CHAPTER VII

LIFE-SAVING APPLIANCES AND ARRANGEMENTS

PART A
GENERAL

Regulation 1
Application

(1) Unless expressly provided otherwise, this chapter shall apply to new vessels of 45 m in length and over.

(2) Regulations 13 and 14 shall also apply to existing vessels of 45 m in length and over, provided that the Administration may defer the implementation of the requirements of these regulations until 1 February 1999 or the date of entry into force of this Protocol, whichever occurs later.

Regulation 2
Definitions

(1) *Float-free launching* is that method of launching a survival craft whereby the craft is automatically released from a sinking vessel and is ready for use.

(2) *Free-fall launching* is that method of launching a survival craft whereby the craft with its complement of persons and equipment on board is released and allowed to fall into the sea without any restraining apparatus.

(3) *Inflatable appliance* is an appliance which depends upon non-rigid, gas-filled chambers for buoyancy and which is normally kept uninflated until ready for use.

(4) *Inflated appliance* is an appliance which depends upon non-rigid, gas-filled chambers for buoyancy and which is kept inflated and ready for use at all times.

(5) *Launching appliance or arrangement* is a means of transferring a survival craft or rescue boat from its stowed position safely to the water.

(6) *Novel life-saving appliance or arrangement* is a life-saving appliance or arrangement which embodies new features not fully covered by the provisions of this chapter but which provides an equal or higher standard of safety.

(7) *Rescue boat* is a boat designed to rescue persons in distress and to marshal survival craft.

(8) *Retro-reflective material* is a material which reflects in the opposite direction a beam of light directed on it.

(9) *Survival craft* is a craft capable of sustaining the lives of persons in distress from the time of abandoning the vessel.

Regulation 3
Evaluation, testing and approval of life-saving appliances and arrangements

(1) Except as provided in paragraphs (5) and (6), life-saving appliances and arrangements required by this chapter shall be approved by the Administration.

(2) Before giving approval to life-saving appliances and arrangements, the Administration shall ensure that such life-saving appliances and arrangements:

(a) are tested, to confirm that they comply with the requirements of this chapter, in accordance with the recommendations of the Organization;[32] or

(b) have successfully undergone, to the satisfaction of the Administration, tests which are substantially equivalent to those specified in those recommendations.

(3) Before giving approval to novel life-saving appliances or arrangements, the Administration shall ensure that such appliances or arrangements:

(a) provide safety standards at least equivalent to the requirements of this chapter and have been evaluated and tested in accordance with the recommendations of the Organization;[33] or

(b) have successfully undergone, to the satisfaction of the Administration, evaluation and tests which are substantially equivalent to those recommendations.

(4) Procedures adopted by the Administration for approval shall also include the conditions whereby approval would continue or would be withdrawn.

(5) Before accepting life-saving appliances and arrangements that have not been previously approved by the Administration, the Administration shall be satisfied that life-saving appliances and arrangements comply with the requirements of this chapter.

(6) Life-saving appliances required by this chapter, for which detailed specifications are not included in part C, shall be to the satisfaction of the Administration.

Regulation 4
Production tests

The Administration shall require life-saving appliances to be subjected to such production tests as are necessary to ensure that the life-saving appliances are manufactured to the same standard as the approved prototype.

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[32] See the *Revised Recommendation on testing of life-saving appliances*, adopted by the Maritime Safety Committee of the Organization by resolution MSC.89(70) as amended.

[33] See the *Code of practice for the evaluation, testing and acceptance of prototype novel life-saving appliances and arrangements*, adopted by the Organization by resolution A.520(13).

PART B
VESSEL REQUIREMENTS

Regulation 5
Number and types of survival craft and rescue boats

(1) Every vessel shall be provided with at least two survival craft.

(2) The number, capacity and type of survival craft and rescue boats of vessels of 75 m in length and over shall comply with the following:

(a) survival craft of sufficient aggregate capacity to accommodate on each side of the vessel at least the total number of persons on board shall be provided. However, if the vessel complies with subdivision requirements, damage stability criteria and criteria of increased structural fire protection additional to those stipulated by regulation III/14 and by chapter V, and the Administration considers that a decrease of the number of survival craft and their capacity will not affect safety, the Administration may allow this decrease, provided that the aggregate capacity of survival craft situated on each side of the vessel is sufficient to accommodate at least 50 per cent of the persons on board. In addition, liferafts for at least 50 per cent of the total number of persons on board shall be provided; and

(b) a rescue boat shall be provided, unless the vessel is provided with a lifeboat which fulfils the requirements for a rescue boat and which is capable of being recovered after the rescue operation.

(3) Vessels of less than 75 m in length shall comply with the following:

(a) survival craft of sufficient aggregate capacity to accommodate on each side of the vessel at least the total number of persons on board shall be provided; and

(b) a rescue boat shall be provided, unless the vessel is provided with a suitable survival craft which is capable of being recovered after the rescue operation.

(4) In lieu of meeting the requirements of paragraph 2(a) or 3(a), vessels may carry one or more lifeboats capable of being free-fall launched over the stern of the vessel of sufficient capacity to accommodate the total number of persons on board and with liferafts of sufficient capacity to accommodate the total number of persons on board.

(5) Where the arrangement required in paragraph (3)(a) would interfere with the normal operation of the vessel, the Administration may decide, in lieu of meeting the requirements, that vessels carry survival craft capable of being launched from only one side of the vessel. These survival craft shall be of sufficient aggregate capacity to accommodate at least twice the total number of persons on board, provided that the survival craft of sufficient capacity to accommodate the total number of persons on board can be easily transferred to the other side of the vessel, where they can be launched safely and rapidly.

(6) In the event of any one survival craft being lost or rendered unserviceable, there shall be sufficient survival craft available for use on either side, including those which are stowed in a position to be transferred to the other side, to accommodate the total number of

persons on board. The transfer shall be easy to do, at a single open deck level, and all craft shall be free of obstacles to avoid entrapment and facilitate easy deployment.

(7) Where the arrangement required in paragraph (3)(b) would interfere with the normal operation of the vessel, the Administration may decide, in lieu of meeting the requirements, that vessels carry other equivalent appliances for rescuing persons from the water, taking into account the vessel's navigational area and operational condition.

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

(9) The survival craft and rescue boats shall comply with the applicable requirements of regulations 17 to 23 inclusive.

Regulation 6
Availability and stowage of survival craft and rescue boats

(1) Survival craft shall:

(a) (i) be readily available in case of emergency;

(ii) be capable of being launched safely and rapidly under the conditions required by regulation 32(1)(a); and

(iii) be capable of rapid recovery if fulfilling also the requirements for a rescue boat;

(b) be so stowed that:

(i) the marshalling of persons at the embarkation deck is not impeded;

(ii) their prompt handling is not impeded;

(iii) embarkation can be effected rapidly and in good order; and

(iv) the operation of any other survival craft is not interfered with.

(2) Where the distance from the embarkation deck to the waterline of the vessel in the lightest operating condition exceeds 4.5 m, survival craft, except float-free liferafts, shall be capable of being davit-launched with a full complement of persons or be provided with equivalent approved means of embarkation.

(3) Survival craft and launching appliances shall be in working order and available for immediate use before the vessel leaves port and kept so at all times when at sea.

(4) (a) Survival craft shall be stowed to the satisfaction of the Administration.

(b) Every lifeboat shall be attached to a separate set of davits or approved launching appliance.

(c) Survival craft shall be positioned as close to accommodation and service spaces as possible, stowed in suitable positions to ensure safe launching,

with particular regard to clearance from the propeller. Lifeboats for lowering down the vessel's side shall be stowed with regard to steeply overhanging portions of the hull, so ensuring, as far as practicable, that they can be launched down the straight side of the vessel. If positioned forward, they shall be stowed abaft the collision bulkhead in a sheltered position and in this respect the Administration shall give special consideration to the strength of the davits.

(d) The method of launching and recovering of rescue boats shall be approved taking into account the weight of the rescue boat including its equipment and 50 per cent of the number of persons it is certificated to carry in regulations 23(1)(b)(ii) and 23(1)(c), the construction and size of the rescue boat and its position of stowage above the waterline in the vessel's lightest operating condition. However, every rescue boat stowed at a height of more than 4.5 m above the waterline in the vessel's lightest operating condition shall be provided with approved arrangements for launching and recovery.

(e) Launching and embarkation appliances shall comply with the requirements of regulation 32.

(f) (i) The liferafts shall be so stowed as to be readily available in case of emergency in such a manner as to permit them to float free from their stowage, inflate and break free from the vessel in the event of its sinking. However, davit-launched liferafts need not float free.

(ii) Lashings, if used, shall be fitted with an automatic (hydrostatic) release system of an approved type.

(g) The Administration, if it is satisfied that the constructional features of the vessel and the method of fishing operation may render it unreasonable and impractical to apply particular provisions of this paragraph, may accept relaxations from such provisions, provided that the vessel is fitted with alternative launching and recovering arrangements adequate for the service for which it is intended. The Administration which has allowed alternative launching and recovery arrangements under this subparagraph shall inform the Organization of the particulars of such arrangements for circulation to other Parties.

Regulation 7
Embarkation into survival craft

Suitable arrangements shall be made for embarkation into the survival craft, which shall include:

(a) at least one ladder, or other approved means, on each side of the vessel to afford access to the survival craft when waterborne, except where the Administration is satisfied that the distance from the point of embarkation to the waterborne survival craft is such that a ladder is unnecessary;

(b) means for illuminating the stowage position of survival craft and their launching appliances during preparation for, and the process of, launching, and also for illuminating the water into which the survival craft are launched

until the process of launching is completed, the power for which is to be supplied from the emergency source required by regulation IV/17;

(c) arrangements for warning all persons on board that the vessel is about to be abandoned; and

(d) means for preventing any discharge of water into the survival craft.

Regulation 8
Lifejackets

(1) For every person on board, a lifejacket of an approved type complying with the requirements of regulation 24 shall be carried.

(2) Lifejackets shall be so placed as to be readily accessible and their position shall be plainly indicated.

Regulation 9
Immersion suits and thermal protective aids

(1) An approved immersion suit, of an appropriate size, complying with the requirements of regulation 25 shall be provided for every person assigned to crew the rescue boat.

(2) Vessels complying with the requirements of regulation 5(2) and (3) shall carry immersion suits complying with the requirements of regulation 25 for every person on board not accommodated in:

(a) lifeboats; or

(b) davit-launched liferafts; or

(c) liferafts served by equivalent approved appliances which do not require entry into the water to board the liferaft.

(3) In addition to paragraph (2)(a), vessels shall carry for each lifeboat at least three immersion suits complying with the requirements of regulation 25. In addition to the thermal protective aids required by regulation 17(8)(xxxi), vessels shall carry thermal protective aids complying with the requirements of regulation 26 for persons to be accommodated in the lifeboats and not provided with immersion suits. These immersion suits and thermal protective aids need not be required if the vessel is equipped with either totally enclosed lifeboats of such aggregate capacity as to accommodate on each side of the vessel at least the total number of persons on board or a free-fall lifeboat of sufficient capacity to accommodate the total number of persons on board.

(4) The requirements of paragraphs (2) and (3) do not apply to vessels constantly engaged in warm climates, where, in the opinion of the Administration, immersion suits and thermal protective aids are unnecessary.

(5) The immersion suits required by paragraphs (2) and (3) may be used to comply with the requirements of paragraph (1).

Regulation 10
Lifebuoys

(1) At least the following number of lifebuoys complying with the requirements of regulation 27(1) shall be provided:

(a) eight lifebuoys in vessels of 75 m in length and over; and

(b) six lifebuoys in vessels of less than 75 m in length.

(2) At least half of the number of lifebuoys referred to in paragraph (1) shall be provided with self-igniting lights complying with the requirements of regulation 27(2).

(3) At least two of the lifebuoys provided with self-igniting lights in accordance with paragraph (2) shall be provided with self-activitating smoke signals complying with the requirements of regulation 27(3), and shall, where practicable, be capable of quick release from the navigation bridge.

(4) At least one lifebuoy on each side of the vessel shall be fitted with a buoyant lifeline complying with the requirements of regulation 27(4) equal in length to not less than twice the height at which it is stowed above the waterline in the lightest seagoing condition, or 30 m, whichever is greater. Such lifebuoys shall not have self-igniting lights.

(5) All lifebuoys shall be so placed as to be readily accessible to the persons on board and shall always be capable of being rapidly cast loose and shall not be permanently secured in any way.

Regulation 11
Line-throwing appliances

Every vessel shall carry a line-throwing appliance of an approved type, complying with the requirements of regulation 28.

Regulation 12
Distress signals

(1) Every vessel shall be provided, to the satisfaction of the Administration, with means of making effective distress signals by day and by night, including at least 12 rocket parachute flares complying with the requirements of regulation 29.

(2) Distress signals shall be of an approved type. They shall be so placed as to be readily accessible and their position shall be plainly indicated.

Regulation 13
Radio life-saving appliances

(1) At least three two-way VHF radiotelephone apparatus shall be provided on every vessel. Such apparatus shall conform to performance standards not inferior to those adopted by the Organization.[34] If a fixed two-way VHF radiotelephone apparatus is fitted in a survival craft, it shall conform to performance standards not inferior to those adopted by the Organization.[34]

[34] See the Recommendation on *Performance standards for survival craft portable two-way VHF radiotelephone apparatus*, adopted by the Organization by resolution A.809(19) annex 1 or annex 2, as applicable.

(2) Two-way VHF radiotelephone apparatus provided on board existing vessels and not complying with the performance standards adopted by the Organization may be accepted by the Administration until 1 February 1999, or the date of entry into force of this Protocol, whichever occurs later, provided that the Administration is satisfied that they are compatible with approved two-way VHF radiotelephone apparatus.

Regulation 14
Radar transponders

At least one radar transponder shall be carried on each side of every vessel. Such radar transponders shall conform to performance standards not inferior to those adopted by the Organization.[35] The radar transponders[36] shall be stowed in such locations that they can be rapidly placed in any survival craft. Alternatively, one radar transponder shall be stowed in each survival craft.

Regulation 15
Retro-reflective materials on life-saving appliances

All survival craft, rescue boats, lifejackets and lifebuoys shall be fitted with retro-reflective material in accordance with the recommendations of the Organization.[37]

Regulation 16
Operational readiness, maintenance and inspections

(1) Operational readiness

Before the vessel leaves port and at all times during the voyage, all life-saving appliances shall be in working order and ready for immediate use.

(2) Maintenance

(a) Instructions for on-board maintenance of life-saving appliances approved by the Administration shall be provided and maintenance shall be carried out accordingly.

(b) The Administration may accept, in lieu of the instructions required by subparagraph (a), a shipboard planned maintenance programme.

(3) Maintenance of falls

Falls used in launching shall be turned end for end at intervals of not more than 30 months and be renewed when necessary due to deterioration of the falls or at intervals of not more than 5 years, whichever is the earlier.

[35] See the Recommendation on *Performance standards for survival craft radar transponders for use in search and rescue operations*, adopted by the Organization by resolution A.802(19).

[36] One of these may be the radar transponder required by regulation IX/6(1)(c).

[37] See the Recommendation on the *Use and fitting of retro-reflective materials on life-saving appliances*, adopted by the Organization by resolution A.658(16).

(4) Spares and repair equipment

Spares and repair equipment shall be provided for life-saving appliances and their components which are subject to excessive wear or consumption and need to be replaced regularly.

(5) Weekly inspection

The following tests and inspections shall be carried out weekly:

(a) all survival craft, rescue boats and launching appliances shall be visually inspected to ensure that they are ready for use;

(b) all engines in lifeboats and rescue boats shall be run ahead and astern for a total period of not less than 3 min provided the ambient temperature is above the minimum temperature required for starting the engine; and

(c) the general emergency alarm system shall be tested.

(6) Monthly inspections

Inspection of the life-saving appliances, including lifeboat equipment, shall be carried out monthly using a checklist to ensure that they are complete and in good order. A report of the inspection shall be entered in the log-book.

(7) Servicing of inflatable liferafts, inflatable lifejackets and inflated rescue boats

(a) Every inflatable liferaft and inflatable lifejacket shall be serviced:

(i) at intervals not exceeding 12 months. However, in cases where it appears proper and reasonable, the Administration may extend this period to 17 months;

(ii) at an approved servicing station which is competent to service them, maintains proper servicing facilities and uses only properly trained personnel.[38]

(b) All repairs and maintenance of inflated rescue boats shall be carried out in accordance with the manufacturer's instructions. Emergency repairs may be carried out on board the vessel; however, permanent repairs shall be effected at an approved servicing station.

(8) Periodic servicing of hydrostatic release units

Disposable hydrostatic release units shall be replaced when their date of expiry has passed. If not disposable, hydrostatic release units shall be serviced:

(a) at intervals not exceeding 12 months. However, in cases where it appears proper and reasonable, the Administration may extend this period to 17 months;

[38] See the *Recommendation on conditions for the approval of servicing stations for inflatable liferafts*, adopted by the Organization by resolution A.761(18).

(b) at a servicing station which is competent to service them, maintains proper servicing facilities and uses only properly trained personnel.

(9) In cases of vessels where the nature of fishing operations may cause difficulty for compliance with the requirements of paragraphs (7) and (8), the Administration may allow the extension of the service intervals to 24 months, provided that the Administration is satisfied that such appliances are so manufactured and arranged that they will remain in satisfactory condition until the next period of servicing.

PART C
LIFE-SAVING APPLIANCES REQUIREMENTS

Regulation 17 - General requirements for lifeboats

(1) Construction of lifeboats

(a) All lifeboats shall be properly constructed and shall be of such form and proportions that they have ample stability in a seaway and sufficient freeboard when loaded with their full complement of persons and equipment. All lifeboats shall have rigid hulls and shall be capable of maintaining positive stability when in an upright position in calm water and loaded with their full complement of persons and equipment and holed in any one location below the waterline, assuming no loss of buoyancy material and no other damage.

(b) All lifeboats shall be of sufficient strength to enable them to be safely lowered into the water when loaded with their full complement of persons and equipment.

(c) Hulls and rigid covers shall be fire-retardant or non-combustible.

(d) Seating shall be provided on thwarts, benches or fixed chairs fitted as low as practicable in the lifeboat and constructed so as to be capable of supporting the number of persons each weighing 100 kg for which spaces are provided in compliance with the requirements of paragraph (2)(b)(ii).

(e) Each lifeboat shall be of sufficient strength to withstand a load, without residual deflection on removal of that load:

(i) in the case of boats with metal hulls, 1.25 times the total mass of the lifeboat when loaded with its full complement of persons and equipment; or

(ii) in the case of other boats, twice the total mass of the lifeboat when loaded with its full complement of persons and equipment.

(f) Each lifeboat shall be of sufficient strength to withstand, when loaded with its full complement of persons and equipment and with, where applicable, skates or fenders in position, a lateral impact against the vessel's side at an impact velocity of at least 3.5 m/s and also a drop into the water from a height of at least 3 m.

(g) The vertical distance between the floor surface and the interior of the enclosure or canopy over 50 per cent of the floor area shall be:

(i) not less than 1.3 m for a lifeboat permitted to accommodate nine persons or less;

(ii) not less than 1.7 m for a lifeboat permitted to accommodate 24 persons or more;

(iii) not less than the distance as determined by linear interpolation between 1.3 m and 1.7 m for a lifeboat permitted to accommodate between 9 and 24 persons.

(2) Carrying capacity of lifeboats

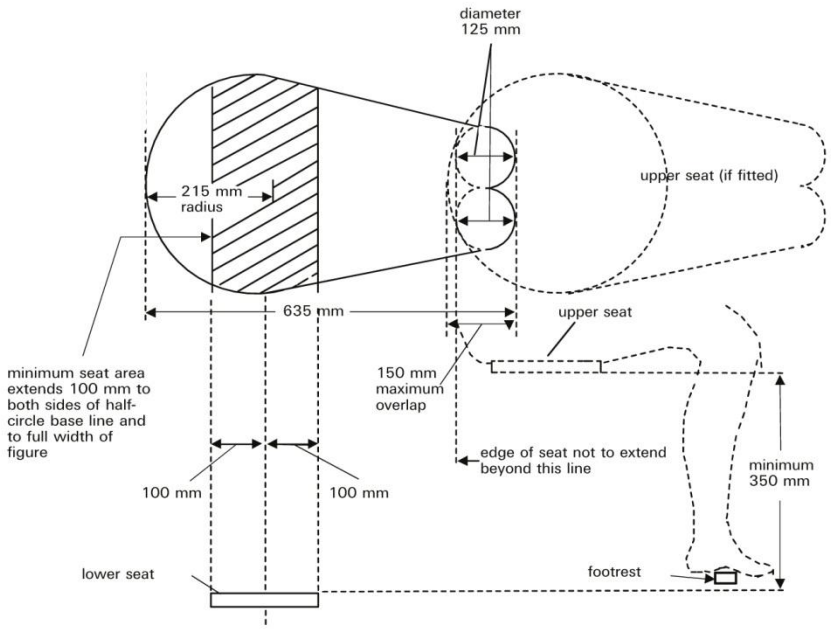
(a) No lifeboat shall be approved to accommodate more than 150 persons.

(b) The number of persons which a lifeboat shall be permitted to accommodate shall be equal to the lesser of:

(i) the number of persons having an average mass of 75 kg, all wearing lifejackets, that can be seated in a normal position without interfering with the means of propulsion or the operation of any of the lifeboat's equipment; or

(ii) the number of spaces that can be provided on the seating arrangements in accordance with figure 1. The shapes may be overlapped as shown, provided footrests are fitted and there is sufficient room for legs and the vertical separation between the upper and lower seat is not less than 350 mm.

(c) Each seating position shall be clearly indicated in the lifeboat.



(3) Access into lifeboats

(a) Every vessel lifeboat shall be so arranged that it can be boarded by its full complement of persons in not more than 3 min from the time the instruction to board is given. Rapid disembarkation shall also be possible.

(b) Lifeboats shall have a boarding ladder that can be used on either side of the lifeboat to enable persons in the water to board the lifeboat. The lowest step of the ladder shall be not less than 0.4 m below the lifeboat's light waterline.

(c) The lifeboat shall be so arranged that helpless people can be brought on board either from the sea or on stretchers.

(d) All surfaces on which persons might walk shall have a non-skid finish.

(4) Lifeboat buoyancy

All lifeboats shall have inherent buoyancy or shall be fitted with inherently buoyant material which shall not be adversely affected by seawater, oil or oil products, sufficient to float the lifeboat with all its equipment on board when flooded and open to the sea. Additional inherently buoyant material, equal to 280 N of buoyant force per person shall be provided for the number of persons the lifeboat is permitted to accommodate. Buoyant material, unless in addition to that required above, shall not be installed external to the hull of the lifeboat.

(5) Lifeboat freeboard and stability

All lifeboats, when loaded with 50 per cent of the number of persons the lifeboat is permitted to accommodate seated in their normal positions to one side of the centreline, shall have a freeboard, measured from the waterline to the lowest opening through which the lifeboat may become flooded, of at least 1.5 per cent of the lifeboat's length or 100 mm, whichever is the greater.

(6) Lifeboat propulsion

(a) Every lifeboat shall be powered by a compression ignition engine. No engine shall be used for any lifeboat if its fuel has a flashpoint of 43°C or less (closed cup test).

(b) The engine shall be provided with either a manual starting system, or a power starting system with two independent rechargeable energy sources. Any necessary starting aids shall also be provided. The engine starting systems and starting aids shall start the engine at an ambient temperature of -15°C within 2 min of commencing the start procedure unless, in the opinion of the Administration having regard to the particular voyages in which the vessel carrying the lifeboat is constantly engaged, a different temperature is appropriate. The starting systems shall not be impeded by the engine casing, thwarts or other obstructions.

(c) The engine shall be capable of operating for not less than 5 min after starting from cold with the lifeboat out of the water.

(d) The engine shall be capable of operating when the lifeboat is flooded up to the centreline of the crankshaft.

(e) The propeller shafting shall be so arranged that the propeller can be disengaged from the engine. Provision shall be made for ahead and astern propulsion of the lifeboat.

(f) The exhaust pipe shall be so arranged as to prevent water from entering the engine in normal operation.

(g) All lifeboats shall be designed with due regard to the safety of persons in the water and to the possibility of damage to the propulsion system by floating debris.

(h) The speed of a lifeboat when proceeding ahead in calm water, when loaded with its full complement of persons and equipment and with all engine-powered auxiliary equipment in operation, shall be at least 6 knots and at least 2 knots when towing a 25-person liferaft loaded with its full complement of persons and equipment or its equivalent. Sufficient fuel, suitable for use throughout the temperature range expected in the area in which the vessel operates, shall be provided to run the fully loaded lifeboat at 6 knots for a period of not less than 24 h.

(i) The lifeboat engine, transmission and engine accessories shall be enclosed in a fire-retardant casing or other suitable arrangements providing similar protection. Such arrangements shall also protect persons from coming into accidental contact with hot or moving parts and protect the engine from exposure to weather and sea. Adequate means shall be provided to reduce the engine noise. Starter batteries shall be provided with casings which form a watertight enclosure around the bottom and sides of the batteries. The battery casings shall have a tight fitting top which provides for necessary gas venting.

(j) The lifeboat engine and accessories shall be designed to limit electromagnetic emissions so that engine operation does not interfere with the operation of radio life-saving appliances used in the lifeboat.

(k) Means shall be provided for recharging all engine-starting, radio and searchlight batteries. Radio batteries shall not be used to provide power for engine starting. Means shall be provided for recharging lifeboat batteries from the vessel's power supply at a supply voltage not exceeding 55 V which can be disconnected at the lifeboat embarkation station.

(l) Water-resistant instructions for starting and operating the engine shall be provided and mounted in a conspicuous place near the engine starting controls.

(7) Lifeboat fittings

(a) All lifeboats shall be provided with at least one drain valve fitted near the lowest point in the hull, which shall automatically open to drain water from the hull when the lifeboat is not waterborne and shall automatically close to prevent entry of water when the lifeboat is waterborne. Each drain valve shall be provided with a cap or plug to close the valve, which shall be attached to the lifeboat by a lanyard, a chain, or other suitable means. Drain valves shall be readily accessible from inside the lifeboat and their position shall be clearly indicated.

(b) All lifeboats shall be provided with a rudder and tiller. When a wheel or other remote steering mechanism is also provided, the tiller shall be capable of controlling the rudder in case of failure of the steering mechanism. The rudder shall be permanently attached to the lifeboat. The tiller shall be permanently installed on, or linked to, the rudder stock; however, if the lifeboat has a remote steering mechanism, the tiller may be removable and securely stowed near the rudder stock. The rudder and tiller shall be so arranged as not to be damaged by operation of the release mechanism or the propeller.

(c) Except in the vicinity of the rudder and propeller, a buoyant lifeline shall be becketed around the outside of the lifeboat.

(d) Lifeboats which are not self-righting when capsized shall have suitable handholds on the underside of the hull to enable persons to cling to the lifeboat. The handholds shall be fastened to the lifeboat in such a way that, when subjected to an impact sufficient to cause them to break away from the lifeboat, they break away without damaging the lifeboat.

(e) All lifeboats shall be fitted with sufficient watertight lockers or compartments to provide for the storage of the small items of equipment, water and provisions required by paragraph (8). Means shall be provided for the storage of collected rainwater.

(f) Every lifeboat to be launched by a fall or falls shall be fitted with a release mechanism complying with the following requirements:

(i) the mechanism shall be so arranged that all hooks are released simultaneously;

(ii) the mechanism shall have two release capabilities as follows:

(1) a normal release capability which will release the lifeboat when it is waterborne or when there is no load on the hooks;

(2) an on-load release capability which will release the lifeboat with a load on the hooks. This release shall be so arranged as to release the lifeboat under any conditions of loading from no-load with the lifeboat waterborne to a load of 1.1 times the total mass of the lifeboat when loaded with its full complement of persons and equipment. This release capability shall be adequately protected against accidental or premature use;

(iii) the release control shall be clearly marked in a colour that contrasts with its surroundings;

(iv) the mechanism shall be designed with a factor of safety of 6 based on the ultimate strength of the materials used, assuming the mass of the lifeboat is equally distributed between the falls.

(g) Every lifeboat shall be fitted with a release device to enable the forward painter to be released when under tension.

(h) Every lifeboat which is fitted with a fixed two-way VHF radiotelephone apparatus with an antenna which is separately mounted shall be provided with arrangements for siting and securing the antenna effectively in its operating position.

(i) Lifeboats intended for launching down the side of a vessel shall have skates and fenders, as necessary, to facilitate launching and prevent damage to the lifeboat.

(j) A manually controlled lamp visible on a dark night with a clear atmosphere at a distance of at least 2 miles for a period of not less than 12 h shall be fitted to the top of the cover or enclosure. If the light is a flashing light, it shall initially flash at a rate of not less than 50 flashes per minute over the first 2 h of operation of the 12-hour operating period.

(k) A lamp or source of light shall be fitted inside the lifeboat to provide illumination for not less than 12 h to enable reading of survival and equipment instructions; however, oil lamps shall not be permitted for this purpose.

(l) Unless expressly provided otherwise, every lifeboat shall be provided with effective means of bailing or be automatically self-bailing.

(m) Every lifeboat shall be so arranged that an adequate view forward, aft and to both sides is provided from the control and steering position for safe launching and manoeuvring.

(8) Lifeboat equipment

All items of lifeboat equipment, whether required by this paragraph or elsewhere in this chapter, with the exception of boat-hooks which shall be kept free for fending off purposes, shall be secured within the lifeboat by lashings, storage in lockers or compartments, storage in brackets or similar mounting arrangements or other suitable means. The equipment shall be secured in such a manner as not to interfere with any abandonment procedures. All items of lifeboat equipment shall be as small and of as little mass as possible and shall be packed in a suitable compact form. Except where otherwise stated, the normal equipment of every lifeboat shall consist of:

(i) sufficient buoyant oars to make headway in calm seas. Thole pins, crutches or equivalent arrangements shall be provided for each oar provided. Thole pins or crutches shall be attached to the boat by lanyards or chains;

(ii) two boat-hooks;

(iii) a buoyant bailer and two buckets;

(iv) a survival manual;[39]

[39] See the *Instructions for action in survival craft*, adopted by the Organization by resolution A.657(16).

(v) a binnacle containing an efficient compass which is luminous or provided with suitable means of illumination. In a totally enclosed lifeboat, the binnacle shall be permanently fitted at the steering position; in any other lifeboat, it shall be provided with suitable mounting arrangements;

(vi) a sea-anchor of adequate size fitted with a shock-resistant hawser and a tripping line which provides a firm hand grip when wet. The strength of the sea-anchor, hawser and tripping line shall be adequate for all sea conditions;

(vii) two efficient painters of a length equal to not less than twice the distance from the stowage position of the lifeboat to the waterline in the lightest seagoing condition or 15 m, whichever is the greater. One painter attached to the release device required by paragraph (7)(g) shall be placed at the forward end of the lifeboat and the other shall be firmly secured at or near the bow of the lifeboat ready for use;

(viii) two hatchets, one at each end of the lifeboat;

(ix) watertight receptacles containing a total of 3 *l* of fresh water for each person the lifeboat is permitted to accommodate, of which 1 *l* per person may be replaced by a de-salting apparatus capable of producing an equal amount of fresh water in two days;

(x) a rustproof dipper with lanyard;

(xi) a rustproof graduated drinking vessel;

(xii) a food ration totalling not less than 10,000 kJ for each person the lifeboat is permitted to accommodate; these rations shall be kept in airtight packaging and be stowed in a watertight container;

(xiii) four rocket parachute flares complying with the requirements of regulation 29;

(xiv) six hand flares complying with the requirements of regulation 30;

(xv) two buoyant smoke signals complying with the requirements of regulation 31;

(xvi) one waterproof electric torch suitable for Morse signalling together with one spare set of batteries and one spare bulb in a waterproof container;

(xvii) one daylight signalling mirror with instructions for its use for signalling to ships and aircraft;

(xviii) one copy of the life-saving signals prescribed by regulation V/8 of the International Convention for the Safety of Life at Sea, 1974, on a waterproof card or in a waterproof container;

(xix) one whistle or equivalent sound signal;

(xx) a first-aid outfit in a waterproof case capable of being closed tightly after use;

(xxi) six doses of anti-seasickness medicine and one seasickness bag for each person;

(xxii) a jack-knife to be kept attached to the boat by a lanyard;

(xxiii) three tin-openers;

(xxiv) two buoyant rescue quoits, attached to not less than 30 m of buoyant line;

(xxv) a manual pump;

(xxvi) one set of fishing tackle;

(xxvii) sufficient tools for minor adjustments to the engine and its accessories;

(xxviii) portable fire-extinguishing equipment suitable for extinguishing oil fires;

(xxix) a searchlight capable of effectively illuminating a light-coloured object at night, having a width of 18 m at a distance of 180 m for a total period of 6 h and of working for not less than 3 h continuously;

(xxx) an efficient radar reflector, unless a survival craft radar transponder is stowed in the lifeboat;

(xxxi) thermal protective aids complying with the requirements of regulation 26 sufficient for 10 per cent of the number of persons the lifeboat is permitted to accommodate or two, whichever is greater; and

(xxxii) in the case of vessels engaged on voyages of such a nature and duration that, in the opinion of the Administration, the items specified in subparagraphs (xii) and (xxvi) are unnecessary, the Administration may allow these items to be dispensed with.

(9) Lifeboat markings

(a) The dimension of the lifeboat and the number of persons which it is permitted to accommodate shall be marked on it in clear permanent characters.

(b) The name and port of registry of the vessel to which the lifeboat belongs shall be marked on each side of the lifeboat's bow in block capitals of the Roman alphabet.

(c) Means of identifying the vessel to which the lifeboat belongs and the number of the lifeboat shall be marked in such a way that they are, as far as practicable, visible from above.

Regulation 18
Self-righting partially enclosed lifeboats

(1) Self-righting partially enclosed lifeboats shall comply with the requirements of regulation 17 and, in addition, shall comply with the requirements of this regulation.

(2) Enclosure

(a) Permanently attached rigid covers shall be provided extending over not less than 20 per cent of the length of the lifeboat from the stem and not less than 20 per cent of the length of the lifeboat from the aftermost part of the lifeboat.

(b) The rigid covers shall form two shelters. If the shelters have bulkheads, they shall have openings of sufficient size to permit easy access by persons each wearing an immersion suit or warm clothes and a lifejacket. The interior height of the shelters shall be sufficient to permit persons easy access to their seats in the bow and stern of the lifeboat.

(c) The rigid covers shall be so arranged that they include windows or translucent panels to admit sufficient daylight to the inside of the lifeboat with the openings or canopies closed so as to make artificial light unnecessary.

(d) The rigid covers shall have railings to provide a secure handhold for persons moving about the exterior of the lifeboat.

(e) Open parts of the lifeboat shall be fitted with a permanently attached foldable canopy so arranged that:

(i) it can be easily erected by not more than two persons in not more than 2 min; and

(ii) it is insulated to protect the occupants against cold by means of not less than two layers of material separated by an air gap or other equally efficient means.

(f) The enclosure formed by the rigid covers and canopy shall be so arranged:

(i) as to allow launching and recovery operations to be performed without any occupant having to leave the enclosure;

(ii) that it has entrances at both ends and on each side, provided with efficient adjustable closing arrangements which can be easily and quickly opened and closed from inside or outside so as to permit ventilation but exclude seawater, wind and cold; means shall be provided for holding the entrances securely in the open and in the closed position;

(iii) that with the canopy erected and all entrances closed, sufficient air is admitted for the occupants at all times;

(iv) that it has means for collecting rainwater;

(v) that the exterior of the rigid covers and canopy and the interior of that part of the lifeboat covered by the canopy is of a highly visible colour. The interior of the shelters shall be of a colour which does not cause discomfort to the occupants;

(vi) that it is possible to row the lifeboat.

(3) Capsizing and re-righting

(a) A safety belt shall be fitted at each indicated seating position. The safety belt shall be so designed as to hold a person of a mass of 100 kg securely in place when the lifeboat is in a capsized position.

(b) The stability of the lifeboat shall be such that it is inherently or automatically self-righting when loaded with its full or a partial complement of persons and equipment and the persons are secured with safety belts.

(4) Propulsion

(a) The engine and transmission shall be controlled from the helmsman's position.

(b) The engine and engine installation shall be capable of running in any position during capsize and continue to run after the lifeboat returns to the upright or shall automatically stop on capsizing and be easily restarted after the lifeboat returns to the upright and the water has been drained from the lifeboat. The design of the fuel and lubricating systems shall prevent the loss of fuel and the loss of more than 250 ml of lubricating oil from the engine during capsize.

(c) Air-cooled engines shall have a duct system to take in cooling air from, and exhaust it to, the outside of the lifeboat. Manually operated dampers shall be provided to enable cooling air to be taken in from, and exhausted to, the interior of the lifeboat.

(5) Construction and fendering

(a) Notwithstanding regulation 17(1)(f), a self-righting partially enclosed lifeboat shall be so constructed and fendered as to ensure that the lifeboat renders protection against harmful accelerations resulting from an impact of the lifeboat, when loaded with its full complement of persons and equipment, against the vessel's side at an impact velocity of not less than 3.5 m/s.

(b) The lifeboat shall be automatically self-bailing.

Regulation 19
Totally enclosed lifeboats

(1) Totally enclosed lifeboats shall comply with the requirements of regulation 17 and, in addition, shall comply with the requirements of this regulation.

(2) Enclosure

Every totally enclosed lifeboat shall be provided with a rigid watertight enclosure which completely encloses the lifeboat. The enclosure shall be so arranged that:

(i) it protects the occupants against heat and cold;

(ii) access to the lifeboat is provided by hatches which can be closed to make the lifeboat watertight;

(iii) hatches are positioned so as to allow launching and recovery operations to be performed without any occupant having to leave the enclosure;

(iv) access hatches are capable of being opened and closed from both inside and outside and are equipped with means to hold them securely in open positions;

(v) it is possible to row the lifeboat;

(vi) it is capable, when the lifeboat is in the capsized position with the hatches closed and without significant leakage, of supporting the entire mass of the lifeboat, including all equipment, machinery and its full complement of persons;

(vii) it includes windows or translucent panels on both sides which admit sufficient daylight to the inside of the lifeboat with the hatches closed to make artificial light unnecessary;

(viii) its exterior is of a highly visible colour and its interior of a colour which does not cause discomfort to the occupants;

(ix) handrails provide a secure handhold for persons moving about the exterior of the lifeboat, and aid embarkation and disembarkation;

(x) persons have access to their seats from an entrance without having to climb over thwarts or other obstructions;

(xi) the occupants are protected from the effects of dangerous subatmospheric pressures which might be created by the lifeboat's engine.

(3) Capsizing and re-righting

(a) A safety belt shall be fitted at each indicated seating position. The safety belt shall be designed to hold a person of a mass of 100 kg securely in place when the lifeboat is in a capsized position.

(b) The stability of the lifeboat shall be such that it is inherently or automatically self-righting when loaded with its full or a partial complement of persons and equipment and all entrances and openings are closed watertight and the persons are secured with safety belts.

(c) The lifeboat shall be capable of supporting its full complement of persons and equipment when the lifeboat is in the damaged condition prescribed in regulation 17(1)(a) and its stability shall be such that, in the event of

capsizing, it will automatically attain a position that will provide an above-water escape for its occupants.

(d) The design of all engine exhaust pipes, air ducts and other openings shall be such that water is excluded from the engine when the lifeboat capsizes and re-rights.

(4) Propulsion

(a) The engine and transmission shall be controlled from the helmsman's position.

(b) The engine and engine installation shall be capable of running in any position during capsize and continue to run after the lifeboat returns to the upright or shall automatically stop on capsizing and be easily restarted after the lifeboat returns to the upright. The design of the fuel and lubricating systems shall prevent the loss of fuel and the loss of more than 250 ml of lubricating oil from the engine during capsize.

(c) Air-cooled engines shall have a duct system to take in cooling air from, and exhaust it to, the outside of the lifeboat. Manually operated dampers shall be provided to enable cooling air to be taken in from, and exhausted to, the interior of the lifeboat.

(5) Construction and fendering

Notwithstanding regulation 17(1)(f), a totally enclosed lifeboat shall be so constructed and fendered as to ensure that the lifeboat renders protection against harmful accelerations resulting from an impact of the lifeboat, when loaded with its full complement of persons and equipment, against the vessel's side at an impact velocity of not less than 3.5 m/s.

(6) Free-fall lifeboats

A lifeboat arranged for free-fall launching shall be so constructed that it is capable of rendering protection against harmful accelerations resulting from being launched, when loaded with its full complement of persons and equipment, from at least the maximum height at which it is designed to be stowed above the waterline with the vessel in its lightest seagoing condition, under unfavourable conditions of trim of up to 10° and with the vessel listed not less than 20° either way.

Regulation 20
General requirements for liferafts

(1) Construction of liferafts

(a) Every liferaft shall be so constructed as to be capable of withstanding exposure for 30 days afloat in all sea conditions.

(b) The liferaft shall be so constructed that when it is dropped into the water from a height of 18 m, the liferaft and its equipment will operate satisfactorily. If the liferaft is to be stowed at a height of more than 18 m above the waterline in the lightest seagoing condition, it shall be of a type which has been satisfactorily drop-tested from at least that height.

(c) The floating liferaft shall be capable of withstanding repeated jumps on to it from a height of at least 4.5 m above its floor both with and without the canopy erected.

(d) The liferaft and its fittings shall be so constructed as to enable it to be towed at a speed of 3 knots in calm water when loaded with its full complement of persons and equipment and with one of its sea-anchors streamed.

(e) The liferaft shall have a canopy to protect the occupants from exposure which is automatically set in place when the liferaft is launched and waterborne. The canopy shall comply with the following:

(i) it shall provide insulation against heat and cold by means of either two layers of material separated by an air gap or other equally efficient means. Means shall be provided to prevent accumulation of water in the air gap;

(ii) its interior shall be of a colour that does not cause discomfort to the occupants;

(iii) each entrance shall be clearly indicated and be provided with efficient adjustable closing arrangements which can be easily and quickly opened from inside and outside the liferaft so as to permit ventilation but exclude seawater, wind and cold. Liferafts accommodating more than eight persons shall have at least two diametrically opposite entrances;

(iv) it shall admit sufficient air for the occupants at all times, even with the entrances closed;

(v) it shall be provided with at least one viewing port;

(vi) it shall be provided with means for collecting rainwater;

(vii) it shall have sufficient headroom for sitting occupants under all parts of the canopy.

(2) Minimum carrying capacity and mass of liferafts

(a) No liferaft shall be approved which has a carrying capacity of less than six persons calculated in accordance with the requirements of regulation 21(3) or 22(3) as appropriate.

(b) Unless the liferaft is to be launched by an approved launching appliance complying with the requirements of regulation 32 and is not required to be portable, the total mass of the liferaft, its container and its equipment shall not be more than 185 kg.

(3) Liferaft fittings

(a) Lifelines shall be securely becketed around the inside and outside of the liferaft.

(b) The liferaft shall be fitted with an efficient painter of length equal to not less than twice the distance from the stowed position to the waterline in the lightest seagoing condition or 15 m whichever is the greater.

(4) Davit-launched liferafts

(a) In addition to the above requirements, a liferaft for use with an approved launching appliance shall:

(i) when the liferaft is loaded with its full complement of persons and equipment, be capable of withstanding a lateral impact against the vessel's side at an impact velocity of not less than 3.5 m/s and also a drop into the water from a height of not less than 3 m without damage that will affect its function;

(ii) be provided with means for bringing the liferaft alongside the embarkation deck and holding it securely during embarkation.

(b) Every davit-launched liferaft shall be so arranged that it can be boarded by its full complement of persons in not more than 3 min from the time the instruction to board is given.

(5) Equipment

(a) The normal equipment of every liferaft shall consist of:

(i) one buoyant rescue quoit, attached to not less than 30 m of buoyant line;

(ii) one knife of the non-folding type having a buoyant handle and lanyard attached and stowed in a pocket on the exterior of the canopy near the point at which the painter is attached to the liferaft. In addition, a liferaft which is permitted to accommodate 13 persons or more shall be provided with a second knife which need not be of the non-folding type;

(iii) for a liferaft which is permitted to accommodate not more than 12 persons, one buoyant bailer. For a liferaft which is permitted to accommodate 13 persons or more, two buoyant bailers;

(iv) two sponges;

(v) two sea-anchors each with a shock-resistant hawser and tripping line, one being spare and the other permanently attached to the liferaft in such a way that when the liferaft inflates or is waterborne it will cause the liferaft to lie oriented to the wind in the most stable manner. The strength of each sea-anchor and its hawser and tripping line shall be adequate for all sea conditions. The sea-anchors shall be fitted with a swivel at each end of the line and shall be of a type which is unlikely to turn inside-out between its shroud lines;

(vi) two buoyant paddles;

(vii) three tin-openers; safety knives containing special tin-opener blades are satisfactory for this requirement;

(viii) one first-aid outfit in a waterproof case capable of being closed tightly after use;

(ix) one whistle or equivalent sound signal;

(x) four rocket parachute flares complying with the requirements of regulation 29;

(xi) six hand flares complying with the requirements of regulation 30;

(xii) two buoyant smoke signals complying with the requirements of regulation 31;

(xiii) one waterproof electric torch suitable for Morse signalling together with one spare set of batteries and one spare bulb in a waterproof container;

(xiv) an efficient radar reflector, unless a survival craft radar transponder is stowed in the liferaft;

(xv) one daylight signalling mirror with instructions on its use for signalling to ships and aircraft;

(xvi) one copy of the life-saving signals referred to in regulation V/8 of the International Convention for the Safety of Life at Sea, 1974, on a waterproof card or in a waterproof container;

(xvii) one set of fishing tackle;

(xviii) a food ration totalling not less than 10,000 kJ for each person the liferaft is permitted to accommodate; these rations shall be kept in airtight packaging and be stowed in a watertight container;

(xix) watertight receptacles containing a total of 1.5 *l* of fresh water for each person the liferaft is permitted to accommodate, of which 0.5 *l* per person may be replaced by a de-salting apparatus capable of producing an equal amount of fresh water in two days;

(xx) one rustproof graduated drinking vessel;

(xxi) six doses of anti-seasickness medicine and one seasickness bag for each person the liferaft is permitted to accommodate;

(xxii) instructions on how to survive;[40]

(xxiii) instructions for immediate action;[40]

[40] See the *Instructions for action in survival craft*, adopted by the Organization by resolution A.657(16).

(xxiv) thermal protective aids complying with the requirements of regulation 26 sufficient for 10 per cent of the number of persons the liferaft is permitted to accommodate or two, whichever is the greater.

(b) The marking required by regulations 21(7)(c)(v) and 22(7)(vii) on liferafts equipped in accordance with subparagraph (a) shall be SOLAS A PACK in block capitals of the Roman alphabet.

(c) Where appropriate the equipment shall be stowed in a container which, if it is not an integral part of, or permanently attached to, the liferaft, shall be stowed and secured inside the liferaft and be capable of floating in water for at least 30 min without damage to its contents.

(6) Float-free arrangements for liferafts

(a) Painter system

The liferaft painter system shall provide a connection between the vessel and the liferaft and shall be so arranged as to ensure that the liferaft when released and, in the case of an inflatable liferaft, inflated is not dragged under by the sinking vessel.

(b) Weak link

If a weak link is used in the float-free arrangements, it shall:

(i) not be broken by the force required to pull the painter from the liferaft container;

(ii) if applicable, be of sufficient strength to permit the inflation of the liferaft;

(iii) break under a strain of 2.2 ± 0.4 kN.

(c) Hydrostatic release units

If a hydrostatic release unit is used in the float-free arrangements, it shall:

(i) be constructed of compatible materials so as to prevent malfunction of the unit. Galvanizing or other forms of metallic coating on parts of the hydrostatic release unit shall not be accepted;

(ii) automatically release the liferaft at a depth of not more than 4 m;

(iii) have drains to prevent the accumulation of water in the hydrostatic chamber when the unit is in its normal position;

(iv) be so constructed as to prevent release when seas wash over the unit;

(v) be permanently marked on its exterior with its type and serial number;

(vi) be provided with a document or identification plate stating the date of manufacture, type and serial number;

(vii) be such that each part connected to the painter system has a strength of not less than that required for the painter;

(viii) if disposable, have instructions for determining the date of expiry and means for marking the date on the unit.

Regulation 21
Inflatable liferafts

(1) Inflatable liferafts shall comply with the requirements of regulation 20 and, in addition, shall comply with the requirements of this regulation.

(2) Construction of inflatable liferafts

(a) The main buoyancy chamber shall be divided into not less than two separate compartments, each inflated through a non-return inflation valve on each compartment. The buoyancy chambers shall be so arranged that, in the event of any one of the compartments being damaged or failing to inflate, the intact compartments shall be able to support, with positive freeboard over the liferaft's entire periphery, the number of persons which the liferaft is permitted to accommodate, each having a mass of 75 kg and seated in their normal positions.

(b) The floor of the liferaft shall be waterproof and shall be capable of being sufficiently insulated against cold either:

(i) by means of one or more compartments that the occupants can inflate, or which inflate automatically and can be deflated and re-inflated by the occupants; or

(ii) by other equally efficient means not dependent on inflation.

(c) The liferaft shall be inflated with a non-toxic gas. Inflation shall be completed within a period of 1 min at an ambient temperature of between 18°C and 20°C and within a period of 3 min at an ambient temperature of -30°C. After inflation, the liferaft shall maintain its form when loaded with its full complement of persons and equipment.

(d) Each inflatable compartment shall be capable of withstanding a pressure equal to at least three times the working pressure and shall be prevented from reaching a pressure exceeding twice the working pressure either by means of relief valves or by a limited gas supply. Means shall be provided for fitting the topping-up pump or bellows required by paragraph (10)(a)(ii) so that the working pressure can be maintained.

(3) Carrying capacity of inflatable liferafts

The number of persons which a liferaft shall be permitted to accommodate shall be equal to the lesser of:

(i) the greatest whole number obtained by dividing by 0.096 the volume, measured in cubic metres, of the main buoyancy tubes (which for this purpose shall include neither the arches nor the thwarts, if fitted) when inflated; or

(ii) the greatest whole number obtained by dividing by 0.372 the inner horizontal cross-sectional area of the liferaft measured in square metres (which for this purpose may include the thwart or thwarts, if fitted) measured to the innermost edge of the buoyancy tubes; or

(iii) the number of persons having an average mass of 75 kg all wearing lifejackets, that can be seated with sufficient comfort and headroom without interfering with the operation of any of the liferaft's equipment.

(4) Access into inflatable liferafts

(a) At least one entrance shall be fitted with a semi-rigid boarding ramp to enable persons to board the liferaft from the sea so arranged as to prevent significant deflation of the liferaft if the ramp is damaged. In the case of a davit-launched liferaft having more than one entrance, the boarding ramp shall be fitted at the entrance opposite the bowsing lines and embarkation facilities.

(b) Entrances not provided with a boarding ramp shall have a boarding ladder, the lowest step of which shall be situated not less than 0.4 m below the liferaft's light waterline.

(c) There shall be means inside the liferaft to assist persons to pull themselves into the liferaft from the ladder.

(5) Stability of inflatable liferafts

(a) Every inflatable liferaft shall be so constructed that, when fully inflated and floating with the canopy uppermost, it is stable in a seaway.

(b) The stability of the liferaft when in the inverted position shall be such that it can be righted in a seaway and in calm water by one person.

(c) The stability of the liferaft when loaded with its full complement of persons and equipment shall be such that it can be towed at speeds of up to 3 knots in calm water.

(6) Inflatable liferaft fittings

(a) The breaking strength of the painter system including its means of attachment to the liferaft, except the weak link required by regulation 20(6)(b), shall be not less than 10 kN for a liferaft permitted to accommodate nine persons or

more, and not less than 7.5 kN for any other liferaft. The liferaft shall be capable of being inflated by one person.

(b) A manually controlled lamp visible on a dark night with a clear atmosphere at a distance of at least 2 miles for a period of not less than 12 h shall be fitted to the top of the liferaft canopy. If it is a flashing light, it shall flash at a rate of not less than 50 flashes per minute for the first 2 h of operation of the 12-hour operating period. The lamp shall be powered by a sea-activated cell or a dry chemical cell and shall light automatically when the liferaft inflates. The cell shall be of a type that does not deteriorate due to damp or humidity in the stowed liferaft.

(c) A manually controlled lamp shall be fitted inside the liferaft capable of continuous operation for a period of at least 12 h. It shall light automatically when the liferaft inflates and be of sufficient intensity to enable reading of survival and equipment instructions.

(7) Containers for inflatable liferafts

(a) The liferaft shall be packed in a container that is:

(i) so constructed as to withstand hard wear under conditions encountered at sea;

(ii) of sufficient inherent buoyancy, when packed with the liferaft and its equipment, to pull the painter from within and to operate the inflation mechanism should the vessel sink;

(iii) as far as practicable watertight, except for drain holes in the container bottom.

(b) The liferaft shall be packed in its container in such a way as to ensure, as far as possible, that the waterborne liferaft inflates in an upright position on breaking free from its container.

(c) The container shall be marked with:

(i) maker's name or trade mark;

(ii) serial number;

(iii) name of approving authority and the number of persons it is permitted to carry;

(iv) SFV;[41]

(v) type of emergency pack enclosed;

(vi) date when last serviced;

[41] Inflatable liferafts complying with section 4.3 of the *International Life-Saving Appliance (LSA) Code*, adopted by the Maritime Safety Committee of the Organization by resolution MSC.48(66), as amended, and marked SOLAS A are fully equivalent to the liferafts described in this regulation, and may be accepted as fully equivalent to liferafts marked SFV.

(vii) length of painter;

(viii) maximum permitted height of stowage above waterline (depending on drop-test height and length of painter);

(ix) launching instructions.

(8) Markings on inflatable liferafts

The liferaft shall be marked with:

(i) maker's name or trade mark;

(ii) serial number;

(iii) date of manufacture (month and year);

(iv) name of approving authority;

(v) name and place of servicing station where it was last serviced;

(vi) number of persons it is permitted to accommodate over each entrance in characters not less than 100 mm in height of a colour contrasting with that of the liferaft.

(9) Davit-launched inflatable liferafts

(a) In addition to complying with the above requirements, a liferaft for use with an approved launching appliance shall, when suspended from its lifting hook or bridle, withstand a load of:

(i) 4 times the mass of its full complement of persons and equipment, at an ambient temperature and a stabilized liferaft temperature of 20±3°C with all relief valves inoperative; and

(ii) 1.1 times the mass of its full complement of persons and equipment at an ambient temperature and a stabilized liferaft temperature of -30°C with all relief valves operative.

(b) Rigid containers for liferafts to be launched by a launching appliance shall be so secured that the container or parts of it are prevented from falling into the sea during and after inflation and launching of the contained liferaft.

(10) Additional equipment for inflatable liferafts

(a) In addition to the equipment required by regulation 20(5), every inflatable liferaft shall be provided with:

(i) one repair outfit for repairing punctures in buoyancy compartments;

(ii) one topping-up pump or bellows.

(b) The knives required by regulation 20(5)(a)(ii) shall be safety knives.

Regulation 22
Rigid liferafts

(1) Rigid liferafts shall comply with the requirements of regulation 20 and, in addition, shall comply with the requirements of this regulation.

(2) Construction of rigid liferafts

(a) The buoyancy of the liferaft shall be provided by approved inherently buoyant material placed as near as possible to the periphery of the liferaft. The buoyant material shall be fire-retardant or be protected by a fire-retardant covering.

(b) The floor of the liferaft shall prevent the ingress of water and shall effectively support the occupants out of the water and insulate them from cold.

(3) Carrying capacity of rigid liferafts

The number of persons which a liferaft shall be permitted to accommodate shall be equal to the lesser of:

(i) the greatest whole number obtained by dividing by 0.096 the volume, measured in cubic metres, of the buoyancy material multiplied by a factor of 1 minus the specific gravity of that material; or

(ii) the greatest whole number obtained by dividing by 0.372 the horizontal cross-sectional area of the floor of the liferaft measured in square metres; or

(iii) the number of persons having an average mass of 75 kg all wearing lifejackets, that can be seated with sufficient comfort and headroom without interfering with the operation of any of the liferaft's equipment.

(4) Access into rigid liferafts

(a) At least one entrance shall be fitted with a rigid boarding ramp to enable persons to board the liferaft from the sea. In the case of a davit-launched liferaft having more than one entrance, the boarding ramp shall be fitted at the entrance opposite to the bowsing and embarkation facilities.

(b) Entrances not provided with a boarding ramp shall have a boarding ladder, the lowest step of which shall be situated not less than 0.4 m below the liferaft's light waterline.

(c) There shall be means inside the liferaft to assist persons to pull themselves into the liferaft from the ladder.

(5) Stability of rigid liferafts

(a) Unless the liferaft is capable of operating safely whichever way up it is floating, its strength and stability shall be such that it is either self-righting or can be readily righted in a seaway and in calm water by one person.

(b) The stability of the liferaft when loaded with its full complement of persons and equipment shall be such that it can be towed at speeds of up to 3 knots in calm water.

(6) Rigid liferaft fittings

(a) The liferaft shall be fitted with an efficient painter. The breaking strength of the painter system, including its means of attachment to the liferaft, except the weak link required by regulation 20(6)(b), shall be not less than 10 kN for liferafts permitted to accommodate nine persons or more, and not less than 7.5 kN for any other liferaft.

(b) A manually controlled lamp visible on a dark night with a clear atmosphere at a distance of at least 2 miles for a period of not less than 12 h shall be fitted to the top of the liferaft canopy. If the light is a flashing light, it shall flash at a rate of not less than 50 flashes per minute for the first 2 h of operation of the 12-hour operating period. The lamp shall be powered by a sea-activated cell or a dry chemical cell and shall light automatically when the liferaft canopy is set in place. The cell shall be of a type that does not deteriorate due to damp or humidity in the stowed liferaft.

(c) A manually controlled lamp shall be fitted inside the liferaft, capable of continuous operation for a period of at least 12 h. It shall light automatically when the canopy is set in place and be of sufficient intensity to enable reading of survival and equipment instructions.

(7) Markings on rigid liferafts

The liferafts shall be marked with:

(i) name and port of registry of the vessel to which it belongs;

(ii) maker's name or trade mark;

(iii) serial number;

(iv) name of approving authority;

(v) number of persons it is permitted to accommodate over each entrance in characters not less than 100 mm in height of a colour contrasting with that of the liferaft;

(vi) SFV;[42]

(vii) type of emergency pack enclosed;

[42] Rigid liferafts complying with chapter IV, section 4.3 of the *International Life-Saving Appliance (LSA) Code*, adopted by the Maritime Safety Committee of the Organization by resolution MSC.48(66), as amended, and marked SOLAS A are fully equivalent to the liferafts described in this regulation and may be accepted as fully equivalent to liferafts marked SFV.

(viii) length of painter;

(ix) maximum permitted height of stowage above waterline (drop-test height);

(x) launching instructions.

(8) Davit-launched rigid liferafts

In addition to the above requirements, a rigid liferaft for use with an approved launching appliance shall, when suspended from its lifting hook or bridle, withstand a load of four times the mass of its full complement of persons and equipment.

Regulation 23
Rescue boats

(1) General requirements

(a) Except as provided by this regulation, all rescue boats shall comply with the requirements of regulations 17(1) to 17(7)(d) inclusive and 17(7)(f), 17(7)(g), 17(7)(i), 17(7)(l) and 17(9).

(b) Rescue boats may be either of rigid or inflated construction or a combination of both and shall:

(i) be not less than 3.8 m and not more than 8.5 m in length, except where, owing to the size of the vessel, or for other reasons where the carriage of such boats is considered unreasonable or impracticable, the Administration may accept a rescue boat of a lesser length but not less than 3.3 m;

(ii) be capable of carrying at least five seated persons and a person lying down or, in the case of a rescue boat less than 3.8 m in length, such lesser number as may be determined by the Administration.

(c) The number of persons which a boat shall be permitted to accommodate shall be determined by the Administration.

(d) Rescue boats which are a combination of rigid and inflated construction shall comply with the appropriate requirements of this regulation to the satisfaction of the Administration.

(e) Unless the rescue boat has adequate sheer, it shall be provided with a bow cover extending for not less than 15 per cent of its length.

(f) Rescue boats shall be capable of manoeuvring at speeds up to 6 knots and maintaining that speed for a period of at least 4 h.

(g) Rescue boats shall have sufficient mobility and manoeuvrability in a seaway to enable persons to be retrieved from the water, marshal liferafts and tow the largest liferaft carried on the vessel when loaded with its full complement of persons and equipment or its equivalent at a speed of at least 2 knots.

(h) A rescue boat shall be fitted with an inboard engine or outboard motor. If it is fitted with an outboard motor, the rudder and tiller may form part of the engine. Notwithstanding the requirements of regulation 17(6)(a), petrol-driven outboard engines with an approved fuel system may be fitted in rescue boats, provided the fuel tanks are specially protected against fire and explosion.

(i) Arrangements for towing shall be permanently fitted in rescue boats and shall be sufficiently strong to marshal or tow liferafts as required by paragraph (1)(g).

(j) Rescue boats shall be fitted with weathertight stowage for small items of equipment.

(2) Rescue boat equipment

(a) All items of rescue boat equipment, with the exception of boat-hooks which shall be kept free for fending off purposes, shall be secured within the rescue boat by lashings, storage in lockers or compartments, storage in brackets or similar mounting arrangements, or other suitable means. The equipment shall be secured in such a manner as not to interfere with any launching or recovery procedures. All items of rescue boat equipment shall be as small and of as little mass as possible and shall be packed in suitable and compact form.

(b) The normal equipment of every rescue boat shall consist of:

(i) sufficient buoyant oars or paddles to make headway in calm seas. Thole pins, crutches or equivalent arrangements shall be provided for each oar. Thole pins or crutches shall be attached to the boat by lanyards or chains;

(ii) a buoyant bailer;

(iii) a binnacle containing an efficient compass which is luminous or provided with suitable means of illumination;

(iv) a sea-anchor and tripping line with a hawser of adequate strength not less than 10 m in length;

(v) a painter of sufficient length and strength, attached to the release device complying with the requirements of regulation 17(7)(g) and placed at the forward end of the rescue boat;

(vi) one buoyant line, not less than 50 m in length, of sufficient strength to tow a liferaft as required by paragraph (1)(g);

(vii) one waterproof electric torch suitable for Morse signalling, together with one spare set of batteries and one spare bulb in a waterproof container;

(viii) one whistle or equivalent sound signal;

(ix) a first-aid outfit in a waterproof case capable of being closed tightly after use;

(x) two buoyant rescue quoits, attached to not less than 30 m of buoyant line;

(xi) a searchlight capable of effectively illuminating a light-coloured object at night having a width of 18 m at a distance of 180 m for a total period of 6 h and of working for at least 3 h continuously;

(xii) an efficient radar reflector;

(xiii) thermal protective aids complying with the requirements of regulation 26 sufficient for 10 per cent of the number of persons the rescue boat is permitted to accommodate or two, whichever is the greater.

(c) In addition to the equipment required by paragraph (2)(b), the normal equipment of every rigid rescue boat shall include:

(i) a boat-hook;

(ii) a bucket;

(iii) a knife or hatchet.

(d) In addition to the equipment required by paragraph (2)(b), the normal equipment of every inflated rescue boat shall consist of:

(i) a buoyant safety knife;

(ii) two sponges;

(iii) an efficient manually operated bellows or pump;

(iv) a repair kit in a suitable container for repairing punctures;

(v) a safety boat-hook.

(3) Additional requirements for inflated rescue boats

(a) The requirements of regulations 17(1)(c) and 17(1)(e) do not apply to inflated rescue boats.

(b) An inflated rescue boat shall be constructed in such a way that, when suspended by its bridle or lifting hook:

(i) it is of sufficient strength and rigidity to enable it to be lowered and recovered with its full complement of persons and equipment;

(ii) it is of sufficient strength to withstand a load of 4 times the mass of its full complement of persons and equipment at an ambient temperature of 20±3°C with all relief valves inoperative;

(iii) it is of sufficient strength to withstand a load of 1.1 times the mass of its full complement of persons and equipment at an ambient temperature of -30°C, with all relief valves operative.

(c) Inflated rescue boats shall be so constructed as to be capable of withstanding exposure:

(i) when stowed on an open deck on a vessel at sea;

(ii) for 30 days afloat in all sea conditions.

(d) In addition to complying with the requirements of regulation 17(9), inflated rescue boats shall be marked with a serial number, the maker's name or trade mark and the date of manufacture.

(e) The buoyancy of an inflated rescue boat shall be provided by either a single tube subdivided into at least five separate compartments of approximately equal volume or two separate tubes neither exceeding 60 per cent of the total volume. The buoyancy tubes shall be so arranged that, in the event of any one of the compartments being damaged, the intact compartments shall be able to support the number of persons which the rescue boat is permitted to accommodate, each having a mass of 75 kg, when seated in their normal positions with positive freeboard over the rescue boat's entire periphery.

(f) The buoyancy tubes forming the boundary of the inflated rescue boat shall, on inflation, provide a volume of not less than 0.17 m^3 for each person the rescue boat is permitted to accommodate.

(g) Each buoyancy compartment shall be fitted with a non-return valve for manual inflation and means for deflation. A safety relief valve shall also be fitted, unless the Administration is satisfied that such an appliance is unnecessary.

(h) Underneath the bottom and on vulnerable places on the outside of the inflated rescue boat, rubbing strips shall be provided to the satisfaction of the Administration.

(i) Where a transom is fitted, it shall not be inset by more than 20 per cent of the overall length of the rescue boat.

(j) Suitable patches shall be provided for securing the painters fore and aft and the becketed lifelines inside and outside the boat.

(k) The inflated rescue boat shall be maintained at all times in a fully inflated condition.

Regulation 24
Lifejackets

(1) General requirements for lifejackets

(a) A lifejacket shall not sustain burning or continue melting after being totally enveloped in a fire for a period of 2 s.

(b) A lifejacket shall be so constructed that:

(i) after demonstration, a person can correctly don it within a period of 1 min without assistance;

(ii) it is capable of being worn inside-out or is clearly capable of being worn in only one way and, as far as possible, cannot be donned incorrectly;

(iii) it is comfortable to wear;

(iv) it allows the wearer to jump from a height of at least 4.5 m into the water without injury and without dislodging or damaging the lifejacket.

(c) A lifejacket shall have sufficient buoyancy and stability in calm fresh water to:

(i) lift the mouth of an exhausted or unconscious person not less than 120 mm clear of the water with the body inclined backwards at an angle of not less than 20° and not more than 50° from the vertical position;

(ii) turn the body of an unconscious person in the water from any position to one where the mouth is clear of the water in not more than 5 s.

(d) A lifejacket shall have buoyancy which is not reduced by more than 5 per cent after 24 h submersion in fresh water.

(e) A lifejacket shall allow the person wearing it to swim a short distance and to board a survival craft.

(f) Each lifejacket shall be fitted with a whistle firmly secured by a cord.

(2) Inflatable lifejackets

A lifejacket which depends on inflation for buoyancy shall have not less than two separate compartments and comply with the requirements of paragraph (1) and shall:

(i) inflate automatically on immersion, be provided with a device to permit inflation by a single manual motion and be capable of being inflated by mouth;

(ii) in the event of loss of buoyancy in any one compartment be capable of complying with the requirements of paragraphs (1)(b), (c) and (e);

(iii) comply with the requirements of paragraph (1)(d) after inflation by means of the automatic mechanism.

(3) Lifejacket lights

(a) Each lifejacket shall have a light which shall:

(i) have a luminous intensity of not less than 0.75 cd;

(ii) have a source of energy capable of providing a luminous intensity of 0.75 cd for a period of at least 8 h;

(iii) be visible over as great a segment of the upper hemisphere as is practicable when attached to a lifejacket.

(b) If the light referred to in paragraph (3)(a) is a flashing light, it shall, in addition:

(i) be provided with a manually operated switch;

(ii) not be fitted with a lens or curved reflector to concentrate the beam;

(iii) flash at a rate of not less than 50 flashes per minute with an effective luminous intensity of at least 0.75 cd.

Regulation 25
Immersion suits

(1) General requirements for immersion suits

(a) The immersion suit shall be constructed with waterproof materials such that:

(i) it can be unpacked and donned without assistance within 2 min taking into account any associated clothing, and a lifejacket if the immersion suit is to be worn in conjunction with a lifejacket;

(ii) it will not sustain burning or continue melting after being totally enveloped in a fire for a period of 2 s;

(iii) it will cover the whole body with the exception of the face. Hands shall also be covered, unless permanently attached gloves are provided;

(iv) it is provided with arrangements to minimize or reduce free air in the legs of the suit;

(v) following a jump from a height of not less than 4.5 m into the water, there is no undue ingress of water into the suit.

(b) An immersion suit which also complies with the requirements of regulation 24 may be classified as a lifejacket.

(c) An immersion suit shall permit the person wearing it, and also wearing a lifejacket if the immersion suit is to be worn in conjunction with a lifejacket, to:

(i) climb up and down a vertical ladder at least 5 m in length;

(ii) perform normal duties during abandonment;

(iii) jump from a height of not less than 4.5 m into the water without damaging or dislodging the immersion suit, or being injured;

(iv) swim a short distance through the water and board a survival craft.

(d) An immersion suit which has buoyancy and is designed to be worn without a lifejacket shall be fitted with a light complying with the requirements of regulation 24(3) and the whistle prescribed by regulation 24(1)(f).

(e) If the immersion suit is to be worn in conjunction with a lifejacket, the lifejacket shall be worn over the immersion suit. A person wearing such an immersion suit shall be able to don a lifejacket without assistance.

(2) Thermal performance requirements for immersion suits

(a) An immersion suit made of material which has no inherent insulation shall be:

(i) marked with instructions that it must be worn in conjunction with warm clothing;

(ii) so constructed that, when worn in conjunction with warm clothing and with a lifejacket if the immersion suit is to be worn with a lifejacket, the immersion suit continues to provide sufficient thermal protection following one jump by the wearer into the water from a height of 4.5 m to ensure that, when it is worn for a period of 1 h in calm circulating water at a temperature of 5°C, the wearer's body core temperature does not fall more than 2°C.

(b) An immersion suit made of material with inherent insulation when worn either on its own or with a lifejacket, if the immersion suit is to be worn in conjunction with a lifejacket, shall provide the wearer with sufficient thermal insulation following one jump into the water from a height of 4.5 m to ensure that the wearer's body core temperature does not fall more than 2°C after a period of 6 h immersion in calm circulating water at a temperature of between 0°C and 2°C.

(c) The immersion suit shall permit the person wearing it with hands covered to pick up a pencil and write after being immersed in water at 5°C for a period of 1 h.

(3) Buoyancy requirements

A person in fresh water wearing either an immersion suit complying with the requirements of regulation 24 or an immersion suit with a lifejacket shall be able to turn from a face-down to a face-up position in not more than 5 s.

Regulation 26
Thermal protective aids

(1) A thermal protective aid shall be made of waterproof material having a thermal conductivity of not more than 0.25 W/m.K and shall be so constructed that, when used to enclose a person, it shall reduce both the convective and evaporative heat loss from the wearer's body.

(2) The thermal protective aid shall:

(i) cover the whole body of a person wearing a lifejacket with the exception of the face. Hands shall also be covered, unless permanently attached gloves are provided;

(ii) be capable of being unpacked and easily donned without assistance in a survival craft or rescue boat;

(iii) permit the wearer to remove it in the water in not more than 2 min, if it impairs ability to swim.

(3) The thermal protective aid shall function properly throughout an air temperature range -30°C to +20°C.

Regulation 27
Lifebuoys

(1) Lifebuoy specification

Every lifebuoy shall:

(i) have an outer diameter of not more than 800 mm and an inner diameter of not less than 400 mm;

(ii) be constructed of inherently buoyant material; it shall not depend upon rushes, cork shavings or granulated cork, any other loose granulated material or any air compartment which depends on inflation for buoyancy;

(iii) be capable of supporting not less than 14.5 kg of iron in fresh water for a period of 24 h;

(iv) have a mass of not less than 2.5 kg;

(v) not sustain burning or continue melting after being totally enveloped in a fire for a period of 2 s;

(vi) be constructed to withstand a drop into the water from the height at which it is stowed above the waterline in the lightest seagoing condition or 30 m, whichever is the greater, without impairing either its operating capability or that of its attached components;

(vii) if it is intended to operate the quick-release arrangement provided for the self-activated smoke signals and self-igniting lights, have a

mass sufficient to operate the quick-release arrangement or 4 kg, whichever is the greater;

(viii) be fitted with a grabline not less than 9.5 mm in diameter and not less than four times the outside diameter of the body of the buoy in length. The grabline shall be secured at four equidistant points around the circumference of the buoy to form four equal loops.

(2) Lifebuoy self-igniting lights

Self-igniting lights required by regulation 10(2) shall:

(i) be such that they cannot be extinguished by water;

(ii) be capable of either burning continuously with a luminous intensity of not less than 2 cd in all directions of the upper hemisphere or flashing (discharge flashing) at a rate of not less than 50 flashes per minute with at least the corresponding effective luminous intensity;

(iii) be provided with a source of energy capable of meeting the requirement of subparagraph (ii) for a period of at least 2 h;

(iv) be capable of withstanding the drop test required by paragraph (1)(vi).

(3) Lifebuoy self-activating smoke signals

Self-activating smoke signals required by regulation 10(3) shall:

(i) emit smoke of a highly visible colour at a uniform rate for a period of at least 15 min when floating in calm water;

(ii) not ignite explosively or emit any flame during the entire smoke emission time of the signal;

(iii) not be swamped in a seaway;

(iv) continue to emit smoke when fully submerged in water for a period of at least 10 s;

(v) be capable of withstanding the drop test required by paragraph (1)(vi).

(4) Buoyant lifelines

Buoyant lifelines required by regulation 10(4) shall;

(i) be non-kinking;

(ii) have a diameter of not less than 8 mm;

(iii) have a breaking strength of not less than 5 kN.

Regulation 28
Line-throwing appliances

(1) Every line-throwing appliance shall:

(i) be capable of throwing a line with reasonable accuracy;

(ii) include not less than four projectiles each capable of carrying the line at least 230 m in calm weather;

(iii) include not less than four lines each having a breaking strength of not less than 2kN;

(iv) have brief instructions or diagrams clearly illustrating the use of the line-throwing appliance.

(2) The rocket, in the case of a pistol-fired rocket, or the assembly, in the case of an integral rocket and line, shall be contained in a water-resistant casing. In addition, in the case of a pistol-fired rocket, the line and rockets together with the means of ignition shall be stowed in a container which provides protection from the weather.

Regulation 29
Rocket parachute flares

(1) The rocket parachute flare shall:

(i) be contained in a water-resistant casing;

(ii) have brief instructions or diagrams clearly illustrating the use of the rocket parachute flare printed on its casing;

(iii) have integral means of ignition;

(iv) be so designed as not to cause discomfort to the person holding the casing when used in accordance with the manufacturer's operating instructions.

(2) The rocket shall, when fired vertically, reach an altitude of not less than 300 m. At or near the top of its trajectory, the rocket shall eject a parachute flare which shall:

(i) burn with a bright red colour;

(ii) burn uniformly with an average luminous intensity of not less than 30,000 cd;

(iii) have a burning period of not less than 40 s;

(iv) have a rate of descent of not more than 5 m/s;

(v) not damage its parachute or attachments while burning.

Regulation 30
Hand flares

(1) The hand flare shall:

(i) be contained in a water-resistant casing;

(ii) have brief instructions or diagrams clearly illustrating the use of the hand flare printed on its casing;

(iii) have a self-contained means of ignition;

(iv) be so designed as not to cause discomfort to the person holding the casing and not endanger the survival craft by burning or glowing residues when used in accordance with the manufacturer's operating instructions.

(2) The hand flare shall:

(i) burn with a bright red colour;

(ii) burn uniformly with an average luminous intensity of not less than 15,000 cd;

(iii) have a burning period of not less than 1 min;

(iv) continue to burn after having been immersed for a period of 10 s under 100 mm of water.

Regulation 31
Buoyant smoke signals

(1) The buoyant smoke signal shall:

(i) be contained in a water-resistant casing;

(ii) not ignite explosively when used in accordance with the manufacturer's operating instructions;

(iii) have brief instructions or diagrams clearly illustrating the use of the buoyant smoke signal printed on its casing.

(2) The buoyant smoke signal shall:

(i) emit smoke of a highly visible colour at a uniform rate for a period of not less than 3 min when floating in calm water;

(ii) not emit any flame during the entire smoke emission time;

(iii) not be swamped in a seaway;

(iv) continue to emit smoke when submerged in water for a period of 10 s under 100 mm of water.

Regulation 32
Launching and embarkation appliances

(1) General requirements

(a) Each launching appliance together with all its lowering and recovery gear shall be so arranged that the fully equipped survival craft or rescue boat it serves can be safely lowered against a trim of up to 10° and a list of up to 20° either way:

(i) when boarded by its full complement of persons;

(ii) without persons in the survival craft or rescue boat.

(b) A launching appliance shall not depend on any means other than gravity or stored mechanical power which is independent of the vessel's power supplies to launch the survival craft or rescue boat it serves in the fully loaded and equipped condition and also in the light condition.

(c) A launching mechanism shall be so arranged that it may be actuated by one person from a position on the vessel's deck, and from a position within the survival craft or rescue boat; the survival craft shall be visible to the person on deck operating the launching mechanism.

(d) Each launching appliance shall be so constructed that a minimum amount of routine maintenance is necessary. All parts requiring regular maintenance by the vessel's crew shall be readily accessible and easily maintained.

(e) The winch brakes of a launching appliance shall be of sufficient strength to withstand:

(i) a static test with a proof load of not less than 1.5 times the maximum working load; and

(ii) a dynamic test with a proof load of not less than 1.1 times the maximum working load at maximum lowering speed.

(f) The launching appliance and its attachments other than winch brakes shall be of sufficient strength to withstand a static proof load on test of not less than 2.2 times the maximum working load.

(g) Structural members and all blocks, falls, padeyes, links, fastenings and all other fittings used in connection with launching equipment shall be designed with not less than a minimum factor of safety on the basis of the maximum working load assigned and the ultimate strength of the material used for construction. A minimum factor of safety of 4.5 shall be applied to all davit and winch structural members, and a minimum factor of safety of 6 shall be applied to falls, suspension chains, links and blocks.

(h) Each launching appliance shall, as far as practicable, remain effective under conditions of icing.

(i) A lifeboat launching appliance shall be capable of recovering the lifeboat with its crew.

(j) The arrangements of the launching appliance shall be such as to enable safe boarding of the survival craft in accordance with the requirements of regulations 20(4)(b) and 17(3)(a).

(2) Launching appliances using falls and a winch

(a) Falls shall be of rotation-resistant and corrosion-resistant steel wire rope.

(b) In the case of a multiple drum winch, unless an efficient compensatory device is fitted, the falls shall be so arranged as to wind off the drums at the same rate when lowering, and to wind on to the drums evenly at the same rate when hoisting.

(c) Every rescue boat launching appliance shall be fitted with a powered winch motor of such capacity that the rescue boat can be raised from the water with its full complement of persons and equipment.

(d) An efficient hand gear shall be provided for recovery of each survival craft and rescue boat. Hand gear handles or wheels shall not be rotated by moving parts of the winch when the survival craft or rescue boat is being lowered or when it is being hoisted by power.

(e) Where davit arms are recovered by power, safety devices shall be fitted which will automatically cut off the power before the davit arms reach the stops in order to avoid overstressing the falls or davits, unless the motor is designed to prevent such overstressing.

(f) The speed at which the survival craft or rescue boat is lowered into the water shall be not less than that obtained from the formula:

$$S = 0.4 + 0.02H$$

where:

S = speed of lowering, in metres per second; and
H = height, in metres, from davit head to the waterline in the lightest seagoing condition.

(g) The maximum lowering speed shall be established by the Administration having regard to the design of the survival craft or rescue boat, the protection of its occupants from excessive forces, and the strength of the launching arrangements taking into account inertia forces during an emergency stop. Means shall be incorporated in the appliance to ensure that this speed is not exceeded.

(h) Every rescue boat launching appliance shall be capable of hoisting the rescue boat when loaded with its full rescue boat complement of persons and equipment at a rate of not less than 0.3 m/s.

(i) Every launching appliance shall be fitted with brakes capable of stopping the descent of the survival craft or rescue boat and holding it securely when

loaded with its full complement of persons and equipment; brake pads shall, where necessary, be protected from water and oil.

(j) Manual brakes shall be so arranged that the brake is always applied, unless the operator, or a mechanism activated by the operator, holds the brake control in the "off" position.

(3) Float-free launching

Where a survival craft requires a launching appliance and is also designed to float free, the float-free release of the survival craft from its stowed position shall be automatic.

(4) Free-fall launching

Every free-fall launching appliance using an inclined plane shall, in addition to complying with the applicable requirements of paragraph (1), also comply with the following requirements:

(i) the launching appliance shall be so arranged that excessive forces are not experienced by the occupants of the survival craft during launching;

(ii) the launching appliance shall be a rigid structure with a ramp angle and length sufficient to ensure that the survival craft effectively clears the vessel;

(iii) the launching appliance shall be efficiently protected against corrosion and be so constructed as to prevent incendive friction or impact sparking during the launching of the survival craft.

(5) Evacuation-slide launching and embarkation

Every evacuation-slide launching appliance shall, in addition to complying with the applicable requirements of paragraph (1), also comply with the following requirements:

(i) the evacuation slide shall be capable of being deployed by one person at the embarkation station;

(ii) the evacuation slide shall be capable of being used in high winds and in a seaway.

(6) Liferaft launching appliances

Every liferaft launching appliance shall comply with the requirements of paragraphs (1) and (2), except with regard to use of gravity for turning out the appliance, embarkation in the stowed position and recovery of the loaded liferaft. The launching appliance shall be so arranged as to prevent premature release during lowering and shall release the liferaft when waterborne.

(7) Embarkation ladders

(a) Handholds shall be provided to ensure a safe passage from the deck to the head of the ladder and vice versa.

(b) The steps of the ladder shall be:

(i) made of hardwood, free from knots or other irregularities, smoothly machined and free from sharp edges and splinters, or of suitable material of equivalent properties;

(ii) provided with an efficient non-slip surface either by longitudinal grooving or by the application of an approved non-slip coating;

(iii) not less than 480 mm long, 115 mm wide and 25 mm in depth, excluding any non-slip surface or coating;

(iv) equally spaced not less than 300 mm or more than 380 mm apart and secured in such a manner that they will remain horizontal.

(c) The side ropes of the ladder shall consist of two uncovered manila ropes not less than 65 mm in circumference on each side. Each rope shall be continuous with no joints below the top step. Other materials may be used, provided the dimensions, breaking strain, weathering, stretching and gripping properties are at least equivalent to those of manila rope. All rope ends shall be secured to prevent unravelling.

CHAPTER VIII

EMERGENCY PROCEDURES, MUSTERS AND DRILLS

Regulation 1
Application

Regulations of this chapter shall apply to new and existing vessels of 24 m in length and over.

Regulation 2
General emergency alarm system, muster list and emergency instructions

(1) The general emergency alarm system shall be capable of sounding the general alarm signal consisting of seven or more short blasts followed by one long blast on the vessel's whistle or siren and, additionally, on an electrically operated bell or klaxon or other equivalent warning system which shall be powered from the vessel's main supply and the emergency source of electrical power required by regulation IV/17.

(2) All vessels shall be provided with clear instructions for each crew member, which shall be followed in case of emergency.

(3) The muster list shall be posted up in several parts of the vessel and, in particular, in the wheelhouse, the engine-room and in the crew accommodation and shall include the information specified in the following paragraphs.

(4) The muster list shall specify details of the general alarm signal prescribed by paragraph (1) and also the action to be taken by the crew when this alarm is sounded. The muster list shall also specify how the order to abandon ship will be given.