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Merchant Shipping (Nonconvention Ships) Safety Regulations

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MERCHANT SHIPPING ACT (CHAPTER 179, SECTION 143)

MERCHANT SHIPPING (NON-CONVENTION SHIPS) SAFETY REGULATIONS

ARRANGEMENT OF REGULATIONS The Schedules

[23rd April 1982]

CHAPTER I

GENERAL PROVISIONS

Regulation 1

Citation

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

Regulation 2

Application

(1) Unless otherwise expressly provided, these Regulations shall apply to the following cargo ships:

- (a) cargo ships of less than 500 tonnes propelled by mechanical means engaged on international voyages;
- (b) barges of any tonnage engaged on international voyages; and
- (c) tankers of any tonnage engaged on 30-mile limit voyages or plying within the port.
- (2) These Regulations shall not apply to
 - (a) ships of war and troop ships;
 - (b) wooden ships of primitive build such as dhows, junks, etc.;
 - (c) pleasure yachts not engaged in trade;
 - (d) fishing vessels; and
 - (e) Government vessels not used for commercial services.

Regulation 3

Definitions

In these Regulations, unless the context othewise requires —

"approved" means approved by the Director;

- "barge" means a cargo ship of any tonnage not propelled by mechanical means;
- "breadth (B)" means the maximum breadth of the ship, measured amidships to the moulded line of the frame in a ship with a metal shell and to the outer surface of the hull in a ship with a shell of any other material;

"Certifying Authority" means the Director of Marine and any other organisation authorised by the Minister under the Merchant Shipping (Authorised Organisations) Regulations 1996 [G.N. No. S 44/96];

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"control station" means the spaces in which the ship's radio or main navigation equipment or the emergency source of power is located, or where the fire recording or fire control equipment is centralised;

"depth (D)" means the vertical distance measured amidships from the keel line to the top of the freeboard deck beam at side except that —

- (*a*) in vessels having rounded gunwales, the depth shall be measured to the point of intersection of the moulded lines of the deck and side shell plating, the lines extending as though the gunwale were of angular design;
- (*b*) where the freeboard deck is stepped and the raised part of the deck extends over the point at which the depth is to be determined, the depth shall be measured to a line of reference extending from the lower part of the deck along a line parallel with the raised part;

"existing ship" means a ship which is not a new ship;

- "fishing vessel" means a vessel used for catching fish, whales, seals, walrus or other living resources of the sea;
- "fuel oil unit" means the equipment used for the preparation of fuel oil for delivery to an oil-fired boiler, or equipment used for the preparation of oil for delivery to an internal combustion engine, and includes any oil pressure pumps, filters and heaters dealing with oil at a pressure greater than 0.18 newtons per square millimetre;
- "international voyage" means a voyage from Singapore to a port or place outside Singapore, or conversely, or between two ports or places which are outside Singapore;

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"length (L)" in relation to a ship means 96% of the total length on a waterline at 85% of the least depth measured from the keel line, or as the length from the foreside of the stem to the axis of the rudder stock on that waterline, if that be greater. In ships designed with rake of keel the waterline on which this length is measured shall be parallel to the designed waterline;

"machinery spaces of Category A" means those spaces (including trunks to such spaces) which contain —

- (*a*) internal combustion type machinery used for main propulsion or for other purposes where such machinery has in the aggregate a total power output of not less than 375 kilowatts; or
- (b) any oil-fired boiler or fuel oil unit;
- "machinery spaces" means those machinery spaces of Category A and all other spaces containing propulsion machinery, boilers, fuel oil units, steam and internal combustion engines, generators, steering gear, major electrical machinery, oil filling stations, refrigerating, stabilising, ventilating and air conditioning machinery and similar spaces and trunks to such spaces;
- "new ship" means a ship the keel of which is laid or which is at a similar stage of construction on or after 23rd April 1982;
- "off-shore supply vessel" means a cargo ship propelled by mechanical means
 - (*a*) whose primary use is the transport of stores, materials and equipment to off-shore installations and which may also be used for the laying of anchors, towage of off-shore installations; and
 - (b) which is designed with accommodation and bridge erections in the forward part of the vessel and an exposed cargo deck in the after part for the handling of cargo at sea;
- "service barge" means a barge especially designed (or suitably converted), fitted out or equipped to operate wholly or generally as a dredger, hopper dredger, sand carrier, hopper barge, reclamation craft or crane barge;

"tonnes" means tonnes gross tonnage;

- "tanker" means a cargo ship constructed or adapted for the carriage in bulk of liquid cargoes of a flammable nature;
- "30-mile limit voyage" means a voyage which does not extend beyond 20 miles from the nearest land and 30 miles from the port limit.

Regulation 4

Exemptions

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

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(2) The Director may, either absolutely or subject to such conditions as he thinks fit, exempt from any of the provisions of these Regulations any ship to which these Regulations apply, if he is satisfied that compliance with that provision is either impracticable or unreasonable in view of the distance of the ship's area of operation from its base port, the type of ship, the weather conditions and the absence of general navigational hazards, provided that it complies with such other requirements which, in the opinion of the Director, are adequate for the service for which it is intended.

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Regulation 5

Standard

The construction, installation, structural strength, fittings, materials, appliances and apparatus unless expressly provided by these Regulations shall be of a standard acceptable to the Certifying Authority.

Regulation 6

Alterations and Modifications

Alterations and modifications of a major character and outfitting related thereto shall meet the requirements prescribed for a new ship to such extent as the Director thinks reasonable and practicable.

Regulation 7

Surveys

- (1) Every cargo ship shall be subjected to the surveys specified below:
 - (a) An initial survey before the ship is put into service or before the certificate required under regulation 8 is issued for the first time, which shall include a complete survey of its —

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- (i) structure, stability, machinery, arrangements and materials, including outside the ship's hull and inside and outside of the boiler and equipment. This survey shall be such as to ensure the arrangements, materials and scantlings of the structure, boiler and other pressure vessels and their appurtenances, main and auxiliary machinery, electrical installations, compasses and other equipment fully comply with these Regulations;
- (ii) life-saving appliances, fire-detection and extinguishing systems and the lights and means of making sound signals and distress signals, required by these Regulations and the Merchant Shipping (Prevention of Collisions at Sea) Regulations [Rg 10]. Where pilot ladders are carried, these shall also be surveyed to ensure that they are in a safe working condition and comply with the relevant requirements of these Regulations; and
- (iii) radio installations, portable radio apparatus for survival craft and emergency position indicating radio beacon (EPIRB).
- (b) Periodical surveys at intervals specified below
 - (i) 4 years in the case of structure and machinery of the ship referred to in Chapters II-1 and II-2 except that the period may be extended for one year subject to the ship being surveyed internally or externally as far as it is reasonable and practicable;
 - (ii) two years in the case of the equipment of the ship referred to in Chapters II-2 and III; and
 - (iii) one year in the case of the radio installations.

The survey shall be such as to ensure that the items referred to in sub-paragraph (a), in particular the safety equipment, fully comply with the applicable requirements of these Regulations, that the equipment is in good working order and that the stability information is readily available on board. However, where the duration of the certificate issued under regulation 8 is extended under regulation 10(3), the interval of the periodical survey may be extended correspondingly.

(c) Intermediate surveys in the case of the structure or machinery and equipment of the ship at intervals specified by the Certifying Authority. The survey shall be such as to ensure that alterations which would adversely affect the safety of the ship or the crew have not been made.

(2) After any survey of the ship under this regulation has been completed, no significant change shall be made to the structure, equipment, fittings, arrangements or material covered by the survey without the permission of the Director, except the direct replacement of such equipment or fittings.

Regulation 8

Issue of Certificates

(1) A Cargo Ship Safety Construction Certificate shall be issued to a cargo ship which complies with the relevant requirements of Chapters II-1, II-2 and IV.

(2) A Cargo Ship Safety Equipment Certificate shall be issued to a cargo ship which complies with the relevant requirements of Chapters II-2, III, IV and the Merchant Shipping (Prevention of Collisions at Sea) Regulations [Rg 10].

(3) A Cargo Ship Safety Radiotelephony Certificate shall be issued to a cargo ship fitted with the radiotelephone installation which complies with the requirements of Part B of Chapter IV.

(4) Where a cargo ship is provided with a radiotelegraph installation complying with the requirements of Part B of Chapter IV a Cargo Ship Safety Radiotelegraphy Certificate shall be issued.

(5) A Cargo Ship Exemption Certificate shall be issued to a cargo ship when an exemption is granted to that ship under regulation 4.

(6) The certificates issued under this regulation shall be in the forms set out in the First Schedule.

Regulation 9

Posting up of Certificate

All certificates or certified copies thereof issued under these Regulations shall be posted up in a prominent and accessible place in the ship.

Regulation 10

Validity of Certificates

- (*a*) A Cargo Ship Safety Construction Certificate shall be valid for a period of not more than 60 months.
- (b) A Cargo Ship Safety Equipment Certificate shall be valid for a period of not more than 24 months.
- (c) A Cargo Ship Safety Radiotelephony Certificate or a Cargo Ship Safety Radiotelegraphy Certificate shall be valid for a period of not more than 12 months.

(2) A Cargo Ship Exemption Certificate shall not be valid for a longer period than that of the certificate to which it refers.

(3) If a ship at the time when its certificate expires is not in Singapore, the certificate may be extended by the Director, but such extension shall be granted

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only for the purpose of allowing the ship to complete its voyage to Singapore or a port in which it is to be surveyed, and then only in cases where it appears proper and reasonable to do so.

(4) No certificate shall be thus extended for a longer period than 5 months, and a ship to which such extension is granted shall not, on its arrival in Singapore or the port in which it is to be surveyed, be entitled by virtue of such extension to leave Singapore or that port without having obtained a new certificate.

(5) A certificate which has not been extended under paragraphs (3) and (4) may remain valid for a further period of one month from the date of expiry.

- (6) A certificate shall cease to be valid
 - (*a*) if major alterations have taken place in the construction, equipment, fittings, arrangements, or material required without the permission of the Director;
 - (b) if periodical or intermediate surveys are not carried out within the periods specified under regulation 7(1)(b) and (c); or
 - (c) unless it has been extended in accordance with paragraph (3).

Regulation 11

Carriage of Oil

(1) No oil shall be carried in tanks or spaces of any cargo ship which are not approved by the Certifying Authority for such purposes.

(2) Notwithstanding paragraph (1) no oil or other liquid substances flammable or harmful to the marine environment shall be carried in the forepeak tank of a ship.

Regulation 12

Safety Convention Regulations

Unless otherwise expressly provided, the Merchant Shipping (Safety Convention) Regulations [Rg 11] shall not apply to ships to which these Regulations apply.

Regulation 13

Penalty

- (1) The owner and the master of a ship to which these Regulations apply shall
 - (a) comply with these Regulations in respect of any matter that is governed thereby; and

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

(2) Any owner or master who contravenes paragraph (1) shall be guilty of an offence and shall be liable on conviction to a fine not exceeding \$10,000 and the ship may be detained.

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CHAPTER II-1

CONSTRUCTION, EQUIPMENT, STABILITY, MACHINERY AND ELECTRICAL INSTALLATION AND PERIODICALLY UNATTENDED MACHINERY SPACES

Part A – GENERAL

Regulation 1

Definitions

For the purposes of this Chapter —

- "superstructure" means the decked structure on the freeboard deck extending from side to side of the ship or with the side plating not being inboard of the shell plating more than 0.04B;
- "watertight" means capable of preventing the passage of water through the structure in any direction under a head of water for which the surrounding structure is designed;
- "weathertight" means that in any sea condition water will not penetrate into the vessel.

Part B — CONSTRUCTION AND EQUIPMENT

Regulation 2

Application

This Part shall apply to all ships except regulations 3(2) to (5) and 6 which apply only to new ships.

Regulation 3

Construction

(1) The strength and construction of hull, superstructures, deckhouses, machinery casings, companion ways and any other structure and equipment shall be sufficient to withstand all foreseeable conditions of the intended service.

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(2) All ships propelled by mechanical means shall be fitted with a collision bulkhead and with watertight bulkheads bounding the machinery spaces. Such bulkheads shall be extended up to the freeboard deck. In ships constructed of wood such bulkheads shall as far as practicable be watertight.

(3) Pipes piercing the collision bulkhead shall be fitted with suitable valves operable from above the freeboard deck and the valve chest shall be secured at the collision bulkhead inside the forepeak. No door, manhole, ventilation duct or any other opening shall be fitted in the collision bulkhead below the freeboard deck.

(4) Where a long forward superstructure is fitted, the collision bulkhead shall be extended weathertight to the deck above the freeboard deck. The extension need not be fitted directly over the bulkhead below provided it is located within the limits specified by the Certifying Authority for such bulkhead and the part of the deck which forms the step is effectively weathertight.

(5) The number of openings in the collision bulkhead above the freeboard deck shall be reduced to the minimum compatible with the design and normal operation of the ship. Such openings shall be capable of being closed weathertight.

(6) No doors, manholes or access openings shall be provided in the collision bulkhead below the freeboard deck.

Regulation 4

Chain Locker

(1) In every ship where the chain locker is located abaft the collision bulkhead or extends into the forepeak tank it shall be watertight and provided with efficient means of drainage.

(2) A chain locker shall not be used for any purpose other than stowage of anchor chain cables.

Regulation 5

Protection of Wood

In every ship the hull of which is constructed of wood, metal trays shall be fitted under the auxiliary engines, main engines and fuel tanks to allow any spillage to drain to a safe place.

Regulation 6

Watertight Doors

(1) The number of openings in watertight bulkheads, as required by regulation 3(2) shall be reduced to the minimum compatible with the general arrangements and operational needs of the ship. Openings shall be fitted with

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watertight closing appliances to the satisfaction of the Certifying Authority. Watertight doors shall be of an equivalent strength to the adjacent unpierced structure.

(2) In a ship of less than 45 metres in length (L) such doors may be of the hinged type, which shall be capable of being operated locally from either side of the door and shall normally be kept closed while at sea. A notice shall be attached to the door on each side to state that the door shall be kept closed while at sea.

(3) In a ship of 45 metres in length (L) and over, watertight doors shall be of the sliding type in —

- (*a*) spaces where they are opened while the ship is at sea and where their sills are located below the deepest operating waterline, unless the Certifying Authority considers it to be impracticable or unnecessary, taking into account the type and operation of the ship; and
- (b) the lower part of a machinery space where there is access to a shaft tunnel.

(4) Sliding watertight doors shall be capable of being operated when the ship is listed up to 15 degrees either side.

(5) Sliding watertight doors whether manually operated or otherwise shall be capable of being operated locally from either side of the door. In a ship of 45 metres in length (L) and over, these doors shall also be capable of being operated by remote control from an accessible position above the freeboard deck except when the doors are fitted in crew accommodation spaces.

(6) Means shall be provided at remote operating positions to indicate when a sliding door is open or closed.

Regulation 7

Sounding Devices

(1) Sounding devices, to the satisfaction of the Certifying Authority, shall be fitted —

- (*a*) to the bilges of those compartments which are not readily accessible at all times during the voyage; and
- (*b*) to all tanks and cofferdams.

(2) Where sounding pipes are fitted, their upper ends shall be extended to a readily accessible position and, where practicable, above the freeboard deck. Their openings shall be provided with permanently attached means of closing. Sounding pipes which are not extended above the freeboard deck shall be fitted with automatic self-closing devices.

Regulation 8

Anchor and Mooring Equipment

(1) Anchor equipment shall be designed for quick and safe operation and shall consist of anchors, anchor chains or wire ropes, stoppers and a windlass or other arrangements for dropping and hoisting the anchor and for holding the ship at anchor in all foreseeable service conditions. Ships shall also be provided with adequate mooring equipment for safe mooring in all operating conditions.

(2) Fairleads intended for use with the wire rope referred to in paragraph (1) shall be designed to minimise wear and to avoid kinking or other similar damage to the rope.

Regulation 9

Towing and Pushing Arrangement of Tugs

(1) The design of the towing gear shall be such as to minimise the overturning moment due to the lead of the towline. The towing hook shall have a positive means of quick release which can be relied upon to function correctly under all operating conditions. As far as practicable, the release mechanism shall be controlled from the wheelhouse, the after control position (if fitted) and at the hook itself. The local control at the hook should preferably be of the direct mechanical type capable of independent control.

(2) In a tug employed as an inserted pusher for barges, where the tug and barge constitute a compact unit, the tug-barge coupling system shall be capable of being controlled and powered from the tug. Disassembly shall be capable of being made without causing damage to the tug or the barge.

(3) In a pusher tug not employed as inserted pusher, a pushbow shall be fitted and fastening arrangement provided to the satisfaction of the Certifying Authority.

(4) In tugs and barges referred to in paragraphs (2) and (3), adequate reinforcements shall be made in contact areas of the structures of the tug and the barge.

Regulation 10

Safety of Service Barges

(1) This regulation applies only to manned self-propelled and non-self-propelled steel hopper barges, steel dredgers, sand carriers and reclamation craft constructed with their main propulsion machinery and/or sand pumps or dredging machinery (other than grab cranes) placed within the main hull structure and engaged on international voyages.

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(2) The areas of deck which are liable to be subjected to regular heavy impact loads shall have adequate thickness to prevent damage to the deck plating.

(3) Ladder wells of bucket dredgers shall be isolated by cofferdams, the extent and widths of which shall be sufficient to contain any damage to the well side bulkheads or bottom shell plating that could result from the impact of large objects brought up in the dredge buckets. In the way of the buckets, the cofferdam may be extended outboard in the form of a local watertight double bottom. Cofferdams shall have means of access.

(4) In general, bulwarks should not be fitted in the way of open hoppers. Under no circumstance shall bulwarks be fitted in the way of open hoppers where the hopper weirs discharge onto the deck instead of into enclosed overflow trunks.

(5) Bulwarks shall not be fitted in the way of open hatches on sand carriers.

(6) If bulwarks are fitted, freeing ports shall be provided throughout their length and be of sufficient size to permit the immediate overboard discharge of any spoil that may spill out of the hopper in the event of the dredger rolling excessively.

(7) In all cases where damage might be likely, all side scuttles, scuppers and discharges including their valves, controls and indicators are to be well protected. Consideration shall be given to the likelihood of impact damage to scuttles and discharges due to barges coming alongside and to scuppers becoming blocked by sand or other spoil which may spill onto the decks or other areas being drained.

(8) The Certifying Authority may permit relaxation of the requirements of paragraph (7) where the sheltered nature and conditions of the voyage are such as to render the application of these requirements unreasonable or unnecessary.

Regulation 11

Additional Safety Measures Against Capsizing for Off-shore Supply Vessels

(1) Provisions shall be made to ensure that air pipes and ventilators are sited in protected positions in order to avoid damage by cargo during operations, and to minimise the possibility of flooding. Air pipes and ventilators on the exposed cargo and forecastle decks shall be fitted with automatic closing devices.

(2) Any access to the engine room from the exposed cargo deck shall be provided with two weathertight closures. Access to spaces below the exposed cargo deck shall be from a position within or above the superstructure deck.

(3) Hatches, doors and other openings which give access to the cargo deck shall be clearly marked to indicate that these fittings are to be kept closed except during access.

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(4) Vessels engaged in towing operations shall be provided with means for the quick release of the towing hawser.

Part C - STABILITY

Regulation 12

Application

This Part shall apply to all ships propelled by mechanical means engaged on all voyages except for regulations 13 and 14 which apply only to new ships.

Regulation 13

Stability Criteria

The following minimum stability criteria shall be met unless the Certifying Authority is satisfied that operating experience justifies departure therefrom:

- (*a*) the area under the righting lever curve (GZ curve) shall not be less than 0.055 metre-radians up to 30 degrees angle of heel and not less than 0.090 metre-radians up to 40 degrees or the angle of flooding θ_f if this angle is less than 40 degrees. Additionally, the area under the righting lever curve (GZ curve) between the angles of heel of 30 degrees and 40 degrees or between 30 degrees and θ_f , if this angle is less than 40 degrees than 0.030 metre-radians. θ_f is the angle of heel at which openings in the hull, superstructure or deckhouses which cannot rapidly be closed water-tight commence to immerse. In applying this criterion, small openings through which progressive flooding cannot take place need not be considered as open;
- (b) the righting lever GZ shall be at least 200 millimetres at an angle of heel equal to or greater than 30 degrees;
- (c) the maximum righting lever GZ_{max} shall occur at an angle of heel preferably exceeding 30 degrees but not less than 25 degrees; and

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(d) the initial transverse metacentric height GM shall not be less than 150 millimetres.

Regulation 14

Stability criteria for off-shore supply vessels of 24 metres in length (L) and above but not more than 100 metres in length (L)

The off-shore supply vessels whose characteristics render compliance with regulation 13 impossible shall comply with the following criteria unless the Certifying Authority is satisfied that operating experience justifies departure therefrom:

(a) the area under the righting lever curve (GZ curve) shall not be less than 0.070 metre-radians up to 15 degrees angle of heel when the maximum righting lever GZ_{max} occurs at angle of heel of 15 degrees and 0.055 metre-radians up to 30 degrees angle of heel when the maximum righting lever GZ_{max} occurs at angle of heel of 30 degrees and above. Where the maximum righting lever GZ_{max} occurs at angle of heel of heel of heel between 15 degrees and 30 degrees, the corresponding requisite area under the righting lever curve shall be determined by the use of the formula:

Area = 0.055 + 0.001 (30 degrees $-\theta_{max}$)

Where θ_{max} is the angle of heel at which the righting lever curve reaches its maximum;

- (b) the area under the righting lever curve (GZ curve) between the angle of heel of 30 degrees and 40 degrees or between the angle of heel 30 degrees and θ_f if this angle is less than 40 degrees, shall be not less than 0.03 metre-radians;
- (c) the righting lever GZ shall be at least 200 millimetres at an angle of heel equal to or greater than 30 degrees;
- (d) the maximum righting lever GZ_{max} shall occur at an angle of heel not less than 15 degrees; and
- (e) the initial transverse metacentric height GM shall not be less than 150 millimetres.

Regulation 15

Inclining Test

(1) Every ship shall undergo an inclining test upon its completion and the actual displacement and position of the centre of gravity shall be determined for the light ship condition.

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(2) Where alterations are made to a ship affecting its light ship condition and the position of the centre of gravity, the ship shall, if the Certifying Authority considers this necessary, be reinclined and the stability information amended.

(3) The Certifying Authority may allow the inclining test of a ship to be dispensed with provided basic stability data are available from the inclining test of a sister ship and it is shown to the satisfaction of the Certifying Authority that reliable stability information for that ship can be obtained from such basic data.

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

Regulation 16

Stability Information

(1) Suitable stability information shall be supplied to enable the master to assess with ease and certainty the stability of the ship under various operating conditions. Such information shall include specific instructions to the master warning him of those operating conditions which could adversely affect either the stability or the trim of the ship. A copy of the stability information shall be submitted to the Certifying Authority for approval.

(2) The approved stability information shall be kept on board, readily accessible at all times and inspected at the periodical surveys of the ship to ensure that it has been approved.

(3) Where alterations are made to a ship affecting its stability, revised stability calculations shall be prepared and submitted to the Certifying Authority for approval. If the Certifying Authority decides that the stability information must be revised, the new information shall be supplied to the master and the superseded information removed.

(4) Every manned barge assigned with a load line shall be supplied with suitable stability information. The stability criteria used shall agree in principle with the requirements referred to in regulation 13.

Part D - PROTECTION OF THE CREW

Regulation 17

General Protection Measures

(1) Hinged covers of hatchways, manholes and other openings shall be protected against accidental closing. In particular, heavy covers on escape hatches shall be

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equipped with counterweights, and so constructed as to be capable of being opened from either side of the cover.

(2) In every new ship the dimensions of access hatches shall not be less than 600 millimetres by 600 millimetres or 610 millimetres by 280 millimetres or 600 millimetres diameter.

(3) Hand-holds shall be provided over escape openings.

(4) Skylights or other similar openings shall be fitted with protective bars spaced not more than 350 millimetres apart.

(5) The surface of all decks shall be so designed or treated as to minimise the possibility of personnel slipping. In particular, decks of working areas such as in machinery spaces, galleys, at winches and at the foot and head of ladders and in front of doors, shall be provided with anti-skid surfaces.

Regulation 18

Stairways and Ladders

Stairways and ladders of adequate size and strength with handrails and non-slip treads shall be provided.

Part E — MACHINERY AND ELECTRICAL INSTALLATIONS

Regulation 19

Application

This Part, unless otherwise expressly provided, shall apply to all ships propelled by mechanical means engaged on all voyages.

Regulation 20

Definitions

For the purposes of this Part —

- "auxiliary means of activating the rudder" means the equipment which is provided for effecting movement of the rudder for the purpose of steering the ship in the event of failure of the main steering gear;
- "dead ship condition" means the condition under which the main propulsion plant and auxiliaries are not in operation due to the absence of power;
- "main steering gear" means the machinery, the steering gear power units, if any, and ancillary equipment and the means of applying torque to the rudder stock (e.g. tiller or quadrant) necessary for effecting movement of

the rudder for the purpose of steering the ship under normal service conditions;

- "main switchboard" means a switchboard directly supplied by the main source of electrical power and intended to distribute electrical energy;
- "maximum ahead speed" means the greatest speed which the ship is designed to maintain in service at sea at its maximum permissible operating draught;
- "maximum astern speed" means the speed which it is estimated the ship can attain at the designed maximum astern power at its maximum permissible operating draught;
- "periodically unattended machinery spaces" means those spaces containing main propulsion and associated machinery and all sources of main electrical supply which are not at all times manned under all operating conditions, including manoeuvring;

- (a) in the case of electric steering gear, an electric motor and its associated electrical equipment;
- (b) in the case of electro-hydraulic steering gear, an electric motor and its associated electrical equipment and connected pump;
- (c) in the case of other hydraulic steering gear, a driving engine and connected pump.

Regulation 21

General

(1) Main propulsion, control, steam pipe, fuel oil, compressed air and electrical systems; auxiliary machinery; boilers and other pressure vessels, piping and pumping arrangements; steering equipment and gears, shafts and couplings for power transmission shall be designed, constructed, tested, installed and serviced to the satisfaction of the Certifying Authority and shall be protected so as to reduce to a minimum danger to persons on board. Special attention shall be paid to moving parts, hot surfaces and other dangers.

(2) Machinery spaces shall be so designed as to provide safe and free access to all machinery and its controls and to any other part which may require servicing. Such spaces shall be adequately ventilated. Provided that the Certifying Authority may, having regard to overall safety considerations, accept a partial reduction in capability in lieu of full normal operation.

(*a*) Means shall be provided whereby the operational capability of the propulsion machinery can be sustained or restored even though one of

the essential auxiliaries becomes inoperative. Special consideration shall be given to the functioning of —

- (i) the arrangements which supply fuel oil pressure for main propulsion machinery;
- (ii) the normal sources of lubricating oil pressure;
- (iii) the hydraulic, pneumatic and electrical means for the control of main propulsion machinery including controllable pitch propellers;
- (iv) the sources of water pressure for main propulsion cooling systems; and
- (v) an air compressor and an air receiver for starting or control purposes:

Provided that the Certifying Authority may, having regard to overall safety considerations, accept a partial reduction in capability in lieu of full normal operation.

(b) Means shall be provided whereby the machinery can be brought into operation from the dead ship condition without external aid.

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

(5) The design and construction of electrical installations shall be such as to provide —

- (a) the services necessary to maintain the ship in normal operational condition without having recourse to an emergency source of power;
- (b) the services essential to safety when failure of the main source of electrical power occurs; and
- (c) protection of the crew and ship from electrical hazards.

(6) In ships fitted with periodically unattended machinery spaces, documentary evidence of their fitness to operate in such mode shall be submitted to the Director.

Regulation 22

Machinery

(1) Main and auxiliary machinery essential for the propulsion and safety of the ship shall be provided with effective means of control.

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

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

(4) Main propulsion machinery and where applicable, auxiliary machinery shall be provided with automatic alarm arrangements in the case of failures, such as lubricating oil supply failure, which could lead rapidly to damage, complete breakdown or explosion.

Regulation 23

Means of Going Astern

Ships shall have sufficient power for going astern to secure proper control of the ship in all circumstances.

Regulation 24

Communications between the Wheelhouse and Machinery Space

(1) Two separate means of communication between the wheelhouse and the machinery space shall be provided. One of the means shall be an engine room telegraph.

(2) In ships fitted with two main propulsion machinery each driving its own propeller, each machinery shall have an engine room telegraph.

(3) The engine room telegraph may be dispensed with if the main propulsion machinery is directly controlled from the wheelhouse.

Regulation 25

Wheelhouse Control of Propulsion Machinery

(1) This regulation applies only to new ships, except for paragraph (2)(e) which also applies to existing ships.

(2) Where remote control of propulsion machinery is provided from the wheelhouse, the following shall apply:

- (*a*) under all operating conditions, including manoeuvring, the speed, direction of thrust and, if applicable, the pitch of the propeller shall be fully controllable from the wheelhouse;
- (b) the main propulsion machinery shall be provided with an emergency stopping device in the wheelhouse and be independent from the wheelhouse control system referred to in sub-paragraph (a);
- (c) control of the propulsion machinery shall be possible only from one station at a time;
- (d) indicators shall be fitted in the wheelhouse for
 - (i) propeller speed and direction in the case of fixed propellers; and
 - (ii) propeller speed and pitch position in the case of controllable pitch propellers;
- (e) it shall be possible to control the propulsion machinery locally, even in the case of failure in any part of the remote control system;
- (f) unless the Certifying Authority considers it impracticable, the design of the remote control system shall be such that if it fails an alarm will be given until local control is in operation; and
- (g) an alarm shall be provided to indicate low starting air pressure and shall be set at a level which will still permit main engine starting operations.

(3) Where the main propulsion and associated machinery including sources of main electrical supply are provided with various degrees of automatic or remote control and are under continuous manned supervision from a control room, the control room shall be so designed, equipped and installed that the machinery operation will be as safe and effective as if it were under direct supervision.

(4) In general, automatic starting, operational and control systems shall include means for manually overriding the automatic means, even in the case of failure of any part of the automatic and remote control system.

Regulation 26

Boilers and Other Pressure Vessels

(1) The boilers and other pressure vessels shall be of a design and construction adequate for the service for which they are intended and shall be installed and protected so as to reduce to a minimum any danger to persons on board.

(2) The boilers and the other pressure vessels and their respective mountings shall, before being put into service for the first time, be subjected to a pressure test to the satisfaction of the Certifying Authority.

Regulation 27

Steam Boilers, Feed Systems and Steam Piping Arrangements

(1) Every steam boiler and unfired steam generator shall be provided with at least two safety valves of adequate capacity provided that the Certifying Authority may, having regard to the output or any other features of any steam boiler or unfired steam generator, permit only one safety valve to be fitted if satisfied that it is adequately protected against overpressure.

(2) Every oil-fired steam boiler which is intended to operate without manual supervision shall have safety arrangements which will shut off the fuel supply and give an alarm in the case of low water level, air supply failure or flame failure.

(3) The Certifying Authority shall give special consideration to steam boiler installations to ensure that feed systems, monitoring devices, and safety provisions are adequate in all respects to ensure the safety of boilers, steam pressure vessels and steam piping arrangements.

Regulation 28

Air Pressure Systems

(1) Means shall be provided to prevent excess pressure in any part of a compressed air system and wherever water-jackets or casings of air compressors and coolers might be subjected to dangerous excessive pressure due to leakage into them from air pressure parts. Suitable pressure-relief arrangements shall be provided.

(2) The main starting air arrangements for main propulsion internal combustion engines shall be adequately protected against the effects of backfiring and internal explosion in the starting air pipes.

(3) All discharge pipes from starting air compressors shall lead directly to the starting air receivers and all starting pipes from the air receivers to main or auxiliary engines shall be entirely separated from the compressor discharge pipe system.

(4) Provision shall be made to reduce to a minimum the entry of oil into the air pressure systems and to drain these systems.

Regulation 29

Arrangements for Fuel Oil, Lubricating Oil and Other Flammable Oils

(1) Fuel oil which has a flashpoint of less than 60° Celsius (closed cup test) as determined by an approved flashpoint apparatus shall not be used as fuel, except in

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emergency generators, in which case the flashpoint shall not be less than 43° Celsius:

Provided that the Certifying Authority may permit the general use of fuel oil having a flashpoint of not less than 43° Celsius subject to such additional precautions as it may consider necessary and on condition that the temperature of the space in which such fuel is stored or used shall not rise to within 10° Celsius below the flashpoint of the fuel.

(2) Safe and efficient means of ascertaining the amount of fuel oil contained in any oil tank shall be provided. If sounding pipes are installed, their upper ends shall terminate in safe positions and shall be fitted with suitable means of closure. Tubular gauge glasses shall not be fitted, but suitably protected gauges having flat glasses of substantial thickness and self-closing fittings may be used. Suitably protected tubular gauge glasses may be permitted on fuel tanks independent of the hull structure provided that they are fitted with self-closing valves to the satisfaction of the Certifying Authority. Other means of ascertaining the amount of fuel oil contained in any fuel oil tank may be permitted provided that their failure or over-filling of the tanks will not permit release of fuel.

(3) Provision shall be made to prevent overpressure in any oil tank or in any part of the fuel oil system including the filling pipes. Relief valves and air or overflow pipes shall discharge to a position and in a manner which is safe.

(4) Subject to the satisfaction of the Certifying Authority, fuel oil pipes which, if damaged, would allow oil to escape from a storage, settling or daily service tank situated above the double bottom, shall be fitted with a cock or valve on the tank capable of being closed from a safe position outside the space concerned in the event of a fire arising in the space in which such tanks are situated. In the special case of deep tanks situated in any shaft or pipe tunnel or similar space, valves on the tanks shall be fitted but control in the event of fire may be effected by means of an additional valve on the pipe or pipes outside the tunnel or similar space. If such an additional valve is fitted in the machinery space it shall be capable of being operated from outside this space.

(5) Pumps forming part of the fuel oil systems shall be separate from any other system and the connections of any such pumps shall be provided with an efficient relief valve which shall be in closed circuit. Where fuel oil tanks are alternatively used as liquid ballast tanks, proper means shall be provided to isolate the fuel oil and ballast systems.

(6) No oil tank shall be situated where spillage or leakage therefrom can constitute a hazard by falling on heated surfaces. Precautions shall be taken to prevent any oil that may escape under pressure from any pump, filter or heater from coming into contact with heated surfaces.

(a) Fuel oil pipes and their valves and fittings shall be of steel or other equivalent material, provided that restricted use of flexible pipes may

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be permitted in positions where the Certifying Authority is satisfied that they are necessary. Such flexible pipes and end attachments shall be of adequate strength and be constructed of approved fire-resistant materials or have fire-resistant coatings.

(b) Where necessary, fuel oil and lubricating oil pipelines shall be screened or otherwise suitably protected to avoid, as far as practicable, oil spray or oil leakage on heated surfaces or into machinery air intakes. The number of joints in piping systems shall be kept to a minimum.

(8) As far as practicable, fuel oil tanks shall be part of the ship's structure and shall be located outside machinery spaces of Category A. Where fuel oil tanks, other than double bottom tanks, are necessarily located adjacent to or within machinery spaces of Category A, at least one of their vertical sides shall be contiguous to the machinery space boundaries, and shall preferably have a common boundary with the double bottom tanks where fitted and the area of the tank boundary common with the machinery space shall be kept to a minimum. When such tanks are sited within the boundaries of machinery spaces of Category A they shall not contain fuel oil having a flashpoint of less than 60° Celsius (closed cup test). In general, the use of free-standing fuel oil tanks shall be avoided in fire hazard areas, and particularly in machinery spaces of Category A. When free-standing fuel oil tanks are permitted, they shall be placed in an oil-tight spill tray of ample size having a suitable drain pipe leading to a suitably sized spill oil tank.

(9) The ventilation of machinery spaces shall be sufficient under all normal conditions to prevent accumulation of oil vapour.

(10) The arrangements for the storage, distribution and use of oil employed in pressure lubrication systems shall be to the satisfaction of the Certifying Authority. Such arrangements in machinery spaces of Category A and wherever practicable, in other machinery spaces shall at least comply with the provisions of paragraphs (1), (3), (6) and (7) and in so far as the Certifying Authority may consider necessary with paragraphs (2) and (4). This does not preclude the use of sight flow glasses in lubrication systems provided they are shown by test to have a suitable degree of fire resistance.

(11) The arrangements for the storage, distribution and use of flammable oils employed under pressure in power transmission systems other than oils referred to in paragraph (10) in control and activating systems and heating systems shall be to the satisfaction of the Certifying Authority. In locations where means of ignition are present such arrangements shall at least comply with the provisions of paragraphs (2) and (6) and with paragraphs (3) and (7) in respect of strength and construction.

Regulation 30

Bilge Pumping Arrangements

(1) This regulation applies to all ships, except for paragraph (3)(b) which applies only to new ships.

(2) An efficient bilge pumping plant shall be provided which under all operating conditions shall be capable of pumping from and draining any watertight compartment which is neither a permanent oil tank nor a permanent water tank whether the ship is upright or listed. Wing suctions shall be provided if necessary for that purpose. Arrangements shall be provided for easy flow of water to the suction pipes: Provided that if the Certifying Authority is satisfied that the safety of the ship is not impaired the bilge pumping arrangements may be dispensed with in particular compartments.

- (*a*) At least two independently driven power bilge pumps shall be provided, one of which may be driven by the main engine. A ballast pump or other general service pump of sufficient capacity may be used as a power driven bilge pump.
- (b) Power bilge pumps shall be capable of giving a speed of water of at least two metres per second through the main bilge pipe which shall have an internal diameter of at least —

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

where d is the internal diameter in millimetres, and L, B and D are in metres.

- (c) Each of the bilge pumps provided in accordance with this regulation shall be provided with a direct bilge suction, one of these suctions drawing from the port side of the machinery space and the other from the starboard side, except that in the case of a ship of less than 75 metres in length (L) only one bilge pump need be provided with a direct bilge suction.
- (d) The arrangement and sizing of the bilge system shall be such that the full rated capacity of the pump specified above can be applied to each of the watertight compartments located between the collision and afterpeak bulkheads.

(4) A bilge ejector in combination with an independently driven high pressure sea-water pump may be installed as a substitute for one independently driven bilge pump required by paragraph (3)(a), provided this arrangement is to the satisfaction of the Certifying Authority.

(5) Bilge pipes shall not be led through fuel oil, ballast or double bottom tanks, unless these pipes are of heavy gauge steel construction.

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(6) Bilge and ballast pumping systems shall be arranged so as to prevent water passing from the sea or from water ballast spaces into holds or into machinery spaces or from one watertight compartment to another. The bilge connection to any pump which draws from the sea or from water ballast spaces shall be fitted with either a non-return valve or a cock which cannot be opened simultaneously either to the bilges and to the sea or to the bilges and water ballast spaces. Valves in bilge distribution boxes shall be of a non-return type.

(7) Any bilge pipe piercing a collision bulkhead shall be fitted with a positive means of closing at the bulkhead with remote control from the freeboard deck with an indicator showing the position of the valve provided that, if the valve is fitted on the after side of the bulkhead and is readily accessible under all service conditions, the remote control may be dispensed with.

Regulation 31

Steering Gear

(1) Ships shall be provided with a main steering gear and an auxiliary means of actuating the rudder to the satisfaction of the Certifying Authority. The main steering gear and the auxiliary means of actuating the rudder shall be arranged so that as far as is reasonable and practicable the failure in one of them will not render the other one inoperative.

(2) Where the main steering gear comprises two or more identical power units an auxiliary steering gear need not be fitted if one of the power units is capable of operating the rudder as required by paragraph (7) when the other unit is out of operation.

(3) The position of the rudder, if power operated, shall be indicated in the wheelhouse. The rudder angle indicator for power-operated steering gear shall be independent of the steering gear control system.

(4) In the event of failure of any of the steering gear units an alarm shall be given in the wheelhouse.

(5) The main steering gear shall be of adequate strength and sufficient to steer the ship at maximum ahead speed. The main steering gear and rudder stock shall be so designed that they will not be damaged at maximum astern speed or by other manoeuvring operations.

(6) The main steering gear power unit shall be arranged to start either by manual or automatic means when power is restored after a power failure.

(7) The auxiliary means for actuating the rudder shall be of adequate strength and sufficient to steer the ship at a navigable speed and capable of being brought speedily into action in an emergency.

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(8) Electric or electro-hydraulic steering gear fitted in ships of 75 metres in length (L) and over shall be served by at least two circuits fed from the main switchboard and these circuits shall be as widely separated as possible.

Regulation 32

Emergency Source of Electrical Power

(1) A self-contained emergency source of electrical power located outside the machinery spaces of Category A shall be provided and so arranged as to ensure its functioning in the event of fire or other causes of failure of the main electrical installations.

(2) The emergency source of electrical power shall be capable, having regard to the starting current and the transitory nature of certain loads, of serving the following simultaneously for a period of at least 3 hours:

- (a) internal communication equipment, fire detecting systems and signals which may be required in an emergency;
- (b) the navigation lights if solely electrical;
- (c) the emergency lights
 - (i) of launching stations;
 - (ii) in all alleyways, stairways and exits;
 - (iii) in spaces containing machinery or the emergency source of power; and
 - (iv) in control stations; and
- (d) the operation of the emergency fire pump, if any.
- (3) The emergency source of power may be either
 - (*a*) an accumulator (storage) battery capable of carrying the emergency load without recharging or excessive voltage drop; or
 - (b) a generator driven by a suitable prime mover with an independent fuel supply and with starting arrangements to the satisfaction of the Certifying Authority. The fuel used shall have a flashpoint of not less than 43° Celsius.

(4) An accumulator battery fitted in accordance with this regulation shall be installed in a well ventilated space which shall not be the same space containing the emergency switchboard.

(5) The emergency generator and its prime mover and any accumulator battery shall be so arranged as to ensure that they will function at full rated power when

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the ship is upright and when rolling up to an angle of 22½ degrees either side and simultaneously pitching 10 degrees by bow or stern.

(6) The emergency source of electrical power and starting equipment shall be so constructed and arranged as to enable adequate testing to be carried out by the crew while the ship is in operating condition.

Regulation 33

Precautions against Shock, Fire and Other Hazards of Electrical Origin

- (a) Exposed permanently fixed metal parts of electrical machines or equipment which are not intended to be "live", but which are liable under fault conditions to become "live" shall be earthed (grounded) unless
 - (i) they are supplied at a voltage not exceeding 55 volts direct current or 55 volts, root mean square, between conductors; autotransformers shall not be used for the purpose of achieving this alternative current voltage;
 - (ii) they are supplied at a voltage not exceeding 250 volts by safety isolating transformers supplying one consuming device only; or
 - (iii) they are constructed in accordance with the principle of double insulation.
- (b) Portable electrical equipment shall operate at a safe voltage. The Certifying Authority may require additional precautions for portable electric lamps, tools or similar apparatus for use in confined or exceptionally damp spaces where particular risks due to conductivity may exist.

(2) Main and emergency switchboards shall be so arranged as to give easy access as may be needed to apparatus and equipment, without danger to attendants. The sides and backs and, where necessary, the fronts of switchboards, shall be suitably guarded. Exposed "live" parts having voltages to earth exceeding a voltage to be specified by the Certifying Authority shall not be installed on the front of such switchboards. There shall be non-conducting mats or gratings at the front and rear, where necessary.

- (*a*) Where a hull return system of distribution is used, special precautions shall be taken to the satisfaction of the Certifying Authority.
- (b) A hull return system shall not be used in tankers.

- (a) Except as permitted by the Certifying Authority in exceptional circumstances, all metal sheaths and armour of cables shall be electrically continuous and shall be earthed.
- (b) Where cables which are installed in spaces where the risk of fire or explosion exists in the event of an electrical fault, special precautions against such risks shall be taken to the satisfaction of the Certifying Authority.
- (c) Wiring shall be supported in such a manner as to avoid chafing or other damage.
- (*d*) Terminations and joints in all conductors shall be made such that they retain the original electrical, mechanical, flame-retarding and, where necessary, fire-resisting properties of the cable.
- (a) Circuits shall be protected against short circuit.
- (b) The rating or appropriate setting of the overload protective device of each circuit shall be permanently indicated at the location of the protective device.

(6) Lighting fittings shall be arranged to prevent temperature rises which could damage the wiring and to prevent surrounding material from becoming excessively hot.

(7) Lighting or power circuits terminating in a space where the risk of fire or explosion exists shall be provided with isolating switches outside the space.

- (*a*) The housing of an accumulator battery shall be constructed and ventilated to the satisfaction of the Certifying Authority.
- (b) Electrical and other equipment which may constitute a source of ignition of flammable vapours shall not be permitted in the housing except as permitted under paragraph (9).
- (c) An accumulator battery shall not be located in accommodation spaces unless installed in a hermetically sealed container.

(9) In spaces where flammable mixtures are liable to collect and in any compartment assigned principally to the containment of an accumulator battery, no electrical equipment shall be installed unless the Certifying Authority is satisfied that it is —

- (a) essential for operational purposes;
- (b) of a type which will not ignite the mixture concerned;
- (c) appropriate to the space concerned; and
- (d) appropriately certified for safe usage in the dusts, vapours or gases likely to be encountered.

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(10) Lightning conductors shall be fitted to all wooden masts or topmasts. In ships constructed of non-conductive materials the lightning conductors shall be connected by suitable conductors to a copper plate fixed to the vessel's hull well below the waterline.

Part F — PERIODICALLY UNATTENDED MACHINERY SPACES

Regulation 34

Application

This Part shall apply to all cargo ships propelled by mechanical means engaged on all voyages.

Regulation 35

Fire Safety

(1) Special consideration shall be given to high pressure fuel oil pipes. Where practicable, leakages from such piping systems shall be collected in a suitable drain tank which shall be provided with a high level alarm.

(2) Where daily service fuel oil tanks are filled automatically or by remote control, means shall be provided to prevent overflow spillages. Similar consideration shall be given to other equipment which treats flammable liquids automatically, e.g. fuel oil purifiers which whenever practicable shall be installed in a special space reserved for purifiers and their heaters.

(3) Where fuel oil daily service tanks or settling tanks are fitted with heating arrangements, a high temperature alarm shall be provided if the flashpoint of the fuel oil can be exceeded.

(4) An approved fire detection system based on a self-monitoring principle and including facilities for periodical testing shall be installed in machinery spaces. In ships of less than 45 metres in length (L) the Certifying Authority may waive this requirement provided the location of the machinery space facilitates the detection of fire by persons on board.

(5) The detection system shall initiate both audible and visual alarm in the wheelhouse and in sufficient appropriate spaces to be heard and observed by persons on board, when the vessel is in harbour.

(6) The fire detection system shall be fed automatically from an emergency source of power if the main source of power fails.

(7) Internal combustion engines of 2,200 kilowatts and over shall be provided with crankcase oil mist detectors or engine bearing temperature detectors or equivalent devices.

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(8) The maintenance of the fire integrity of the machinery spaces, the location and centralization of the fire-extinguishing system controls, the shut-down arrangements provided for ventilation, fuel pumps, etc. shall be to the satisfaction of the Certifying Authority who may require fire-extinguishing appliances and other fire-fighting equipment and breathing apparatus in addition to the relevant requirements of Chapter II-2.

Regulation 36

Protection against Flooding

(1) Bilges in machinery spaces shall be provided with a high level alarm in such a way that the accumulation of liquids is detected at normal angles of trim and heel. The detection system shall initiate an audible and visual alarm in the places where a continuous watch is maintained.

(2) In ships of 45 metres in length (L) and over the controls of any valve serving a sea inlet, a discharge below the waterline or a bilge injection system shall be so sited as to allow adequate time for operation in case of influx of water to the space.

Regulation 37

Communications

In ships of 75 metres in length (L) and over, one of the two separate means of communication referred to in regulation 24 shall be a reliable means of vocal communication. An additional reliable means of vocal communication shall be provided between the wheelhouse and the engineers' accommodation.

Regulation 38

Alarm System

(1) An alarm system shall be provided which shall indicate any fault requiring attention.

(a) The alarm system shall be capable of sounding in the machinery space an audible alarm and indicate visually each separate alarm function at a suitable position. However, in ships of less than 45 metres in length (L) the Certifying Authority may permit the system to be capable of sounding and indicating visually each separate alarm function in the wheelhouse only.

(b) In ships of 45 metres in length (L) and over the alarm system shall have a connection to the engineers' cabins through a selector switch to ensure connection to one of these cabins and to the engineers' public rooms, if any. The Certifying Authority may permit alternative arrangements which provide an equivalent measure of safety.

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(c) Audible and visual alarms shall be activated in the wheelhouse for any situation requiring action by the responsible person on watch or which should be brought to his attention.

(d) The alarm system shall as far as is practicable be designed on the fail-safe principle.

- (3) The alarm system shall be
 - (*a*) continuously powered with automatic change-over to a stand-by power supply in case of loss of normal power supply; and
 - (b) activated by failure of the normal power supply.
 - (*a*) The alarm system shall be able to indicate at the same time more than one fault and the acceptance of any alarm shall not inhibit another alarm.

(b) Acceptance at the position referred to in paragraph (2)(a) of any alarm condition shall be indicated at the positions where it was shown. Alarms shall be maintained until they are accepted and the visual indications shall remain until the fault has been corrected, when the alarm system shall automatically reset to the normal operating condition.

Regulation 39

Special Requirements for Machinery, Boiler and Electrical Installations

(1) If the electrical power is normally supplied by more than one generating set simultaneously, there shall be provisions, e.g. by load shedding, to ensure that in case of loss of one of these generating sets, the remaining ones are kept in operation without overload to permit propulsion and steering.

(2) Where required to be duplicated, other auxiliary machinery essential to propulsion shall be fitted with automatic change-over devices allowing transfer to a stand-by machinery. An alarm shall be given on automatic change-over.

(3) Automatic control and alarm systems shall be provided as follows:

- (a) the control system shall be such that through the necessary automatic arrangements the services needed for the operation of the main propulsion machinery and its auxiliaries are ensured;
- (b) means shall be provided to keep the starting air pressure at the required level where internal combustion engines are used for main propulsion;
- (*c*) an alarm system complying with regulation 38 shall be provided for all important pressures, temperatures, fluid levels, etc.; and

(*d*) where appropriate an adequate central position shall be arranged with the necessary alarm panels and instrumentation indicating any fault.

Regulation 40

Safety System

A safety system shall be provided so that serious malfunction in machinery or boiler operations, which presents an immediate danger, shall initiate the automatic shut-down of that part of the plant and an alarm shall be given. Shut-down of the propulsion system shall not be automatically activated except in cases which could lead to serious damage, complete breakdown or explosion. Where arrangements for overriding the shut-down of the main propelling machinery are fitted these shall be such as to preclude inadvertent activation. Visual means shall be provided to show whether or not it has been activated.

CHAPTER II-2

FIRE PROTECTION, FIRE DETECTION, FIRE EXTINCTION AND FIRE FIGHTING

Part A – GENERAL

Regulation 1

Application

Unless otherwise expressly provided, this Chapter shall apply to every cargo ship propelled by mechanical means engaged on international voyages and tankers engaged on 30-mile limit voyages or plying within the port.

Regulation 2

Definitions

For the purposes of this Chapter —

- "accommodation spaces" means those spaces used for public spaces, corridors, lavatories, cabins, offices, hospitals, cinemas, games and hobbies rooms, pantries containing no cooking appliances and similar spaces;
- "low flame spread" means that the surface thus described will adequately restrict the spread of flame, this being determined to the satisfaction of the Certifying Authority by an established test procedure;
- "non-combustible material" means a material which neither burns nor gives off flammable vapours in sufficient quantity for self-ignition when heated to approximately 750° Celsius this being determined to the satisfaction of

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the Certifying Authority by an established test procedure. Any other material is a combustible material;

- "public spaces" means those portions of the accommodation spaces which are used for halls, dining rooms, lounges and similar permanently enclosed spaces;
- "service spaces" means those spaces used for galleys, pantries containing cooking appliances, lockers and store-rooms, workshops other than those forming part of the machinery spaces, and similar spaces and trunks to such spaces;
- "standard fire test" means a test in which specimens of the relevant bulkheads or decks are exposed in a test furnace to temperatures corresponding approximately to the standard time-temperature curve. The specimen shall have an exposed surface of not less than 4.65 square metres and a height (or length of deck) of 2.44 metres resembling as closely as possible the intended construction and including where appropriate at least one joint. The standard time-temperature curve is defined by a smooth curve drawn through the following points:

at the end of the first 5 minutes 538° Celsius,

at the end of the first 10 minutes 704° Celsius,

at the end of the first 30 minutes 843° Celsius,

- at the end of the first 60 minutes 927° Celsius;
- "steel or other equivalent material" means steel or any material which, by itself or due to insulation provided, has structural and integrity properties equivalent to steel at the end of the applicable fire exposure to the standard fire test (e.g. aluminium alloy with appropriate insulation).

Part B — FIRE SAFETY MEASURES FOR ALL SHIPS

Regulation 3

Structural Fire Protection

(1) The hull, superstructure, structural bulkheads, decks and deckhouses shall be constructed of non-combustible materials. The Certifying Authority may permit combustible construction in ships other than a tanker provided the requirements of this regulation are complied with.

(2) In a ship, the hull of which is constructed of combustible materials, the decks and bulkheads shall be so constructed as to be capable of preventing the spread of fire to the unexposed side to the satisfaction of the Certifying Authority, in particular in relation to the following divisions: (a) decks and bulkheads separating machinery spaces from accommodation spaces, service spaces or control stations;

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- (b) boundary bulkheads and decks of spaces containing any emergency source of power;
- (c) bulkheads and decks between galleys, paint room or any store room which contain appreciable quantities of highly flammable materials, and accommodation spaces, service spaces or control stations;
- (*d*) decks and bulkheads separating control stations from accommodation and service spaces; and
- (e) bulkheads of corridors serving accommodation spaces, service spaces and control stations.

Machinery space boundaries shall as far as practicable prevent the passage of smoke.

(3) Interior stairways below the weather deck shall be of steel or other equivalent material.

(4) Doors and other closures of openings in bulkheads and decks referred to in paragraph (2) and doors fitted in engine and boiler casings shall be as far as practicable equivalent in resisting fire to the divisions in which they are fitted. Doors to machinery spaces of Category A shall be self-closing.

- (5) Windows and skylights to machinery spaces shall be as follows:
 - (*a*) where skylights can be opened they shall be capable of being closed from outside the space. Skylights containing glass panels shall be fitted with external shutters of steel or other equivalent material permanently attached;
 - (b) glass or similar materials shall not be fitted in machinery space boundaries. This does not preclude the use of wire-reinforced glass for skylights and glass in control rooms within the machinery spaces; and
 - (c) in skylights referred to in sub-paragraph (a) wire-reinforced glass shall be used.

(6) Insulating materials in accommodation spaces, service spaces (except domestic refrigerating compartments), control stations and machinery spaces shall be non-combustible. The surface of insulation fitted on the internal boundaries of machinery spaces of Category A shall be impervious to oil or oil vapours.

(7) Deck coverings within accommodation spaces on the decks forming the crown of machinery and cargo spaces shall be of a type which will not readily ignite.

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(8) Pipes conveying oil or combustible liquids shall be of a material approved by the Certifying Authority having regard to the fire risk. Materials readily rendered ineffective by heat shall not be used for overboard scuppers, sanitary discharges, and other outlets which are close to the waterline and where the failure of the material in the event of fire would give rise to danger of flooding.

(9) Power ventilation of machinery spaces shall be capable of being stopped from an easily accessible position outside the machinery spaces.

(10) Exposed surfaces within accommodation spaces, service spaces, control stations, corridor and stairway enclosures and the concealed surfaces behind bulkheads, ceilings, panellings and linings in accommodation spaces, service spaces, and control stations shall have low flame spread characteristics.

(11) All exposed surfaces of glass-reinforced plastic construction within accommodation and service spaces, control stations, machinery spaces of Category A and other machinery spaces of similar fire risk shall have the final lay-up layer of approved resin having inherent fire-retardant properties or be coated with an approved fire-retardant paint or be protected by non-combustible materials.

(12) Paints, varnishes and other finishes used on exposed interior surfaces shall not be capable of producing excessive quantities of smoke or toxic gases or vapours or being an undue fire hazard.

(13) Machinery driving fuel oil transfer pumps, fuel oil unit pumps and other similar fuel pumps shall be fitted with remote controls situated outside the space concerned so that they can be stopped in the event of a fire arising in the space in which they are located.

(14) Drip trays shall be fitted where necessary to prevent oil leaking into bilges.

Regulation 4

Heating Installations

(1) Electric radiators shall be fixed in position and so constructed as to reduce fire risks to a minimum. No such radiator shall be fitted with an element so exposed that clothing, curtains or other similar materials can be scorched or set on fire by heat from the element.

(2) Heating by means of open fires shall not be permitted. Heating stoves and other similar appliances shall be firmly secured and adequate protection and insulation against fire shall be provided beneath and around such appliances and in way of their uptakes. Uptakes of stoves which burn solid fuel shall be so arranged and designed as to minimise the possibility of becoming blocked by combustion products and shall have a ready means for cleaning. Dampers for limiting draughts in uptakes shall, when in the closed position, still leave an adequate area open.

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Spaces in which stoves are installed shall be provided with ventilators of sufficient area to provide adequate combustion air for the stove. Such ventilators shall have no means of closure and their position shall be to the satisfaction of the Certifying Authority.

(3) Open flame gas appliances, except cooking stoves and water heaters, shall not be permitted. Spaces containing any such stoves or water heaters shall have adequate ventilation to remove fumes and possible gas leakage to a safe place. All pipes conveying gas from container to stove or water heater shall be of steel or other approved material. Automatic safety gas shut-off devices shall be fitted to operate on loss of pressure in the gas main pipe or flame failure on any appliance.

Regulation 5

Means of Escape

(1) Stairways and ladders leading to and from all accommodation spaces and in spaces in which the crew is normally employed, other than machinery spaces, shall be so arranged as to provide ready means for escape to the open deck and thence to the survival craft.

(2) Two means of escape shall be provided from every machinery space of Category A which shall be as widely separated as possible. Vertical escapes shall be by means of steel ladders. Where the size of the machinery spaces makes it impracticable, one of these means of escape may be omitted provided that the exit is to the satisfaction of the Certifying Authority.

Regulation 6

Automatic Fire Alarm and Fire Detection Systems

Where the Certifying Authority has permitted under regulation 3(1), a combustible construction or where otherwise appreciable amounts of combustible materials are used in the construction of accommodation spaces, service spaces and control stations, special consideration shall be given to the installation of an automatic fire alarm and fire detection system in those spaces, having due regard to the size of those spaces, their arrangement and location relative to control stations as well as, where applicable, the flame spread characteristics of the installed furniture.

Regulation 7

Fire Pumps

(a) All ships shall be provided with at least one independent poweroperated fire pump.
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(b) In ships of less than 24 metres in length (L) the fire pump may be driven by main propulsion machinery provided that the propeller shafting can be readily disconnected or that a controllable pitch propeller is fitted.

(2) Sanitary, bilge, ballast, general service or any other pump may be used as fire pumps if they comply with the requirements of this Chapter and do not affect the ability to cope with pumping of the bilges. Fire pumps shall be so connected that they cannot be used for pumping oil or other flammable liquids.

(3) Centrifugal pumps or other pumps connected to the fire main through which backflow could occur shall be fitted with non-return valves.

(*a*) If fire in any one compartment can pull all the fire pumps out of action, there shall be an alternate means to extinguish the fire. This alternate means may be an emergency power-operated fire pump.

(b) An emergency power-operated fire pump shall be an independently driven self-contained pump either with its own prime mover and fuel supply fitted in an accessible position outside the compartment which contains the main fire pump, or be driven by a self-contained generator which may be an emergency generator of sufficient capacity and which is positioned in a safe place outside the engine room and above the freeboard deck.

(c) The emergency fire pump, sea suction and other valves shall be operable from outside the compartment containing the main fire pump and in a position not likely to be cut off by fire in that compartment.

(5) The total capacity (Q) of the main power-operated fire pump shall be at least —

 $Q = (0.15 \sqrt{L (B + D)} + 1)^2$ cubic metres per hour

where L, B and D are in metres.

(6) Where two independent power-operated fire pumps are fitted, the capacity of each pump shall not be less than 40% of the quantity required by paragraph (5).

(7) When the main power fire pump is delivering the quantity of water required by paragraph (5) through the fire main, fire hoses and nozzles, the pressure maintained at any hydrant shall be not less than 0.21 newtons per square millimetre.

(8) Where the power-operated emergency fire pump is delivering the maximum quantity of water through the jet required by regulation 9(1), the pressure maintained at any hydrant shall be to the satisfaction of the Certifying Authority.

Fire Mains

(1) Where more than one hydrant is required to provide a jet of water required by regulation 9(1), a fire main shall be provided.

(2) Materials readily rendered ineffective by heat shall not be used for fire mains, unless adequately protected.

(3) When the fire pump delivery pressure can exceed the designed working pressure of fire mains, relief valves shall be fitted.

(4) Fire mains shall have no connections other than those required for fire fighting, except for the purposes of washing the deck and anchor chains or operating the chain locker bilge ejector.

Regulation 9

Fire Hydrants, Fire Hoses and Nozzles

(1) Fire hydrants shall be positioned so as to allow easy and quick connection of fire hoses and so that at least one jet of water can be directed into any part of the ship which is normally accessible during navigation.

(2) The jet required in paragraph (1) shall be from a single length of fire hose.

(3) In addition to the requirements of paragraph (1), in every machinery space of Category A —

- (*a*) there shall be at least two fire hydrants each complete with fire hose and combined jet and spray nozzle. One of the hydrants shall be located near the entrance; or
- (b) in a ship of less than 24 metres in length (L) there shall be at least one fire hydrant complete with fire hose and combined jet and spray nozzle. This hydrant shall be located outside the space and near the entrance.

(4) A single length of fire hose shall not exceed 15 metres.

(5) Fire hoses shall be of an approved material. Each fire hose shall be provided with couplings and an approved nozzle.

(6) Except where fire hoses are permanently attached to the fire main, the couplings of fire hoses and nozzles shall be completely interchangeable.

(7) The nozzles as required by paragraph (5) shall be appropriate to the delivery capacity of the fire pumps fitted, but in any case shall have a diameter of not less than 12 millimetres.

Fire Extinguishers

(1) Fire extinguishers shall be of approved types. The capacity of required portable fluid extinguishers shall be not more than 14 litres and not less than 9 litres. Other extinguishers shall not be in excess of the equivalent portability of the 14-litre fluid extinguisher and shall not be less than the fire-extinguishing equivalent of a 9-litre fluid extinguisher. The Certifying Authority shall determine the equivalents of fire extinguishers.

(2) Spare charges shall be provided to the satisfaction of the Certifying Authority.

(3) Fire extinguishers containing an extinguishing medium which, in the opinion of the Certifying Authority, either by itself or under expected conditions of use, gives off toxic gases in such quantities as to endanger persons shall not be permitted.

(4) Fire extinguishers shall be periodically examined and subjected to such tests as the Certifying Authority may require.

(5) One of the portable fire extinguishers intended for use in any space shall be stowed near an entrance to that space.

Regulation 11

Fire Buckets

(1) Fire buckets shall be of metal, painted red and clearly and permanently marked with the word "FIRE". Except in open ships such fire buckets shall be kept filled with sand or water.

(2) All fire buckets shall be provided with lanyards of sufficient length.

Regulation 12

Portable Fire Extinguishers in Control Stations, Accommodation and Service Spaces

(1) A sufficient number of approved portable fire extinguishers shall be provided in control stations, accommodation and service spaces to ensure that at least one extinguisher of a suitable type is readily available for use in any part of such spaces. The total number of extinguishers in these spaces, however, shall not be less than 3.

(2) In addition to the requirements under paragraph (1) every ship shall be provided with at least 3 fire buckets.

(3) Every manned barge when engaged on international voyages shall be provided with —

- (*a*) one fire extinguisher in each separate crew compartment but in any case at least two such extinguishers in the barge; and
- (b) at least two fire buckets.

Regulation 13

Fire-Extinguishing Appliances in Machinery Spaces

- (a) In a ship of 1,000 tonnes and above registered as a Singapore ship on or after 23rd April 1982, spaces containing oil-fired boilers, fuel oil units or internal combustion machinery having a total power output of not less than 746 kilowatts shall be provided with one of the following fixed fire-fighting installations:
 - (i) a pressure water-spraying installation;
 - (ii) a fire-smothering gas installation;
 - (iii) a fire-extinguishing installation using froth having an expansion ratio not exceeding 12 to 1;
 - (iv) a fire-extinguishing installation using a high expansion froth having expansion ratio not exceeding 1,000 to 1.

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(b) Where the engine and boiler rooms are not entirely separated from each other or if fuel oil can drain from the boiler room into the engine room, the engine and boiler rooms shall be considered as one compartment.

(2) Installations listed in paragraph (1)(a) shall be controlled from readily accessible positions outside such spaces not likely to be cut off by a fire in the protected space. Arrangements shall be made to ensure the supply of power and water necessary for the operation of the system in the event of fire in the protected space.

(3) In all machinery spaces of Category A at least two portable extinguishers of a type suitable for extinguishing fires involving fuel oil shall be provided. Where such spaces contain machinery which has a total power output of not less than 350 kilowatts, at least 3 such extinguishers shall be provided. One of the extinguishers shall be stowed near the entrance to the space.

(4) Every ship to which paragraph (1) does not apply having machinery spaces not protected by a fixed fire-extinguishing system shall be provided with at least a 45-litre foam extinguisher suitable for fighting oil fires. Where the size of the machinery spaces makes this provision impracticable, the extinguisher shall be

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positioned outside the machinery space in such a way as to be readily available for use in case of fire in such space.

(5) In each firing space of every such ship, fitted with auxiliary oil-fired boilers, a receptacle shall be provided which shall contain at least 0.28 cubic metres of sand or other dry material suitable for quenching oil fires. Scoops shall be provided for distributing the contents of the receptacle.

(6) Every manned barge fitted with internal combustion machinery shall be provided with at least two portable fire extinguishers suitable for fighting oil fires, in addition to the requirements referred to in regulation 12(3).

(7) Where, in the opinion of the Certifying Authority, a fire hazard exists in any machinery space for which no specific provision for fire-extinguishing appliances are prescribed in paragraph (1), (3) or (4) there shall be provided in, or adjacent to, that space a number of approved portable fire extinguishers or other means of fire extinction to the satisfaction of the Certifying Authority.

(8) Where fixed fire-extinguishing systems not required by this Part are installed, such systems shall be to the satisfaction of the Certifying Authority.

Regulation 14

Fireman's Outfit

- (1) Ships of 500 tonnes and above shall carry at least two firemen's outfits.
- (2) Ships of less than 500 tonnes shall carry at least one fireman's outfit.
- (3) The fireman's outfit referred to in paragraphs (1) and (2) shall consist of
 - (a) a breathing apparatus of either the air hose type or self-contained compressed air type;
 - (b) a fireproof lifeline of sufficient length and strength;
 - (c) an electric safety lamp;
 - (d) an axe;
 - (e) a rigid helmet and a pair of boots and gloves; and
 - (*f*) two sets of protective clothing of material to protect the skin from radiation from the fire and from burns and scalding by steam.

In ships having machinery spaces of more than 36 metres in length selfcontained breathing apparatus shall be provided.

Fireman's Axe

Every ship and every manned barge shall carry at least one fireman's axe.

Regulation 16

Fire Control Plan

There shall be a permanently exhibited fire control plan to the satisfaction of the Certifying Authority. In small ships the Certifying Authority may dispense with this requirement.

Regulation 17

Availability of Appliances

Fire-extinguishing appliances shall be kept in good order and available for immediate use at all times.

Regulation 18

Acceptance of Substitutes

Where in this Part a special type of appliance, apparatus, extinguishing medium or arrangement is specified, any other type of appliance, etc., may be allowed provided the Certifying Authority is satisfied that it is not less effective.

Part C — FIRE SAFETY MEASURES FOR TANKERS

Regulation 19

Application

(1) Unless otherwise expressly provided, this Part shall apply to any tanker registered as a Singapore ship on or after 23rd April 1982 engaged on all voyages carrying crude oil and petroleum products having a flash-point not exceeding 60° Celsius (closed cup test) as determined by an approved flashpoint apparatus and whose Reid vapour pressure is below that of atmospheric pressure, and other liquid products having a similar fire hazard.

(2) Where cargoes, other than those referred to in paragraph (1), which introduce additional fire hazards are intended to be carried, additional safety measures shall be required to the satisfaction of the Certifying Authority.

(3) Combination carriers shall not carry solid cargoes unless all cargo tanks are empty of oil and gas freed or unless, in each case, the Certifying Authority is satisfied with the arrangements provided.

Construction

(1) The hull, superstructure, structural bulkheads, decks and deckhouses shall be constructed of steel or other equivalent material except as otherwise specified in paragraph (2).

(2) Crowns and casings of machinery spaces of Category A shall be of steel construction adequately insulated and any opening therein shall be suitably arranged and protected to prevent the spread of fire.

(*a*) Boundary bulkheads and decks of machinery spaces of Category A and cargo rooms shall be of steel construction adequately insulated to the satisfaction of the Certifying Authority.

(b) Gastight bulkheads shall be provided for the isolation of all cargo pumps and piping from spaces containing stoves, electrical apparatus, propelling machinery, or other machinery where sources of ignition are normally present.

(c) Where such bulkheads and decks are penetrated for the passage of electrical cables, pipes, trunks, ducts, etc., arrangements shall be made to ensure that the fire integrity of the bulkhead is not impaired.

(4) Doors shall be resistant to fire, as far as practicable, equivalent to the division in which they are fitted.

(5) Doors fitted in boundary bulkheads of machinery spaces of Category A shall be self-closing and reasonably gastight.

(6) Doors required to be self-closing shall not be fitted with hold-back hooks. However, hold-back arrangements fitted with remote release fittings of the failsafe type may be used.

(7) Watertight doors need not be insulated.

(8) Air space enclosed behind ceilings, panellings or linings in accommodation spaces, service spaces and control stations shall be divided by close-fitting draught stops spaced not more than 7 metres apart.

Regulation 21

Separation of Spaces

Oiltight and vented cofferdams, with widths as required for ready access, shall be provided for the separation of all cargo tanks from galleys, living quarters, general cargo spaces below the uppermost continuous deck, and spaces containing propelling machinery or other machinery where sources of ignition are normally present. Pump room, compartments arranged solely for ballast, and fuel-oil tanks may be considered as cofferdams for compliance with this regulation.

Ventilation

(1) Ventilation openings may be permitted in and under the doors in corridor bulkheads except that such openings shall not be permitted in and under stairway enclosure doors. The openings shall be provided only in the lower half of a door. Where such opening is in or under a door the total net area of any such opening or openings shall not exceed 0.05 square metres. When such opening is cut in a door it shall be fitted with a grille made of non-combustible material.

(2) Ventilation ducts for machinery spaces of Category A or galleys shall not in general pass through accommodation spaces, service spaces or control stations. Where the Certifying Authority permits this arrangement, the ducts shall be constructed of steel or equivalent material and arranged to preserve the integrity of the divisions.

(3) Ventilation ducts of accommodation spaces, service spaces or control stations shall not in general pass through machinery spaces of Category A or through galleys. Where the Certifying Authority permits this arrangement the ducts shall be constructed of steel or equivalent material and arranged to preserve the integrity of the divisions.

(4) The arrangement and positions of openings in the cargo tank deck from which gas emission can occur shall be such as to minimise the possibility of gas being admitted to enclosed spaces containing a source of ignition, or collecting in the vicinity of deck machinery and equipment which may constitute an ignition hazard. In every case the height of the outlet above the deck and the discharge velocity of the gas shall be considered in conjunction with the distance of any outlet from any deckhouse opening or source of ignition.

(5) The arrangement of ventilation inlets and outlets and other deckhouse and superstructure boundary space openings shall be such as to complement the provisions of paragraph (4). Such vents especially for machinery spaces shall be situated as far aft as practicable. Due consideration in this regard should be given when the ship is equipped to load or discharge at the stern. Sources of ignition such as electrical equipment shall be so arranged as to avoid an explosion hazard.

(6) Cargo pump rooms shall be mechanically ventilated and discharges from the exhaust fans shall be led to a safe place on the open deck. The ventilation of these rooms shall have sufficient capacity to minimise the possibility of accumulation of flammable vapours. The number of changes of air shall be at least 20 times per hour, based upon the gross volume of the space. The air ducts shall be so arranged that all of the space is effectively ventilated. The ventilation shall be of the suction type.

Means of Escape

In addition to the requirements of regulation 5(1), consideration shall be given by the Certifying Authority to the availability of emergency means of escape for personnel from each cabin.

Regulation 24

Cargo Tank Protection

(1) Every tanker and manned or unmanned barge carrying flammable products referred to in regulation 19(1) engaged on voyages outside the port limit shall be provided with a suitable arrangement to the satisfaction of the Certifying Authority for providing sufficient quantity of froth for —

- (a) extinguishing spill fires and also preclude ignition of spill oil not yet ignited;
- (b) combating fires in ruptured tanks; and
- (c) discharging internally or externally to the tanks.

(2) Where non-portable fire extinguishers are provided to comply with the requirements of paragraph (1), they shall be easily transportable to any part of the cargo deck in case of emergency.

Regulation 25

Cargo Pump Room

(1) Machinery and fittings which are sources of ignition shall not be permitted in the cargo pump room.

(2) Each cargo pump room shall be provided with a fixed fire-fighting system operated from a readily accessible position outside the pump room. The system shall use water-spray or another suitable medium satisfactory to the Certifying Authority.

(3) Ships not fitted with a fixed fire-extinguishing system in the cargo pump room shall be provided with a 45 litre-foam extinguisher or its equivalent near the entrance to the pump room.

Regulation 26

Hose Nozzles

All water hose nozzles provided shall be of an approved dual purpose type (i.e. spray/jet type) incorporating a shut-off.

CHAPTER III

LIFE-SAVING APPLIANCES, EMERGENCY PROCEDURES, MUSTERS AND DRILLS

Regulation 1

Application

This Chapter shall apply to all manned cargo ships.

Regulation 2

Definitions

For the purposes of this Chapter —

- "inflated lifeboat" means a permanently inflated survival craft subdivided and of strong, abrasion-resistant construction;
- "launching appliance" means a device capable of launching from the embarkation position, a craft fully loaded with the number of persons it is certified to carry and with its equipment;
- "survival craft" means a craft provided for accommodating the persons on board in the event of abandonment of the ship and includes lifeboats, liferafts and any other craft approved as suitable for the protection and preservation of persons in such circumstances.

Regulation 3

Numbers and Types of Survival Craft

- (a) All ships propelled by mechanical means engaged on international voyages other than tankers referred to in paragraph (2) shall carry —
- (i) on each side one or more survival craft of sufficient aggregate capacity to accommodate the total number of persons the ship is certified to carry; or
- (ii) at least two survival craft capable of being launched on both sides of the ship of sufficient aggregate capacity to accommodate 200% of the total number of persons the ship is certified to carry. The maximum capacity of each survival craft shall not be more than 100% of the total number of persons the ship is certified to carry.

(b) All ships propelled by mechanical means engaged on 30-mile limit voyages and tankers plying within the port (other than tankers referred to in paragraph (2)) may, in lieu of the requirements referred to in sub-paragraph (a) carry one or more survival craft capable of being launched on both sides of the ship and of sufficient aggregate capacity to accommodate all persons the ship is certified to carry.

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Regulations

(a) All tankers carrying crude oil and petroleum products having a flash point not exceeding 60° Celsius (closed cup test) as determined by an approved flashpoint apparatus and whose Reid vapour pressure is below atmospheric pressure, and other liquid products having a similar fire hazard, shall carry on each side one or more rigid lifeboats of sufficient aggregate capacity to accommodate the total number of persons the ship is certified to carry.

(b) Such tankers engaged on 30-mile limit voyages or plying within the port may, in lieu of the requirements referred to in sub-paragraph (a) carry —

- (i) on each side one or more rigid liferafts of sufficient aggregate capacity to accommodate all persons the ship is certified to carry; or
- (ii) one or more rigid lifeboats or rigid liferafts capable of being launched on both sides of the ship and of sufficient aggregate capacity to accommodate all persons the ship is certified to carry.

(3) Every manned barge to which these Regulations apply shall be provided with one or more survival craft of sufficient capacity to accommodate at least all persons the barge is certified to carry.

Regulation 4

Marking of Survival Craft

(1) The dimensions of a lifeboat and the number of persons which it is certified to carry shall be clearly marked on it with permanent characters. The name of the ship and the word "Singapore" shall be painted on each side of the bow.

(2) An inflatable liferaft and its valise or container shall be marked with the number of persons it is certified to carry, the serial number and the manufacturer's name. In addition, the liferaft shall be marked with the name of the ship and the word "Singapore".

(3) Every rigid liferaft shall be marked with the name of the ship and the word "Singapore" and with the number of persons it is certified to carry.

(4) No survival craft shall be marked for a greater number of persons than that obtained in the manner specified in regulations 5 and 6.

Regulation 5

Construction and Capacity of Lifeboats

(1) Lifeboats shall be constructed to the satisfaction of the Certifying Authority and be of such form and proportions that they shall have adequate freeboard and stability in a seaway when loaded with their full complement of persons and equipment and shall comply with the provisions of paragraphs 1 and 2 of the Second Schedule as far as applicable. Lifeboats loaded with their full complement of persons and equipment shall, when flooded and open to the sea, be capable of keeping afloat with positive stability.

(2) The cubic capacity of a rigid lifeboat shall be determined by the rule given in paragraph 3 of the Second Schedule or by other methods giving at least the same degree of accuracy. The capacity of a square-sterned lifeboat shall be calculated as if the lifeboat had a pointed stern.

(3) The number of persons which a rigid lifeboat shall be permitted to accommodate shall —

- (*a*) be equal to the greatest whole number obtained by dividing the capacity in cubic metres by a factor
 - (i) of 0.283 for a boat of 7.3 metres in length or over;
 - (ii) of 0.396 for a boat of 4.9 metres in length; and
 - (iii) obtained by linear interpolation between 0.396 and 0.283 for boats over 4.9 metres but less than 7.3 metres; and
- (b) in no case exceed the number of adult persons wearing life-jackets who can be properly seated without in any way interfering with the use of oars or the operation of other propulsion equipment.

(4) The number of persons which an inflated lifeboat shall be permitted to accommodate shall be the lesser of the following numbers:

- (*a*) the greatest whole number obtained by dividing by 0.12 the volume of the main buoyancy tubes measured in cubic metres reduced by 0.40 cubic metres which for this purpose shall include neither the thwarts nor the centreline tube, if fitted; or
- (b) the greatest whole number obtained by dividing by 0.32 the area of the floor measured in square metres which for this purpose may include the thwarts and centreline tube, if fitted.

In no case shall it exceed the number of adult persons wearing life-jackets who can be properly seated without in any way interfering with the use of oars or the operation of other propulsion equipment. No inflated lifeboat shall be approved which has a carrying capacity of fewer than 10 persons.

Regulation 6

Construction and Capacity of Liferafts

(1) The construction of inflatable liferafts shall comply with the provisions of paragraph 4.2 of the Second Schedule.

(2) The number of persons which an inflatable liferaft shall be permitted to accommodate shall be the lesser of the following numbers:

- (*a*) 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 thwart or thwarts, if fitted) when inflated; or
- (b) the greatest whole number obtained by dividing by 0.372 the area measured in square metres of floor (which for this purpose may include the thwart or thwarts, if fitted) of the liferaft when inflated.

(3) Rigid liferafts shall comply with the provisions of paragraph 4.1 of the Second Schedule and —

- (*a*) be so constructed that if they are dropped into the water from their stowed position neither the liferaft nor its equipment will be damaged; and
- (b) at all times be effective and stable when floating either way up.

(4) The number of persons which a rigid liferaft shall be deemed fit to accommodate shall be the lesser of the following numbers:

- (a) the greatest whole number obtained by dividing by 0.096 the volume measured in cubic metres of the air cases or buoyant material; or
- (b) the greatest whole number obtained by dividing by 0.372 the deck area of the liferaft measured in square metres.

Regulation 7

Availability and Stowage of Survival Craft

- (1) Survival craft shall
 - (a) (i) be readily available in case of emergency; and
 - (ii) be capable of being launched safely and rapidly even under unfavourable conditions of trim and against 15 degrees of list; and
 - (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) Survival craft and launching appliances shall be in working order and available for immediate use before the ship leaves port and so kept at all times when at sea.

(*a*) Survival craft shall be stowed in accordance with paragraph 6 of the Second Schedule to the satisfaction of the Certifying Authority.

(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 and steeply overhanging portions of the hull, so ensuring as far as practicable that they can be launched down the straight side of the ship. If positioned forward they shall be stowed abaft the collision bulkhead in a sheltered position and in this respect the Certifying Authority shall give special consideration to the strength of the davits.

(d) Davits shall be of an approved design complying with the requirements of paragraph 6 of the Second Schedule.

(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 in the case of inflatable liferaft 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.

Regulation 8

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 it is waterborne;
- (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 32 of Chapter II-1;
- (c) arrangements for warning all persons on board that the ship is about to be abandoned; and
- (d) means for preventing any discharge of water into the survival craft.

Life-jackets

(1) For every person on board, a life-jacket of an approved type shall be carried complying with the requirements of paragraph 7.1 of the Second Schedule. Each life-jacket shall be suitably marked showing that it has been approved.

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

(a) In addition to the life-jackets required by paragraph (1), the additional number of life-jackets shall be provided in accordance with the following table:

The number of persons that the ship is certified to carry	Minimum number of additional life-jackets
more than 16 persons	not less than 25% of the total number of persons the ship is certified to carry
between 4 and 16 persons	not less than 4
fewer than 4 persons	2.

- (b) The additional life-jackets shall be of the same type as supplied to the ship to meet the requirements of paragraph (1) and shall be stowed at or near the normal embarkation positions, except in the cases of smaller ships and other vessels which carry life-jackets to meet the requirements of paragraph (1) in boxes on deck. In these latter cases bridge stowage for additional life-jackets may be provided, or alternatively in positions to the satisfaction of the Certifying Authority.
- (c) A suitable dry stowage position, unlocked and clearly marked, shall be provided.

Regulation 10

Lifebuoys

(1) Every ship propelled by mechanical means engaged on all voyages shall carry at least 8 lifebuoys.

(2) Every manned barge engaged on international voyages shall carry at least 4 lifebuoys.

(3) Lifebuoys required by this regulation shall comply with the requirements of paragraph 7.2 of the Second Schedule.

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(4) At least half of the number of lifebuoys referred to in paragraphs (1) and (2) shall be provided with self-igniting lights, which shall be near the lifebuoys to which they belong, with the necessary means of attachment.

(5) The self-igniting lights required by paragraph (4) shall be such that they cannot be extinguished by water. They shall be capable of burning for not less than 45 minutes and shall have a luminous intensity of not less than two candelas in all directions of the upper hemisphere.

(6) In ships of 45 metres in length (L) and over at least two of the lifebuoys provided with self-igniting lights in accordance with paragraph (4) shall also be provided with an efficient self-activating smoke signal capable of producing smoke of a highly visible colour for at least 15 minutes, and shall where practicable be capable of quick release from the wheelhouse.

(7) At least one lifebuoy on each side of the ship shall be fitted with a buoyant lifeline of at least 27.5 metres in length. Such lifebuoys shall not have self-igniting lights.

(8) 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

(1) Every ship of 24 metres in length (L) and above propelled by mechanical means engaged on international voyages other than 30-mile limit voyages shall carry a line-throwing appliance of an approved type.

(2) A line-throwing appliance shall be capable of carrying a line not less than 230 metres with reasonable accuracy and shall include not less than two projectiles and two lines.

(3) The rockets, with the means of igniting them and the lines shall be kept in a watertight case.

Regulation 12

Distress Signals

(1) Every ship shall be provided, to the satisfaction of the Certifying Authority, with means of making effective distress signals by day and by night, including at least 12 parachute signals capable of giving a bright red light at a high altitude.

(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.

Portable Radio Equipment for Survival Craft

(1) Every ship propelled by mechanical means engaged on international voyages other than 30-mile limit voyages shall carry a portable radio apparatus or an emergency position-indicating radio beacon (EPIRB), each of an approved type and located in such a way as to be readily accessible.

(2) In the case of ships engaged on voyages of such duration that in the opinion of the Director the portable radio apparatus or EPIRB referred to in paragraph (1) is unnecessary, the Director may allow such equipment to be dispensed with.

Regulation 14

Muster List and Abandon Ship Procedure

(1) Subject to paragraph (2), a muster list shall be drawn up for every ship to which these Regulations apply and shall include the following information:

- (a) duties assigned to different members of the crew in the event of an emergency in connection with
 - (i) the closing of any watertight doors, valves and closing mechanisms of scuppers, overboard shoots, sidecuttles and fire doors;
 - (ii) the equipping of survival craft (including portable radio apparatus for survival craft);
 - (iii) the launching of the survival craft;
 - (iv) the general preparation of other life-saving appliances;
 - (v) the manning of fire parties assigned to deal with fires; and
 - (vi) the special duties assigned in respect of the operation of firefighting equipment and installations; and
- (b) the signals for summoning the crew to their survival craft and fire stations and particulars of these signals including the emergency signal for summoning the crew to muster stations which shall be a succession of 7 or more short blasts followed by one long blast on the whistle or siren.

(2) In ships of less than 45 metres in length (L), the Director may permit relaxation of the requirements of paragraph (1) if satisfied that, due to the small number of crew members, no muster list is necessary.

(3) The muster list shall be updated whenever there is a change in any of the crew.

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(4) The list of emergency signals shall be posted up in the wheelhouse and in the crew accommodation. Copies of the muster list shall be posted up in several parts of the ship and, in particular, in the crew accommodation.

(5) Emergency signals specified in the muster list shall be made with the whistle or siren. Ships of 45 metres in length (L) and over shall be fitted with an electrical system of alarm bells capable of being operated from the wheelhouse.

Regulation 15

Practice Musters and Drills

(1) A muster of the crew for abandon ship drill and fire drill shall take place at intervals of not more than one month, except that these musters shall take place as soon as practicable whenever more than 25% of the crew has been replaced since the last muster.

(2) When holding musters, the master shall examine the life-saving, firefighting and other safety equipment to ensure that they are complete and in satisfactory working order.

(3) The dates on which musters are held shall be recorded in the official log book and if no muster is held within the prescribed interval or a part muster is held, an entry shall be made stating the circumstances and extent of the muster held. A report of the examination of the life-saving equipment shall be entered in the log book, together with a record of the survival craft used.

(4) In ships fitted with lifeboats, different boats shall be swung out at successive drills. The lifeboats shall, where practicable, be lowered into the water at least once every 4 months at which time checks shall be carried out for the reliability of all apparatuses and systems and the watertight integrity of the boats as well as the operation of the releasing devices.

(5) Musters shall be conducted to ensure that the crew thoroughly understand and are familiar with the duties they have to perform including the handling and operation of liferafts where these are carried.

CHAPTER IV

MISCELLANEOUS

Regulation 1

Application

This Chapter shall apply to all ships propelled by mechanical means.

Merchant Shipping (Nonconvention Ships) Safety Regulations

CAP. 179, Rg 9]

[1990 Ed. p. 55

Part A — SHIPBORNE NAVIGATION EQUIPMENT AND SAFETY OF NAVIGATION

Regulation 2

Compasses

(1) Every ship of 150 tonnes and above engaged on voyages other than 30-mile limit voyages shall be fitted with —

- (a) a standard magnetic compass in a suitable binnacle positioned on the ship's centreline. The standard magnetic compass, or any repeater from it, which provides the primary means of navigating the ship shall be sited in the vicinity of the position from which the ship is ordinarily navigated, and the view of the horizon from this position shall be as uninterrupted as possible for the purpose of taking bearings. In the sector from right ahead to 115 degrees on either side the view of the horizon shall be uninterrupted as far as practicable by such permanent structures as masts, derrick posts, etc.; and
- (b) a second magnetic compass in a suitable binnacle adjacent to the main steering position for the helmsman to steer by.

(2) Where a projected or reflected image of the standard compass referred to in sub-paragraph (1)(a) is provided at the main steering position for the helmsman to steer by, the second magnetic compass referred to in sub-paragraph (1)(b) need not be fitted.

(3) Ships of less than 150 tonnes engaged on international voyages and all ships on 30-mile limit voyages and tankers plying within the port shall be fitted with —

- (*a*) a magnetic compass in a suitable binnacle at the main steering position for the helmsman to steer by; and
- (b) a second magnetic compass in a suitable binnacle shall be fitted in a position suitable for taking bearings:

Provided that the second magnetic compass need not be fitted if the first magnetic compass is suitable for taking bearings or other suitable equipment is provided for taking bearings.

(4) In ships which are required to be fitted with only one magnetic compass, a spare magnetic compass bowl which is interchangeable with the magnetic compass shall be carried.

- (5) Every magnetic compass fitted shall be positioned in such a way that
 - (a) the helmsman can efficiently steer by the compass; and
 - (b) the compass is located at a safe distance away from the other equipment and fittings which affect the performance of the compass.

(6) Means shall be provided to ensure that compass bearings can be taken by day and by night.

(7) Magnetic compasses shall be properly compensated and a table or curve of residual deviations shall be provided on board the ship.

(8) In a ship fitted with a dry magnetic compass, spare compass cards in sufficient quantity shall be carried.

(9) Means of illumination and facilities for dimming shall be provided to enable reading of the compass card at all times.

(10) The magnetic compasses installed in a ship shall be adjusted —

- (a) when the compasses are first installed;
- (b) whenever the ship undergoes structural repairs or alterations that are liable to affect her permanent or induced magnetism;
- (c) when any alteration which may have an effect on compass performance is made to any electrical apparatus or equipment made of magnetic materials in the vicinity of the compass; or
- (d) when a magnetic compass becomes unreliable from causes unknown.

(11) A voice pipe or other adequate means of communication between the normal navigation control position and the standard compass position or emergency steering position shall be provided.

Regulation 3

Nautical Instruments and Publications

Suitable nautical instruments, adequate and updated charts, sailing directions, list of lights, notices to mariners, tide tables and all other nautical publications necessary for the intended voyage shall be carried.

Regulation 4

Signalling Equipment

(1) All ships shall be provided with a full complement of flags and pendants to enable communication using the International Code of Signals in force.

(2) In all ships a copy of the International Code of Signals in force shall be carried.

(3) In addition to the requirements referred to in paragraphs (1) and (2), all ships of over 150 tonnes, when engaged on voyages other than 30-mile limit voyages, shall have on board an efficient daylight signalling lamp which shall not be solely dependent upon the ship's main source of electrical power.

Safety of Navigation

(1) The following Regulations of Chapter V of the Merchant Shipping (Safety Convention) Regulations [Rg 11] shall apply to all ships propelled by mechanical means engaged on voyages other than 30-mile limit voyages:

(<i>a</i>)	Regulation 8	:	Life-Saving Signals		
(<i>b</i>)	Regulation 23	:	Pilot Transfer Arrangements		
(c)	Regulation 31	:	Danger Messages		
(d)	Regulation 32	:	Information required in danger messages		
(e)	Regulation 33	:	Distress Situations: Obligations and Procedures		
(f)	Regulation 35	:	Misuse of Distress Signals		

[S 998/2024 wef 01/01/2025]

(2) All ships engaged on 30-mile limit voyages shall comply with the provisions referred to in paragraph (1)(a), (b), (e) and (f).

[S 998/2024 wef 01/01/2025]

Part B — RADIOTELEPHONY

Regulation 6

Definition

For the purposes of this Part, "Radio Regulations" means the Radio Regulations annexed to the International Telecommunication Convention in force.

Regulation 7

MF Radiotelephone and VHF Radiotelephone Station

(1) A ship of less than 300 tonnes propelled by mechanical means engaged on voyages outside the port limit shall be provided with a Very High Frequency (VHF) radiotelephone station complying with paragraph 1 of the Third Schedule. Such ships if fitted with a Medium Frequency (MF) radiotelephone station complying with paragraphs 2 and 3 of the Third Schedule need not be provided with a VHF radiotelephone station.

(2) A ship of 300 tonnes and above engaged on voyages outside the port limit shall comply with the relevant requirements of Chapter IV of the Merchant Shipping (Safety Convention) Regulations [Rg 11].

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Regulations

(3) A ship which is fitted with a radiotelegraph station complying with paragraphs 5 and 6 of the Third Schedule in pair material except for reg. 3-1 of 219/84 (New) need not be provided with either MF radiotelephone station or VHF radiotelephone station.

Regulation 8

Radiowatches

(1) A ship which is fitted with a MF radiotelephone station shall carry at least one radiotelephone operator (who may be the master, an officer or a member of the crew holding a certificate for radiotelephony) who shall, while the ship is at sea, maintain continuous watch on the radiotelephone distress frequency in the place on board from which the ship is usually navigated, by use of a radiotelephone distress frequency watch receiver, using a loudspeaker, a filtered loudspeaker or radiotelephone auto alarm.

(2) A ship which is fitted with a radiotelegraph station shall carry a radio operator holding at least a Special Radiotelegraph Operator's Certificate of Competency, who shall while the ship is at sea, maintain continuous watch on the radio-telephone distress frequency in a place to be determined by the Director, by use of a radiotelephone distress frequency watch receiver, using a loudspeaker, a filtered loudspeaker or radiotelephone auto alarm.

(3) On a ship fitted with a VHF radiotelephone station, a listening watch shall be maintained while the ship is at sea, on the VHF radiotelephone distress frequency except when the VHF radiotelephone station is engaged in communications on a working frequency.

Regulation 9

Radio Logs

(1) The radio log (diary of the radio service) required by the Radio Regulations for a ship which is fitted with a radiotelegraph station shall be kept in the radiotelegraph operating room while the ship is at sea. Every radio operator shall enter in the log his name, the time at which he goes on and off watch, and all incidents connected with the radio service which occur during his watch which may appear to be of importance to safety of life at sea. In addition, there shall be entered in the log —

- (a) the details required by the Radio Regulations;
- (b) details of the maintenance, including a record of the charging of the batteries;
- (c) a daily statement that paragraph 6.10 of the Third Schedule has been complied with;

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- (d) in ships fitted with a radiotelegraph auto alarm, details of tests made under paragraph 7.3 of the Third Schedule; and
- (e) details of the maintenance and tests of portable radio apparatus for survival craft and EPIRB referred to in regulation 13 of Chapter III.

(2) The radio log required by the Radio Regulations for a ship which is fitted with a radiotelephone station shall be kept at the place where the listening watch is maintained. Every qualified operator and every crew member carrying out a listening watch shall enter in the log his name and the details of all incidents connected with the radio service which occur during his watch which may appear to be of importance to safety of life at sea. In addition, there shall be entered in the log —

- (a) the details required by the Radio Regulations;
- (b) the time at which the listening watch begins when the ship leaves port, and the time at which it ends when the ship reaches port;
- (c) the time at which the listening watch is for any reason discontinued together with the reason and the time at which the listening watch is resumed;
- (d) details of the maintenance of the batteries (if provided), including a record of the charging required by paragraph 3.12 of the Third Schedule; and
- (e) details of the maintenance and tests of portable radio apparatus for survival craft and EPIRB referred to in regulation 13 of Chapter III.

(3) The radio log required for a ship which is fitted with a VHF radiotelephone station shall be kept at the place where the listening watch is maintained. Every crew member carrying out a listening watch shall enter in the log the details of all communications connected with distress. In addition, there shall be entered in the log such details as may be required by the Director.

(4) Radio logs shall be available for inspection by the officers authorised by the Director to make such inspection.

Part C — CARRIAGE OF GRAINS, DANGEROUS GOODS AND STORES

Regulation 10

Carriage of Grains

Chapter VI of the Merchant Shipping (Safety Convention) Regulations [Rg 11] shall apply to every ship to which these Regulations apply when engaged on international voyages.

Carriage of Dangerous Goods and Stores

(1) Chapter VII of the Merchant Shipping (Safety Convention) Regulations [Rg 11] shall apply to every ship to which these Regulations apply.

(2) Every cargo ship to which these Regulations apply shall comply with the following stowage requirements of gas cylinders and dangerous materials:

- (*a*) cylinders for compressed, liquefied or dissolved gases shall be clearly marked by means of prescribed identifying colours, have a clear legible identification of the name and chemical formula of their contents and be properly secured;
- (b) cylinders containing flammable or other dangerous gases and expended cylinders shall be stored and properly secured on open decks. All valves, pressure regulators and pipes leading from such cylinders shall be protected against damage. Cylinders shall be protected against excessive variation in temperature and direct rays from the sun. However, the Certifying Authority may permit such cylinders to be stored in compartments complying with sub-paragraphs (c) and (e);
- (c) spaces containing highly flammable liquids, such as volatile paints, paraffin, benzole, etc., and, where permitted, liquefied gas, shall have direct access from open decks only. Pressure-adjusting devices and relief valves shall exhaust within the compartment. Where boundary bulkheads of such compartments adjoin other enclosed spaces they shall be gastight;
- (d) except as necessary for service within the space, electrical wiring and fittings shall not be permitted within compartments used for the storage of highly flammable liquids or liquefied gases. Where such electrical fittings are installed, they shall be to the satisfaction of the Certifying Authority for use in a flammable atmosphere. Sources of heat shall be kept clear of such spaces and "No Smoking" and "No Naked Light" notices shall be displayed in a prominent position; and
- (e) separate storage shall be provided for each type of compressed gas. Compartments used for the storage of such gases shall not be used for storage of other combustible products nor for tools or objects not part of the gas distribution system. However, the Certifying Authority may permit relaxation of these requirements considering the characteristics, volume and intended use of such compressed gases.

FIRST SCHEDULE

FORM 1

Merchant Shipping (Nonconvention Ships) Safety Regulations

FIRST SCHEDULE — continued

Chapter I regulation 8(1)

CARGO SHIP SAFETY CONSTRUCTION CERTIFICATE

Issued under

MERCHANT SHIPPING (NON-CONVENTION SHIPS) SAFETY REGULATIONS

REPUBLIC OF SINGAPORE

Name of Ship	Official Number	Port of Registry	Gross Tonnage	Length (L)	Date on which keel was laid (See Note 1 below)

THIS IS TO CERTIFY —

That the above-mentioned ship has been duly surveyed in accordance with the provisions of the Merchant Shipping (Non-convention Ships) Safety Regulations, and that the survey showed that the hull, machinery and equipment, as defined in the above Regulations, were in all respect satisfactory.

THIS CERTIFICATE shall remain in force until subject to annual/intermediate surveys being carried out and endorsements made accordingly within the period from to annually.

Issued at SINGAPORE.

(Date of issue)

..... Director of Marine, Singapore.

Notes: 1. It will be sufficient to indicate the year in which the keel was laid except for 1982, in which case the actual date should be given.

2. The duplicate of this certificate is to be put up in a prominent place in the ship, where it is accessible to all persons on board.

ENDORSEMENT OF ANNUAL AND INTERMEDIATE SURVEYS

THIS IS TO CERTIFY that at a survey required by Regulation 7(1)(c) of Chapter I of the Merchant Shipping (Non-Convention Ships) Safety Regulations, the ship was found to comply with the relevant requirements of the Regulations.

Annual survey:

Signed

Merchant Shipping (Non-	
convention Ships) Safety	

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FIRST SCHEDULE — continued

	Name
	Place
	Date
Annual/Intermediate* survey:	Signed
	Name
	Place
	Date
Annual/Intermediate* survey:	Signed
	Name
	Place
	Date
Annual survey:	Signed
	Name
	Place
	Date

Under the provisions of Regulation $7(1)(b)(i)/10(c)(3)/10(c)(4)^*$ the validity of this Certificate is extended until

Signed
Name
Place
Date

*Delete as appropriate

[S 230/97 wef 09/05/1997]

FORM 2

Chapter I regulation 8(2)

CARGO SHIP SAFETY EQUIPMENT CERTIFICATE

(For ships engaged on international voyages/30-mile limit voyages*)

Informal Consolidation - version in force from 1/1/2025

Merchant Shipping (Nonconvention Ships) Safety Regulations

FIRST SCHEDULE — continued

Issued under



MERCHANT SHIPPING (NON-CONVENTION SHIPS) SAFETY REGULATIONS

REPUBLIC OF SINGAPORE

Name of Ship	Official Number	Port of Registry	Gross Tonnage	Length (L)	Date on which keel was laid (See Note 1 below)

THIS IS TO CERTIFY ----

- I. That the above-mentioned ship has been duly surveyed in accordance with the provisions of the Merchant Shipping (Non-Convention Ships) Safety Regulations.
- II. That the inspection showed that the life-saving appliances provided for a total number of persons and no more, viz:—
 - survival craft for which approved launching devices are required capable of accommodating persons;
 - survival craft for which approved launching devices are not required capable of accommodating persons;
 - lifebuoys; and
 - life-jackets.
- III. That the survival craft were equipped in accordance with the provisions of the Regulations.
- IV. That the ship was provided with a line-throwing apparatus and portable radio apparatus for survival craft in accordance with the provisions of the Regulations.
- V. That the inspection showed that the ship complied with the requirements of the said Regulations as regards fire-extinguishing appliances and fire control plans and was provided with navigation lights and shapes, pilot ladder, and means of making sound signals and distress signals, in accordance with the provisions of the Regulations and the Merchant Shipping (Prevention of Collisions at Sea) Regulations.
- VI. That in all other respects the ship complied with the requirement of the Regulations so far as these requirements apply to it.

THIS CERTIFICATE shall remain in force until

Issued at SINGAPORE.

.....

(Date of issue)

Director of Marine, Singapore.

.....

Informal Consolidation – version in force from 1/1/2025

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Regulations

FIRST SCHEDULE — continued

*Delete as appropriate

- *Notes:* 1. It will be sufficient to indicate the year in which the keel was laid except for 1982, in which case the actual date should be given.
 - 2. The duplicate of this certificate is to be put up in a prominent place in the ship, where it is accessible to all persons on board.

[S 230/97 wef 09/05/1997]

FORM 3

Chapter I regulation 8(3)

CARGO SHIP SAFETY RADIOTELEPHONY CERTIFICATE

Issued under

MERCHANT SHIPPING (NON-CONVENTION SHIPS) SAFETY REGULATIONS

REPUBLIC OF SINGAPORE

(For ships of less than 300 tons)

Name of Ship	Official Number	Port of Registry	Gross Tonnage	Date on which keel was laid (See Note 1 below)

THIS IS TO CERTIFY —

I. That the above-mentioned ship complies with the provisions of the Regulations as regards Radiotelephony:-

	Requirement of Regulations	Actual provisions
Hours of listening		
Number of operators		

II. That the functioning of the portable radio apparatus for survival craft, if provided, complies with the provisions of the said Regulations.

THIS CERTIFICATE shall remain in force until

Issued on

.....



Informal Consolidation – version in force from 1/1/2025

CAP. 179, Rg 9]

Merchant Shipping (Nonconvention Ships) Safety Regulations

FIRST SCHEDULE — continued

Director of Marine, Singapore.

- *Notes*: 1. It will be sufficient to indicate the year in which the keel was laid except for 1982, in which case the actual date should be given.
 - 2. The duplicate of this certificate is to be put up in a prominent place in the ship, where it is accessible to all persons on board.

[S 230/97 wef 09/05/1997]

FORM 4

Chapter I regulation 8(4)

CARGO SHIP SAFETY RADIOTELEGRAPHY CERTIFICATE

Issued under

MERCHANT SHIPPING (NON-CONVENTION SHIPS) SAFETY REGULATIONS

REPUBLIC OF SINGAPORE

(For ships of less than 300 tons)

Name of Ship	Official Number	Port of Registry	Gross Tonnage	Date on which keel was laid (See Note 1 below)

THIS IS TO CERTIFY —

I. That the above-mentioned ship complies with the provisions of the Regulations as regards Radiotelegraphy:-

	Requirements of Regulations	Actual provisions
Hours of listening by operator		
Number of operators		
Whether auto alarm fitted		
Whether main installation fitted		
Whether reserve installation fitted		
	•••••	

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Regulations

FIRST SCHEDULE — continued

Whether main and reserve transmitters electrically separated or combined	
Whether radio equipment for homing on the radiotelephone distress frequency fitted	

II. That the functioning of the portable radio apparatus for survival craft, if provided, complies with the provisions of the said Regulations.

THIS CERTIFICATE shall remain in force until

Issued on

.....

Director of Marine, Singapore.

- *Notes*: 1. It will be sufficient to indicate the year in which the keel was laid except for 1982, in which case the actual date should be given.
 - 2. The duplicate of this certificate is to be put up in a prominent place in the ship, where it is accessible to all persons on board.

[S 230/97 wef 09/05/1997]

FORM 5

Chapter I regulation 8(5)

EXEMPTION CERTIFICATE

Issued under

MERCHANT SHIPPING (NON-CONVENTION SHIPS) SAFETY REGULATIONS

REPUBLIC OF SINGAPORE

(For ships of less than 300 tons)

Name of Ship	Official Number	Port of Registry	Gross Tonnage

THIS IS TO CERTIFY that the above-mentioned ship is exempted under regulation 4 of Chapter I of the Merchant Shipping (Non-Convention Ships) Safety Regulations, from the requirements of regulation(s) subject to the following conditions, if any:



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Regulations

FIRST SCHEDULE — continued

THIS CERTIFICATE shall remain in force until

Issued on

.....

Director of Marine, Singapore.

[S 230/97 wef 09/05/1997]

[G.N. No. S 356/81]

SECOND SCHEDULE

Chapter III Regulations 5 to 7, 9, 10

SPECIFICATIONS FOR LIFE-SAVING APPLIANCES

1. Construction of Lifeboats

1.1 Rigid Lifeboats.

Lifeboats shall have rigid sides and internal buoyancy only. The Certifying Authority may approve lifeboats with a rigid shelter, provided that it may be readily opened from both inside and outside, and does not impede rapid embarkation and disembarkation or the launching and handling of the lifeboat.

Lifeboats shall be not less than 4.9 metres in length except for ships engaged on 30-mile limit voyages but in no case shall a lifeboat be less than 3.7 metres in length.

No lifeboat the mass of which when fully laden with persons and equipment exceeds 20,300 kilogrammes or which has a carrying capacity calculated in accordance with regulation 5(3) of Chapter III of more than 150 persons, shall be provided.

Lifeboats permitted to carry more than 60 persons shall be motor lifeboats complying with the requirements of paragraph 2.1 of this Schedule.

Lifeboats shall be of sufficient strength to enable them to be safely lowered into the water with their full complement of persons and equipment and will not suffer residual deflection if subjected to an overload of 25%.

Lifeboats of 4.9 metres or more in length shall have a mean sheer at least equal to 4% of their length. Lifeboats of less than 4.9 metres in length shall have a mean sheer at least equal to 5% of their length. The sheer shall be approximately parabolic in form.

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Regulations

SECOND SCHEDULE — continued

Lifeboats shall have inherent buoyancy, or shall be fitted with watertight air cases or other equivalent non-corrodible buoyant material which shall not be adversely affected by oil or oil products, sufficient to float the lifeboat and its equipment when the lifeboat is flooded and open to the sea. An additional volume of watertight air cases or other equivalent non-corrodible buoyant material, which shall not be adversely affected by oil or oil products, equal to at least 10% of the cubic capacity of the lifeboat or, in cases where the length of the lifeboat is less than 4.9 metres, at least 7.5% of the cubic capacity shall be provided. The Certifying Authority may permit the watertight air cases to be filled with a noncorrodible buoyant material which shall not be adversely affected by oil or oil products.

Thwarts and side seats shall be fitted as low in the lifeboat as practicable.

The block coefficient as determined in accordance with paragraph 3 of this Schedule shall not be less than 0.64. However, in exceptional circumstances it may be less than 0.64 provided that the Certifying Authority is satisfied that the metacentric height and freeboard are adequate when the lifeboat is loaded with its full complement of persons and equipment.

1.2 Inflated Lifeboats.

The lifeboat's buoyancy shall consist of at least two inflated tubes arranged one on top of the other on both sides of the lifeboat.

The buoyancy tubes shall be made of approved material.

- (a) The minimum diameter of the buoyancy tubes shall not be less than
 - (i) 350 millimetres for lifeboats certified to carry not more than 15 persons; and
 - (ii) 400 millimetres for lifeboats certified to carry more than 15 persons.

(b) Where the buoyancy tubes are of different diameters the tube with the larger diameter shall be the lower tube.

The buoyancy of the lifeboat, when loaded with the full complement of persons and equipment, shall be so arranged as to ensure by division into a number of separate compartments that, after a loss of 50% of its buoyancy in any part or parts of its buoyancy tubes, the lifeboat remains stable and maintains adequately its shape to provide sufficient space for its full complement of persons. Each compartment shall be capable of being inflated separately.

Lifeboats shall be so constructed as to maintain their shape and rigidity in all operating and loading conditions.

Lifeboats shall be so constructed as to be capable of withstanding exposure for 30 days afloat in all sea conditions and have a sufficient margin of durability to ensure

Merchant Shipping (Nonconvention Ships) Safety Regulations

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SECOND SCHEDULE — continued

that their performance will not be affected by being stowed on an exposed deck during the period between normal inspections.

The floor of lifeboats shall be waterproof and provide an efficient working platform of adequate strength capable of withstanding all stresses to which it may be subjected in all operating conditions, including lowering of the lifeboat loaded with its full complement of persons and equipment.

The stability of a lifeboat shall be adequate and positive when loaded with its full complement of persons and equipment.

The ratio of length to width of a lifeboat shall not exceed 2.2, unless the Certifying Authority is satisfied that departure from this ratio will not impair the seaworthiness of the lifeboat.

Lifeboats shall be of sufficient strength to enable them to be safely lowered into the water with their full complement of persons and equipment. They shall be strong enough to withstand a 25% overload test without significant distortion or any resultant permanent deformation.

Materials used in the construction of lifeboats shall be unaffected by oil or oil products and be highly resistant to ultraviolet light. The lifeboat shall be capable of operating throughout a temperature range of plus 66° Celsius to minus 30° Celsius.

Rowing and seating thwarts shall be arranged as low as possible in the lifeboat. An adequate number of suitably positioned anti-capsizing bags shall be fitted, unless the Certifying Authority is satisfied that the stability and seaworthiness of the lifeboat when not fitted with anti-capsizing bags is sufficient.

A suitable cover for protecting the occupants against injury from exposure shall be provided. The cover and the upper buoyancy tube shall be of a highly visible colour.

An adequate number of strong patches shall be provided for attaching fittings and securing equipment.

Rubbing strips shall be fitted underneath the bottom of the boat and along the lower buoyancy tube.

- 2. Motor Lifeboats
- 2.1 Rigid Motor Lifeboats.

Motor lifeboats shall be fitted with a compression ignition engine which shall be kept so as to be at all times ready for use and be capable of being readily started in all conditions. Sufficient fuel for at least 24 hours continuous operation at the speed specified in paragraph 2.1.3 below shall be provided.

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The engine and its accessories shall be suitably enclosed to ensure operation under adverse weather conditions, and the engine casing shall be fire-resistant. Provision shall be made for going astern.

The ahead speed of the motor lifeboat in smooth water when loaded with its full complement of persons and equipment shall be at least four knots.

The volume of the internal buoyancy appliances of a motor lifeboat shall be increased above that required by paragraph 1.1.7 of this Schedule by the amount, if any, by which the volume of the internal buoyancy appliances required to support the engine and its accessories, and, if fitted, the searchlight and radiotelegraph installation and their accessories, exceeds the volume of the internal buoyancy appliances required, at the rate of 0.0283 cubic metres per person, to support the additional persons which the lifeboat could accommodate if the motor and its accessories, and, if fitted, the searchlight and radiotelegraph installation and their accessories, were removed.

2.2 Inflated Motor Lifeboats

An inflated motor lifeboat shall be fitted with a compression ignition motor permanently attached to the lifeboat. The motor shall be kept at all times ready for use and be capable of being readily started in all conditions. Sufficient fuel for at least 24 hours continuous operation at a speed specified in paragraph 2.2.3 below shall be provided.

The motor and its accessories shall be of such construction as to ensure operation under adverse weather conditions. Provisions shall be made for going astern.

The ahead speed of the motor lifeboat in smooth water loaded with its full complement of persons and equipment shall be at least four knots.

The reserve buoyancy shall be increased above that required by paragraph 1.2.4 of this Schedule by an amount sufficient to support the motor and its accessories.

3. Capacity of Rigid Lifeboats

3.1 The cubic capacity of a lifeboat which may be calculated with the aid of Simpson's Rule, may be considered as given by the following formula:

$$\frac{L_1}{12}$$
 (4A + 2B + 4C)

where L^1 is the length of the lifeboat in metres from the inside of the planking or plating at the stem to the corresponding point at the stern post. In the case of a lifeboat with a square stern, the length is measured to the inside of the transom; and A, B and C denote respectively the areas of the cross sections at the quarterlength forward, amidships, and the quarter-length aft, which correspond to the three points obtained by dividing L, into four equal parts (The areas corresponding CAP. 179, Rg 9]

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to the two ends of the lifeboat are considered negligible). The areas A, B and C shall each be calculated with the aid of the following formula:

 $\frac{h}{12}(a + 4b + 2c + 4d + e)$

where h is the depth measured in metres inside the planking or plating from the keel to the level of the gunwale, or, in certain cases, to a lower level as determined hereafter, and a, b, c, d and e denote the horizontal breadths of the lifeboat measured in metres at the upper and lower points of the depth and at the three points obtained by dividing h into four equal parts (a and e being the breadths at the extreme point, and c at the middle point of h).

3.2 If the sheer of the gunwale, measured at the two points situated at a quarter of the length of the lifeboat from the ends, exceeds 1% of the length of the lifeboat the depth employed in calculating the area of the cross-sections A or C shall be deemed to be the depth amidships plus 1% of the length of the lifeboat.

3.3 If the depth of the lifeboat amidships exceeds 45% of the breadth, the depth employed in calculating the area of the amidship cross-section B shall be deemed to be equal to 45% of the breadth, and the depth employed in calculating the areas of the quarter-length sections A and C is obtained by increasing this last figure by an amount equal to 1% of the length of the lifeboat, provided that in no case shall the depths employed in the calculation exceed the actual depths at these points.

3.4 If the depth of the lifeboat is greater than 1.22 metres the number of persons as determined by the application of regulation 5 of Chapter III shall be reduced in proportion to the ratio of 1.22 metres to the actual depth until the lifeboat has been satisfactorily tested afloat with that number of persons on board, all wearing lifejackets of an approved type.

3.5 The Certifying Authority may assign to a lifeboat constructed of wooden planks a capacity equal to the product of the length, the breadth and the depth multiplied by 0.6 if it is evident that this formula does not give a greater capacity than that obtained by the above method. The dimensions shall then be measured in the following manner:

Length:	From the intersection of the outside of the planking with the stem to the corresponding point at the stern post or, in the case of a square-sterned boat, to the afterside of the transom.
Breadth:	From the outside of the planking at the point where the breadth of the boat is greatest.
Depth:	Amidships inside the planking from the keel to the level of the gunwale, but the depth used in calculating the cubic capacity may not in any case exceed 45% of the breadth.

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In all cases the owner of the ship has the right to require that the cubic capacity of the lifeboat shall be determined by exact measurement

The cubic capacity of a motor lifeboat shall be obtained from the gross capacity by deducting a volume equal to that occupied by the motor and its accessories.

4. Liferafts

4.1 Rigid Liferafts.

The liferaft shall be so constructed that its air cases or buoyant material are placed as near as possible to its sides.

The deck area of the liferaft shall be situated within that part of the liferaft which affords protection to its occupants. The nature of the deck shall be such as to prevent as far as practicable the ingress of water and it shall effectively support the occupants out of the water.

The liferaft shall be fitted with a cover or equivalent arrangement of a highly visible colour, which shall be capable of protecting the occupants against injury from exposure whichever way up the liferaft is floating.

The total weight of a liferaft and its equipment shall not exceed 180 kilogrammes except that such total weight may be exceeded where the liferaft is capable of being launched from both sides of the ship or if means are provided for putting it into the water mechanically on either side of the ship.

The liferaft shall have a painter attached and a lifeline securely becketed round the outside. A lifeline shall also be fitted around the inside of the liferaft.

The liferaft shall be fitted at each opening with efficient means to enable persons in the water to climb on board.

The liferaft shall be so constructed as not to be affected by oil or oil products.

A buoyant light of the electric battery type shall be attached to the liferaft by a lanyard.

The liferaft shall be fitted with arrangements enabling it to be readily towed.

The liferaft shall be so stowed as to float free in the event of the ship sinking.

A liferaft designed for use with a launching appliance shall be properly constructed for the purpose for which it is intended and shall be of sufficient strength to permit it to be safely lowered into the water when loaded with its full complement of persons and equipment.
4.2 Inflatable Liferafts.

The liferaft shall be so constructed that, when fully inflated and floating with the cover upper most, it shall be stable in a seaway.

The liferaft shall be so constructed that if it is dropped into the water from a height of 18 metres, neither the liferaft nor its equipment will be damaged. If the liferaft is to be stowed on the ship at a height above the water of more than 18 metres, it shall be of a type which has been satisfactorily drop-tested from a height at least equal to the height at which it is to be stowed.

The construction of the liferaft shall include a cover which shall automatically be set in place when the liferaft is inflated. This cover shall be capable of protecting the occupants against injury from exposure, and means shall be provided for collecting rain. The top of the cover shall be fitted with a lamp which derives its luminosity from a sea-activated cell and a similar lamp shall also be fitted inside the liferaft. The cover of the liferaft shall be of a highly visible colour.

The liferaft shall be fitted with a painter and shall have a lifeline securely becketed around the outside. A lifeline shall also be fitted around the inside of the liferaft.

The liferaft shall be capable of being readily righted by one person if it inflates in an inverted position.

The liferaft shall be fitted at each opening with efficient means to enable persons in the water to climb on board.

The liferaft shall be contained in a valise or other container so constructed as to be capable of withstanding hard wear under conditions met with at sea. The liferaft in its valise or other container shall be inherently buoyant.

The buoyance of the liferaft shall be so arranged as to ensure, by a division into an even number of separate compartments, half of which shall be capable of supporting out of the water the number of persons which the liferaft is permitted to accommodate, or by some other equally efficient means, that there is a reasonable margin of buoyancy if the liferaft is damaged or partially fails to inflate.

The total mass of the liferaft, its valise or other container and its equipment shall not exceed 180 kilogrammes.

The floor of the liferaft shall be waterproof and shall be capable of being sufficiently insulated against cold.

The liferaft shall be inflated by a gas which is not injurious to the occupants and the inflation shall take place automatically either on the pulling of a line or by some equally simple and efficient method. Means shall be provided whereby the Merchant Shipping (Nonconvention Ships) Safety Regulations

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topping-up pump or bellows required by paragraph 5.5.7 of this Schedule may be used to maintain pressure.

The liferaft shall be of approved material and construction, and shall be so constructed as to be capable of withstanding exposure for 30 days afloat in all sea conditions.

The material used in the construction of liferafts shall be unaffected by oil or oil products. The liferaft shall be capable of operating over a temperature range of plus 66° Celsius to minus 30° Celsius.

The liferaft shall be fitted with arrangements enabling it to be readily towed.

A liferaft designed for use with a launching appliance shall be properly constructed for the purpose for which it is intended and shall be of sufficient strength to permit it to be safely lowered into the water when loaded with its full complement of persons and equipment.

5. Equipment for Survival Craft

The equipment, with the exception of any boat hooks (which shall be kept ready for fending purposes) shall be secured within the craft. The fastening devices shall be so arranged as to ensure safe stowage of the equipment and to prevent any obstruction for a rapid embarkation and handling during the launching operation. Small items of equipment shall be kept in a bag or container fastened to the craft in a locker conspicuously marked. In rigid liferafts the equipment shall be so stowed as to be readily available whichever way up the raft is floating. All items of equipment should be as small and light as practicable.

5.1 Equipment for Rigid Lifeboats.

A single banked complement of buoyant oars, two spare buoyant oars, and a buoyant steering oar; a set and a half of crutches or thole pins attached to the boat by lanyard or chain.

A boat hook.

Two plugs for each plug hole (plugs are not required when proper automatic valves are fitted) attached to the boat by lanyards or chains.

A bailer and two buckets of approved material.

A rudder attached to the boat and a tiller.

A mast or masts with galvanized wire stays together with orange coloured sails.

A lifeline becketed round the outside of the boat; an approved means to enable persons to cling to the boat if upturned in the form of bilge keels or keel rails, together with grab lines secured from gunwale to gunwale under the keel; or other approved arrangements.

Two hatchets, one at each end of the boat.

A lamp with oil sufficient for 12 hours.

A watertight container with two boxes of matches not readily extinguishable by wind.

An efficient compass in binnacle, to be luminized or fitted with suitable means of illumination.

A sea anchor of approved size with a line of adequate strength and length.

Two painters of adequate length and strength. One shall be secured to the forward end of the boat with a strop and toggle so that it can be readily released and the other shall be firmly secured to the stem of the boat and be ready for use.

A vessel containing 4.5 litres of vegetable, fish or animal oil, capable of easily distributing oil on the water surface and capable of being attached to the sea anchor.

Four parachute distress signals of an approved type capable of giving a bright red light at a high altitude and six hand-held distress flare signals of an approved type capable of giving a bright red light.

Two buoyant smoke signals of an approved type (for daytime use) capable of giving off a volume of orange coloured smoke.

An approved first-aid outfit in a watertight case.

A waterproof electric torch suitable for Morse signalling, together with a spare set of batteries and a spare bulb in a watertight container.

A daylight signalling mirror of an approved type.

A jack-knife fitted with a tin-opener to be kept attached to the lifeboat with a lanyard.

Two light buoyant heaving lines.

A manual pump of an approved type.

A whistle or equivalent sound signal.

A set of fishing tackle.

An approved cover of a highly visible colour capable of protecting the occupants against injury from exposure.

A copy of the illustrated table of life-saving signals referred to in regulation 5(1)(e) of Chapter IV.

Instructions on how to survive in the boat.

Means to enable persons in the water to climb into the boat.

A food ration, comprising 450 grammes of suitable non-thirst-provoking food providing at least 4.8 calories per gramme weight and 450 grammes of barley sugar or their equivalent, for each person the lifeboat is certified to carry.

Watertight receptacles containing 3 litres of fresh water for each person the boat is certified to carry, or watertight receptables containing 2 litres of fresh water for each person together with an approved de-salting apparatus capable of providing 1 litre of fresh water per person; a rust-proof dipper with lanyard; a rust-proof graduated drinking vessel.

5.2 Equipment for Rigid Motor Lifeboats.

All the equipment listed in paragraph 5.1 of this Schedule. Motor lifeboats need not carry a mast or sails or more than half the complement of oars, but they shall carry two boat hooks.

Portable fire-extinguishing equipment of an approved type capable of discharging froth or other suitable substance for extinguishing oil fires.

5.3 Equipment for Inflated Lifeboats.

A single banked complement of buoyant oars, two spare buoyant oars and a buoyant steering oar; a set of rowlocks and a steering rowlock firmly attached to the boat.

A boat hook with a ball point.

Two plugs for each plug hole (plugs are not required when proper automatic valves are fitted) attached by lanyards to the boat.

A sponge, a bailer and two buckets of approved material.

A lifeline becketed round the outside of the upper tube and a lifeline becketed round the inside of the upper tube of the boat together with grab lines secured from gunwale to gunwale under the keel or other approved arrangements.

A lamp with oil sufficient for 12 hours.

A watertight container with two boxes of matches not readily extinguishable by wind.

An efficient compass in binnacle, to be luminized or fitted with suitable means of illumination.

A sea anchor of approved size with a line of adequate strength and length.

Two painters of adequate length and strength. One shall be secured to the forward end of the boat with a strop and toggle so that it can be readily released and the other shall be firmly secured to the stem of the boat and be ready for use. Merchant Shipping (Nonconvention Ships) Safety Regulations

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A vessel containing 4.5 litres of vegetable, fish or animal oil, capable of easily distributing oil on the water surface and capable of being attached to the sea anchor.

Four parachute distress signals of an approved type capable of giving a bright red light at a high altitude; six hand-held distress flare signals of an approved type giving a bright red light.

Two buoyant smoke signals of an approved type (for daytime use) capable of releasing a volume of orange-coloured smoke.

An approved first-aid outfit in a watertight case.

A waterproof electric torch suitable for Morse signalling together with a spare set of batteries and a spare bulb in a watertight container.

A daylight signalling mirror of an approved type.

A safety knife to be kept attached by a lanyard to the boat.

Two light buoyant heaving lines.

A whistle or equivalent sound signal.

A set of fishing tackle.

An approved cover of a highly visible colour capable of protecting the occupants against injury from exposure.

A copy of the illustrated table of life-saving signals referred to in regulation 5(1)(e) of Chapter IV.

Instructions on how to survive in the boat.

An approved repair outfit for repairing punctures in buoyancy compartments.

A topping-up pump or bellows.

A pressure gauge for controlling the filling pressure.

Means to enable persons in the water to climb into the boat.

Arrangements to enable the boat to be readily towed.

A food ration, comprising 450 grammes of suitable non-thirst-provoking food providing at least 4.8 calories per gramme weight and 450 grammes of barley sugar or their equivalent, for each person the lifeboat is certified to carry.

Watertight receptacles containing 3 litres of fresh water for each person the boat is certified to carry, or watertight receptacles containing 2 litres of fresh water for each person together with an approved de-salting apparatus capable of providing 1 litre of fresh water per person; a rust-proof dipper with lanyard; a rust-proof graduated drinking vessel.

Three safety tin-openers.

5.4 Equipment for Inflated Motor Lifeboats.

All the equipment listed in paragraph 5.3 of this Schedule.

Portable fire extinguishing equipment of an approved type capable of discharging froth or other suitable substance for extinguishing oil fires.

5.5 Equipment for Liferafts.

Two paddles.

A buoyant rescue quoit attached to at least 30 metres of buoyant line.

For liferafts which are permitted to accommodate not more than 12 persons: a safety knife and one bailer. For liferafts which are permitted to accommodate 13 persons or more: two safety knives and two bailers.

Two sponges.

Two sea anchors, one permanently attached to the liferaft and a spare with line.

A repair outfit capable of repairing punctures in buoyancy compartments unless the liferaft complies with the requirements of paragraph 4.1 of this Schedule.

A topping-up pump or bellows, unless the liferaft complies with paragraph 4.1 of this Schedule.

Three safety tin-openers.

An approved first-aid outfit in a waterproof case.

A waterproof electric torch suitable for Morse signalling, together with a spare set of batteries and a spare bulb in a water-tight container.

A daylight signalling mirror of an approved type and a signalling whistle.

Two parachute distress signals of an approved type capable of giving a bright red light at a high altitude.

Six hand-held distress flare signals of an approved type capable of giving a bright red light.

A set of fishing tackle.

A food ration, comprising 340 grammes of suitable non-thirst-provoking food providing at least 4.8 calories per gramme weight and 170 grammes of barley sugar or their equivalent, for each person the liferaft is certified to carry.

Watertight receptacles containing 1.5 litres of fresh water for each person the liferaft is permitted to accommodate, of which 0.5 litre per person may be replaced

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by a suitable de-salting apparatus capable of producing an equal amount of fresh water, and a rust-proof graduated drinking vessel.

Six anti-seasickness tablets or approved equivalent medicine for each person which the liferaft is permitted to accommodate.

Instructions on how to survive in the liferaft.

A copy of the illustrated table of life-saving signals referred to in regulation 5(1)(e) of Chapter IV.

5.6 Dispensation in respect of Survival Craft Equipment.

Where ships are engaged on voyages of such duration and in such conditions that, in the opinion of the Certifying Authority, items of the survival craft equipment specified in paragraph 5 of this Schedule are unnecessary, the Certifying Authority may allow them to be dispensed with as follows:

- (*a*) for rigid lifeboats, items referred to in paragraphs 5.1.6, 5.1.19, 5.1.20, 5.1.24 and 5.1.29;
- (b) for inflated lifeboats, items referred to in paragraphs 5.3.16, 5.3.17, 5.3.20 and 5.3.29; and
- (c) for liferafts, some of the items of paragraph 5.5 which are considered unnecessary by the Certifying Authority for the voyage intended.
- 6. Stowage and Davit Requirements for Survival Craft

6.1 Except where an alternative launching appliance is approved, davits shall be as follows:

- (a) luffing or gravity type davits for operating lifeboats having a weight of not more than 2,300 kilogrammes in their turning out condition; and
- (b) gravity type davits for operating lifeboats having a weight of more than 2,300 kilogrammes in their turning out condition.

6.2 Davits, falls, blocks and all other gear shall be of such strength that the lifeboats can be turned out manned by a launching crew of two persons and then safely lowered with the full complement of persons and equipment, with the ship listed to 15 degrees either way and with a 10-degree trim.

6.3 Where mechanically powered appliances are fitted for the recovery of survival craft, efficient hand gear shall also be provided. Where davits are recovered by action of the falls by power, safety devices shall be fitted which will automatically cut off the power before the davits come against the stops in order to avoid overstressing the wire rope falls or davits.

6.4 Lifeboats and davit launched liferafts shall be serviced by wire rope falls together with winches of an approved type. The Certifying Authority may permit

manila rope falls or falls of another approved material with or without winches where it is satisfied that such falls are adequate.

6.5 Skates or other suitable means shall be provided to facilitate launching of lifeboats against a list of 15 degrees.

6.6 Means shall be provided for bringing lifeboats or davit launched liferafts against the ship's side and there holding them so that persons may be safely embarked.

6.7 At least two lifelines shall be fitted to the davit span and the falls and lifelines shall be long enough to reach the water with the vessel in its lightest operating condition and listed to 15 degrees either way. Lower fall blocks shall be fitted with a suitable ring or long link for attaching to the sling hooks unless an approved type of disengaging gear is fitted.

6.8 Lifeboats attached to davits shall have the falls ready for service and arrangements shall be made for speedily, but not necessarily simultaneously, detaching the lifeboats from the falls. The point of attachment of the lifeboats to the falls shall be at such height above the gunwale as to ensure stability when lowering the lifeboats.

7. Requirements for Life-Jackets and Lifebuoys

7.1 Life-jackets.

They shall be constructed with proper workmanship and materials.

They shall be so constructed as to eliminate as far as possible all risk of their being put on incorrectly, except that they shall be capable of being worn inside out.

They shall be capable of lifting the face of an exhausted or unconscious person out of the water and holding it above the water with the body inclined backwards from its vertical position.

They shall be capable of turning the body in the water from any position to a safe floating position with the body inclined backwards from its vertical position.

They shall not be adversely affected by oil or oil products.

They shall be of a highly visible colour.

They shall be fitted with an approved whistle, firmly secured by a cord.

The buoyancy of the life-jackets required to provide the foregoing performance shall not be reduced by more than 5% after 24 hours submergence in fresh water.

Life-jackets, the buoyancy of which depends on inflation, shall ----

- (a) have two separate inflatable compartments;
- (b) be capable of being inflated both mechanically and by mouth; and

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(c) comply with the requirements of paragraphs 7.1.1 to 7.1.8 of this Schedule with either compartment inflated separately.

Life-jackets shall be tested to the satisfaction of the Director.

7.2 Lifebuoys.

They shall be of solid cork or any other equivalent material.

They shall be capable of supporting in fresh water for 24 hours at least 14.5 kilogrammes of iron.

They shall not be adversely affected by oil or oil products.

They shall be of a highly visible colour.

They shall be marked in block letters with the name of the ship and the word "Singapore".

Lifebuoys made of plastic or other synthetic compounds shall be capable of retaining their buoyant properties and durability in contact with seawater or oil products, or under variation of temperature or climatic changes prevailing in open sea voyages.

Every lifebuoy shall be fitted with grab lines which shall be of good quality unkinkable line and well secured at four equidistant points, providing four loops of line.

The mass of a lifebuoy shall not exceed 6.15 kilogrammes when newly constructed. Lifebuoy provided with self-igniting lights and self-activating smoke signals shall have a mass of not less than 4 kilogrammes.

Lifebuoys shall not be filled with rushes, cork shavings, granulated cork or any other loose granulated material, and their buoyancy shall not depend upon air compartments which require to be inflated.

THIRD SCHEDULE

Chapter IV Regulations 7 and 9

TECHNICAL REQUIREMENTS OF RADIO EQUIPMENT

1. VHF Radiotelephone Stations

1.1 When a VHF radiotelephone station is provided, it shall be a permanent installation situated in the upper part of the ship and include a VHF radiotelephone installation complying with this paragraph and comprising a transmitter and

receiver, a source of power capable of actuating them at their rated power levels, and an antenna suitable for efficiently radiating and receiving signals at the operating frequencies.

1.2 Such a VHF installation shall conform to the requirements laid down in the Radio Regulations for equipment used in the Maritime Mobile VHF International Radiotelephone Service and shall be capable of operation on those channels specified by the Radio Regulations and as may be required by the Director.

1.3 The transmitter radio frequency carrier power output shall be at least 10 watts with a reduction capability to one watt. The antenna shall, as far as is practicable, have an unobstructed view in all directions.

1.4 Control of the VHF channels required for navigational safety shall be immediately available in the wheelhouse convenient to the conning position and, where necessary, facilities shall also be available to permit radiocommunications from the wings of the wheelhouse.

1.5 Where a VHF radiotelephone station is fitted as the main installation under regulation 7(1) of Chapter IV, a reserve source of energy shall be provided complying with paragraphs 3.9, 3.10, 3.11 and 3.12 of this Schedule with sufficient capacity to operate the transmitter and receiver for at least 6 hours continuously.

2. MF Radiotelephone Stations

2.1 The radiotelephone station shall be placed in the upper part of the ship and so located that it is sheltered to the greatest possible extent from noise which might impair the correct reception of messages and signals.

2.2 There shall be efficient communication between the radiotelephone station and the wheelhouse.

2.3 A reliable clock with a dial not less than 125 millimetres in diameter, the face of which is marked to indicate the silence periods prescribed for the radiotelephone service by the Radio Regulations, shall be provided. It shall be securely mounted in such a position that the entire dial can be easily and accurately observed by the operator.

2.4 A card of instructions giving a clear summary of the radiotelephone distress procedure shall be displayed in full view of the radiotelephone operating position.

2.5 A reliable emergency light shall be provided, independent of the system which supplies the normal lighting of the radiotelephone installation and permanently arranged so as to be capable of providing adequate illumination of the operating controls of the radiotelephone installation, the clock and the card of instructions.

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2.6 Where a source of energy consists of a battery or batteries, the radiotelephone station shall be provided with a means of assessing the charge condition.

3. MF Radiotelephone Installations

3.1 The MF radiotelephone installation shall include transmitting and receiving equipment and appropriate sources of energy (referred to in this Regulation as the transmitter, the receiver, the radiotelephone distress frequency watch receiver and the source of energy respectively).

3.2 The transmitter shall be capable of transmitting on the radiotelephone distress frequency and on at least one other frequency in the bands between 1,605 kilohertz and 2,850 kilohertz, using the classes of emission assigned by the Radio Regulations for these frequencies. In normal operation a double sideband transmission or a single sideband transmission with full carrier (ie. A3H) shall have a depth of modulation of at least 70% at peak intensity. Modulation of a single sideband transmission with reduced or suppressed carrier (A3A, A3J) shall be such that the unwanted emission shall not exceed the values given in the Radio Regulations.

3.3 The transmitter shall produce a power in the antenna of at least 15 watts for A3 emission or 60 watts for A3H emission. In any case the transmitter shall have a minimum normal range of at least 75 miles.

3.4 The transmitter shall be fitted with a device for generating the radiotelephone alarm signal by automatic means so designed as to prevent actuation by mistake. The device shall be capable of being taken out of operation at any time in order to permit the immediate transmission of a distress message. Arrangements shall be made to check periodically the proper functioning of the device on frequencies other than the radiotelephone distress frequency using a suitable artificial antenna.

3.5 The device required by paragraph 3.4 shall comply with the following requirements:

- (a) the tolerance of the frequency of each tone shall be plus or minus 1.5%;
- (b) the tolerance on the duration of each tone shall be plus or minus 50 milliseconds;
- (c) the interval between successive tones shall not exceed 50 milliseconds; and
- (*d*) the ratio of the amplitude of the stronger tone to that of the weaker shall be within the range of 1 to 1.2.

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3.6 The receiver required by paragraph 3.1 shall be capable of receiving the radiotelephone distress frequency and at least one other frequency available for maritime radiotelephone stations in the bands between 1,605 kilohertz and 2,850 kilohertz, using the classes of emission assigned by the Radio Regulations for these frequencies. In addition the receiver shall permit the reception of such other frequencies, using the classes of emission assigned by the Radio Regulations, as are used for the transmission by radiotelephony of meteorological messages and such other communications relating to the safety of navigation as may be considered necessary by the Director. The receiver shall have sufficient sensitivity to produce signals by means of a loudspeaker when the receiver input is as low as 50 microvolts.

3.7 The radiotelephone distress frequency watch receiver shall be pre-set to this frequency. It shall be provided with a filtering unit or a device to silence the loudspeaker in the absence of a radiotelephone alarm signal. The device shall be capable of being easily switched in and out and may be used when, in the opinion of the master, conditions are such that maintenance of the listening watch would interfere with the safe navigation of the ship.

3.8 To permit rapid change-over from transmission to reception when manual switching is used, the control for the switching device shall, where practicable, be located on the microphone or the telephone handset.

- (*a*) While the ship is at sea, there shall be available at all times a main source of energy sufficient to operate the installation over the normal range in paragraph 3.3.
- (b) A reserve source of energy shall be provided in a position as high as practicable which under all circumstances shall have sufficient capacity to operate the transmitter and receiver for at least 6 hours continuously under normal working conditions.
- (c) If the reserve source of energy supplies several of the radio installations mentioned in paragraph 3.10 its capacity shall be sufficient to operate the transmitter and receiver of these installations continuously and simultaneously for at least 6 hours unless one switchgear permits the selective operation of the radio installations.
- (d) The reserve source of energy may also be used as the main source of energy, provided that the manner of installation and use is such that these requirements are met at all times when the ship is at sea.
- (e) A reserve source of energy is not required for the radiotelephone installation if a reserve medium frequency radiotelegraph installation with a reserve source of energy is fitted.

- 3.10 The reserve source of energy shall be used to supply only
 - (a) the radiotelephone installation;
 - (b) the radiotelegraph installation or the reserve radiotelegraph installation, including the radiotelegraph auto alarm and the device required by paragraph 6.12 for keying radiotelegraph alarm signals if electrically operated;
 - (c) the VHF installation;
 - (d) the emergency light required by paragraph 2.5; and
 - (e) the device required by paragraph 3.4 for generating the radiotelephone alarm signal.

3.11 Notwithstanding paragraph 3.10 the Director may authorise the use of the reserve source of energy for a direction-finder, if fitted, and for a number of low-power emergency circuits which are wholly confined to the upper part of the ship such as emergency lighting on the embarkation station for survival craft, on condition that the additional loads can be readily disconnected, and that the source of energy is of sufficient capacity to carry them.

3.12 While the ship is at sea, any battery provided shall be kept charged so as to meet the requirements of paragraph 3.9 and in any case shall be capable of being brought to a fully charged state within a period of 16 hours.

3.13 An antenna shall be provided and installed and, if suspended between supports liable to whipping, shall be protected against breakage. In addition, a spare antenna shall be carried on board completely assembled for immediate replacement or, where this is not practicable, sufficient antenna wire and insulators to enable a spare antenna to be erected. The necessary tools to erect an antenna shall also be provided.

4. Radiotelephone Auto Alarms

4.1 The radiotelephone auto alarm shall comply with the following minimum requirements:

- (a) the frequencies of maximum response of the tuned circuits, and other tone selecting devices, shall be subject to a tolerance of plus or minus 1.5% of each instance; and the response shall not fall below 50% of the maximum response for frequencies within 3% of the frequency of maximum response;
- (b) in the absence of noise and interference, the automatic receiving equipment shall be capable of operating from the alarm signal in a period of not less than 4 and not more than 6 seconds;

- (c) the automatic receiving equipment shall respond to the alarm signal under conditions of intermittent interference caused by atmospherics and powerful signals other than the alarm signal, preferably without any manual adjustment being required during any period of watch maintained by the equipment;
- (d) the automatic receiving equipment shall not be actuated by atmospherics or by powerful signals other than the alarm signal;
- (e) the automatic receiving equipment shall be effective beyond the range at which speed transmission is satisfactory;
- (f) automatic receiving equipment shall be capable of withstanding vibration, humidity, changes of temperature and variations in power supply voltage equivalent to the severe conditions experienced on board ships at sea, and shall continue to operate under such conditions; and
- (g) the automatic receiving equipment shall, as far as practicable, give warning of faults that would prevent the apparatus from performing its normal functions during watch hours.

4.2 Before a new type of radiotelephone auto alarm is approved, the Director shall be satisfied by practical tests, made under operating conditions equivalent to those obtained in practice, that the apparatus complies with paragraph 4.1.

5. Radiotelegraph Stations

5.1 The radiotelegraph station shall be so located that no harmful interference from extraneous mechanical or other noise will be caused to the proper reception of radio signals. The station shall be placed as high in the ship as is practicable, so that the greatest possible degree of safety may be secured.

5.2 The radiotelegraph operating room shall be of sufficient size and of adequate ventilation to enable the radiotelegraph station to be operated efficiently, and shall not be used for any purpose which will interfere with the operation of the radiotelegraph station.

5.3 The sleeping accommodation of at least one radio operator shall be situated as near as practicable to the radiotelegraph operating room.

5.4 An efficient two-way system for calling and voice communication shall be provided between the radiotelegraph operating room and wheelhouse and one other place, if any, from which the ship is navigated and which shall be independent of the main communication system of the ship. Сар. 179, Rg 9]

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5.5 The radiotelegraph station shall be installed in such a position that it will be protected against the harmful effects of water or extremes of temperature. It shall be readily accessible both for immediate use in case of distress and for repair.

5.6 A reliable clock with a dial not less than 125 millimetres in diameter and a concentric seconds hands, the face of which is marked to indicate the silence periods prescribed for the radiotelegraph service by the Radio Regulations, shall be provided. It shall be securely mounted in the radiotelegraph operating room in such a position that the entire dial can be easily and accurately observed by the radio operator from the radiotelegraph operating position and from the position for testing the radiotelegraph auto alarm receiver.

5.7 A reliable emergency light shall be provided in the radiotelegraph operating room, consisting of an electric lamp permanently arranged so as to provide satisfactory illumination of the operating controls of the radiotelegraph station and of the clock required by paragraph 5.6. This lamp shall, if supplied from the reserve source of energy, be controlled by two-way switches placed near the main entrance to the radiotelegraph operating room and at the radiotelegraph operating position, unless the layout of the radiotelegraph operating room does not warrant it. These switches shall be clearly labelled to indicate their purpose.

5.8 Either an electric inspection lamp, operated from the reserve source of energy and provided with a flexible lead of adequate length, or a flashlight shall be provided and kept in the radiotelegraph operating room.

5.9 The radiotelegraph station shall be provided with such maintenance manuals, spare parts, tools and testing equipment as will enable the radiotelegraph station to be maintained in efficient working condition while the ship is at sea. The testing equipment shall include at least a portable multimeter capable of accurately measuring alternating currents and voltages, direct currents and voltages, and resistance values likely to be encountered in servicing the station.

5.10 If a separate emergency radiotelegraph operating room is provided the requirements of paragraphs 5.4, 5.5, 5.6, 5.7 and 5.8 shall apply to it.

- 6. Radiotelegraph Installations
- 6.1 Except as otherwise expressly provided in this paragraph
 - (*a*) the installation shall include a transmitter, a receiver and a main source of energy;
 - (b) a main antenna shall be provided and installed and, if suspended between supports liable to whipping, shall be suitably protected against breakage;

- (c) a spare antenna completely assembled for immediate installation shall be carried; and
- (*d*) sufficient antenna wire and insulators shall in all cases be provided to enable a suitable antenna to be erected.

(a) The transmitter shall be capable of being quickly connected with and tuned to the main antenna and the spare antenna when erected.

(b) The receiver shall be capable of being quickly connected with any antenna with which it is required to be used.

6.3 The transmitter shall be capable of transmitting on the radiotelegraph distress frequency using a class of emission assigned by the Radio Regulations for that frequency. In addition, the transmitter shall be capable of transmitting on at least two working frequencies in the authorised bands between 405 kilohertz and 535 kilohertz, using classes of emission assigned by the Radio Regulations for these frequencies.

6.4 The transmitter shall, if modulated emission is prescribed by the Radio Regulations, have a depth of modulation of not less than 70% and a note frequency between 450 hertz and 1,350 hertz.

6.5 The transmitter shall, when connected to the main antenna, have a minimum normal range on 500 kilohertz as specified in this paragraph and shall be capable of transmitting clearly perceptible signals from ship to ship by day and under normal conditions and circumstances over the minimum normal range of 75 miles.

(Clearly perceptible signals will normally be received if the root mean square value of the field strength at the receiver is at least 50 microvolts per metre).

(*a*) The receiver shall be capable of receiving the radiotelegraph distress frequency and the classes of emission assigned by the Radio Regulations for that frequency.

(b) In addition, the receiver shall permit the reception of such of the frequencies and classes of emission used for the transmission of time signals, meteorological messages and such other communications relating to safety of navigation as may be considered necessary by the Director.

6.7 The receiver shall have sufficient sensitivity to produce signals in headphones or by means of a loudspeaker when the receiver input is as low as 50 microvolts.

6.8 There shall be available at all times, while the ship is at sea, a supply of electrical energy sufficient to operate the installation over the normal range required by paragraph 6.5 as well as for the purpose of charging any batteries forming part of the radiotelegraph station. The voltage of the supply for the

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installation shall, in the case of new ships, be maintained within plus or minus 10% of the rated voltage. In the case of existing ships, it shall be maintained as near the rated voltage as possible and, if practicable, within plus or minus 10%.

6.9 Where a reserve MF radiotelegraph installation is fitted or a radiotelegraph installation is fitted as the main installation, a reserve source of energy complying with paragraphs 3.9, 3.10, 3.11 and 3.12, with sufficient capacity to operate the transmitter and receiver for at least 6 hours continuously, shall be provided.

6.10 While the ship is at sea, accumulator batteries shall be brought up to the normal fully charged condition daily.

6.11 All steps shall be taken to eliminate so far as possible the causes of, and to suppress, radio interference from electrical and other apparatus on board. If necessary, steps shall be taken to ensure that the antennae attached to broadcast receivers do not cause interference to the efficient or correct working of the radiotelegraph installation. Particular attention shall be paid to this requirement in the design of new ships.

6.12 In addition to a means for manually transmitting the radiotelegraph alarm signal, an automatic radiotelegraph alarm signal keying device shall be provided capable of keying the transmitter so as to transmit the radiotelegraph alarm signal. The device shall be capable of being taken out of operation at any time in order to permit immediate manual operation of the transmitter. If electrically operated, this keying device shall be capable of operation from the reserve source of energy.

6.13 All items of equipment forming part of the radiotelegraph station shall be reliable, and shall be so constructed that they are readily accessible for maintenance purposes.

7. Radiotelegraph Auto Alarms

7.1 A radiotelegraph auto alarm shall comply with the following minimum requirements:

- (a) in the absence of interference of any kind it shall be capable of being actuated, without manual adjustment, by any radiotelegraph alarm signal transmitted on the radiotelegraph distress frequency by any coast station, ship's or vessel's emergency or survival craft transmitter operating in accordance with the Radio Regulations, provided that the strength of the signal at the receiver input is greater than 100 microvolts and less than 1 volt;
- (*b*) in the absence of interference of any kind it shall be actuated by either 3 or 4 consecutive dashes when the dashes vary in length from 3.5 to as near 6 seconds as possible and the spaces vary in length between 1.5

seconds and the lowest practicable value, preferably not greater than 10 milliseconds;

- (c) it shall not be actuated by atmospherics or by any signal other than the radiotelegraph alarm signal, provided that the received signals do not in fact constitute a signal falling within the tolerance limits referred to in sub-paragraph (*b*);
- (*d*) the selectivity of the radiotelegraph auto alarm shall be such as to provide a practically uniform sensitivity over a band extending not less than 4 kilohertz and not more than 8 kilohertz on each side of the radiotelegraph distress frequency and to provide outside this band a sensitivity which decreases as rapidly as possible in conformity with the best engineering practice;
- (e) if practicable, it shall, in the presence of atmospherics or interfering signals, automatically adjust itself so that within a reasonably short time it approaches the condition in which it can most readily distinguish the radiotelegraph alarm signal;
- (f) when actuated by a radiotelegraph alarm signal, or in the event of failure of the apparatus, it shall cause a continuous audible warning to be given in the radiotelegraph operating room, in the radio operator's sleeping accommodation and in the wheelhouse. If practicable, warning shall also be given in the case of failure of any part of the whole alarm receiving system. Only one switch for stopping the warning shall be provided and this shall be situated in the radiotelegraph operating room;
- (g) for the purpose of regularly testing the radiotelegraph auto alarm, the apparatus shall include a generator pre-tuned to the radiotelegraph distress frequency and a keying device by means of which a radiotelegraph alarm signal of the minimum strength referred to in sub-paragraph (a) is produced. Means shall also be provided for attaching headphones for the purpose of listening to signals received on the radiotelegraph auto alarm; and
- (h) it shall be capable of withstanding vibration, humidity and changes of temperature, equivalent to severe conditions experienced on board ships at sea and shall continue to operate under such conditions.

7.2 Before a new type of radiotelegraph auto alarm is approved, the Director shall be satisfied, by practical tests made under operating conditions equivalent to those encounter in practice, that the apparatus complies with paragraph 7.1.

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7.3 In ships fitted with a radiotelegraph auto alarm, its efficiency shall be tested by a radio operator at least once every 24 hours while at sea. If it is not in working order, the radio operator shall report that fact to the officer on watch.

7.4 A radio operator shall periodically check the proper functioning of the radiotelegraph auto alarm receiver, with its normal antenna connected, by listening to signals and by comparing them with similar signals received on the radiotelegraph distress frequency on the main installation.

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