
No.99 Recommendations for the Safety of Cargo Vessels of less than Convention Size

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Preamble

Cargo vessels of less than 500 Gross Tonnage (except vessels down to 300 GT with respect to radio-communication) are not covered by the SOLAS Convention, and there exist no uniform regulations or guidance that provides an internationally accepted level of safety for such vessels.

As in the SOLAS Convention, a cargo vessel may be taken to mean any vessel which is not a passenger vessel, gas carrier or chemical tanker, and includes tugs, dredgers, pilot craft, etc in addition to cargo vessels. Smaller vessels due to a combination of their size and constant exposure to coastal hazards are particularly vulnerable and therefore careful consideration should be given to all aspects of their safety.

Fishing vessels are not part of these Recommendations. For fishing vessels, equal or greater than 24 m in Load Line Length, reference should be made to the Recommendations of the Torremolinos International Convention for the Safety of Fishing Vessels, 1993 Protocol. Fishing vessels less than 24 m in length, are generally covered by the Requirements as specified by the Administration.

The purpose of these Recommendations is to provide a generally applicable code of safe practice in particular for fire protection, detection and extinction; safety equipment, radio installations and navigational equipment.

The Recommendations are intended to be applied by the Member Societies, with the consent of the Administration concerned, where no national regulations exist; they may also be offered for consideration by Administrations, who may wish to establish national statutory Recommendations for such vessels or consider their revision.

It is recognised that the Recommendations are used as a basis for contract specifications by builders and owners, but care should be taken to ensure an appropriate level of safety, having regard to both the type and service area of the vessels involved. Vessels engaged on coastal voyages may encounter widely varying weather and sea conditions depending upon the geography of the area involved and the advice of the classification society should be sought in all cases when applying the Recommendations.

Materials and equipment specified in these recommendations should be of an approved type in accordance with national or International Requirements.

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CHAPTER I GENERAL PROVISIONS**1. Application**

The recommendations as specified in this document, are within the spirit of the International Conventions and Protocols, and are applicable for cargo vessels of less than Convention size.

The provisions of these recommendations are intended to apply to new and - as far as reasonable and practicable, or as found necessary by the relevant Administration – to existing cargo vessels of less than 500 Gross Tonnage (GT).

Vessels carrying dangerous goods- chemicals, and/or liquefied gasses in bulk, should comply with IMDG*, IGC and IBC Codes, as applicable.

* Refer to MSC/Circ 858 *Document of compliance with SOLAS regulation 11-2/54*

2. Definitions

The terms, used in these Recommendations are as defined in SOLAS 1974 (as amended) and the classification rules of IACS Member Societies, as applicable at the date of shipbuilding or major conversion contract.

The term Gross Tonnage (GT) is as defined in IMO Resolution A.493 (XII), calculated in accordance with the International Convention of Tonnage Measurements of Ships of 1969.

2.1 Service Area Definitions

Unrestricted service means a vessel engaged on International voyages, and not bounded by any limitations on operating environment.

Service restrictions are broken down into 2 broad categories:

1. vessels operating coastal or specified operating areas,
2. vessels operating within protected or extended protected waters.

1. Restricted Service:

- (a) **Specified coastal service.** Service along a coast the geographical limits of which should be defined and for a distance out to sea generally not exceeding 20 nautical miles, unless some other distance is specified for 'coastal service' by the Administration with which the vessel is registered, or by the Administration of the coast off which it is operating.
- (b) **Specified operating or service areas.** Service between two or more ports or other geographical features, or service within a defined geographical area such as: "Red Sea Service", "Piraeus to Thessaloniki and Islands within the Aegean Sea".

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- (a) **Protected water service.** Service in sheltered water adjacent to sand banks, reefs, breakwaters to other coastal features, in sheltered waters between islands and lagoons.
- (b) **Extended protected water service.** Service in protected waters and also short distances (generally less than 15 nautical miles) beyond protected waters in 'reasonable weather'.

3. Surveys and Maintenance

- 3.1 The hull, machinery and all equipment of every vessel should be constructed and installed so as to be capable of being regularly maintained to ensure that they are at all times, in all respects, satisfactory for the vessel's intended service.
- 3.2 An organisation, recognized by the Administration, should carry out surveys of vessel during construction and, at regular intervals after completion, generally as prescribed within Chapter I of SOLAS 1974 (as amended). It is recommended that such surveys should be carried out by an IACS Member Society.
- 3.3 (a) The condition of the vessel and its equipment should be maintained to conform with the provisions of the Recommendations to ensure that the vessel will remain fit for the intended operation. The hull structure and machinery, not forming part of these Recommendations, should also be similarly surveyed and maintained.
- (b) No change should be made in the structural arrangements, machinery, equipment and other items covered by the survey, without the approval of the Administration or recognized organization.
- (c) Whenever an accident occurs to a vessel or a defect is discovered, the master or owner of the vessel should report to the Administration or surveying authority without delay.

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99****CHAPTER II WATERTIGHT INTEGRITY AND EQUIPMENT****1. Load Line Recommendations**

For vessels greater than 24 metres in length, the requirements set forth in LL Convention 1966 (LLC 66), as amended*, should be met.

* subject to ratification of protocols by the Administrations.

Unless specified otherwise by the Administration, vessels of less than 24 metres in length, should comply with the relevant conditions of assignment and the assignment of freeboard, as specified in the International Load Line Convention 1966, as amended, as far as practicable.

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99****CHAPTER III STABILITY****1. Application**

The following IMO Resolutions should be applied to vessels greater than 24 metres in length:

- The 2008 Intact Stability Code (IMO Resolution MSC.267(85))

The Requirements, if any, of the Administration, should be taken into consideration.

Due regard should also be paid to particulars of either the vessel concerned or its cargo, for assessing, whether additional or amended criteria need to be applied.

CHAPTER IV FIRE FIGHTING**Fire safety objectives**

The fire safety objectives of this chapter are to:

- prevent the occurrence of fire and explosion;
- reduce the risk to life caused by fire;
- reduce the risk of damage caused by fire to the vessel, its cargo and the environment;
- contain, control and suppress fire and explosion in the compartment of origin; and
- provide adequate and readily accessible means of escape for crew.

Achievement of the fire safety objectives

The fire safety objectives set out above could be achieved by ensuring compliance with Sections 1 to 6, or by alternative design and arrangements which comply with Section 7. A ship could be considered to achieve the fire safety objectives set out in first paragraph when either:

- the vessel's designs and arrangements, as a whole, comply with Sections 1 to 6, as applicable;
- the vessel's designs and arrangements, as a whole, have been reviewed and approved in accordance with Section 7; or
- part(s) of the vessel's designs and arrangements have been reviewed and approved in accordance with Section 7 and the remaining parts of the vessel comply with the relevant Recommendations in Sections 1 to 6.

Section 1 Fire Pumps and Fire Main Systems**1.1 Purpose**

The purpose of this Recommendation is to suppress and swiftly extinguish a fire in the space of origin. For this purpose, the following functional Recommendations should be met:

- fixed fire extinguishing systems should be installed, as applicable, having due regard to the fire growth potential of the protected spaces; and
- fire extinguishing appliances should be readily available.

1.1.1 Capacity

The total capacity of the main fire pump(s) is not to be less than:

$$Q = (0,145 (L (B+D))^{1/2} + 2,170)^2 \text{ but need not exceed } 25\text{m}^3/\text{hour}$$

Where

B	=	greatest moulded breadth of vessel, in metres
D	=	moulded depth to bulkhead deck, in metres
L	=	Freeboard Length, in metres
Q	=	total capacity, in m ³ /hour

1.1.2 Fire pumps

Generally one main power pump and one portable fire pump should be provided as specified below.

1.1.2.1 Sanitary, ballast, bilge or general service pumps may be accepted as fire pumps, provided that they are not normally used for pumping oil, and that, if they are subject to occasional duty for the transfer or pumping of fuel oil, suitable changeover arrangements are fitted.

1.1.2.2 A power pump is a fixed pump driven by a power source other than by hand.

1.1.2.3 In cargo vessels classed for navigation in ice, the fire pump sea inlet valves should be provided with ice clearing arrangements.

1.1.2.4 Relief valves should be provided in conjunction with any fire pump if the pump is capable of developing a pressure exceeding the design pressure of the water service pipes, hydrants and hoses. These valves should be so placed and adjusted as to prevent excessive pressure in any part of the fire main system.

1.1.2.5 Where a centrifugal pump is provided in order to comply with this sub-Section, a non-return valve should be fitted in the pipe connecting the pump to the fire main.

1.1.3 Portable fire pumps

1.1.3.1 Portable fire pumps should comply with the following:

- The pump should be self-priming.
- The total suction head and the net positive suction head of the pump should be determined taking account of actual operation, i.e. pump location when used.

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- (c) The portable fire pump, when fitted with its length of discharge hose and nozzle, should be capable of maintaining a pressure sufficient to produce a jet throw of at least 12 m, or that required to enable a jet of water to be directed on any part of the engine room or the exterior boundary of the engine room and casing, whichever is the greater.
- (d) Except for electric pumps, the pump set should have its own fuel tank of sufficient capacity to operate the pump for three hours. For electric pumps, their batteries should have sufficient capacity for three hours.
- (e) Except for electric pumps, details of the fuel type and storage location should be carefully considered. If the fuel type has a flashpoint below 60°C, further consideration to the fire safety aspects should be given.
- (f) The pump set should be stored in a secure, safe and enclosed space, accessible from open deck and clear of the Category 'A' machinery space.
- (g) The pump set should be easily moved and operated by two persons and be readily available for immediate use.
- (h) Arrangements should be provided to secure the pump at its anticipated operating position(s).
- (i) The overboard suction hose should be non-collapsible and of sufficient length, to ensure suction under all operating conditions. A suitable strainer should be fitted at the inlet end of the hose.
- (j) Any diesel-driven power source for the pump should be capable of being readily started in its cold condition by hand (manual) cranking. If this is impracticable, consideration should be given to the provision and maintenance of heating arrangements, so that readily starting can be ensured.

1.1.3.2 Alternatively to the Recommendations of 1.1.3.1 a fixed fire pump may be fitted, which should comply with the following:

- (a) The pump, its source of power and sea connection should be located in accessible positions, outside the compartment housing the main fire pump.
- (b) The sea valve should be capable of being operated from a position near the pump.
- (c) The room where the fire pump prime mover is located should be illuminated from the emergency source of electrical power, and should be well ventilated.
- (d) Pump is required to supply water for a fixed fire-extinguishing system in the space where the main fire pump is situated, it should be capable of simultaneously supplying water to this system and the fire main at the required rates.
- (e) The pump may also be used for other suitable purposes, subject to the approval in each case.
- (f) Pressure and quantity of water delivered by the pump being sufficient to produce a jet of water, at any nozzle, of not less than 12 m in length. For vessels of less than 150 GT, the jet of water may be specially considered.

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1.1.3.3 For vessels less than 150 GT fitted with an approved fixed fire-fighting system in the engine room, portable pumps may be omitted.

1.1.3.4 Means to illuminate the stowage area of the portable pump and its necessary areas of operation should be provided from the emergency source of electrical power.

1.2 Fire main

1.2.1 The diameter of the fire main should be based on the required capacity of the fixed main fire pump(s) and the diameter of the water service pipes should be sufficient to ensure an adequate supply of water for the operation of at least one fire hose.

1.2.2 The wash deck line may be used as a fire main provided that the Recommendations of this sub-Section are satisfied.

1.2.3 All exposed water pipes for fire-extinguishing should be provided with drain valves for use in frosty weather. The valves should be located where they will not be damaged by cargo.

1.3 Pressure in the fire main

1.3.1 When the main fire pump is delivering the quantity of water required by 1.1.1, or the fire pump described in 1.1.3.2, through the fire main, fire hoses and nozzles, the pressure maintained at any hydrant should be sufficient to produce a jet throw at any nozzle of not less than 12 m in length. (For vessels less than 150 GT, the jet of water may be specially considered).

1.4 Fire Hydrants

1.4.1 Number and position of hydrants

1.4.1.1 For vessels less than 150 GT the number and position of the hydrants should be such that at least one jet of water may reach any part normally accessible to the crew, while the cargo vessel is being navigated and any part of any cargo space when empty. Furthermore, such hydrants should be positioned near the accesses to the protected spaces. (At least one hydrant should be provided in each Category 'A' machinery space).

1.4.1.2 For vessels equal or greater than 150 GT the number and position of hydrants should be such that at least two jets of water not emanating from the same hydrant, one of which should be from a single length of hose, may reach any part of the vessel normally accessible to the crew while the vessel is being navigated and any part of any cargo spaces when empty. Furthermore, such hydrants should be positioned near the accesses to the protected spaces. Other Requirements specified by the Administration may be considered.

1.4.2 Pipes and hydrants

1.4.2.1 Materials readily rendered ineffective by heat should not be used for fire mains. Where steel pipes are used, they should be galvanized internally and externally. Cast iron pipes are not acceptable. The pipes and hydrants should be so placed that the fire-hoses may be easily coupled to them. The arrangement of pipes and hydrants should be such as to avoid the possibility of freezing. In vessels where deck cargo may be carried, the positions of the hydrants should be such that they are always readily accessible and the pipes should be arranged, as far as practicable, to avoid risk of damage by such cargo. There should be complete interchangeability of hose couplings and nozzles.

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1.4.2.2 A valve should be fitted at each fire hydrant so that any fire-hose may be removed while the fire pump is at work.

1.4.2.3 Where a fixed fire pump is fitted outside the engine room, in accordance with 1.1.3.2:

- (a) an isolating valve should be fitted in the fire main so that all the hydrants in the vessel, except that or those in the Category 'A' machinery space, can be supplied with water. The isolating valve should be located in an easily accessible and tenable position outside the Category 'A' machinery space; and
- (b) the fire main should not re-enter the machinery space downstream of the isolating valve.

1.5 Fire-hoses

1.5.1 Fire-hoses should be of approved non-perishable material. The hoses should be sufficient in length to project a jet of water to any of the spaces in which they may be required to be used. Their length, in general, is not to exceed 18 m. Each hose should be provided with a nozzle and the necessary couplings. Fire-hoses, together with any necessary fittings and tools, should be kept ready for use in conspicuous positions near the water service hydrants or connections.

1.5.2 For vessel less than 150 GT, one hose should be provided for each hydrant. In addition one spare hose should be provided onboard.

1.5.3 Vessel equal or greater than 150 GT should be provided with fire hoses the number of which should be one for each 30 m length of the ship and one spare, but in no case less than three in all. Unless one hose and nozzle is provided for each hydrant in the ship, there should be complete interchangeability of hose couplings and nozzles.

1.6 Nozzles

1.6.1 For the purpose of this Chapter, standard nozzle sizes are 12 mm, 16 mm or 19 mm, or as near thereto as possible, so as to make full use of the maximum discharge capacity of the fire pump(s).

1.6.2 For accommodation and service spaces, the nozzle size need not exceed 12 mm.

1.6.3 The size of nozzles used in conjunction with a portable fire pump need not exceed 12 mm.

1.6.4 All nozzles should be of an approved dual purpose type (i.e. spray/jet type) incorporating a shut-off.

Section 2 Fire Safety Measures

2.1 Purpose

The purpose of this regulation should contain a fire in the space of origin. For this purpose, the following functional Recommendations should be met:

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

2.1.1 Structural fire protection

The minimum fire integrity of bulkheads and decks should be as prescribed in Table 1.

Table 1 Minimum fire integrity of bulkheads and decks

[Item]	Space	Separation By	From Space
[(1)]	Machinery Space Class 'A'	A-60	Accommodation / control stations / corridors / staircases / service spaces of high fire risk / ro-ro spaces / vehicle spaces
[(2)]	Machinery Space Class 'A'	A-0	Other than above [item (1)]
[(3)]	Galley	A-0	Unless specified otherwise
[(4)]	Service space of high fire risk other than galley	B-15	Unless specified above [item (1)]
[(5)]	Corridor Staircase	B-0	Unless specified above [item (1)]
[(6)]	Cargo Space (other than ro-ro spaces and vehicle space)	A-0	Unless specified above [item (1)]
[(7)]	Ro-ro space and vehicle space (except weather deck)	A-60	Control stations/machinery spaces of category 'A'
[(8)]	Ro-ro space and vehicle space (except weather deck)	A-0	Unless specified above [item (1)]

Category 'A' machinery spaces should be enclosed by A-60 Class divisions, where adjacent to:

1. Accommodation spaces
 2. Control stations
 3. Corridors and staircases
 4. Service spaces of high fire risk,
- and by A-0 Class divisions elsewhere.

The divisions used to separate spaces, not mentioned above, should be of non-combustible material.

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2.1.1.1 The hull, superstructure, structural bulkheads, decks and deckhouses should be constructed of steel or other equivalent material. For the purpose of applying the definition of steel or other equivalent material, as given in SOLAS, the 'applicable fire exposure' should be one hour. Vessels built of materials other than steel should be specially considered.

2.1.1.2 Stairways should be enclosed, at least at one level, by divisions and doors or hatches, in order to restrict the free flow of smoke to other decks in the vessel and the supply of air to the fire. Doors forming such enclosures should be self-closing.

2.1.1.3 Openings in 'A' Class divisions should be provided with permanently attached means of closing which should be at least as effective for resisting fires as the divisions in which they are fitted.

2.1.1.4 Interior stairways serving machinery spaces, accommodation spaces, service spaces or control stations should be of steel or other equivalent material.

2.1.1.5 Doors should be self-closing in way of Category 'A' machinery spaces and galleys, except where they are normally kept closed.

2.1.1.6 Where 'A' Class divisions are penetrated for the passage of electric cables, pipes, trunks, ducts, etc., or for girders, beams or other structural members, arrangements should be made to ensure that the fire resistance is not impaired. Arrangements should also prevent the transmission of heat to un-insulated boundaries at the intersections and terminal points of the divisions and penetrations by insulating the horizontal and vertical boundaries or penetrations for a distance of 450 mm.

2.1.2 Materials

2.1.2.1 Paints, varnishes and other finishes used on exposed interior surfaces should not be capable of producing excessive quantities of smoke, toxic gases or vapours and should be of the low flame spread type in accordance with the IMO FTP Code, Annex 1, Parts 2 and 5.

2.1.2.2 Except in cargo spaces or refrigerated compartments of service spaces, insulating materials should be non-combustible.

2.1.2.3 Where pipes penetrate 'A' or 'B' Class divisions, the pipes or their penetration pieces should be of steel or other approved materials having regard to the temperature and integrity Recommendations such divisions are required to withstand.

2.1.2.4 Pipes conveying oil or combustible liquids through accommodation and service spaces should be of steel or other approved materials having regard to the fire risk.

2.1.2.5 Materials readily rendered ineffective by heat should 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 the danger of flooding.

2.1.2.6 Primary deck coverings within accommodation spaces, service spaces and control stations should be of a type which will not readily ignite, or give rise to toxic or explosive hazards at elevated temperatures in accordance with the IMO FTP Code, Annex 1, Parts 2 and 6.

2.1.2.7 Materials used for insulating pipes, etc., in machinery spaces and other compartments containing high fire risks should be non-combustible. Vapour barriers and adhesives used in conjunction with insulation, as well as the insulation of pipe fittings, for cold service systems

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need not be of non-combustible materials, but they should be kept to the minimum quantity practicable and their exposed surfaces should have low flame spread characteristics.

2.1.3 Surface of insulation

2.1.3.1 In spaces where penetration of oil products is possible, the surface of the insulation should be impervious to oil or oil vapours. Insulation boundaries should be arranged to avoid immersion in oil spillage.

2.1.4 Ventilation systems

2.1.4.1 Ventilation fans should be capable of being stopped and main inlets and outlets of ventilation systems closed from outside the spaces being served.

2.1.4.2 Ventilation ducts for Category 'A' machinery spaces, ro-ro spaces and vehicle spaces should not pass through accommodation spaces, galleys, service spaces or control stations, unless the ducts are constructed of steel and arranged to preserve the integrity of the division.

2.1.4.3 Ventilation ducts for accommodation spaces, service spaces or control stations should not pass through Category 'A' machinery spaces or galleys unless the ducts are constructed of steel and arranged to preserve the integrity of the division.

2.1.4.4 Ventilation arrangement for store rooms containing highly flammable products should be specially considered.

2.1.4.5 Ventilation systems serving Category 'A' machinery spaces and galley exhaust ducts should be independent of systems serving other spaces.

2.1.4.6 Ventilation should be provided to prevent the accumulation of gases that may be emitted from batteries.

2.1.4.7 Ventilation openings may be fitted in and under the lower parts of cabin, mess and dayroom doors in corridor bulkheads. The total net area of any such openings is not to exceed 0,05 m². Balancing ducts should not be permitted in fire divisions.

2.1.5 Oil fuel arrangements

2.1.5.1 In a cargo vessel in which oil fuel is used, the arrangements for the storage, distribution and utilization of the oil fuel should be such as to ensure the safety of the vessel and persons on board.

2.1.5.2 Oil fuel tanks situated within the boundaries of Category 'A' machinery spaces should not contain oil fuel having a flashpoint of less than 60°C.

2.1.5.3 Oil fuel, lubricating oil and other flammable oils should not be carried in fore peak tanks.

2.1.5.4 For vessels of 150 GT or more, and as far as practicable:

- (a) oil fuel lines shall be arranged far apart from hot surfaces, electrical installations or other sources of ignition and shall be screened or otherwise suitably protected to avoid oil spray or oil leakage onto the sources of ignition. The number of joints in such piping systems shall be kept to a minimum.

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- (b) surfaces with temperatures above 220°C which may be impinged as a result of a fuel system failure shall be properly insulated. 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.
- (c) External high-pressure fuel delivery lines between the high pressure fuel pumps and fuel injectors shall be protected with a jacketed piping system capable of containing fuel from a high-pressure line failure. A suitable enclosure on engines having an output of 375 kW or less having fuel injection pumps serving more than one injector may be used as an alternative to the jacketed piping system.

2.1.6 Special arrangements in Category 'A' machinery spaces and where necessary other machinery spaces

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

2.1.6.2 Skylights should be of steel and are not to contain glass panels. Suitable arrangements should be made to permit the release of smoke, in the event of fire, from the space to be protected.

2.1.6.3 Windows should not be fitted in machinery space boundaries. This does not preclude the use of glass in control rooms within the machinery spaces.

2.1.6.4 Means of control should be provided for:

- (a) opening and closure of skylights, closure of openings in funnels which normally allow exhaust ventilation, and closure of ventilator dampers;
- (b) permitting the release of smoke;
- (c) closing power-operated doors or actuating release mechanism on doors other than power-operated watertight doors;
- (d) stopping ventilating fans; and
- (e) stopping forced and induced draught fans, oil fuel transfer pumps, oil fuel unit pumps and other similar fuel pumps.

2.1.6.5 The controls required in 2.1.6.4 should be located outside the space concerned, where they will not be cut off in the event of fire in the space they serve. Such controls and the controls for any required fire-extinguishing system should be situated at one control position or grouped in as few positions as possible. Such positions should have a safe access from the open deck.

2.1.7 Arrangements for gaseous fuel for domestic purposes

2.1.7.1 Where gaseous fuel is used for domestic purposes, the arrangements for the storage, distribution and utilization of the fuel should be specially considered.

2.1.8 Space heating

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

2.2 Means of escape

Purpose

The purpose of this Recommendation is to provide means of escape so that persons onboard can safely and swiftly escape to the lifeboat and liferaft embarkation deck. For this purpose, the following functional Recommendations should be met:

- safe escape routes should be provided;
- escape routes should be maintained in a safe condition, clear of obstacles; and
- additional aids for escape should be provided as necessary to ensure accessibility, clear marking, and adequate design for emergency situations.

2.2.1 Stairways, ladders and corridors serving crew spaces and other spaces to which the crew normally have access should be arranged so as to provide ready means of escape to a deck from which embarkation into survival craft may be effected.

2.2.2 There should be at least two means of escape, as widely separated as possible, from each section of accommodation and service spaces and control stations.

- (a) The normal means of access to the accommodation and service spaces below the open deck should be arranged so that it is possible to reach the open deck without passing through spaces containing a possible source of fire (e.g. machinery spaces, storage spaces of flammable liquids).
- (b) The second means of escape may be through portholes or hatches of adequate size and preferably leading directly to the open deck.
- (c) Dead-end corridors having a length of more than 7m should not be accepted.

2.2.3 At least two means of escape should be provided from machinery spaces, except where the small size of a machinery space makes it impracticable. Escape should be by steel ladders that should be as widely separated as possible.

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Section 3 Fixed fire detection and fire-alarm systems

An approved and fixed fire detection system should be installed in all Category 'A' machinery spaces and cargo pump rooms.

No.
99**Section 4 Fire-Extinguishing Arrangements****Purpose**

The purpose of this Recommendation should suppress and swiftly extinguish a fire in the space of origin. For this purpose, the following functional Recommendations should be met:

- fixed fire-extinguishing systems should be installed, as applicable, having due regard to the fire growth potential of the protected spaces; and
- fire-extinguishing appliances should be readily available.

4.1 Fixed Fire-extinguishing arrangements in Category 'A' machinery spaces

4.1.1 Machinery spaces of category 'A' on vessels with GT greater than or equal to 150 and operating in unrestricted or restricted waters, should be provided with an approved fixed fire-extinguishing system, as specified in paragraph 4.2. Machinery spaces of category 'A' on vessels operating in protected areas may be exempted from this recommendation.

4.2 Fixed Fire-extinguishing systems

4.2.1 Fixed fire-fighting systems where required, should be in accordance with the requirements of the IMO FSS Code.

4.3 Protection of paint lockers and flammable liquid lockers

4.3.1 The Recommendations for the protection of paint lockers and flammable liquids lockers should be specially considered.

4.4 Fixed Fire-extinguishing systems not required by this Chapter

4.4.1 If such a system is installed, it should be of an approved type.

4.5 Portable Fire-extinguishers (UNRESTRICTED, RESTRICTED and PROTECTED)

PORTABLE FIRE EXTINGUISHERS	
Accommodation and service spaces.	
Vessels greater than or equal to 150 GT	≥ 3
Vessels less than 150 GT (see 4.5.6.1)	≥ 1
Machinery spaces (one extinguisher per every 375 kW of internal combustion engine power)	≥ 2, ≤ 6

4.5.1 Approved types

4.5.1.1 All fire-extinguishers should be of approved types and designs.

4.5.2 Extinguishing medium

4.5.2.1 The extinguishing media employed should be suitable for extinguishing fires in the compartments in which they are intended to be used.

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4.5.2.2 The extinguishers required for use in the machinery spaces of cargo vessels using oil as fuel should be of a type discharging foam, carbon dioxide gas, dry powder or other approved media suitable for extinguishing oil fires.

4.5.3 Capacity

4.5.3.1 The capacity of required portable fluid extinguishers should not exceed more than 13,5 litres but not less than 9 litres. Other extinguishers should be at least as portable as the 13,5 litre fluid extinguishers, and should have a fire-extinguishing capability at least equivalent to a 9 litre fluid extinguisher.

4.5.3.2 The following capacities may be taken as equivalents:

- 9 litre fluid extinguisher (water or foam).
- 5 kg dry powder.
- 5 kg carbon dioxide.

4.5.4 Spare charges

4.5.4.1 A spare charge should be provided for each required portable fire-extinguisher that can be readily recharged on board. If this cannot be done, duplicate extinguishers should be provided.

4.5.5 Location

4.5.5.1 The extinguishers should be stowed in readily accessible positions and should be spread as widely as possible and not be grouped.

4.5.5.2 One of the portable fire-extinguishers intended for use in any space should be stowed near the entrance to that space.

4.5.6 Portable fire-extinguishers in accommodation spaces, service spaces and control stations

4.5.6.1 Accommodation spaces, service spaces and control stations should be provided with a sufficient number of portable fire-extinguishers to ensure that at least one extinguisher will be readily available for use in every compartment of the crew spaces. In any case, their number should be not less than three, except where this is impractical for very small vessels, in which case one extinguisher should be available at each deck having accommodation or service spaces, or control stations.

**No.
99****Section 5 Fire Fighting Equipment**

The fire fighting equipment should comply with the minimum Recommendations as specified below, regardless of UNRESTRICTED, RESTRICTED or PROTECTED service.

5.1 Fire blanket

5.1.1 A fire blanket should be provided.

5.2 Fire-fighter's outfit (which includes an axe)

5.2.1 All cargo vessels greater than or equal to 150 GT should carry at least one firefighter's outfit complying with the Requirements of the IMO FSS Code.

5.3 Fire control plans**5.3.1 Description of plans**

5.3.1.1 In all cargo vessels, general arrangement plans should be permanently exhibited for the guidance of the vessel's officers, using graphical symbols that are in accordance with IMO Resolution A.952(23), which show clearly for each deck the control stations, the various fire sections enclosed by steel or 'A' Class divisions, together with particulars of:

- the fire detection and fire-alarm systems;
- fixed fire-fighting system;
- the fire-extinguishing appliances;
- the means of access to different compartments, decks, etc.;
- the position of the fireman's outfits;
- the ventilating system, including particulars of the fan control positions, the position of dampers and identification numbers of the ventilating fans serving each section; and
- the location and arrangement of the emergency stop for the oil fuel unit pumps and for closing the valves on the pipes from oil fuel tanks.

5.3.1.2 Alternatively, the details required by 5.3.1.1 may be set out in a booklet, a copy of which should be supplied to each officer, and one copy is at all times to be available on board in an accessible position.

5.3.1.3 The plans and booklets should be kept up to date, any alterations being recorded thereon as soon as practicable. Description in such plans and booklets should be in the official language of the Flag State and in the language as shown in the following Table 2. In addition, instructions concerning the maintenance and operation of all the equipment and installations on board for the fighting and containment of fire should be kept under one cover, readily available in an accessible position.

**No.
99****Table 2 Language in Fire Control Plan**

Service Restrictions	Language
UNRESTRICTED	English
RESTRICTED PROTECTED	Official language(s) of the Administration(s) concerned with the ship's service, or language(s) recognized by such Administration(s) (possibly English) However, description in such plans and booklets for ships engaged in domestic service only may be in the official language of the Flag State only.

5.3.1.4 In all cargo vessels greater than or equal to 150 GT, a duplicate set of fire-control plans or a booklet containing such plans should be permanently stored in a prominently marked weathertight enclosure outside the deckhouse for the assistance of shoreside fire-fighting personnel.

Section 6 Additional Fire Safety Measures for tankers**6.1 General**

6.1.1 The requirements for tankers of SOLAS Chapter II-2 should apply to tankers carrying crude oil and petroleum products, having a flash point not exceeding 60°C, and other liquid products having a similar fire hazard.

6.2 Application

6.2.1 The additional requirements for tankers of SOLAS Chapter II-2 should apply to tankers carrying crude oil and petroleum products having a flash point not exceeding 60°C (closed cup test), as determined by an approved flash point apparatus, and a Reid vapour pressure which is below atmospheric pressure, and other liquid products having a similar fire hazard.

6.2.2 Tankers carrying petroleum products having a flashpoint exceeding 60°C (closed cup test), as determined by an approved flashpoint apparatus, should comply with the provisions of 6.3 of the Recommendations.

6.3 Cargo area deck protection

6.3.1 At least one mobile foam appliance should be provided for use on the cargo tank deck including the cargo manifolds. It should be capable of simple and rapid operation. Where the appliance is of the inductor type it should comply with 6.3.2 of the Recommendations. Self-contained appliances should have a foam solution capacity of at least 135 litres.

6.3.2 A portable foam applicator unit should consist of an air foam nozzle of an inductor type capable of being connected to the fire main by a fire hose, together with a portable tank containing at least 20 litres of foam-making liquid and one spare tank. The nozzle should be capable of producing effective foam, suitable for extinguishing an oil fire, at the rate of at least 1,5 m³/min.

6.3.3 The type of foam used should be suitable for the cargoes to be carried.

Section 7 Alternative design and arrangements

7.1 Purpose

The purpose of this recommendation should provide a methodology for alternative design and arrangements for fire safety.

7.2 General

7.2.1 Fire safety design and arrangements may deviate from Sections 1 to 6 of this Chapter, provided that the design and arrangements meet the fire safety objectives and the functional Recommendations.

7.2.2 When fire safety design or arrangements deviate from the Recommendations of this Chapter, engineering analysis, evaluation and approval of the alternative design and arrangements should be carried out in accordance with this regulation*.

* Reference can be made to MSC/Circ. 1002 *Guidelines on alternative design and arrangements for fire safety*

7.3 Engineering analysis

7.3.1 The engineering analysis should be prepared and submitted to the Member Society, based on the guidelines developed by the International Maritime Organization and should include, as a minimum, the following elements:

- (a) determination of the vessel type and space(s) concerned;
- (b) identification of recommendation(s) with which the vessel or the space(s) will not comply;
- (c) identification of the fire and explosion hazards of the vessel or the space(s) concerned:
 - identification of the possible ignition sources;
 - identification of the fire growth potential of each space concerned;
 - identification of the smoke and toxic effluent generation potential for each space concerned;
 - identification of the potential for the spread of fire, smoke or of toxic effluents from the space(s) concerned to other spaces;
- (d) determination of the required fire safety performance criteria for the vessel or the space(s) concerned:
 - performance criteria should be based on the fire safety objectives and on the functional Recommendations of this Chapter;
 - performance criteria should provide a degree of safety not less than that achieved the recommendation in Sections 1 to 6; and
 - performance criteria should be quantifiable and measurable;
- (e) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions; and

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- (f) technical justification demonstrating that the alternative design and arrangements meet the required fire safety performance criteria.

7.4 Evaluation of the alternative design and arrangements

7.4.1 The engineering analysis required in paragraph 7.3 should be evaluated and approved by Member Society taking into account the guidelines developed by the International Maritime Organization.

7.4.2 A copy of the documentation, as approved by the Member Society, indicating that the alternative design and arrangements comply with this regulation should be carried onboard the vessel.

7.5 Re-evaluation due to change of conditions

7.5.1 If the assumptions, and operational restrictions that were stipulated in the alternative design and arrangements are changed, the engineering analysis should be carried out under the changed condition and should be approved by Member Society.

**No.
99****Section 8 Fire extinguishing Recommendations for vessels not fitted with propelling machinery****8.1 Basic Recommendations**

8.1.1 Arrangements for fire protection, detection and extinction in vessels not fitted with propelling machinery should be specially considered in each case and should depend on the size and purpose of the vessel and the presence of accommodation spaces, machinery and combustible materials on board.

No.
99**CHAPTER V LIFE SAVING APPLIANCES**

The minimum Recommendations for the carriage of life saving equipment is specified in the table below unless specified otherwise by the Administration.

The equipment specified in the table below, should comply with the IMO Life Saving Appliances Code or specified otherwise by the Administration.

CHAPTER V LIFE SAVING APPLIANCES X indicates items to be provided * see notes	Unrestricted	Restricted	Protected
All cargo vessels excluding tankers, chemical tankers and gas carriers should be provided with liferafts on each side of the vessel capable of accommodating the total number of persons on board.	X* ¹⁾	X* ¹⁾	X* ²⁾
Oil tankers, chemical tankers and gas carriers carrying cargoes having a flashpoint not exceeding 60°C (closed-cup test), not engaged on International voyages, should be provided with totally enclosed fire protected lifeboats capable of accommodating the total number of persons on board on each side of the vessel or a single free-fall lifeboat.	X	X	X
Chemical tankers and gas carriers, not engaged on International voyages, carrying cargoes emitting toxic vapours or gases should carry lifeboats as above with the addition of a self contained air support system.	X	X	X
Oil tankers, chemical tankers and gas carriers, not engaged on International voyages, should in addition be provided with life-rafts for 200% of the persons on board in the case of a free-fall lifeboat or 100% in the case of davit launched lifeboats which should be capable of being launched on each side of the vessel.	X	X	X
All cargo vessels should be provided with a rescue boat and launching appliance, a lifeboat may be accepted as a rescue boat provided that it also complies with the Recommendations for a rescue boat.	- X if length greater than 20m - X* ³⁾ if length under/equal 20m	X* ³⁾	-
A satellite EPIRB complying with GMDSS Requirements, appropriate to the sea area within which the vessel operates.	X	X* ⁴⁾	X* ⁴⁾
A radar transponder complying with GMDSS Requirements.	X	X	-
At least 2 two-way portable VHF radiotelephone apparatus complying with GMDSS Requirements.	X	X	-

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A minimum of 6 lifebuoys, 2 fitted with a self-activating smoke and light signal, 2 with a self-igniting light and 2 with a buoyant lifeline.	X	X	X
A lifejacket for each of the persons on board, and in addition a minimum of two lifejackets for persons on watch. All life jackets should be fitted with an approved lifejacket light.	X	X	X
An immersion suit to be provided for each person on board, which may include those provided for the rescue boat crew.	X ⁽⁵⁾⁺⁶⁾	X ⁽⁵⁾⁺⁶⁾	X ⁽⁵⁾⁺⁶⁾
Rocket parachute flares.	12	12	6
Line-throwing apparatus.	1	1	-
General emergency alarm.	X	X ⁽⁷⁾	X ⁽⁷⁾
Muster lists, operating instruction etc. as applicable	X	X ⁽⁸⁾	X ⁽⁸⁾

Notes:

- 1) If such liferafts cannot be readily transferred for launching on either side of the vessel, then liferafts capable of accommodating 150% the total number of persons on board should, where practicable considering vessel's size, be provided on each side.

The arrangement should be such that in the event of failure or loss of any one liferaft, sufficient liferafts remain, on each side of the vessel capable of accommodating the total number of persons on board.

All liferafts should be provided with a hydrostatic or similar automatic release to enable the liferafts to float free in the event of the vessel sinking.

- 2) Vessels operating within the extended protected waters should, where practicable, be provided with liferafts on each side.

Vessels operating within protected waters should, where practicable, be provided with at least one liferaft capable of accommodating the total number of persons on board. Craft of 24 m or less may be provided with buoyant apparatus or additional lifebuoys (1 per 2 persons) in place of liferafts.

- 3) Wherever practicable vessels should be provided with a rescue boat or on smaller vessels a suitable inflated boat with engine, however, the design and operational Recommendations of some vessels such as small tugs may preclude this.
- 4) If the vessel operates within an area designated as A1 a VHF EPIRB may be provided in place of the satellite EPIRB in accordance with GMDSS Recommendations.
- 5) Immersion suits and thermal protective aids may be omitted on vessels operating permanently between the latitudes 20°N and 20°S or within other defined areas where water temperatures and climatic conditions are satisfactory to the administration.

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- 6) Each person assigned to crew the rescue boat, including combined lifeboat/rescue boats, should be provided with an immersion suit.

Where totally enclosed lifeboats and/or davit launched liferafts are provided a minimum of 3 immersion suits should be provided.

Vessels provided with throw overboard liferafts should be provided with immersion suits for each person on board, which may include those provided for the rescue boat crew, unless exempted by 5) above or especially protected service.

Thermal protective aids should be provided in accordance with SOLAS Requirements where they form part of a lifeboat and liferaft equipment.

- 7) General emergency alarm may be omitted where the design of the vessel is such as to make it unnecessary.
- 8) The extent to which such notices are required and can be posted is dependent upon the size and type of vessel.

No.
99**CHAPTER VI RADIO INSTALLATIONS**

The minimum Recommendations for the radio installations should be as given in the table below unless specified otherwise by the Flag Administration.

CHAPTER VI RADIO INSTALLATIONS	Unrestricted	Restricted	Protected
GMDSS Requirements as contained in SOLAS IV as amended, appropriate to the sea area involved, A1, A2, A3 and A4, should apply to all vessels 300 GT and above regardless of service area and to all vessels regardless of size engaged on unrestricted service.	X	X	X
Vessels engaged on restricted service should comply as above when 300 GT and above, for vessels less than 300 GT GMDSS Requirements appropriate to the sea area involved should be complied with unless otherwise specified by the Administration.	-	X	-
Vessels engaged on protected service should comply as above when 300 GT and above, for vessels less than 300 GT GMDSS Requirements appropriate to the sea area involved should be complied with unless otherwise specified by the Administration.	-	-	X

CHAPTER VII NAVIGATIONAL EQUIPMENT

The Requirements, as specified in SOLAS 1974, as amended, Chapter V, as applicable based on ship's size, should be complied with unless the Flag Administration specifies otherwise.

CHAPTER VIII PREVENTION OF COLLISIONS

The Requirements, as specified by the Convention on International Regulations for Preventing Collisions at Sea (COLREG, 1972) as amended, should be complied with.

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