergency source of electrical power shall be provided for illuminating the rigging, sails and sail controls including and dropping/furling in an emergency. The lighting shall be such that the night vision of the watchkeepers is not impaired and is to be arranged so that it cannot be mistaken for navigation light by another ship. Care shall also be given to preventing glare and stray reflections.
- 32.1.9.2 Main engines shall have a minimum power to ensure that the vessel has a minimum speed of 6 knots while heading into Beaufort Force 8 weather and corresponding sea conditions.
- 32.1.9.3 The sail handling facilities shall be equipped to allow a controlled emergency release of the sheets from both locally and from the bridge which shall be supplied by stored power. Sail controls shall have a local secondary means of control in the event of failure.
- 32.1.9.4 A control system is to be provided so that the setting and trimming of sails may be carried out from the bridge, and is to be such that, once established, the desired setting and trimming may be automatically maintained. The control system is to provide adequate speed of response to automatically neutralize the sail system in the event of wind conditions which may damage the sail system and endanger the ship.
- 32.1.9.5 Lowering or furling of any combination of the sails shall be operational from a source of power other than the main source of power. These controls shall be operational at the down flooding angle or 60° whichever is least.
- 32.1.9.6 The Emergency Generator, fire pump and bilge pumps shall operate at 22.5 degrees or greater depending on the vessels specific operating conditions.

- 32.1.9.7 Vessels shall have lightning strike protection<sup>98</sup>.
- 32.1.9.8 Watertight Doors shall be able to operate at the maximum steady heel angles.
- 32.1.10 *Fire Protection, Detection and Extinction*
- 32.1.10.1 Within the interior of the vessel, the mast shall be either insulated directly to A-60 class requirements or contained within a space dedicated to the protection of the mast only, and insulated as follows:
- .1 'A-30' when adjacent to category (1),(2),(3),(4) & (10) spaces as per 6.7.10.2.vi;and
  - .2 'A-60' when adjacent to cat. (5),(6),(7),(9) spaces as per 6.7.10.2.vi.
- The space and those adjacent shall be fitted with a fully addressable fire detection system and a fixed firefighting system complying with the relevant provision of the Fire Safety Systems Code.
- 32.1.10.2 Standing and running rigging shall not be located or terminated in Category (32.1), (9), (7), (6) or (5) spaces. Where this is not possible, the rigging shall be locally protected to A-60 Class.
- 32.1.10.3 When applying 6.3.23 for the application of the requirements to furniture on open deck, all sails and rigging equipment shall be considered in the same way as lifesaving appliances.
- 32.1.11 *Life-Saving Appliances and Arrangements*
- 32.1.11.1 Life-saving appliances shall not be stowed in any position during normal operating conditions where, if required to be used or float free, rigging, the running rigging, spars or any other structure or equipment would cause an obstruction to its use.
- 32.1.11.2 The requirements of 13.4.1 shall be achievable under any combinations of sails within the Sailing Operations Manual.
- 32.1.11.3 Equipment shall be provided for the cutting and clearing of the rigging if dismasted.

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<sup>98</sup> See IEC 60092-401:1980 as amended or IEC 60092-507 as appropriate and Recognised Organisation requirements.

- 32.1.12 *Emergency Procedures, Training and Drills*
- 32.1.12.1 Sail Reduction drills shall be conducted in accordance with the vessel's 'Sailing Operations Manual'. These drills shall be conducted weekly or within the first 24 hours of the ship leaving a port where one has not been conducted within the last 7 days.
- 32.1.13 *Safety of Navigation*
- 32.1.13.1 Subject to any special provisions given in the national legislation every ship to which this Code applies shall comply with the applicable requirements of Chapter V of SOLAS.
- 32.1.13.2 Special consideration shall be given to 'Bridge Visibility' on sailing vessels in compliance with the Code specifically with regard to the placement of dedicated lookouts which shall:
- .1 have the sole duty, while the ship is underway, of maintaining a lookout;
  - .2 be positioned outside the passenger spaces, and
  - .3 be instructed by the master to keep a continuous lookout, and in particular over any or all (as the case may be) of the areas which are obstructed from the navigating position which the helmsman cannot see.
- The dedicated lookout may be in the wheelhouse, but if positioned outside the wheelhouse and remote they shall be provided with a means of voice communication to the helmsman.
- 32.1.13.3 Every sailing vessel shall carry a masthead anemometer, and an inclinometer, both of which shall be readable from the helms position.
- 32.1.13.4 Where the GMDSS radio aerial is located in the mast or rigging, an emergency aerial shall be carried so that in the event of a dismasting, the equipment can be rendered serviceable.
- 32.1.14 *Sailing Operations Manual*
- 32.1.14.1 The Sailing Operations Manual shall be approved by the BMA and used to indicate the various applicable sail combinations in relation to maximum wind speed & direction. This data shall be supported by results from appropriate testing and/or sea trials.
- 32.1.14.2 The sailing operations manual shall include the following:
- .1 General design parameters, environment data and limited operating conditions;
  - .2 Sail combination and reefing schedules with their corresponding, or in the case of a multihull, the values of maximum advised mean apparent wind speed, for the reference of the watchkeeper;
  - .3 Curves of maximum steady heel angle to prevent down flooding in squalls;
  - .4 Operational plans shall outline the sailing manoeuvres and numbers of trained crew required to conduct them (this will be considered in the requirements for minimum safe manning) including full particulars and plans of automatic operating systems.

- .5 The Stability book and Sailing Operations Manual shall contain the following statement for the Master:

The vessel has not been reviewed against damage stability criteria whilst under sail. Additional wind heeling moments from the sails could lead to capsize after minor damage.

**IN THE EVENT OF DAMAGE, ALL SAILS SHALL BE IMMEDIATELY FURLED OR DROPPED AS APPROPRIATE**

32.1.15 *Health and Safety*

32.1.15.1 Consideration will need to be given to the function of doors at adverse angles of heel while not making them dangerous to passengers at adverse heel angles.

32.1.15.2 Crew and passengers shall be able to move about the vessel safely at angles up to the 'Derived Heeling Angle'.

32.1.15.3 Consideration shall be given to the protection of persons on board from running rigging, sheets and spars, and in particular the possible flogging of sails and sheets.

32.1.15.4 Escape routes, muster stations and embarkation stations shall be protected from running rigging, sheets and spars.

32.1.16 *Manning Certification*

32.1.16.1 In assessing the appropriate level of manning for a passenger yacht the following factors are among those which shall be taken into account:

- .1 Sail control/handling systems onboard (captive winch systems etc)
- .2 Sail areas & numbers of sails & masts
- .3 Type of rig (traditional square rigger, modern sloop etc)
- .4 Skilled crew requirements for manoeuvring as per the 'Sailing Operations Manual'
- .5 Obstructed views from the bridge caused by masts and sails (see 32.1.13.2)

32.1.16.2 A sufficient number of Sail Coordinators may be required by the BMA to be carried dependent on the items in 32.1.16.1. Although the ultimate responsibility for the vessel is always with the Master, the on watch Sail Coordinator role is the designated person whose only responsibility is for the number and combination of sails to be set for the prevailing and forecast conditions, staying within the statement of operational limitation related to the sailing and the rig, adhering to the curves of maximum steady heel angle to prevent down flooding in squalls and providing constant reference to the 'Sailing Operations Manual' and Stability Book.

32.1.17 *Masts and Spars and Standing Rigging*

32.1.17.1 Dimensions and construction materials of masts and spars and dimensions of standing rigging including connection to chain plates shall be in accordance with the requirements

or recommendations of a Recognised Organisation or a national or international standard recognised by the BMA.

- 32.1.17.2 The associated structure for masts and spars (including chain plates, fittings, decks and floors) shall be constructed to effectively carry and transmit the forces involved.
- 32.1.17.3 Running rigging, blocks, shackles, rigging screws, cleats and associated fittings shall be Type approved and sized to the Recognised Organisation's satisfaction.
- 32.1.17.4 Sails controls (sheets, Halyards), blocks & attachments shall be Type Approved and sized to the Recognised Organisation's satisfaction.
- 32.1.17.5 Compliance with 32.1.17.1 to 32.1.17.4 shall be confirmed by a design review and approval by the Recognised Organisation (e.g. Rig Design Certificate) which is assigned with the review of the rig.
- 32.1.17.6 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.
- 32.1.17.7 A physical survey on the rig stepping procedure and the rig behaviour during sea trials is to be carried out by or on behalf of the Recognised Organisation that is involved with the classification of the vessel's hull.
- 32.1.17.8 Annual surveys on the vessel shall include reviewing records and history of rig maintenance.
- 32.1.17.9 Rig manuals (Rig Behaviour Report and Rig Maintenance Manual) to monitor the condition of the rig in accordance with a Maintenance Manual and a planned maintenance schedule shall be provided. The schedule shall include, in particular, regular monitoring of all the gear associated with safe work aloft and on the bowsprit.
- 32.1.18 *Sails*
- 32.1.18.1 In order to eliminate the wind heeling moment in case of damage, all the sails for any given sail combination (as per the vessel's Sailing Operations Manual) shall be able to be dropped/stowed or furled within 10 minutes under the conditions described in 32.1.9.5.
- 32.1.18.2 Adequate means of reefing or shortening sail shall be provided.

**32.2 Requirements for vessels carrying more than 120 persons**

*32.2.1 General*

32.2.1.1 This section applies to all yachts certified to carry more than 120 and no more than 200 persons on board.

32.2.1.2 Yachts of less than 80 metres length L are not eligible to carry more than 120 persons on board or to be certified in accordance with this section due to the stability limitations for vessels of this size.

32.2.1.3 This section shall only be applied to yachts which are built and operated as either PCY or PPY.

*32.2.2 Construction and Equipment Requirements*

32.2.2.1 Unrestricted PPY and PPY vessels which are limited to an operational area within 60 nautical miles of a safe haven (PY-L2)<sup>99</sup> certified to carry more than 120 persons shall:

- i. comply with the enhanced survivability standard as defined in section 11.17 for all watertight compartments;
- ii. comply with the maximum floodable length requirements as defined in section 11.18;
- iii. have boundaries including windows and doors, with external escape routes and muster stations, of a standard being at least an A-0 Class division;
- iv. have low location lighting in accordance with Section 14.10.18 installed in all corridors and staircases in crew/occasional worker areas;
- v. have lifebuoys provided in accordance with the requirements of section 13.10.1;
- vi. have immersion Suits provided in accordance with the requirements of section 13.10.13; and
- vii. have a flooding detection system to be provided in accordance with the requirements of SOLAS II-1/22-1

32.2.2.2 In addition to the requirements of 32.2.2.1, PCY Vessels wishing to operate outside the limitations specified in 32.2.2.1, certified to carry over 120 persons shall comply with the requirements of section 11.9, SOLAS II-2/21 and 22 for 'Safe Return to Port' as applicable.

*32.2.3 Crew Qualifications*

32.2.3.1 All seafarers shall hold the following STCW qualifications:

- .1 A-VI/1-1 - personal survival techniques;
- .2 A-VI/1-2 - fire prevention and firefighting;
- .3 A-VI/1-3 - elementary first aid;
- .4 A-VI/1-4 - personal safety and social responsibilities;
- .5 A-VI/6.5 - Security Awareness Training.

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<sup>99</sup> The BMA may permit single voyages on specified routes with additional restrictions as appropriate

- 32.2.3.2 All persons who are not passengers or do not meet the definition of a seafarer, shall meet the requirements of an occasional worker as set out in section 26.2.
- 32.2.3.3 The number of occasional workers shall not exceed 10% of the total number of non-passengers on board the Yacht, unless otherwise agreed by the BMA.

Category of persons	Number on Board
Passengers	36
Seafarers	150
Occasional workers	14
<b>TOTAL</b>	<b>200</b>

**Table 32.2 – Example number of persons on board**

Category of yacht	Passenger Charter Yacht (PCY)		Passenger Private Yacht (PPY)
Operational Area	Unlimited	60 nautical miles from safe haven	Unlimited
Construction and Equipment Requirements (Section 32.2)	Section 32.2.1 + Section 32.2.2	Section 32.2.1	Section 32.2.1
	SOLAS 'Safe Return to Port'		
Crew Qualifications (Section 32.3)	Section 32.3.1 (Seafarers to hold STCW) + Section 32.3.2 (10% occasional workers)		

**Table 32.2 – Summary of requirements for vessels carrying more than 120 persons**

**32.3 Additional Equivalence Considerations**

- 32.3.1 None



### 33 HELICOPTER LANDING AREAS

#### 33.1 General

##### 33.1.1 *Introduction*

33.1.1.1 This section outlines the minimum standards for Helicopter Landing Areas (HLA), and associated facilities onboard vessels within the scope of this Code where helicopter operations to or from the vessel are required. It also addresses operational considerations as related to the yacht crew.

33.1.1.2 The appointed Aviation Inspection Body is responsible for the issuing of the following certificates:

- .1 A "Helicopter Landing Area Technical Certificate" may be issued where only the physical design characteristics of this section have been met, but may include operational limitations such as night use or maximum wind speeds etc; and
- .2 A "Helicopter Landing Area Certificate" shall be issued when all of the requirements of this section have been met and will also note any operational deck limitations.

33.1.1.3 Requirements with respect to the HLA on a vessel results from the need to ensure that helicopters are always afforded sufficient space to be able to operate safely in the varying conditions experienced.

33.1.1.4 In order to ensure safe operation it is envisaged that limitations regarding the availability of the landing area shall be applied by the Aviation Inspection Body on behalf of the BMA.

33.1.1.5 The helicopter's performance requirements and handling techniques are contained in, and governed by, the Rotorcraft Flight Manual and/or the operator's Operations Manual.

##### 33.1.2 *Risk Assessment*

33.1.2.1 In all cases, a formal and documented risk assessment of the operation shall be carried out by a suitably experienced and qualified individual authorised by the BMA. The risk assessment shall establish the hazards and resultant risks associated with the operation of each helicopter type that it is planned to utilise the HLA of the yacht concerned. This shall include the physical requirements for the characteristics of the landing area.

### 33.1.3 *Further guidance*

33.1.3.1 This section does not address helicopter flight operations in any detail. It is intended as a technical standard for the landing area and associated on-board helicopter facilities. The helicopter pilot/operator is responsible for ensuring that the requirements of the Administration with which the helicopter is registered and the requirements of the Administration responsible for the airspace in which the helicopter is operating are complied with in full. The Aviation Inspection Body may provide further guidance.

33.1.3.2 The ICS<sup>100</sup> 'Guide to Helicopter/Ship Operations' (as amended) shall be considered during the development of Helicopter Landing Areas and their safe operations.

33.1.3.3 Enquiries regarding operational (flight) limitations based on non-compliances of the landing area shall be directed to the Aviation Inspection Body.

## **33.2 Design and Construction**

### 33.2.1 *Introduction*

33.2.1.1 This section provides information on physical requirements for the characteristics of helicopter landing areas on a yacht within the scope of the Code.

33.2.1.2 The risk assessment carried out in 33.1.2.1 in order to establish the adequacy of the landing area shall include, for each helicopter landing area, the proposed maximum size of helicopter in terms of D-value and the proposed maximum take-off weight of the heaviest helicopter in terms of "t" value for which it is proposed each landing area is certificated with regard to size and strength.

33.2.1.3 The criteria which follow in Table 33.1 are based on helicopter size and weight and are for guidance only. The latest information shall be sought from the helicopter manufacturer.

33.2.1.4 In addition to the risk assessment, the following plans and particulars shall be submitted to the Aviation Inspection Body, Certifying Authority, Recognised Organisation and BMA (as appropriate) for approval-

- .1 Hangar general arrangement (showing dimensions and structural considerations).
- .2 Helicopter lift and movement arrangements (if appropriate).
- .3 Structural fire protection.
- .4 Fire detection and extinguishing arrangements

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<sup>100</sup> International Chamber of Shipping - [www.ics-shipping.org](http://www.ics-shipping.org)

TYPE	D VALUE (m)	PERIMETER 'D' MARKING	ROTOR DIAMETER (m)	MAXIMUM WEIGHT (kg)	'T' VALUE
MD 500E	9.4	9	8.05	1361	1.4
Robinson R44	11.66	12	5.03	1134	1.2
Airbus Ind. H120	11.52	12	10.00	1715	1.7
MD 600N	11.79	12	8.38	1860	1.9
Bell 206 B3	12.11	12	10.16	1519	1.5
Bolkow Bo 105D	12.00	12	9.90	2400	2.4
MD 902	12.37	12	10.34	3250	3.3
Bell 206 L4	12.91	13	11.13	2018	2.0
Bell 407	12.61	13	10.66	2268	2.3
Airbus Ind. H130	12.64	13	10.69	2400	2.4
Airbus Ind. H125 B3	12.94	13	10.69	2250	2.3
Airbus Ind. AS355	12.94	13	10.69	2800	2.8
Airbus Ind. H135	12.10	12	10.20	2720	2.7
Agusta A119	13.02	13	10.83	2720	2.7
Bell 427	13.00	13	11.28	2971	3.0
Bell 429	13.11	13	10.98	3175	3.2
Bolkow 117	13.00	13	11.00	3200	3.2
Airbus Ind. H145	13.03	13	11.00	3585	3.6
Agusta A109	13.05	13	11.00	2600	2.6
Agusta Grand	12.96	13	10.83	3175	3.2
Airbus Ind. AS365 N3	13.73	14	11.94	4300	4.3
H155 B1	14.30	14	12.60	4920	4.9
AW 169	14.65	15	12.12	4500	4.5
Bell 430	15.29	15	12.80	4218	4.2
Sikorsky S76	16.00	16	13.40	5318	5.3
Agusta/Bell 139	16.66	17	13.80	6400	6.4
Bell 212	17.46	17	14.63	5080	5.1
Bell 412	17.13	17	14.02	5398	5.4
AW 189	17.60	18	14.60	8300	8.3
Airbus Ind. H175	18.06	18	14.80	7500	7.5
Super Puma AS332 L	18.70	19	15.00	8599	8.6
Bell 214ST	18.95	19	15.85	7938	8.0
Super Puma AS332 L2	19.50	20	16.20	9300	9.3
H 225	19.50	20	16.20	11000	11.0
Bell 525	19.75	20	15.70	9299	9.3

**Table 33.1 - Value and Helicopter Type Criteria (Not Exhaustive)**

### 33.2.2 *Purpose*

33.2.2.1 This section provides additional measures in order to address the fire safety objectives for ships fitted with special facilities for helicopters and for this purpose the following functional requirements shall be met:

- .1 helideck structure shall be adequate to protect the ship from the fire hazards associated with helicopter operations;
- .2 fire-fighting appliances shall be provided to adequately protect the ship from the fire hazards associated with helicopter operations;
- .3 refuelling and hangar facilities and operations shall provide the necessary measures to protect the ship from the fire hazards associated with helicopter operations; and
- .4 operation manuals and training shall be provided.

### 33.2.3 *General Requirements*

33.2.3.1 Helicopter landing areas shall meet the requirements of ICAO Annex 14 to the Convention on International Civil Aviation.

33.2.3.2 The standards of ICAO Annex 14 shall be followed where applicable for:

- .1 "Purpose-built Shipboard Heliports"; and
- .2 "Purpose-built Shipboard Heliports provided in the bow or stern of the ship"

33.2.3.3 The structural strength of the helicopter landing area shall be designed and constructed according to rules of a Recognised Organisation on helicopter landing areas for vessels.

### 33.2.4 *Construction of steel or other equivalent material*

33.2.4.1 In general, the construction of the helidecks shall be of steel or other equivalent materials. The underside of the helideck in way of all enclosed spaces shall be insulated to A-60 class.

### 33.2.5 *Construction of aluminium or other low melting point metals*

33.2.5.1 Where the BMA has permitted aluminium or other low melting point metal construction that is not made equivalent to steel, the following provisions shall be satisfied:

- .1 The underside of the helideck in way of all enclosed spaces shall be insulated to A-60 class.
- .2 after any fire on the ship or on the platform, the platform shall undergo a structural analysis to determine its suitability for further use; and
- .3 consideration shall be given to the protection of any glazed openings in exposed locations immediately forward of and/or below the helideck. Such glazed openings do not include those that are considered to be adequately protected by an overhanging superstructure deck or are located within recesses in the hull side.

### 33.2.6 *Fire Fighting Appliances*

33.2.6.1

The following firefighting appliances shall be provided in close proximity to the helideck and stored near the means of access to that helideck-

- .1 at least two dry powder extinguishers having a total capacity of not less than 45 kilograms;
- .2 carbon dioxide extinguishers of a total capacity of not less than 18 kg or equivalent;
- .3 a suitable foam application system consisting of monitors or foam making branch pipes or pop up nozzles in a Deck Integrated Fire Fighting System (DIFFS), capable of delivering foam to all parts of the helideck in all weather conditions in which helicopters can operate and which shall be capable of delivering a discharge rate as required in Table D.2 for at least five minutes;
- .4 the principal agent shall be suitable for use with salt water and conform to performance standards not inferior to those acceptable to the IMO<sup>101</sup>;
- .5 at least two nozzles of an approved dual-purpose type (jet/spray) and hoses sufficient to reach any part of the helideck;
- .6 in lieu of the requirements of paragraphs .3 to .5 on ships constructed on or after 01 January 2021 having a helideck, foam firefighting appliances which comply with the provisions of the Fire Safety Systems Code Chapter 17;
- .7 in addition to the requirements of the relevant Part of the Code, two sets of fire-fighter’s outfits; and
- .8 at least the following equipment shall be stored in a manner that provides for immediate use and protection from the elements-
  - i. adjustable wrench
  - ii. blanket, fire resistant;
  - iii. cutters, bolt, 60 cm;
  - iv. hook, grab or salving;
  - v. hacksaw, heavy duty, complete with 6 spare blades;
  - vi. ladder;
  - vii. lift line 5 millimetres diameter × 15 m in length;
  - viii. pliers, side-cutting;
  - ix. set of assorted screwdrivers; and
  - x. harness knife, complete with sheath.

<b>Category</b>	<b>Helicopter overall length</b>	<b>Discharge rate foam solution (litres/minute)</b>
H1	up to but not including 15 metres	250

<sup>101</sup> Refer to the International Civil Aviation Organization Airport Services Manual, part 1, Rescue and Fire Fighting, chapter 8, Extinguishing Agent Characteristics, Paragraph 8.1.5, Foam Specifications table 8-1, Level “B”.

H2	from 15 metres up to but not including 24 metres	500
H3	from 24 metres up to but not including 35 metres	800

**Table H.2 Foam discharge rates**

33.2.7 *Drainage Facilities*

33.2.7.1 Drainage facilities in way of helidecks shall be constructed of steel and shall lead directly overboard independent of any other system and shall be designed so that drainage does not fall onto any part of the ship.

33.2.8 *Access Points and Means of Escape*

33.2.8.1 Many helicopters have passenger access on one side only and helicopter landing orientation in relation to landing area access points becomes important because it is necessary to ensure that embarking and disembarking passengers are not required to pass around the helicopter tail rotor, or under the front of the main rotor of those helicopters with a low profile rotor, should a 'rotors-running turn-round' be conducted.

33.2.8.2 There shall be a minimum of two access/egress routes to the helicopter landing area and these shall be as widely separated as possible. The arrangements shall be optimised to ensure that, in the event of an accident or incident on the helicopter landing area, personnel shall be able to escape upwind of the landing area. Adequacy of the emergency escape arrangements from the helicopter landing area shall be included in any evacuation, escape and rescue analysis for the vessel, and may require a third escape route to be provided.

33.2.8.3 Where foam monitors are co-located with access points, care shall be taken to ensure that no monitor is so close to an access point as to cause injury to escaping personnel by operation of the monitor in an emergency situation.

33.2.8.4 Where handrails associated with landing area access/escape points exceed the height limitations given by ICAO Annex 14, they shall be retractable, collapsible or removable. When retracted, collapsed or removed the rails shall not impede access/egress. Procedures shall be in place to retract, collapse, or remove them prior to helicopter arrival. Once the helicopter has landed, and the crew has indicated that passenger movement may commence, the handrails may be raised and locked in position. The handrails shall be retracted, collapsed, or removed again prior to the helicopter taking-off.

33.2.8.5 A helideck shall be provided with both a main and an emergency means of escape and access for firefighting and rescue personnel. These shall be located as far apart from each other as is practicable and preferably on opposite sides of the helideck.

33.2.9 *Environmental Effects*

- 33.2.9.1 The safety of helicopter flight operations can be seriously degraded by environmental effects that may be present around vessels. The term “environmental effects” describes the effects of the vessel, its systems, and forces in the surrounding environment, which result in a degraded local environment in which the helicopter is expected to operate. These environmental effects are typified by structure-induced turbulence, and turbulence/thermal effects caused by exhaust emissions. Controls in the form of landing area availability restrictions may be necessary and shall be imposed via the Aviation Inspection Body. Such restrictions can be minimised by careful attention to the design and layout of the vessel topsides and, in particular, the location of the helicopter landing area.
- 33.2.9.2 All new helicopter landing areas, or modifications to existing topside arrangements which could potentially have an effect on the environmental conditions due to turbulence around an existing helicopter landing area, or helicopter landing areas where operational experience has highlighted potential airflow problems shall be subject to appropriate wind tunnel testing or Computational Fluid Dynamics (CFD) studies to establish the wind environment in which helicopters shall be expected to operate. Operations to a vessel underway where the helideck shall be subjected to relative rather than true wind velocity shall be taken into consideration. As a guide the standard deviation of the vertical airflow velocity shall be limited to 1.75m/s. This airflow velocity shall be applied to the recommended approach/departure path and landing/take off phase of the aircraft. The helicopter pilot/operator and Aviation Inspection Body shall be informed at the earliest opportunity of any wind conditions for which this criterion is not met in order to allow the appropriate platform availability restrictions/limitations shall be defined if necessary.
- 33.2.9.3 Designers of helicopter landing areas shall commission a survey of ambient temperature rise based on a Gaussian dispersion model and supported by wind tunnel tests or CFD studies for new build helicopter landing areas, modifications to existing topside arrangements, or for helicopter landing areas where operational experience has highlighted potential thermal problems. When the results of such modelling and/or testing indicate that there may be a rise of air temperature of more than 2°C (averaged over a 3 second time interval), the helicopter pilot/operator and Aviation Inspection Body shall be consulted at the earliest opportunity so that appropriate platform availability restrictions/limitations may be applied if necessary.
- 33.3 Operations**
- 33.3.1 *HLA Operations Manual*
- 33.3.1.1 Each helicopter facility (including any refuelling and hangar facilities) shall have an Operations Manual, including a description and a checklist of safety precautions, procedures and equipment requirements. This manual may be part of the ship’s emergency response procedures.
- 33.3.1.2 The maximum helicopter weight and ‘D’ value for which the helicopter landing area has been designed and the maximum size and weight of helicopter for which the vessel is certificated shall be included in the Helicopter Landing Area Operations Manual,

Helicopter Landing Area Technical Certificate (where issued) and Helicopter Landing Area Certificate. The extent of the obstacle-free area shall also be stated and reference made to any helicopter landing area operating limitation imposed by helicopter operators or the Aviation Inspection Body as a result of non-compliances. Details of non-compliances themselves shall also be listed.

- 33.3.1.3 The procedures and precautions shall be followed during refuelling operations shall be in accordance with recognized safe practices and contained in the operations manual.
- 33.3.1.4 Firefighting personnel, consisting of at least two persons trained for rescue and firefighting duties, and firefighting equipment shall be immediately available at all times when helicopter operations are expected.
- 33.3.1.5 On-board refresher training shall be carried out and additional supplies of firefighting media shall be provided for training and testing of the equipment.
- 33.3.2 *Movement of HLA due to Wave Motions at Ship*
- 33.3.2.1 Yachts experience dynamic motions due to wave action which represent a potential hazard to helicopter operations. For helicopter operations, acceleration in pitch, roll and heave shall provide the limiting factor. These limits are a combination of both vessel and helicopter capability. Operational limitations based on limited pitch, roll and heave may therefore be applied to the landing area by the Aviation Inspection Body. Helicopter landing area downtime due to excessive deck motion can be minimised by careful consideration of the location of the landing area on the vessel at the design stage. Guidance on helicopter landing area location and how to assess the impact of the resulting motion on operability is presented in UK CAA Paper 2004/02 "Helideck Landing Area Design Considerations – Environmental Effects", as may be amended from time to time and which is available on the Publications section of the UK CAA website at [www.caa.co.uk](http://www.caa.co.uk). Designers of helicopter landing areas shall consult this paper at the earliest possible stage of the design process.
- 33.3.2.2 The helicopter landing area shall be limited to receiving helicopters in the conditions agreed by the Aviation Inspection Body.
- 33.3.2.3 Details of pitch, roll, and heave motions shall be recorded on the vessel prior to, and during, all helicopter movements. Pitch and roll reports to helicopters shall include values, in degrees, about both axes of the true vertical datum (i.e. relative to the true horizon) and be expressed in relation to the vessel's head. Roll shall be expressed in terms of 'port' and 'starboard'; pitch shall be expressed in terms of 'up' and 'down'; heave shall be reported in a single figure, being the total heave motion of the helicopter landing area rounded up to the nearest metre. Heave shall be taken as the vertical difference between the highest and lowest points of any single cycle of the helicopter landing area movement. The parameters reported shall be the maximum peak levels recorded during the 10-minute period prior to commencement of helicopter operations.



- 33.3.2.4 The helicopter pilot is concerned, in order to make vital safety decisions, with the amount of 'slope' on, and the rate of movement of, the helicopter landing area surface. It is therefore important that the roll values are only related to the true vertical and do not relate to any 'false' datum (i.e. a 'list') created, for example, by anchor patterns or displacement. There are circumstances in which a pilot can be aided by amplification of the heave measurement by reference to the time period (seconds) in terms of 'peak to peak'.
- 33.3.3 *Aircraft Operational Data – Reporting and Recording*
- 33.3.3.1 It is essential that yachts are provided with means of ascertaining and reporting at any time-
- .1 The movement of the vessel to deduce 'Roll', 'Pitch', and 'Heave'.
  - .2 the wind speed and direction using aviation approved equipment to ICAO standard;
  - .3 the air temperature;
  - .4 the barometric pressure using aviation approved equipment to ICAO standard;
  - .5 the visibility, cloud base and cover; and
  - .6 the sea state.
- 33.3.3.2 Air temperature and barometric pressure shall be measured by conventional instruments approved to ICAO standards. An indication of wind speed and direction shall be provided visually to the pilot by the provision of a windsock coloured so as to give maximum contrast with the background. However, for recording purposes, an anemometer positioned in an unrestricted airflow is required. A second anemometer located at a suitable height and position can give useful information on wind velocity at hover height over the helicopter landing area in the event of turbulent or deflected airflows over the deck. Visibility, cloud conditions, and sea state shall normally be assessed by visual observations.
- 33.3.3.3 Measuring instruments used to provide the data listed in 33.3.3.1 and 33.3.3.2 above shall be periodically calibrated in accordance with the manufacturer's recommendations in order to provide continuing accuracy.
- 33.3.4 *Support Equipment*
- 33.3.4.1 Provision shall be made for equipment needed for use in connection with helicopter operations including-
- .1 chocks and tie-down strops;
  - .2 a suitable power source for starting helicopters if helicopter shut down is seen as an operational requirement; and
  - .3 equipment for clearing the helicopter landing area of snow and ice and other contaminants.

- 33.3.4.2 Chocks shall be compatible with helicopter undercarriage/wheel configurations. Helicopter operating experience has shown that the most effective chock for use on helicopter landing areas is the 'NATO sandbag' type. Alternatively, 'rubber triangular' or 'single piece fore and aft' type chocks may be used as long as they are suited to all helicopters likely to operate to the helicopter landing area. The 'rubber triangular' chock is generally only effective on decks without nets.
- 33.3.4.3 For securing helicopters to the helicopter landing area only adjustable tie-down strops shall be used.
- 33.3.5 *Radio Communications Equipment*
- 33.3.5.1 At least one aeronautical frequency radio licensed by the Administration responsible for the airspace in which the helicopter is intended to operate when approaching the vessel shall be fitted onboard the vessel.
- 33.3.5.2 Radio operators of offshore aeronautical radio stations are required to hold a Certificate of Competence. Further information can be found in CAA Publication CAP 452 'Aeronautical Radio Station Operator's Guide'.
- 33.3.6 *Risk Assessment*
- 33.3.6.1 A full risk assessment shall be carried out addressing all the operations anticipated with helicopter operations onboard a yacht. This shall include-
- .1 Landing and securing
  - .2 Preparing for take-off and taking off
  - .3 Unloading passengers, baggage and stores
  - .4 Refuelling
  - .5 Securing
  - .6 Safe movement of personnel
- 33.3.6.2 The risk assessment shall be submitted to the BMA. The risk assessment to address the safe movement of personnel on the helicopter landing area shall also be submitted for approval by the Aviation Inspection Body to demonstrate that safe passenger movement may take place without endangering the safety of the helicopter or the life of personnel on-board.
- 33.3.7 *Crew Training*
- 33.3.7.1 All crew onboard shall undergo familiarisation training regarding helicopter operations onboard.
- 33.3.7.2 Specific training shall be provided to the Helicopter Landing Officer (HLO) by an appropriate training provider. Training of crewmembers and the HLO shall include both practical and theoretical sessions and, wherever possible, practical training shall be carried out onboard.

- 33.3.7.3 All other crew assigned duties within the helicopter landing area operations team(s) shall be certificated as Helideck Landing Assistants (HLA) by an appropriate training provider. The training shall include dealing with fires and other possible emergency scenarios.
- 33.3.7.4 Where there are refuelling facilities onboard, at least one member of crew shall be trained in the handling of aviation fuel and associated quality control procedures.
- 33.3.7.5 The crew shall practice dealing with the possible emergency scenarios through regular drills onboard with an annual inspection by an external auditor.
- 33.3.7.6 The emergency scenarios shall be addressed in the yacht's contingency plans and similar documents.

### **33.4 Helicopter Hangar Facilities**

#### *33.4.1 General Requirements*

- 33.4.1.1 Hangar and maintenance facilities shall be treated as category 'A' machinery spaces with regard to structural fire protection, fixed fire-extinguishing and detection system requirements.
- 33.4.1.2 Enclosed hangar facilities shall be provided with mechanical ventilation, as required by section 14.13.3 and ventilation fans shall be of non-sparking type.
- 33.4.1.3 Electric equipment and wiring in enclosed hangar or enclosed spaces containing refuelling installations shall also comply with the requirements of section 14.13.9;
- .1 when developing hangar arrangements, consideration shall be given to the type of fuel on which the helicopter to be stowed is run.
  - .2 the following plans and particulars shall be submitted to the Recognised Organisation and BMA for approval-
    - i. hangar general arrangement and structure;
    - ii. helicopter lift, hoist, and movement arrangements (if appropriate);
    - iii. structural fire protection;
    - iv. fire detection and extinguishing arrangements; and
    - v. ventilation arrangements.
- 33.4.1.4 Helicopter hangar(s) onboard shall be positioned, as far as is practicable, so as to preclude excessive movement and acceleration forces. Guidance on this shall be sought from the helicopter manufacturer/operator. Where possible, the positioning of hangar(s) shall be determined through the use of computer modelling and/or wind tunnel testing (refer also to Section 33.2.9.3);
- 33.4.1.5 If the hanger is to be accessed whilst the helicopter is stowed within it, means of escape and clearance around the helicopter for crew shall be considered, as well as any minimum clearances required for maintenance to be conducted whilst stowed.

33.4.1.6 Where appropriate CCTV shall be used to ensure visibility of the aircraft at all times.

### **33.5 Helicopter Re-Fuelling Facilities**

#### *33.5.1 Introduction*

33.5.1.1 This section outlines the considerations for the storage and transfer of aviation fuel. When developing fuelling arrangements, consideration shall be given to the type of fuel on which the helicopter to be operated is run. In addition, all facilities for the storage and handling of aviation fuels onboard shall be grade identified using an appropriate industry marking for the grade of fuel used. Aviation fuel facilities shall also be fully segregated from any other fuel system.

33.5.1.2 Refuelling and defuelling systems onboard are highly specialist areas and as such, expertise shall be sought in the design of such systems which shall be to an appropriate industry standard to the satisfaction of the Aviation Inspection Body.

33.5.1.3 Refuelling and defuelling operational considerations shall be agreed with the helicopter pilot/operator and Aviation Inspection Body.

33.5.1.4 The following plans and particulars shall be submitted to the Aviation Inspection Body and Recognised Organisation for approval-

- .1 description of fuel with statement of minimum flash point (closed cup test);
- .2 arrangements of fuel storage and piping;
- .3 arrangements for drainage, ventilation and sounding of spaces adjacent to storage tanks;
- .4 details and approval certification of pumping units;
- .5 structural fire protection arrangements of all spaces to contain aviation fuel;
- .6 fire detection and extinguishing arrangements; and
- .7 ventilation arrangements.

33.5.1.5 When developing operational procedures for the movement of aviation fuel onboard, the restricted use of radio frequency equipment including portable phones, with regard to transmission sparks, shall be considered.

#### *33.5.2 General Requirements*

33.5.2.1 Where the ship has helicopter refuelling facilities, the following requirements shall be complied with:

- .1 a designated area shall be provided for the storage of fuel tanks which shall be:
  - i. as remote as is practicable from accommodation spaces, escape routes and embarkation stations; and
  - ii. isolated from areas containing a source of vapour ignition.
- .2 the fuel storage area shall be provided with arrangements whereby fuel spillage may be collected and drained to a safe location;
- .3 tanks and associated equipment shall be protected against physical damage and from a fire in an adjacent space or area;

- .4 where portable fuel storage tanks are used, special attention shall be given to-
  - i. design of the tank for its intended purpose;
  - ii. mounting and securing arrangements;
  - iii. electric bonding; and
  - iv. inspection procedures;
- .5 storage tank fuel pumps shall be provided with means which permit shutdown from a safe remote location in the event of a fire and where a gravity fuelling system is installed, equivalent closing arrangements shall be provided to isolate the fuel source;
- .6 the fuel pumping unit shall be connected to one tank at a time and the piping between the tank and the pumping unit shall be of steel or equivalent material, as short as possible, and protected against damage;
- .7 electrical fuel pumping units and associated control equipment shall be of a type suitable for the location and potential hazards;
- .8 fuel pumping units shall incorporate a device which shall prevent over-pressurisation of the delivery or filling hose;
- .9 equipment used in refuelling operations shall be electrically bonded;
- .10 "NO SMOKING" signs shall be displayed at appropriate locations;
- .11 refuelling facilities shall be treated as category 'A' machinery spaces with regard to structural fire protection, fixed fire-extinguishing and detection system requirements;
- .12 enclosed spaces containing refuelling installations shall be provided with mechanical ventilation, as required by section 14.13.3 and ventilation fans shall be of non-sparking type; and
- .13 electric equipment and wiring in enclosed spaces containing refuelling installations shall also comply with requirements of section 14.13.9.

33.5.3 *Storage of Aviation Fuel*

33.5.3.1 The storage and handling area shall be permanently marked. Instructions for filling fuel and, if appropriate, emptying fuel, shall be posted in the vicinity of the filling area.

33.5.4 *Fuel Pumping and Storage Tank Filling*

33.5.4.1 In general, all piping systems shall be located clear of accommodation spaces, escape routes, embarkation stations and ventilation openings and shall not pass through category A machinery spaces. However, where arrangements are such that piping has to pass through accommodation spaces, service spaces, escape routes, or embarkation stations double skinned piping shall be used, or pipes shall be enclosed in a cofferdam.

33.5.4.2 Means shall be provided for keeping deck spills away from accommodation and service areas.

- 33.5.5 *Refuelling and Defuelling Helicopters*
- 33.5.5.1 Where appropriate CCTV shall be used to ensure full view from the bridge of all helicopter refuelling activities that would normally be hidden from view.
- 33.5.6 *Prevention of Fuel Contamination*
- 33.5.6.1 The location and arrangement of air pipes for fuel tanks shall be such that in the event of a broken vent pipe, this does not directly lead to ingress of seawater or rainwater.
- 33.5.6.2 At least one member of crew on-board the vessel shall be trained in the handling of aviation fuel and associated quality control procedures. This person(s) shall oversee all operations involving the movement of aviation fuel on-board. Further guidance on such training may be obtained from the fuel supplier and marine aviation consultants.
- 33.5.7 *Fuel Pumping Spaces and Compartments*
- 33.5.7.1 Where it is intended to install fuel transfer pumps for handling aviation fuel in a separate compartment, the pump room(s); shall be totally enclosed and have no direct communication through, e.g. bilge piping systems and ventilation systems, with machinery spaces; shall be situated adjacent to the fuel storage tanks; and shall be provided with ready means of access from the weather deck.
- 33.6 Other references**
- 33.6.1 Guidance for landing area design considerations are given in UK Civil Aviation Authority Paper 2004/02 (as may be amended from time to time) which shall be consulted by designers of helicopter landing areas at the earliest possible stage of the design process and is available through the CAA website ([www.caa.co.uk](http://www.caa.co.uk)).

## 34 BATTERY SYSTEMS

### 34.1 Summary

34.1.1 The intent of this Section is to provide guidance on best practice to facilitate safe solutions for vessels utilising batteries used for propulsion and/or electric power supply purposes during ship operations.

### 34.2 Introduction

34.2.1 This guidance has been developed to identify industry best practice; however, it is recognised that it cannot cover every eventuality in design, installation, operation, etc., and each case shall be considered separately. There are several areas within a design where the use of risk assessments or hazard identification techniques (such as Failure Modes Effects Analysis (FMEA)) shall be performed to understand the potential safety issues for personnel, the environment, the vessel and the vessel's operations.

34.2.2 This guidance does not supersede any other guidance or statutory instruction and shall be taken into account when developing designs for battery power systems. This guidance does not replace the need for sound engineering practice nor seamanlike precautions.

### 34.3 Definitions

34.3.1 A **cell** is a single electrochemical unit in its simplest form, typically packaged in metal cylinders; or flat, rectangular metal or plastic cases ("prismatic cells"); or heat-sealed foil pouches.

34.3.2 A **battery** is an assembly of two or more cells that are electrically connected together and fitted in a case with devices as terminals, markings and protective devices that it needs to function properly and safely.

34.3.3 **Thermal runaway** is when a cell enters a self-heating state (exothermic reaction) where the heat generated is greater than the heat dissipated. (Note: thermal runaway can begin at temperatures as low as 120°C depending on the cell size, design and chemistry, and from the initiation of thermal runaway, a cell's temperature can rise to a maximum in under 2 minutes.)

34.3.4 **State of charge** is the available capacity in a battery expressed as a percentage of rated capacity.

34.3.5 **State of health** reflects the general condition of a battery and its ability to deliver the specified performance compared with a new battery.

34.3.6 A **battery management system (BMS)** is an electronic device that controls, manages, detects or calculates electric and thermal functions of the battery system and provides communication between the battery system and upper level control systems.

**34.4 General Overview**

34.4.1 The content of this Section does not cover every eventuality in design, installation, operation, etc, and each case shall be considered separately. The use of risk assessments or hazard identification techniques shall be performed to understand the potential safety issues for personnel, the environment, the vessel and the vessel's operations caused by the incorporation of a battery. Suitable mitigations or safeguards shall be implemented to reduce risks to an acceptable level. In general, amendments to operational methods or procedures will not be accepted as an alternative to the safe design of a battery system and its installation in a vessel, whether this be regarding location, materials, equipment, auxiliaries, construction method, etc.

34.4.2 The design of a battery system within a vessel shall anticipate future changes. These changes might relate to the operational tasking of the vessel, modifications to the electrical equipment, upgrades to the battery cell chemistry (and energy density) or caused by obsolescence of equipment. It shall be highlighted that any modification which changes the requirements upon an existing battery system shall be thoroughly assessed against the original requirements of the battery and its current state of health.

**34.5 Battery Installation in a Vessel**

34.5.1 This section provides guidance to ensure that the hazards associated with installing and operating a battery on a vessel do not lead to unacceptable risks to persons, the vessel, the environment, or the vessel's operations. SOLAS II-1 Part D Electrical Installations shall take precedence over the following paragraphs however their content should be considered.

34.5.2 The role of the battery shall be clearly defined for its intended use in a vessel; for example, the battery may be a small part of a hybrid system, or it may be the sole source of propulsive power. A risk assessment method such as an FMEA shall be performed to assess the effects of a battery system failure upon the vessel and its operations. These assessments shall consider the vessel's different operating modes and the state of health of the battery through its intended design life.

34.5.3 The vessel shall employ its own electrical protective devices (e.g. fuses or circuit breakers) to protect the battery and personnel but also to prevent damage to ships equipment caused by battery defects. A positive lockable means of isolating the battery shall be provided to allow maintenance.

34.5.4 The location of the battery compartment shall take into account the operational role of the battery (e.g. whether the battery is used for emergency power during an engine room fire) as well as the effects that a battery fire would have on the vessel. Consideration shall be given for avoiding adjacent compartments containing sources of heat or significant fire loads as increases in battery compartment temperature could affect battery operations or lead to thermal runaway. It is expected that further considerations would be necessary for



vessel not built of steel or equivalent material. A full assessment shall be made for the routing of cables and pipework through the battery compartment, and the routing of cables from the battery in order to maintain essential services during an incident.

- 34.5.5 It is strongly recommended that the temperature of the battery space/compartment is carefully considered for all installations. To ensure that the batteries are kept within their thermal operating limits, temperature control systems like water cooling systems or heating, ventilation and air conditioning (HVAC) systems shall be employed with levels of redundancy to ensure that localised cell temperatures remain within manufacturers guidelines in the most onerous heating condition (e.g. high external atmospheric temperatures with all equipment operating at maximum load). The failure of such temperature control systems shall produce alarms for the battery system. Temperature monitoring of the battery compartment is also recommended, and this may be linked to early warning alarms as well as fixed fire suppression systems.
- 34.5.6 All ventilation and electrical systems within the battery compartment shall be capable of being isolated from a safe location outside of the battery compartment. Ventilation systems shall safely expel toxic or flammable gases to a safe location.
- 34.5.7 The battery and battery systems shall be fixed within the battery compartment such that they can endure the maximum predicted vessel motions. Heavy items or items which could cause physical damage to the battery shall not be co-located with the battery unless these are retained within the same parameters. Consideration shall be given to fixing the battery adjacent to any potential heat source which could result in inadvertent heating of the battery, e.g. exhaust, heavily loaded electrical cabling and direct sunlight.
- 34.5.8 The battery location and fixings shall ensure that standing water and residues are removed from around the battery and firefighting media can adequately penetrate the battery casings to extinguish and/or quench a potential fire.
- 34.5.9 Consideration shall be given to the reduction of combustible materials within a battery compartment, especially those which produce smoke or toxic products in a fire. For certain types of vessel, the use of combustible materials within the battery compartment may be prohibited. Dangerous goods shall not be stored in a battery compartment.
- 34.5.10 The boundaries of the battery compartment shall have fire protection to contain a fire in the space of origin and it shall be appropriate for the cumulative fire loads within the compartment and the type of vessel (e.g. an A-60 class division). Penetrations through these boundaries shall be protected to the same fire protection standard. For domestic vessels, the required fire protection may be defined in the applicable vessel regulations.
- 34.5.11 Early identification of a potential battery fire and automated actions prior to an incident are key to preventing thermal runaway and a possible chain reaction between adjacent cells. The battery compartment shall be fitted with detectors in accordance with

manufacturer's recommendations which are capable of providing early identification of a fire. Possible early identification could involve the monitoring of local cell temperatures or detection of electrolyte solvent vapours. When activated, the detectors shall initiate appropriate alarms and may automatically isolate electrical systems and ventilation or activate fixed fire-fighting systems.

- 34.5.12 An assessment shall be conducted to identify the most appropriate firefighting equipment and procedures for the types of fire within the battery space/compartiment - such an assessment may consider at what point firefighting using portable equipment may no longer be appropriate. Both extinguishment and heat removal are fundamental to fire-fighting efforts and many of the common firefighting media can be utilised once the relevant isolations are made (e.g. electrical or ventilation). It is strongly recommended that one or more fixed firefighting systems are designed and installed so that these can be operated from a safe location with feedback provided to confirm proper activation. In addition, portable fire extinguishers shall be provided to address the potential classes of fire within the battery compartment and the fire loads that they present. For certain vessel types, a fire hydrant, hose and suitable nozzle shall also be available to access all parts of the battery compartment.

### **34.6 Battery Management System**

- 34.6.1 The battery management system is required to maintain the condition of the cells and battery and protect them from unsafe situations such as internal battery defects, excessive external demands (e.g. a high current demand) and overcharging. It shall be ensured that the battery management system is compatible with the requirements of the battery system, the other battery components and the vessels electrical equipment. The use of risk assessment methods are important to ensure that all of the potential failures in the battery and in the vessel have been appropriately considered with mitigations adopted according to the severity of risk.
- 34.6.2 Abnormal temperature rise can be considered the first warning of thermal degradation of cells and shall be continuously monitored. Out of tolerance readings shall initiate an automatic response such as shutdown of a group of cells. It is recommended that temperature monitoring is provided at the cell level, especially if the batteries experience high charge or discharge rates. The battery management system may actively manage battery operations with respect to the temperature of the battery to improve efficiencies and to further reduce the risk of high temperature incidents. Due to the importance of temperature on batteries, continuous temperature monitoring may also be linked to responses external to the battery (e.g. isolation of the battery, early warning alarms and fixed fire suppression systems).
- 34.6.3 The battery management system shall limit currents to ensure the battery remains in a safe condition. Permitted currents may be controlled relative to the state of charge and shall take account of the battery's state of health through-life.

- 34.6.4 Lithium-ion cells, unlike other conventional battery technologies, shall not be charged in excess of 100% state of charge as this may cause rapid failure of the electrodes and possible thermal runaway. Discharging below the minimum safe voltage can also cause cell damage. Unlike other battery technologies, it is therefore not possible to balance the state of charge of several lithium-ion cells using top-off or trickle charging of the battery, and it is vital that charging is stopped immediately if there is an unacceptable temperature rise - battery management systems shall only be employed if they are compatible with lithium ion batteries and are suitable for the application.
- 34.6.5 The battery management system shall be capable of monitoring cell voltages and currents to a high resolution in order to ensure that the voltage of each cell remains within the range specified by the manufacturer. Cell voltages shall be continuously monitored with an automatic alarm if these voltages exceed or fall below set limits, and a cell or battery shutdown shall occur automatically if any voltage approaches the cell damage threshold.
- 34.7 Battery Operations and Procedures**
- 34.7.1 Labels and signs - batteries, high voltage equipment, battery systems and compartments shall be adequately labelled using internationally agreed symbols where available. Emergency systems shall be appropriately labelled and be clearly visible.
- 34.7.2 Logbooks and configuration - it is recommended that a battery logbook is held onboard to record the status of the battery and its equipment. The logbook may include equipment serial numbers and dates of manufacture/installation/testing/expiry, maintenance records, test results, defects, a summary of the battery charge/discharge cycles, etc. Software used for control, monitoring, data logging, alarm and safety systems, which may be part of the battery management system, shall be developed using robust and auditable processes. All software within such systems shall be version controlled and recorded.
- 34.7.3 Operational procedures - it shall be ensured that the battery system is never operated outside of its designed scope of assumptions and limitations. Therefore, although a battery system shall contain many cascading levels of protective devices, the vessel shall not employ operational procedures that rely on these protective devices for a safe condition.
- 34.7.4 For vessels utilising electrical power from the battery system for propulsive power or dynamic positioning, operational procedures are considered of prime importance to protect the battery system whilst ensuring that loss of a battery system does not affect the safety of the vessel or its operations. Formal operating procedures shall be developed for the operating scenarios expected of the battery; considerations might include failure scenarios (e.g. loss of a cooling system) to ensure that the battery is not inadvertently operated outside of safe parameters - it is expected that consideration of such scenarios may lead to further safety mitigations in the design of the battery system.

- 34.7.5 Inspections and maintenance – all inspections and maintenance shall be in accordance with manufacturer’s recommendations but shall include the testing of all sensors, assessment of the state of health of each cell, recording of the environmental conditions in the battery compartment and assessment of any other relevant factors. Routine inspections may check for physical damage, cleanliness, signs of arcing or increased temperature, correct operation of ventilation and battery protection systems, etc. Maintenance activities shall be planned in a vessel’s maintenance schedule. Procedures shall be held onboard to detail the necessary actions if the battery is at risk of being operated outside of its normal operating envelope (e.g. during extended refit periods, following limited charge periods or following identification of a defect).
- 34.7.6 Emergency procedures shall be developed for the actions to be taken in all likely emergency scenarios; these may require consultation with an independent body such as a Recognised Organisation. Scenarios may include a battery localised high temperature, activation of a fire detection device, identification of a fire in the battery compartment (a battery fire or another combustible), a medical incident, flooding, violent cell venting, etc. Emergency procedures shall be held on board and shall include actions to be taken by all stakeholders, including emergency services and salvage teams, to create a safe condition. Emergency drills and training shall be routinely conducted for all of the main emergency scenarios.
- 34.7.7 An assessment shall be made of the possible medical scenarios related to the battery and suitable mitigations shall be actioned whether these be pre-emptive (e.g. provision of personal protective equipment) or remedial (e.g. installation of an eyewash station).
- 34.7.8 Crew Training - it is recommended that at no time shall there be less than two persons on the vessel who are adequately trained and experienced in all battery equipment and procedures. In addition, all crew shall have an awareness of the vessel’s emergency procedures regarding the batteries.
- 34.8 Further Information**
- UK MGN 550 (M+F) Electrical Installations - Guidance for Safe Design, Installation and Operation of Lithium-ion Batteries
  - IEC 62281 Safety of primary and secondary lithium cells and batteries during transport
  - IEC 62619 Safety requirements for secondary lithium cells and batteries for use in industrial applications
  - IEC 62620 Secondary lithium cells and batteries for use in industrial applications
  - IEC 60529 - Specification for classification of degrees of protection provided by enclosures
  - UN DOT 38.3 Recommendations on the transport of dangerous goods, manual of tests and criteria

**35 OVER-SIDE WORKING SYSTEMS**

**35.1 Introduction**

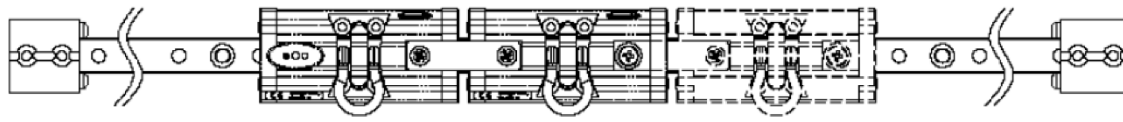
35.1.1 The use of Over-side Working Systems is common on vessels, especially commercial yachts. Such installations allow crew members to work outside conventional guardrails for cleaning and maintenance purposes.

35.1.2 Most over-side working systems consist of one or a combination of the following:

- .1 "Rail and car" or "rail and trolley" systems comprising of two travellers, cars or trolleys linked in tandem that can be separated, if necessary, into independent units. These cars are fitted to a metal rail which allows them to glide along it and to which support harnesses are attached.
- .2 Harnesses, lanyards, fall arresters, energy absorber and similar devices.
- .3 Single anchoring points, pad eyes and eye bolts

35.1.3 Traditionally many of the early "rail and car" systems were designed for the sole purpose of sail handling and not for supporting crew members working over the side of the yacht. Equipment which is used for supporting persons shall be designed for that purpose and it is not acceptable to use a "rail and car" system designed solely for sail handling for the purpose of supporting crew members working over the yacht's side.

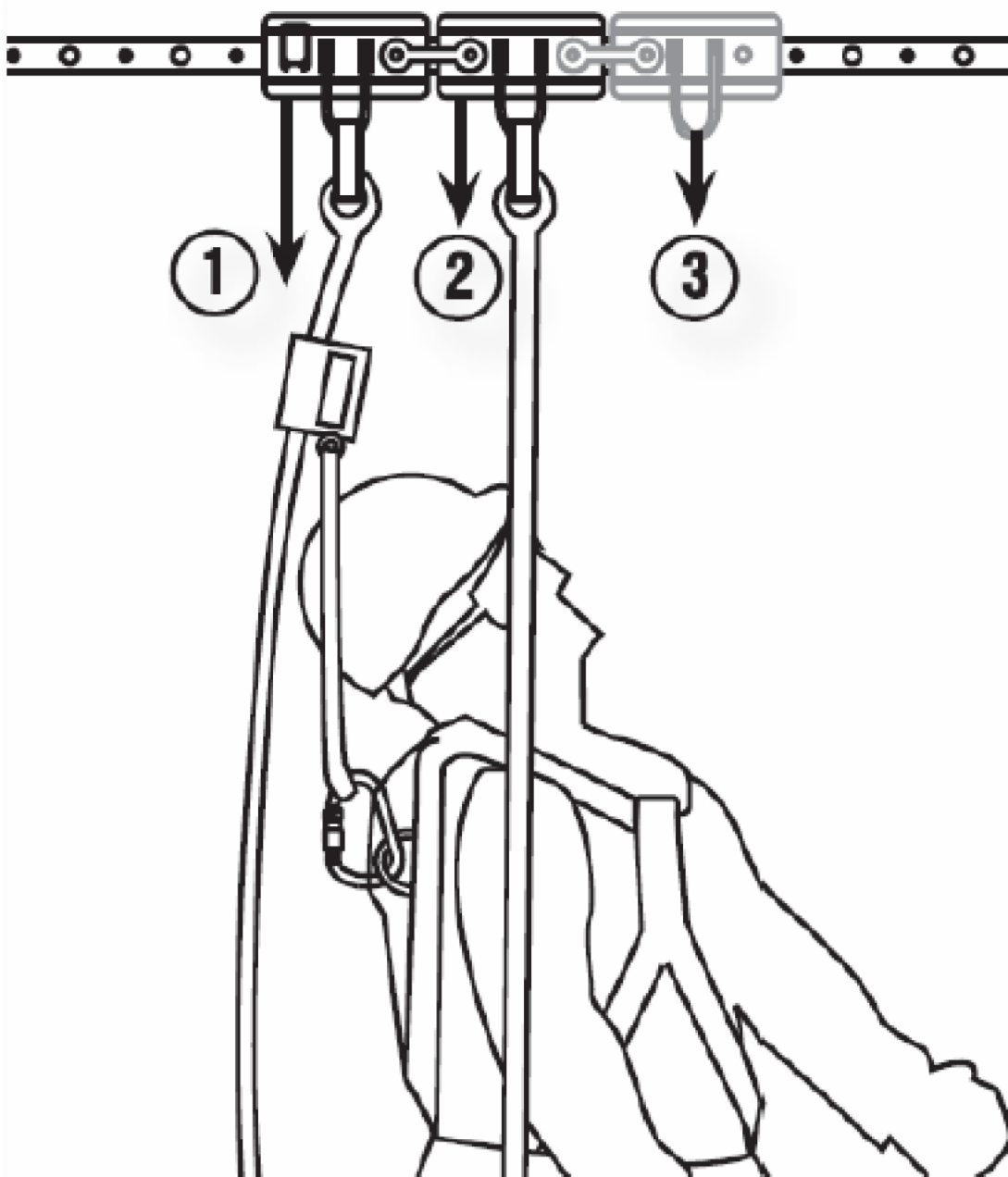
35.1.4 Below is an example of a "rail and car" system showing its construction.



Lanyard Attachment Points

End stop                      Tandem Car                      (Optional Equipment Car & Connector Plate)                      Track Rail

35.1.5 Below is a typical set up for the attachments to the traveller cars.



1. Full-body safety harness
2. Working harness
3. Additional options, such as supporting a tool service car

**35.2 Installation**

- 35.2.1 Over-side working systems shall have their fixed components tested, certified and approved to a recognised standard for fall protection equipment<sup>102</sup>.
- 35.2.2 If it cannot be confirmed that the design of the attachment to the substrate is identical to that used in the type approval process completed by the over-side working system's manufacturer, or through approval of the design on another vessel, separate pre-installation testing is required to be satisfactorily completed prior to the system being installed.
- 35.2.3 In addition to the over-side working systems requiring type approval, the installation of the system to the substrate of the yacht shall be tested to meet the requirements of a recognised standard, such as BS EN 795.
- 35.2.4 Yacht substrates can be of many differing thicknesses and materials, as can the fixtures and fittings that secure the over-side working systems to the substrate. In all cases the method of installation to the particular substrate shall be tested in accordance with a recognised standard, such as BS EN 795, in order to be considered approved and suitable for supporting crew members working over the yacht's side. If a particular method of attachment of the over-side working systems to the yacht's substrate has been previously approved and documentary evidence can be provided, only post-installation testing shall be required.
- 35.2.5 Trackway orientation to be within manufacturer's approval certificate considering the path of the harness line and resultant wear.

**35.3 Pre-installation testing**

- 35.3.1 When the method of attachment to the substrate has not been approved, additional static and dynamic load tests shall be required to prove the strength of the individual installation for each type of base material/fastener type. These tests effectively 'type approve' the method of attachment to the underlying structure. It is recommended that such testing is carried out in a workshop on a section of track of at least 400 millimetres in length attached to a representative mock-up of the vessel's superstructure. Tests shall be witnessed by a Recognised Organisation and if successfully carried out, suitably endorsed records shall be retained.

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<sup>102</sup> For example, BS EN 795: 1997, Class D

- 35.3.2 The specifications for such tests are as follows:
- .1 Static load test – this requires the application of a 12kN load in at least 3 locations, typically at both ends and at any rail joint or in the middle. This load shall be applied for 3 minutes.
  - .2 Dynamic load test – this requires the use of a test lanyard manufactured from rope conforming to a recognised standard, such as BS EN 892, with a 100kg solid test mass dropped through a predetermined distance in order to apply a fall arrest load of 9kN. Direct reference should be made to BS EN 795:2012 as to how this shall be achieved.
  - .3 Following the dynamic load test, the car(s) and section of track used for testing shall have been overloaded and shall be discarded.
- 35.4 Post-installation testing**
- 35.4.1 As with all lifting appliances, once the device has been installed onto the yacht a post-installation load test shall be carried out before the system is taken into use.
- 35.4.2 Testing post-installation shall be completed as follows:
- .1 A test load of 6kN shall be attached to a single car or single anchor point for at least 15 seconds in at least 3 locations, typically at both ends and at any rail joint or in the middle.
  - .2 Such testing shall be carried out along with any additional requirements specified by the system manufacturer.
  - .3 This testing shall be witnessed by an approved surveyor and recorded on a suitable load test certificate which is duly endorsed by the witnessing parties.
- 35.5 5 yearly testing**
- 35.5.1 The post-installation test shall be carried out at 5 yearly intervals and also at intervals prescribed by the manufacturer.
- 35.6 Non-compliant and pre-existing systems**
- 35.6.1 Yachts fitted with uncertified over-side working systems, shall have the systems decommissioned, unless retrospective certification can be obtained.
- 35.6.2 In yachts fitted with over-side working systems or which there is evidence that the system is in compliance with a recognised standard but without evidence that the installation was tested by an approved surveyor, the following applies:
- .1 The system shall not be used until such time as the installation arrangements have been approved by an approved surveyor. This may require the submission of drawings of the existing attachment arrangements and the subsequent conducting of static and dynamic testing of the rail attachment method as deemed applicable.
  - .2 On satisfactory completion of this testing the over-side working systems shall be subject to the equivalent of the post-installation testing as defined previously in section 35.4.



- 35.6.3 In yachts fitted with over-side working systems for which there is evidence that the system is in compliance with a recognised standard and there is evidence that the installation was approved but there is no evidence of post-installation testing, the following applies:
- .1 The over-side working systems shall be subject to post-installation testing as defined previously in section 35.4.
- 35.6.4 In the case of section 35.6.1 – 35.6.3, prior to the completion of the required load testing, signage shall be clearly displayed stating the track is not to be used unless the crew member has a fall arrester attached by a secondary line which is secured to a strong point suitably tested to take the full load for fall arrest or around an item of yacht structure substantial enough to withstand the drop loads.
- 35.7 Operation**
- 35.7.1 Before use the Owner or Company shall ensure that:
- .1 the manufacturers' instructions are read and understood by the persons who will be using the equipment;
  - .2 a risk assessment is carried out and an appropriate rescue plan developed to recover persons who fall into the water; and
  - .3 crew members are competent to use the equipment and are aware of any conditions relating to its use and their safety.
- 35.7.2 Over-side working systems shall not be used whilst the vessel is underway.
- 35.7.3 These systems are designed to be used with the appropriate PPE (harnesses, lanyards, fall arresters, lifejackets and other devices).
- 35.7.4 On systems where one of the travellers is fitted with a locking device, the device which locks the traveller in position along the track rail shall ONLY be disengaged from the track rail while the user is changing position. Once the user is in position, the locking device shall be re-engaged to hold the car in position and limit the user's movement along the track rail.
- 35.7.5 The user shall NEVER rely on only one attachment point for personal protective equipment. The working harness shall be attached to one traveller and a fall arrestor, or other safety device, to the other. A third traveller could be used to attach work tools.
- 35.7.6 Over-side working should be subject to a permit to work.
- 35.8 Additional notes**
- 35.8.1 Where any over-side working systems has been subject to a dynamic loading equivalent to fall arrest, the system shall be retired from service and subject to a full review by a representative of the manufacturer to confirm the system remains fit for continued use.

- 35.8.2 All over-side working systems shall be marked for the use of one user only.
- 35.8.3 The attachment of the safety harness to the car shall be in accordance with the manufacturer's instructions, which shall include an energy absorber certified for compliance with a recognised standard, such as BS EN 355.
- 35.8.4 Regardless of whether the system shall be used for restraint or fall arrest, the more onerous test requirements shall be met.
- 35.8.5 Documentation retained onboard shall be as indicated in Annex A of BS EN 795:2012 or equivalent and shall include as a minimum:
- .1 approved plans;
  - .2 certificates of load test for installation; and
  - .3 post-installation and periodical testing.

**35.9 Further Information**

- BS EN 795:2012 Personal fall protection equipment – Anchor devices (It shall be noted that the original BS EN 795 standard has been replaced by BS EN 795:2012);
- BS EN 795:1997 Protection against falls from a height. Anchor devices. Requirements and testing;
- BS EN 355:2002 Personal protective equipment against falls from a height. Energy absorbers; and
- BS EN 892:2012 Mountaineering equipment. Dynamic mountaineering ropes. Safety requirements and test methods.

## 36 RECREATIONAL FIRE APPLIANCES

### 36.1 Introduction

36.1.1 The intent of this Section is to provide guidance on best practice and to facilitate the installation of Recreational Fire Appliances (RFA) such as fireplaces which use either wood, ethanol or liquefied petroleum gas (LPG) as a fuel source, charcoal galley ovens, LPG gas fired barbecues and charcoal barbecues, spit roasts and fire pits.

36.1.2 It shall be noted that this guidance will not cover every eventuality regarding the design, installation and operation of such items and that each case shall subsequently be considered separately.

36.1.3 For installations that fall outside the scope of this guidance, the use of Risk Assessments or Hazard Identification techniques (such as Failure Mode Effects Analysis (FMEA)) shall be performed to understand the potential safety related issues.

### 36.2 General Requirements

36.2.1 The method of securing the RFA and any of its doors or hatches in the closed position shall take into account the sea conditions likely to be experienced in service (i.e. roll, list, trim and heave) and possible damage due to mechanical impact from adjacent objects.

36.2.2 Clearance from any hot surfaces to combustible materials shall be sufficient to avoid heating combustible material to a temperature in excess of 32°C (≈90°F) above ambient and shall as a minimum be in accordance with the manufacturers recommendations but shall be at least:

36.2.3 Clearance from the exhaust duct to combustible material shall be in accordance with the requirements/recommendations of the RFA manufacturer. Where no such details are available, this distance shall be at least 230 millimetres.

36.2.4 Clearance from the sides and rear of the appliance to combustible material shall be in accordance with the requirements/recommendations of the RFA manufacturer. Where no such details are available, this distance shall be at least 460 millimetres

36.2.5 A carbon monoxide (CO) alarm on both main and emergency power shall be provided in any internal space in which an RFA is located.

- 36.2.6 The ventilation requirements of a space containing an RFA shall be assessed against an appropriate standard<sup>103</sup> and shall take into account burning equipment and persons occupying that space<sup>104</sup>.
- 36.2.7 Requirements and/or recommendations published by the manufacturer of RFA shall be observed and implemented during the design and installation process.
- 36.2.8 The space in which any additional fuel is stored shall be treated as a service space (high risk) and shall be enclosed by 'A' Class fire rated boundaries as per the structural fire protection tables in the relevant part of the Code. See also subsections for fuel storage of different types.
- 36.2.9 Due consideration shall be given at the installation stage to the protection of personnel from hot surfaces and any exposed flames.
- 36.2.10 A dedicated portable extinguisher shall be located adjacent to externally located RFA or within the same space that the RFA is installed when internal.
- 36.2.11 Any insulation used in the construction shall be non-combustible.
- 36.2.12 Any relevant national or international standards shall be followed.
- 36.2.13 The combined amount of bioethanol and any petrol that may be carried onboard shall not exceed 150 litres, unless formal agreement to carry larger quantities has been obtained directly from the BMA.
- 36.3 Operational Requirements**
- 36.3.1 An appropriate risk assessment shall be made when using this type of equipment and its use be covered in the vessels safety management system.
- 36.3.2 Maintenance for all RFA and relevant systems shall be performed by trained or familiarised crew as appropriate, in accordance with a maintenance plan produced by the manufacturer.
- 36.3.3 Operational instructions shall be provided and posted or otherwise readily available.

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<sup>103</sup> For example, the upper limit for indoor air quality standard set by the UK Dept of Health, Committee on the Medical Effect of Air Pollutants (COMEAP) for Carbon Monoxide (CO) is 10 ppm (8 - hour average)

<sup>104</sup> The recommended occupational level of 5000 ppm (0.5% by volume) [8 - hour average] for Carbon Dioxide (CO<sub>2</sub>) as recommended by the UK Health & Safety Executive, publication E25.40/2005 "Workplace Exposure Limit"

- 36.3.4 A shipboard procedure shall be developed outlining the requirements on the use of RFA which shall be readily available to all involved, including outside caterers. This shall include a regular and thorough cleaning routine of all equipment and associated areas. The Master shall, after due inspection, decide whether to allow the use of the equipment subject to being satisfied about weather conditions and other safety factors.
- 36.3.5 Maintenance instructions shall be provided, which include the need for the installation to be inspected annually for soundness, freedom from deposits, operation of interlocks/alarms and correct clearances where applicable. Cleaning, maintenance and repairs shall be undertaken, if necessary, at this time. The servicing requirements shall be included in any safety management documentation.
- 36.3.6 Where applicable, the crew member designated as the RFA operator shall be trained in the use of the firefighting equipment and the emergency procedures onboard. They shall, in consultation with the Master, set up and agree clear lines of communication should there be an emergency incident.
- 36.3.7 It is not safe to use flammable liquids on a charcoal (or wood) fire to improve burning. Only use solid fuel fire lighters specifically made for lighting charcoal.
- 36.3.8 The disposal of any waste such as ash or coal waste shall be handled in accordance with MARPOL, the vessel's safety management system and Garbage Management Plan.
- 36.3.9 Where ventilators in intermittent use can be closed, there shall be appropriate signs at the appliance warning of the need to have those ventilators open before the appliance is used.
- 36.4 Ventilation for Internal Appliances**
- 36.4.1 Exhaust ducts shall be constructed of steel having a wall thickness of at least 3 millimetres and shall be of a type recommended by the RFA manufacturer.
- 36.4.2 The duct dimensions and the capacity of exhaust air to be provided shall be in accordance with the installation advice provided by the RFA manufacturer.
- 36.4.3 Exhaust duct connections shall be suitably located and kept to a minimum in order to prevent the risk of leakage of exhaust gases into the yacht's internal spaces.
- 36.4.4 Exhaust ducts shall be provided with cleaning/inspection openings in easily accessible locations which shall be tightly closed, sealed and secured when not

in use. The exhaust ducts shall be located or shielded in order to prevent personnel from coming into contact with hot surfaces.

- 36.4.5 Any exhaust filters shall be in an easily accessible position for cleaning/maintenance purposes.
- 36.4.6 The exhaust duct penetrations of a fire rated division shall maintain the fire integrity of the bulkhead/deck.
- 36.4.7 Exhaust Fans (if fitted) shall be monitored and, in case of failure, an audible and visual alarm shall be activated that is received immediately by a responsible member of the crew at all times, when at sea or in port.
- 36.4.8 Exhaust fans and ducts shall ventilate direct to the open atmosphere and be independent of other systems and each other.
- 36.4.9 A manually operated damper shall be provided in the lower end of a chimney (to isolate the chimney from a fireplace in the event of a fire in the chimney), the damper arrangement in the open position shall be such that the damper does not obstruct more than 20% of the duct area, (i.e. 80% free area of chimney is available when the damper is open).
- 36.4.10 The chimney shall be provided with a fixed fire extinguishing system. Controls for the system shall be in a safe location outside the space or adjacent to the exit to the space. Where CO<sub>2</sub> is used as an extinguishing medium, the quantity of medium provided shall take into account the anticipated leakage rate associated with the outboard end of the chimney being open. Where dampers are provided to close the upper end of the chimney, means shall be provided to prevent over pressure on the duct boundaries.
- 36.4.11 A spark arrester (i.e. a screening device to prevent the passage of sparks and hot embers to the outside atmosphere) shall be provided at outlet ventilation openings.
- 36.4.12 Exhaust shall be routed to discharge directly to the outside of the vessel in a suitable area clear of any air intakes, vents from spaces or tanks containing flammable liquids and or dangerous zones which shall be located at least 3 metres away from any inlet.

**36.5 Solid Fuelled Fireplaces****36.5.1 General Requirements**

36.5.1.1 The proposed fireplace shall be enclosed within a steel enclosure with a glass or other heat resistant non-combustible material front being provided to prevent any burning material from falling from the burning chamber.

36.5.1.2 Should the temperature within the chimney or burning chamber exceed the RFA manufacturer's recommendations, ventilation shall be automatically shut down and the door to the burning chamber automatically locked to ensure no more fuel can be added.

36.5.1.3 A hearth of heat resisting non-combustible material (e.g. stone or tile) shall be provided in accordance with the RFA manufacturer, and be at least provided as per the following:

- .1 Where the fireplace opening is less than 0.56m<sup>2</sup>, the hearth shall extend at least 405 millimetres beyond the front of the fireplace and at least 200 millimetres beyond each side of the fireplace opening.
- .2 Where the fireplace opening is greater than 0.56m<sup>2</sup>, the hearth shall extend at least 510 millimetres beyond the front of the fireplace and at least 300 millimetres beyond each side of the fireplace opening.
- .3 The hearth shall extend under the base of the fireplace.

**36.5.2 Fuel Storage**

36.5.2.1 Stores shall be protected by a fixed fire detection system and a sprinkler system or equivalent.

36.5.2.2 No electrical equipment other than lighting shall be located in the store.

36.5.2.3 A steel box shall be provided for ash collection and storage onboard.

**36.6 Ethanol Fuelled Fireplaces****36.6.1 General Requirements**

36.6.1.1 The proposed fireplace shall be enclosed within a steel enclosure suitably insulated with a steel/glass front to the fireplace.

36.6.1.2 If expressly not required by the RFA manufacturer, fireplaces fuelled by ethanol or bio ethanol may not require a chimney or vent for exhaust gas. However, as a minimum, the design shall have the following features:

- .1 Fail safe concept: any electrical blackout or forced system shutdown stops the fuel injection automatically
- .2 Emergency shutdown capable of manual operation

.3 Segregation of ancillaries (pump, pipework and burner): due to the compact design characteristics, all the system components shall be segregated below the fireplace housing

36.6.1.3 The fireplace shall be certified to a recognised standard<sup>105</sup>.

36.6.1.4 The fireplace shall be locally protected by a sprinkler system, which may be manually controlled by the crew in case of emergency. The release position for the firefighting medium shall be located in a safe location outside the space or adjacent to the exit to the space and grouped with any other RFA controls as required above.

**36.6.2 Fuel Storage**

36.6.2.1 Signage, indicating the presence of flammable material and the prohibition of smoking shall be posted at the entrance to storage spaces.

36.6.2.2 Portable ethanol containers shall be of a certified type and with spill proof spout or equivalent. The amount of bio ethanol that may be carried onboard shall be to the satisfaction of the BMA.

36.6.2.3 The locker or compartment shall comply with the requirements of section 14.1.4 or 14.1.5 of the Code, as applicable.

36.6.2.4 The fuel storage containers shall be positively secured against movement and protected from damage in any foreseeable event.

**36.7 LPG Fuelled Installations**

37.1 LPG fuelled installations shall comply with Section 37.

**36.8 Charcoal Galley Ovens**

**36.8.1 General Requirements**

36.8.1.1 Suitable non-combustible insulation shall be provided directly between the base of the oven and the unit it is mounted on in order to prevent heat transmission.

36.8.1.2 Suitable ventilation air supply arrangements to be provided in accordance with the manufacturer’s instructions. Supply air shall be capable of being shut off.

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<sup>105</sup> For example, (EU) 2015/547 of 1 April 2015 on the safety requirements to be met by European standards for alcohol-powered flueless fireplaces pursuant to Directive 2001/95/EC of the European Parliament and of the Council on general product safety



- 36.8.1.3 A fire break and cowl to be fitted in accordance with the details provided in the manufacturer's instructions.
- 36.8.1.4 A carbon monoxide detector shall be provided in all cases where such appliances are installed in enclosed spaces.
- 36.8.2 *Operational Considerations*
- 36.8.2.1 Coals shall always be soaked with water after cooking as they retain their heat for long periods of time. Remove the charcoal ashes from the grill only after they are cold to the touch and no warm embers remain and place them into a metal container with a tight-fitting metal lid.
- 36.8.3 *Fuel Storage*
- 36.8.3.1 Fuel storage shall be as per this Section according to the fuel type
- 36.9 External Fire Pits**
- 36.9.1 *General Requirements*
- 36.9.1.1 Means of securing the fire pit firmly in place shall be provided.
- 36.9.1.2 Deck scuppers which are located in the vicinity of the proposed location of the fire pit shall be arranged to discharge directly overboard.
- 36.9.1.3 Consideration and protection of overhanging decks or structures shall be made in agreement with the BMA
- 36.9.1.4 The use of spark guards shall be considered.
- 36.9.2 *Operational Considerations*
- 36.9.2.1 A statement confirming that the use of the fire pit shall be limited to the open deck in a safe location well clear of any combustible material (in accordance with the measurements stated in the Manufacturers Data Sheet) when the vessel is either moored or at anchor and in favourable weather conditions
- 36.9.2.2 Details highlighting that the burner is not to be left unattended when in use and that a portable extinguisher shall be readily available at all times.
- 36.9.3 *Fuel Storage*
- 36.9.3.1 Fuel storage shall be as per this Section according to the fuel type
- 36.10 Barbecues and Spit Roasts for use in Open Deck Areas**
- 36.10.1 *General Requirements*

- 36.10.1.1 The appliance shall be sited on an open deck in a well-ventilated position, clear of any hazard, such as overhanging combustible awnings, flammable liquids, etc. Under no circumstances shall any appliances be placed internally.
- 36.10.1.2 In use, the appliance shall be safely secured to prevent movement caused by the vessel's motion.
- 36.10.1.3 A fixed collecting tray shall be secured to the deck, or directly below the appliance, and the appliance suitably screened, to prevent fat, hot ash, etc. falling onto the deck.
- 36.10.1.4 A suitable portable fire extinguisher shall be positioned close to the appliance along with heatproof gloves (2 pairs).
- 36.10.1.5 The use of spark guards shall be considered.
- 36.10.2 *Operational Considerations*
- 36.10.2.1 Coals shall always be soaked with water after cooking as they retain their heat for long periods of time. Remove the charcoal ashes from the grill only after they are cold to the touch and no warm embers remain and place them into a metal container with a tight-fitting metal lid.
- 36.10.3 *Fuel Storage*
- 36.10.3.1 Fuel storage shall be as per this Section according to the fuel type.

## **37 LPG INSTALLATIONS**

### **37.1 General Requirements**

- 37.1.1 The installation shall be in accordance with recognised national or international standards. An open flame gas appliance provided for cooking, heating or any other purpose shall comply with the requirements of a recognised standard<sup>106</sup>.
- 37.1.2 Possible dangers arising from the use of liquid petroleum gas (LPG) open flame appliances in the marine environment include fire, explosion and asphyxiation due to leakage of gas from the installation. Consequently, the siting of gas consuming appliances and storage containers and the provision of adequate ventilation to spaces containing them, is most important.
- 37.1.3 Because of the risk of carbon monoxide poisoning, gas-consuming open flame appliances shall not be installed in sleeping accommodation.
- 37.1.4 LPG is heavier than air and, if released, may travel some distance whilst seeking the lowest part of a space. Therefore, it is possible for gas to accumulate in relatively inaccessible areas, such as bilges, and diffuse to form an explosive mixture with air, as in the case of petrol vapour.
- 37.1.5 A frequent cause of accidents involving LPG installations is the use of unsuitable fittings and improvised "temporary" repairs.

### **37.2 Stowage of Gas Containers**

- 37.2.1 LPG cylinders, regulators and safety devices shall be stowed on the open deck (where leakage will not accumulate) or in a compartment that is vapour-tight to the vessels interior, and fitted with a vent and drain, so that any gas which may leak can disperse overboard.
- 37.2.2 The vent and drain shall be not less than 19 millimetres in diameter, shall run to the outside of the craft and shall terminate 75 millimetres or more above the "at rest" waterline. Generally, the drain and locker ventilation should be 500 millimetres or more from any opening to the interior.
- 37.2.3 The cylinders and associated fittings shall be positively secured against movement and protected from damage in any foreseeable event.
- 37.2.4 Any electrical equipment located in cylinder lockers shall be certified safe for use in a potentially explosive atmosphere.

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<sup>106</sup> For example, EC Directive 90/396/EEC or equivalent acceptable to the BMA

**37.3 Cylinders and Attachments**

- 37.3.1 Each system shall be fitted with a readily accessible, manually operated isolating valve in the supply pressure part of the system.
- 37.3.2 In multiple container installations, a non-return valve shall be placed in the supply line near to the stop valve on each container. If a changeover device is used (automatic or manual), it shall be provided with non-return valves to isolate any depleted container.
- 37.3.3 Where more than one container can supply a system, the system shall not be used with a container removed, unless the unattached pipe is fitted with a suitable gas tight plug arrangement.
- 37.3.4 Containers not in use or not being fitted into an installation shall have the protecting cap in place over the container valve.

**37.4 Fittings and Pipework**

- 37.4.1 For rigid pipework systems, solid drawn copper alloy or stainless steel tube shall be used. Steel tubing, aluminium, or any materials having a low melting point shall not be used.
- 37.4.2 Connections between rigid pipe sections shall be made with hard solder (minimum melting point 450°C). Appropriate compression or screwed fittings are recommended for general use for pipework in LPG installations.
- 37.4.3 Lengths of flexible piping (if required for flexible connections) shall conform to an appropriate standard, be kept as short as possible, and be protected from inadvertent damage. Such flexible piping shall be installed in such a manner to allow access for inspection along its length. Proposals for a more extensive use of flexible piping (which conforms to an internationally recognised standard for its application) shall be submitted to the BMA for approval on an individual basis.
- 37.4.4 Any piping shall be installed in such a manner as to have as few connections as possible and not to interfere with inspection, maintenance or servicing of the appliance.

**37.5 Appliances**

- 37.5.1 All unattended appliances shall be of the room sealed type, i.e. where the gas flames are isolated in a totally enclosed shield where the air supply and combustion gas outlets are piped to open air.
- 37.5.2 All gas burners and pilot flames shall be fitted with a flame supervision device which shall shut off the gas supply to the burner or pilot flame in the event of flame failure
- 37.5.3 Flueless heaters shall be selected only if fitted with atmosphere sensitive cut-off devices to shut off the gas supply at a carbon dioxide concentration of not more than 1.5% by volume.

37.5.4 Heaters of a catalytic type shall not be used.

### **37.6 Gas Detection**

37.6.1 Suitable means for detecting the leakage of gas shall be provided in any compartment containing a gas consuming appliance, or in any adjoining space of a compartment into which the gas (denser than air) may seep. The means of detecting leakage shall operate on both main and emergency power.

37.6.2 Gas detector heads shall be securely fixed in the lower part of the compartment in the vicinity of the gas consuming appliance and in other space(s) into which gas may seep. In areas where the detector head is susceptible to damage in the lowest part of the compartment (e.g. engine space bilge) the detector head shall at least be fitted below the lowest point of ignition.

37.6.3 Any gas detector shall be of a type which shall be actuated promptly and automatically by the presence of a gas concentration in air of not greater than 0.5% (representing approximately 25% of the lower explosive limit). The detection system shall incorporate a visible alarm and an audible alarm which can be heard in the space concerned and the control position with the vessel in operation.

37.6.4 Where electrical detection equipment is fitted, it shall be certified as being flameproof or intrinsically safe for the gas being used.

37.6.5 In all cases, the arrangements shall be such that the detection system can be tested frequently whilst the vessel is in service, which shall include a test of the detector head operation as well as the alarm circuit, in accordance with the manufacturer's instructions.

37.6.6 All detection equipment shall be maintained in accordance with the manufacturer's requirements.

### **37.7 Operational Considerations**

37.7.1 A suitable notice, detailing the action to be taken when an alarm is given by the gas detection system, shall be displayed prominently in the vessel. The information given shall include the following:

- .1 The need to be ever alert for gas leakage;
- .2 When leakage is detected or suspected, all gas-consuming appliances shall be shut off at the main supply from the container(s) and **NO SMOKING** shall be permitted until it is safe to do so;
- .3 Actions to increase the ventilation in the space; and
- .4 **WARNING: NAKED LIGHTS SHALL NEVER BE USED AS A MEANS OF LOCATING GAS LEAKS.**

- 37.7.2 A check for leaks shall be made every time a gas cylinder is replaced. If it is suspected that there is a leak to the cylinder or pipework, brush soapy solution around the connections and watch for bubbles – tighten to fix but do not overtighten. Do not use the RFA until the leak is fixed. Make sure all the connections are secure before turning on the gas.
- 37.7.3 After use, turn off the gas cylinder before turning off at RFA controls to ensure any residual gas in the pipe work is used up.

## APPENDIX 1

### SUMMARY OF YACHT CATEGORIES, STABILITY & SURVIVABILITY, LIFESAVING APPLIANCES, MAXIMUM PERSONS ON BOARD, ETC.

Category of yacht		Passenger Charter Yacht (PCY)		Passenger Private Yacht (PPY)		PY-L1		PY-L2 and PPYRC	
Operational Area		Unlimited		Unlimited		Prescribed international voyage (see definitions)		60nm of a safe haven and 20nm from land in conditions not exceeding wind force 6 and sea state Beaufort 5	
Damage Stability Standard		<80m L Sections 11.12 to 11.16	≥80m L Sections 11.2 to 11.9	<80m L Sections 11.12 to 11.16	≥80m L Sections 11.2 to 11.9	<80m L Sections 11.12 to 11.16	≥80m L Sections 11.2 to 11.9	<80m L Sections 11.12 to 11.16	≥80m L Sections 11.2 to 11.9
LSA <sup>107</sup> <sub>108</sub>	≤50 persons	300% liferafts + Additional provisions (Sections 11.17&11.18)	300% liferafts + Additional provisions (Sections 11.17&11.18)	300% Liferafts		300% liferafts + Additional provisions (Sections 11.17&11.18)		300% Liferafts	
	>50 and ≤99 persons								
	>99 and ≤120 persons	Lifeboats (in accordance with section 13.19) + Doctor	Lifeboats (in accordance with section 13.19) + Doctor	Lifeboats (in accordance with section 13.19) + Doctor	Lifeboats (in accordance with section 13.19) + Doctor	Lifeboats (in accordance with section 13.19) + Doctor	Lifeboats (in accordance with section 13.19) + Doctor	Lifeboats (in accordance with section 13.19) + Doctor	
	>120 and ≤200 persons	Not applicable (see section 32.2.2)	Lifeboats (in accordance with section 13.19) + Doctor	Not applicable (see section 32.2.2)	Lifeboats (in accordance with section 13.19) + Doctor	Not applicable (see section 32.2.2)	Lifeboats (in accordance with section 13.19) + Doctor	Not applicable (see section 32.2.2)	Lifeboats (in accordance with section 13.19) + Doctor

<sup>107</sup> 300% Liferafts can be 300% Davit Launched Liferafts or a combination of DLLR & MES in accordance with Section 7.19.3

<sup>108</sup> Lifeboats may be carried in place of 300% liferafts and the Additional Provisions of Chapter 4 part VII need not be complied with

## APPENDIX 2

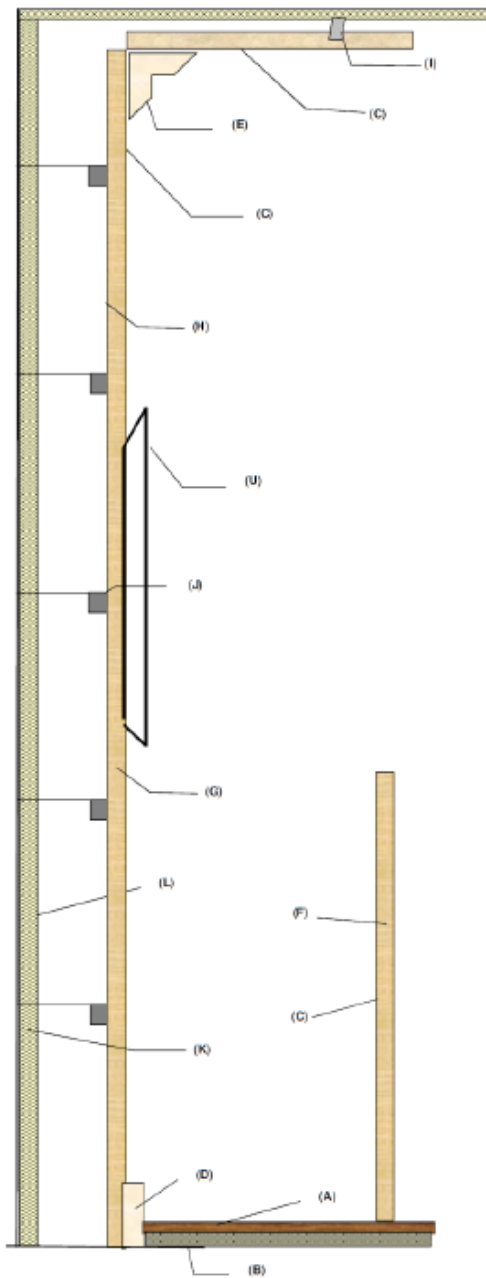
### GUIDANCE MATERIALS MATRIX FOR ACCOMMODATION SPACES, SERVICE SPACES AND CONTROL STATIONS

Type of Space	Control Stations	Stairway Enclosures	Corridors	Accommodation Areas	Service spaces and Garage Spaces	Balconies see note (10)	Included in Calorific value Calculation	Included in Fire Volume Calculation
<b>Category Of Space</b>	<b>1</b>	<b>4</b>	<b>2</b>	<b>3</b>	<b>5, 9, 11</b>	<b>10</b>	<b>1 - 9</b>	<b>1 - 9</b>
<b>Material</b>								
<b>(A) Floor coverings</b>	No Applicable Requirements	Annex 1, Part 5 Annex 1, Part 2	Annex 1, Part 5 Annex 1, Part 2	Annex 1, Part 2 (PYC 6.4 refers)	No Applicable Requirements	Annex 1, Part 5 Annex 1, Part 2 <b>Except natural hardwood decking systems</b> <b>See Note (10)</b>		
<b>(B) Primary deck coverings</b>	Annex 1, Part 5 Annex 1, Part 2	Annex 1, Part 5 Annex 1, Part 2	Annex 1, Part 5 Annex 1, Part 2	Annex 1, Part 5 Annex 1, Part 2	Annex 1, Part 5 Annex 1, Part 2	Annex 1, Part 5 Annex 1, Part 2		
<b>(C) Exposed surfaces of walls and ceilings, panel surfaces and ceiling linings, including paints, varnishes, fabrics and veneers (see note 16)</b>	Annex 1, Part 5 Annex 1, Part 2	Annex 1, Part 5 Annex 1, Part 2	Annex 1, Part 5 Annex 1, Part 2	Annex 1, Part 5 Annex 1, Part 2	Annex 1, Part 5 Annex 1, Part 2	Annex 1, Part 5 Annex 1, Part 2	✓	✓ (except Balconies)
<b>(D) Skirting Board</b>	Annex 1 Part 2 Annex 1 Part 5 <b>see note (6)</b>	Annex 1 Part 2 Annex 1 Part 5 <b>see note (6)</b>	Annex 1 Part 2 Annex 1 Part 5 <b>see note (6)</b>	Annex 1 Part 2 Annex 1 Part 5 <b>see note (6)</b>	Annex 1 Part 2 Annex 1 Part 5 <b>see note (6)</b>	No Applicable Requirements		✓
<b>(E) Combustible facings, mouldings, decorations</b>	Annex 1 Part 2 Annex 1 Part 5 <b>see note and (6)</b>	Annex 1 Part 2 Annex 1 Part 5 <b>see note (6)</b>	Annex 1 Part 2 Annex 1 Part 5 <b>see note (6)</b>	Annex 1 Part 2 Annex 1 Part 5 <b>see note (6)</b>	Annex 1 Part 2 Annex 1 Part 5 <b>see note (6)</b>	Annex 1 Part 2 Annex 1 Part 5 <b>see note (6)</b>	✓	✓
<b>(F) Partial Bulkhead</b>	Annex 1, Part 1	Annex 1, Part 1	Annex 1, Part 1	Annex 1, Part 1	Annex 1, Part 1	Annex 1, Part 1		
<b>(G) Wall panel/Lining</b>	Annex 1, Part 1	Annex 1, Part 1	Annex 1, Part 1	Annex 1, Part 1	Annex 1, Part 1	Annex 1, Part 1		
<b>(H) Concealed panel surface</b>	Annex 1, Part 5	Annex 1, Part 5	Annex 1, Part 5	Annex 1, Part 5	Annex 1, Part 5	No Applicable Requirements	✓	
<b>(I) Draught stops</b>	Annex 1, Part 1 <b>see note (14)</b>	Annex 1, Part 1 <b>see note (14)</b>	Annex 1, Part 1 <b>see note (14)</b>	Annex 1, Part 1 <b>see note (14)</b>	Annex 1, Part 1 <b>see note (14)</b>	Not applicable		
<b>(J) Grounds and supports</b>	Annex 1, Part 1 <b>see note (15)</b>	Annex 1, Part 1 <b>see note (15)</b>	Annex 1, Part 1 <b>see note (15)</b>	Annex 1, Part 1 <b>see note (15)</b>	Annex 1, Part 1 <b>see notes (14) and (15)</b>	Annex 1, Part 1 <b>see notes and(15)</b>		
<b>(K) Insulation</b>	Annex 1, Part 1	Annex 1, Part 1	Annex 1, Part 1	Annex 1, Part 1	Annex 1, Part 1 <b>see note (12)</b>	Annex 1, Part 1		
<b>(L) Insulation surface</b>	Annex 1, Part 5 <b>see note (13)</b>	Annex 1, Part 5 <b>see note (13)</b>	Annex 1, Part 5 <b>see note (13)</b>	Annex 1, Part 5 <b>see note (13)</b>	Annex 1, Part 5 <b>see note (13)</b>	Annex 1, Part 5 <b>see note (13)</b>		
<b>(M) Curtains and other suspended textiles</b>	Annex 1, Part 7 <b>see note (5)</b>	Annex 1, Part 7	Annex 1, Part 7	<b>see note (17)</b>	Annex 1, Part 7	Not applicable		
<b>(N) Upholstered furniture (including Sofas and Chairs)</b>	<b>see note (5)</b>	<b>see notes (2) and (4)</b>	<b>see note (11)</b>	<b>see note (17)</b>	<b>see note (5)</b>	Annex 1, Part 8 <b>see note (9)</b>		
<b>(O) Case furniture (desks, wardrobes, dressing tables, bureaux, dressers etc.)</b>	<b>see note (5)</b>	Not allowed	Not allowed	<b>see note (17)</b>	No Applicable Requirements	No Applicable Requirements		
<b>(P) Free standing furniture (tables etc.)</b>	<b>see note (5)</b>	Not allowed	Not allowed	<b>see note (17)</b>	No Applicable Requirements	<b>see note (9)</b>		
<b>(Q) Window box surface</b>	Annex 1, Part 5 Annex 1, Part 2	Annex 1, Part 5 Annex 1, Part 2	Annex 1, Part 5 Annex 1, Part 2	Annex 1, Part 5 Annex 1, Part 2	Annex 1, Part 5 Annex 1, Part 2	Annex 1, Part 5 Annex 1, Part 2	✓	✓ <b>see note (1)</b>
<b>(R) GRP surfaces in private Bathroom/Toilet Modules</b>	Not applicable	Not applicable	Not applicable	Annex 1, Part 5 Annex 1, Part 2	Not applicable	Not applicable	✓	✓
<b>(S) Light fixtures</b>	In general no certification required, but to be looked at on a case by case basis, in particular when at ceiling or fixed to bulkhead							
<b>(T) Waste receptacles</b>	Not allowed	Not allowed	Not allowed	Non-combustible <b>see note (3)</b>	Non-combustible <b>see note (3)</b>	Non-combustible <b>see note (3)</b>		
<b>(U) Object d'art, planters, paintwork (NEVER TO REDUCE ESCAPE WIDTHS)</b>	Not allowed	<b>see notes (7) and (8)</b>	<b>see notes (7) and (8)</b>	<b>see note (8)</b>	Not allowed	No Applicable Requirements		

To be read with Section 6 of the Code and MSC/Circ.1120, Annex, Interpretation of SOLAS II-2/5.3 and 6.  
**For guidance only, please refer to section 6 for actual requirements.**



Description	FTP Code Part	Test Procedure
Non-combustibility test	FTP Code Annex 1, Part 1	ISO 1182:2010
Smoke and toxicity test	FTP Code Annex 1, Part 2	ISO 5659-2:2012 and reference to MSC/Circ.1120
"A", "B" & "F" class divisions	FTP Code Annex 1, Part 3	-
Test for fire door control systems	FTP Code Annex 1, Part 4	-
Test for surface flammability	FTP Code Annex 1, Part 5	-
Test for primary deck covering	FTP Code Annex 1, Part 5	-
Test for vertically supported textiles	FTP Code Annex 1, Part 7	-
Test for upholstered furniture	FTP Code Annex 1, Part 8	-
Test for bedding components	FTP Code Annex 1, Part 9	-
Determination of calorific potential	SOLAS II-2/5.3.2.2	ISO 1716:2002



Where the words “no applicable requirements” appear, although no compliance is required by the Regulations, use of restricted fire risk articles as defined in Section 2 of the Code is recommended	
Note (1)	The windows box shall have a non-combustible structure. Where the structure is faced with a combustible veneer, this item shall be included in the fire volume calculation.
Note (2)	Furniture in stairway enclosures shall be limited to seating. It shall be fixed, limited to six seats on each deck in each stairway enclosure, of restricted fire risk, and shall not restrict the passenger escape route
Note (3)	Refer to BPYC 14.2.32 for detailed requirements
Note (4)	These items shall be constructed with frames of non-combustible materials and, if upholstered are to comply with FTP Annex 1, Part 8
Note (5)	Such spaces shall be outfitted with restricted fire risk articles as defined in Section 2 of the Code.
Note (6)	FTP Code, Annex 1, Parts 2 and 5 are applicable only to paints, varnishes and other finishes (Reg. II-2/6.2) (i.e. not veneers or substrate).
Note (7)	To be kept to a minimum, be fixed and have properties that are not readily ignitable.
Note (8)	Large artworks that form the majority of the bulkhead are to have low frame spread surface.
Note (9)	Refer to BPYC 14.3.21, 22 and 23 for details regarding Furniture and furnishings on cabin balconies.
Note (10)	For open deck spaces other than balconies, attention shall be paid to MSC.1/Circ.1274 when adjacent to LSA
Note (11)	Not allowed in cabin corridors. In other corridors (i.e. corridors not forming part of an Escape Route), notes 2 and 4 apply.
Note (12)	Insulating materials located in cargo spaces, mail rooms and refrigerated compartments of service spaces need not be non-combustible. SOLAS II-2/5.3.1.1 refers.
Note (13)	Combustible vapour barriers and adhesives used in conjunction with insulation shall be kept to the minimum quantity practicable. SOLAS II-2/5.3.1.1 refers.
Note (14)	Linings, grounds, draught stops and ceilings in mail rooms, baggage rooms, saunas or refrigerated compartments need not be non-combustible. SOLAS II-2/5.3.1.2.1 refers.
Note (15)	Grounds in concealed or inaccessible spaces in accommodation, service spaces and control stations shall have low flame spread characteristics in accordance with FTP Code Annex 1, Part 5. SOLAS II-2/5.3.2.4.1.2 refers.
Note (16)	See BPYC 14.3.18 for details regarding the possible relaxation of Low Flame-spread characteristics in areas appropriated for the use of the Owners and passengers, subject to agreement by the BMA.
Note (17)	Refer to Section 2 of the Code and for detailed requirements where the space shall be treated as spaces of restricted fire risk.

