

RULES

FOR THE CLASSIFICATION AND CONSTRUCTION OF SEA-GOING SHIPS

PART XX

ADDITIONAL REQUIREMENTS FOR YACHTS

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RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF SEA-GOING SHIPS

Rules for the Classification and Construction of Sea-Going Ships of Russian Maritime Register of Shipping (RS, the Register) have been approved in accordance with the established approval procedure and come into force on 1 January 2023.

The present edition of the Rules is based on the 2022 edition taking into account the amendments and additions developed immediately before publication.

The procedural requirements, unified requirements, unified interpretations and recommendations of the International Association of Classification Societies (IACS) and the relevant resolutions of the International Maritime Organization (IMO) have been taken into consideration.

The Rules are published in the following parts:

Part I "Classification";

Part II "Hull";

Part III "Equipment, Arrangements and Outfit";

Part IV "Stability";

Part V "Subdivision";

Part VI "Fire Protection";

Part VII "Machinery Installations";

Part VIII "Systems and Piping";

Part IX "Machinery";

Part X "Boilers, Heat Exchangers and Pressure Vessels";

Part XI "Electrical Equipment";

Part XII "Refrigerating Plants";

Part XIII "Materials";

Part XIV "Welding";

Part XV "Automation";

Part XVI "Structure and Strength of Fiber-Reinforced Plastic Ships";

Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships";

Part XVIII "Additional Requirements for Structures of Container Ships and Ships, Dedicated Primarily to Carry their Load in Containers". The text of the Part is identical to IACS UR S11A "Longitudinal Strength Standard for Container Ships" (June 2015) and S34 "Functional Requirements on Load Cases for Strength Assessment of Container Ships by Finite Element Analysis" (May 2015);

Part XIX "Additional Requirements for Cargo Ships of Less Than 500 Gross Tonnage";

Part XX "Additional Requirements for Yachts";

Supplement to Rules and Guidelines of Russian Maritime Register of Shipping "IACS Procedural Requirements, Unified Requirements, Unified Interpretations and Recommendations".

REVISION HISTORY¹

(purely editorial amendments are not included in the Revision History)

Amended paras/chapters/sections	Information on amendments	Number and date of the Circular Letter	Entry-into-force date
Section 1	New definitions "Margin line" and "Passenger spaces" have been introduced	312-10-1887c of 24.01.2023	01.03.2023
Para 2.1	Scope of application of Part XX has been specified	312-10-1887c of 24.01.2023	01.03.2023
Para 2.5	Requirements have been specified for yachts subject to the requirements of international conventions and codes	312-10-1887c of 24.01.2023	01.03.2023
Para 2.6	Procedure for application of Flag State MA requirements to yachts has been specified	312-10-1887c of 24.01.2023	01.03.2023
Para 2.7	Requirements for commercial yachts carrying more than 12 passengers have been specified	312-10-1887c of 24.01.2023	01.03.2023
Para 2.8	New para specifying the conditions for assigning class notation to yachts has been introduced	312-10-1887c of 24.01.2023	01.03.2023
Para 3.1	Conditions for assigning class notation to yachts have been specified	312-10-1887c of 24.01.2023	01.03.2023
Para 4.1	Editorial amendment: reference to the Rules for the Equipment of Sea-Going Ships has been deleted	—	01.03.2023
Paras 5.1.3 — 5.1.7	New paras have been introduced setting requirements for ship structure and for tightness tests	312-10-1887c of 24.01.2023	01.03.2023
Paras 5.3.3 and 5.3.4	Requirements have been specified for subdivision of yachts carrying less than 12 passengers	312-10-1887c of 24.01.2023	01.03.2023
Paras 5.3.5 — 5.3.8	New paras 5.3.5 and 5.3.6 have been introduced, containing requirements for subdivision of passenger yachts; existing paras 5.3.5 — 5.3.6.10 and references thereto have been renumbered 5.3.7 — 5.3.8.10 accordingly	312-10-1887c of 24.01.2023	01.03.2023
Para 5.10.1.1	Scope of Chapter 5.10 "Electrical Equipment" has been specified	312-10-1887c of 24.01.2023	01.03.2023

¹ Amendments and additions introduced at re-publication or by new versions based on circular letters or editorial amendments.

Amended paras/chapters/ sections	Information on amendments	Number and date of the Circular Letter	Entry-into-force date
Para 5.10.9.1.1	Scope of requirement for availability of sources of electrical power on yachts has been specified	312-10-1887c of 24.01.2023	01.03.2023
Para 5.10.10.1	Requirement has been specified for emergency source of electrical power for yachts, carrying from 13 to 36 passengers	312-10-1887c of 24.01.2023	01.03.2023
Para 5.10.10.4	Requirement has been specified for emergency transitional source of electrical power for yachts, carrying from 13 to 36 passengers	312-10-1887c of 24.01.2023	01.03.2023
Para 5.10.10.7	Requirement has been specified for emergency transitional source of electrical power for yachts, carrying from 13 to 36 passengers	312-10-1887c of 24.01.2023	01.03.2023
Para 5.10.17.1	Scope of requirement for general alarm system and fixed fire detection and fire alarm system has been specified	312-10-1887c of 24.01.2023	01.03.2023
Para 5.14.1	Scope of radio equipment requirements for yachts has been specified	312-10-1887c of 24.01.2023	01.03.2023
Para 5.14.2	Scope of radio equipment requirements for yachts has been specified	312-10-1887c of 24.01.2023	01.03.2023
Para 5.15.1	Scope of navigational equipment requirements for yachts has been specified	312-10-1887c of 24.01.2023	01.03.2023
Para 5.15.2	Scope of navigational equipment requirements for yachts has been specified	312-10-1887c of 24.01.2023	01.03.2023
Para 5.16.1	Editorial amendment: reference to the Rules for the Equipment of Sea-Going Ships has been specified	—	01.03.2023

1 DEFINITIONS AND EXPLANATIONS

Definitions and explanations used in this Part are detailed in the relevant parts of the Rules for the Classification and Construction of Sea-Going Ships, Rules for the Equipment of Sea-Going Ships, Load Line Rules for Sea-Going Ships, Rules for the Cargo Handling Gear of Sea-Going Ships, Rules for the Classification and Construction of Pleasure Craft, Rules for the Classification and Construction of High-Speed Craft.

In addition to the above definitions, the following definitions have been adopted for the purposes of this Part:

Commercial vessel means a vessel which is not a pleasure vessel.

Margin line is a line drawn at least 76 mm below the upper surface of the bulkhead deck at side.

Passenger spaces means those spaces which are provided for the accommodation and use of passengers, excluding baggage store, provision and mail rooms; spaces provided below the margin line for the accommodation and use of the crew shall be regarded as passenger spaces.

Yacht means a decked self-propelled vessel, other than rowing craft, intended for water trips with persons lodged on board and having enclosed spaces used to accommodate all the persons the vessel is certified to carry.

2 APPLICATION

2.1 Subject to [2.2 — 2.8](#), the requirements of this Part apply to the following motor, sailing and sailing-motor yachts, not carrying cargoes and made of steel or aluminium alloys, fiber-reinforced plastic materials, of length L_{LL} (as defined in Part II "Hull") 24 m and above:

for commercial use, not carrying more than 12 passengers and not engaged on international voyages;

regardless of the nature of use, carrying from 13 to 36 passengers inclusive, the total number of persons on which does not exceed 200 (passenger yachts in case of commercial use; passenger pleasure yachts in case of non-commercial use (recreation in water bodies)).

In accordance with 1.9 of "General Regulations" of the Rules for the Classification and Construction of Pleasure Craft, the requirements of this Part may be applied to pleasure yachts of 24 m and more in length as defined in the Rules for the Classification and Construction of Pleasure Craft, not carrying cargoes and more than 12 passengers.

For yachts made of wood, the Rules for the Classification and Construction of Wooden Ships apply.

2.2 The requirements of this Part do not apply to yachts capable of operating at a maximum speed, in metres per second, equal to or exceeding $3,7 \times \nabla^{0,1667}$, where ∇ is volume displacement equal to the design waterline, in m³.

Such yachts shall be subject to the requirements of the Rules for the Classification and Construction of High-Speed Craft.

2.3 The yachts, mentioned in [2.1](#), are also subject to the Rules for the Prevention of Pollution from Ships Intended for Operation in Sea Areas and Inland Waterways of the Russian Federation, Load Line Rules for Sea-Going Ships, where applicable, the relevant requirements of the Rules for the Equipment of Sea-Going Ships, Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships, as well as the relevant provisions of the Guidelines on Technical Supervision of Ships under Construction and Guidelines on Technical Supervision of Ships in Service.

2.4 Sailing yachts are subject to the applicable provisions of the Rules for the Classification and Construction of Pleasure Craft as it pertains to sailing rig.

2.5 For yachts subject to the requirements of international conventions and codes, the relevant requirements of those international documents shall apply, with account of [2.6](#).

2.6 Requirements (standards)¹ of the Flag State MA for yachts, if any, shall be met as a matter of priority. Where the requirements of the applicable standards for yachts prescribed by the Flag State MA differ from the provisions of the applicable conventions and codes, an official confirmation by the Flag State MA that the standards applied are equivalent to the provisions of the applicable conventions and codes shall be required, in the manner established by the relevant conventions/codes.

2.7 Unless otherwise stated in this Part, commercial yachts carrying more than 12 passengers shall fully comply with all requirements of the Rules for the Classification and Construction of Sea-Going Ships that apply to passenger ships and, if applicable, the requirements of international conventions (SOLAS 74, LL-66/88, TM-69, MARPOL 73/78, etc.) and codes. Such commercial yachts carrying more than 12 passengers are passenger ships.

Commercial yachts carrying more than 12 but less than 36 passengers but not more than 200 persons on board, not carrying cargoes and engaged on international voyages, may be subject to the requirements of this Part, provided that the provisions of this Part do not conflict with the requirements of the Flag State MA taking into consideration [2.6](#).

2.8 The class notation shall be assigned to yachts in accordance with [Section 3](#).

¹ List of standards applied by the Register that provide an equivalent level of safety in relation to certain provisions of SOLAS 74 and LL-66/88, as decided by the Flag State MA:

Red Ensign Group – Yacht Code (Part A (Large Yacht Code) and Part B (Passenger Yacht Code (PYC))), Malta Commercial Yacht Code, Malta Passenger Yacht Code, Republic of the Marshall Islands Yacht Code (RMI Yacht Code), Bahamas Yacht Codes (BLYC – Bahamas Large Yacht Code; BSYC – Bahamas Small Charter Yacht Code; BPYC – Bahamas Passenger Yacht Code); other standards and codes in agreement with the Register Head Office.

3 CLASS OF A SHIP

3.1 The character of classification, distinguishing marks in the class notation are assigned in accordance with the general provisions and requirements given in Section 2 of Part I "Classification".

Subject to [3.2](#) and [3.3](#):

for commercial yachts, not carrying cargoes and more than 12 passengers, complying with the requirements of this Part, the main descriptive notation **Yacht for commercial service** shall be assigned;

for passenger yachts specified in [2.1](#), not engaged on international voyages (refer also to the Note below), complying with the requirements of this Part, the descriptive notation **Passenger yacht** shall be assigned.

Note. If the requirements of this Part and the standards for yachts acceptable to the Flag State MA are applied, the descriptive notation **Passenger yacht** may be assigned to commercial passenger yachts engaged on international voyages. Otherwise, yachts carrying more than 12 passengers, engaged on international voyages, are assigned the descriptive notation **Passenger ship** taking into account the provisions in 2.2 of Part I "Classification".

For sailing yachts, the design category shall be additionally determined for the purposes of correct application of certain provisions of the Rules for the Classification and Construction of Pleasure Craft.

3.2 Vessels complying with the applicable requirements of these Rules taking account of their structural features or purpose, whenever possible, shall be assigned one or several additional descriptive notations, as stated below.

The additional descriptive notations are stated in parentheses after the main descriptive notation.

The additional descriptive notation may represent:

.1 determination of propelling forces:

(Sailing) — for sailing vessels;

(Sailing-motor) — for sailing-motor vessels;

(Motor-sailing) — for motor-sailing vessels;

(Motor) — for motor yachts;

.2 structural particulars of a vessel;

(Multihull) — for multihull vessels;

(Hydroplane) — for planning vessels.

3.3 Additional characteristics.

When complying with the requirements of these Rules stipulated by the structural features or operational characteristics of the vessel the fulfillment of which is not reflected by distinguishing marks and descriptive notations in the class notation, the confirmation of compliance of the vessel with such requirements shall be certified by an entry in column "Other characteristics" of the Classification Certificate (e.g. that additional restrictions on navigation have been imposed on the vessel, etc.).

4 TECHNICAL DOCUMENTATION

4.1 The requirements for the scope of technical documentation to be submitted are specified in Section 3 of Part I "Classification", Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships" (as applicable), Section 3 of Part I "Classification" of the Rules for the Classification and Construction of Pleasure Craft (as applicable).

4.2 Prior to the commencement of survey of the items of technical supervision during manufacture, the documentation in the scope specified in the corresponding parts of these Rules, as well as the Rules for the Equipment of Sea-Going Ships, Rules for the Cargo Handling Gear of Sea-Going Ships, Load Line Rules for Sea-Going Ships, as applicable, shall be submitted to the Register for review.

4.3 The yacht shall be furnished with an Owner's Operating manual, approved by the Register and containing information necessary for the safe operation of the vessel, equipment and systems with the consideration for the environment.

At least the following data shall be included in the Operating manual:

- general vessel data, including name of the vessel, identification numbers, main dimensions, freeboard height, maximum speed at associated displacement and for the various sea-states (wave height of 3 % probability), under which the yacht will be operated, list of tanks (purpose, location, volume), maximum number of persons on board, including passengers, etc.;

- main data from the approved documentation on stability or references to the approved documentation on stability;

- list of doors, hatches and other openings to be kept closed at sea;

- information on emergency escapes;

- information on operation of vessel arrangements (anchoring, mooring, etc.);

- service limitations, if any;

- information about precautions to be taken when connecting/disconnecting power supply from shore. If the vessel is powered from a shore supply, the Manual shall include information regarding the hazard caused when the vessel sails in the vicinity of the shore power cables and the necessity of using in this case the relevant notice "SAFETY PRECAUTION";

- information about precautions to be taken when dealing with electrical equipment, for example:

- actions to change position of the battery switch when charging accumulator batteries, procedure for replacing a fuse and other detachable electrical components, warnings "SAFETY PRECAUTION" about explosion and fire hazard in relevant spaces which have not been properly pre-ventilated, warnings "SAFETY PRECAUTION" about current injury hazard;

- information about limited parameter values and types of protection and indication.

The Operating manual may be also produced in electronic format provided that the following conditions are met:

- data protection from editing is ensured;

- the file containing the Manual shall be installed in a computer intended for this purpose, connected to the main and emergency sources of power supply, which is accessible for use at all times during operation of the vessel;

- brightness of the data display on the computer monitor shall not interfere with watch keeping at night;

- the Manual shall also be stored in a data backup software.

4.4 Additionally, a Maintenance Manual developed by the mast manufacturer and approved by the Register shall be provided onboard for both sailing yachts and sailing-motor yachts. The Manual shall provide guidance on:

- survey frequency of spars and rigging, procedure of surveys, form of a logbook for registering data on completed surveys, repairs, modifications, etc.;

- survey frequency of keels, including close-up survey procedure and form of a logbook for registering data on completed close-up survey, including non-destructive testing (if required).

5 TECHNICAL REQUIREMENTS

5.1 HULL

5.1.1 Structural design of steel and aluminium alloy hulls shall meet the requirements of Part II "Hull".

5.1.2 Structural design of hulls in composite materials shall meet the requirements of Part XVI "Structure and Strength of Fiber-Reinforced Plastic Ships".

5.1.3 A weather deck shall be fitted throughout the length of passenger yachts and be of adequate strength to withstand the external loads that may arise due to effects of the sea and weather conditions.

5.1.4 The double bottom depth need not be taken as more than 2 m on passenger yachts.

5.1.5 On passenger yachts, steps and recesses in watertight bulkheads shall be as strong as the bulkhead at the place where each occurs.

5.1.6 On passenger yachts, the forepeak, double bottom spaces, including duct keel and inner skins, shall be hydrostatically tested to a head of water up to the bulkhead deck.

5.1.7 Hydrostatical tests on passenger yachts for the purpose of ensuring that the structural arrangements are watertight shall not be regarded as a strength test. To evaluate the fitness of any compartment for the storage of oil fuel or other liquids, a test of a superior character may be required depending on the height to which the liquid has access in the tank or its connections.

5.2 EQUIPMENT, ARRANGEMENTS AND OUTFIT

5.2.1 Equipment, arrangements and outfit of yachts shall comply with the requirements of Part III "Equipment, Arrangements and Outfit" unless provided otherwise in this Chapter. The yachts of less than 500 gross tonnage are subject to provisions of Part XIX "Additional Requirements for Cargo Ships of Less Than 500 Gross Tonnage".

5.2.2 All windows and side scuttles in bulkheads of accommodation spaces, services spaces and control stations in positions 1 and 2 shall be so constructed as to provide watertight closure.

5.2.3 The deadlights shall be installed on side scuttles in spaces that are factored into stability calculations.

5.3 STABILITY, SUBDIVISION, FREEBOARD

5.3.1 The yachts are subject to provisions of Part IV "Stability" and Part V "Subdivision".

5.3.2 For sailing yachts, stability shall meet the following criteria:

- .1 maximum righting lever shall be not less than 0,30 m;
- .2 extent of positive range of righting lever curve shall be not less than 60° without ballast keel and not less than 90° with ballast keel;
- .3 corrected initial metacentric height shall be not less than 0,60 m;
- .4 angle of static heel due to steady wind shall not exceed the open deck edge immersion angle. The Stability Booklet shall state the maximum permissible wind speed at which navigating under sails is possible;
- .5 ratio of areas A , B and C shown in [Fig. 5.3.2.5](#) shall fulfil the condition:

$$(A + B) \geq 1,4(B + C),$$

where A = the area under the righting lever curve from the angle of static heel to the down-flooding angle or the angle of heel of second intersection between the righting lever and wind heeling lever curves;

B = the area below the wind heeling lever curve l_w from the angle of static heel to the down-flooding angle or the angle of heel of second intersection between the righting lever and wind heeling lever curves;

C = the area contained between the wind heeling lever curve and the righting lever curve from the angle of static heel to the angle of heel of first intersection between them;

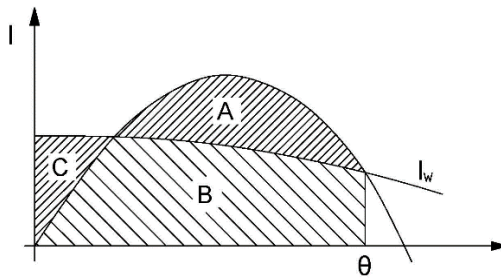


Fig. 5.3.2.5

.6 heeling lever l_w is determined by the formula

$$l_w = \frac{p_v A_z z_v}{1000 g \Delta},$$

- where
- p_v = wind pressure, in Pa, to be determined proceeding from the maximum permissible wind speed at which navigating under sails is possible;
 - z_v = windage area lever, in m, to be determined in accordance with 1.4.6.3 of Part IV "Stability" taking into account windage area variation as function of the heeling angle;
 - A_v = windage area, in m², to be determined in accordance with 1.4.6 of Part IV "Stability" taking into account its variation as function of the heeling angle;
 - Δ = yacht displacement, in t;
 - g = gravitational acceleration, equal to 9,81 m/s².

5.3.3 The yachts not carrying more than 12 passengers and cargoes, of length $L_1 < 80$ m (as defined in Part V "Subdivision") shall comply with the below subdivision requirements.

5.3.3.1 Watertight bulkheads shall be so arranged that a minor damage resulting in the flooding of any one compartment will cause the damage waterline to pass at least 0,075 m below the open deck or the freeboard deck, whichever is lower.

5.3.3.2 Minor damage shall be assumed at any position along the length of the yacht between adjacent watertight bulkheads.

5.3.3.3 In the calculations of damage trim and stability the permeability index of flooded space shall be assumed equal to:

Spaces	Permeability
Appropriated to stores	0,60
Appropriated to small amount of stores	0,95
Occupied by accommodation	0,95
Occupied by machinery	0,85

5.3.3.4 Permeability of flooded tanks with liquid cargo or liquid stores or water ballast is determined based on the assumption that all the cargo is discharged from the tank and sea water is ingressed taking into consideration the permeability index being equal to 0,95.

5.3.3.5 In damaged condition as defined in [5.3.3.1](#), the angle of heel for asymmetric flooding shall not exceed 7°, and the length of positive lever arm curve, flooding angle considered, shall be not less than 15°. The maximum lever arm shall be at least 0,1 m within this length and the positive lever arm section within the said extent shall not be less than 0,015 m·rad.

The angle of submersion of the openings specified in 1.4.5.3 of Part IV "Stability" shall be taken as flooding angle.

5.3.4 The yachts not carrying more than 12 passengers and cargoes, of length $L_1 \geq 80$ m are subject to provisions in Section 2 of Part V "Subdivision" applicable to cargo ships.

5.3.5 The requirements in Section 2 of Part V "Subdivision" applicable to passenger ships shall apply to passenger yachts, taking into account the following alterations.

5.3.5.1 When checking the probabilistic requirements for such yachts, the regulations of Explanatory Notes to SOLAS 74 Chapter II-1 shall be taken into account (refer to Collection of Regulating Documents, book nineteen, 2010).

5.3.5.2 The required subdivision index R shall be calculated as follows:

$$R = 1 - 5000 / (L_s + 2,5N + 15225), \quad (5.3.5.2-1)$$

$$\text{where } N = N_1 + 2N_2; \quad (5.3.5.2-2)$$

N_1 = number of persons for whom lifeboats are provided;

N_2 = number of persons (including officers and crew) the ship is permitted to carry in excess of N_1 .

5.3.5.3 Where compliance with the requirement of [5.3.5.2](#) on the basis of $N = N_1 + 2N_2$ is impracticable and where justification is provided that a suitably reduced degree of hazard exists¹, a lesser value of N may be taken but in no case less than $N = N_1 + N_2$.

5.3.5.4 In the calculation of index A , the level trim shall be used for the deepest subdivision draught and the partial subdivision draught. The actual service trim shall be used for the light service draught. If in any service condition, the trim variation in comparison with the calculated trim is greater than 0,5 % of L_s , one or more additional calculations of A shall be submitted for the same draughts but different trims so that, for all service conditions, the difference in trim in comparison with the reference trim used for one calculation shall be less than 0,5 % of L_s .

5.3.5.5 The factor $s_{final.i}$ shall be obtained from the formula:

$$s_{final.i} = K[(GZ_{max}/0,12)(Range/16)]^{1/4}, \quad (5.3.5.5-1)$$

where GZ_{max} shall not be taken as more than 0,12 m;

$Range$ is 16°;

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

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

$K = \sqrt{(\theta_{max} - \theta_e) / (\theta_{max} - \theta_{min})}$ otherwise, (5.3.5.5-2)

where $\theta_{min} = 7^\circ$;

$\theta_{max} = 15^\circ$.

¹ Regarding the term "reduced degree of hazard", the interpretation to Regulation 6.2.4 shall be applied, refer to Collection of Regulating Documents, book nineteen, 2010.

5.3.5.6 The damage extent to be assumed when demonstrating compliance with 2.7.2 of Part V "Subdivision" shall be dependent on both N as defined in 2.2 of Part V "Subdivision", and L_s as defined in 1.2 of Part V "Subdivision", such that:

.1 where 400 or more persons shall be carried, a damage length of $0,03L_s$ but not less than 3 m shall be assumed at any position along the side shell, in conjunction with a penetration inboard of $0,1B$ but not less than 0,75 m measured inboard from the ship side, at right angle to the centreline at the level of the deepest subdivision draught;

.2 where 36 persons are carried, a damage length of $0,015L_s$ but not less than 3 m shall be assumed, in conjunction with a penetration inboard of $0,05B$ but not less than 0,75 m.

5.3.5.7 Damage Stability Booklet shall additionally contain information on location of watertight doors that are allowed to be left open during the voyage.

5.3.6 The following requirements are allowed to be applied to passenger yachts of length $L_1 < 80$ m, if the requirements specified in [5.3.5](#) cannot be met.

5.3.6.1 Floodable length.

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

5.3.6.1.2 In a ship with a continuous bulkhead deck, the floodable length at a given point is the maximum portion of the length of the ship, having its centre at the point in question, which can be flooded under the definite assumptions set forth in [5.3.6.2](#) without the ship being submerged beyond the margin line.

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

5.3.6.2 Permeability.

5.3.6.2.1 The definite assumptions referred to in [5.3.6.1](#) relate to the permeability of the spaces below the margin line.

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

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

5.3.6.2.3 The uniform average permeability throughout the machinery room shall be determined from the formula:

$$85 + 10 \frac{a-c}{v}, \quad (5.3.6.2.3)$$

- where
- a = the volume of passenger spaces;
 - c = the volume of between-deck spaces below the margin line within the limits of the machinery room which are appropriated to stores; and
 - v = the whole volume of the machinery room below the margin line.

5.3.6.2.4 The permeability value may be assumed lower than specified above only in case a special permeability calculation is performed which is approved by the Register. The value obtained by detailed calculation may be used, with the permeability of passenger spaces taken as 95, that of store spaces as 60, and that of double bottom, oil fuel and other tanks at such value as obtained from a special calculation approved by the Register.

5.3.6.2.5 Except as provided in [5.3.6.2.6](#), the uniform average permeability throughout the portion of the ship forward of or abaft the machinery room shall be determined from the formula:

$$63 + 35 \frac{a}{v}, \quad (5.3.6.2.5)$$

where a = the volume of the passenger spaces which are situated below the margin line, forward of or abaft the machinery room; and
 v = the whole volume of the portion of the ship below the margin line forward of or abaft the machinery room.

5.3.6.2.6 In the case of unusual arrangements, average permeability for the portions forward of or abaft the machinery room may be determined by a special calculation which shall be approved by the Register. For the purpose of such calculation, the permeability of passenger spaces shall be taken as 95, that of spaces containing machinery as 85, that of all store spaces as 60, and that of double bottom, oil fuel and other tanks at such value as obtained from a special calculation approved by the Register.

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

5.3.6.3 Permissible length of compartments.

5.3.6.3.1 General.

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

5.3.6.3.2 Factor of subdivision.

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

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

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

5.3.6.3.4 The variations of the factors A and B shall be expressed by the following formulae:

$$A = \frac{58,2}{L_1 - 60} + 0,18, \quad (5.3.6.3.4-1)$$

where $L_1 \geq 131$ m;

$$B = \frac{30,3}{L_1 - 42} + 0,18, \quad (5.3.6.3.4-2)$$

where $L_1 \geq 79$ m.

5.3.6.3.5 Criterion of service.

5.3.6.3.5.1 For a ship of given length the appropriate factor of subdivision shall be determined by the criterion of service numeral (hereinafter called the criterion numeral) as given by the following formulae:

when P_1 is greater than P

$$C_s = 72 \frac{M + 2P_1}{V + P_1 - P}, \quad (5.3.6.3.5.1-1)$$

in other cases

$$C_s = 72 \frac{M + 2P}{V}, \quad (5.3.6.3.5.1-2)$$

where C_s = the criterion numeral;

M = the volume of the machinery room, in m^3 , with the addition thereto of the volume of any permanent oil fuel tanks which may be situated above the inner bottom and forward of or abaft the machinery room;

P = the whole volume of the passenger spaces below the margin line, in m^3 ;

V = the whole volume of the ship below the margin line, in m^3 ; and

$P_1 = KN$ (5.3.6.3.5.1-3)

where N = the number of passengers for which the ship shall be certified, and

$K = 0,056L_1$. (5.3.6.3.5.1-4)

5.3.6.3.5.2 When the value of KN is greater than the sum of P and the whole volume of the actual passenger spaces above the margin line, the figure to be taken as P_1 is that sum or two-thirds KN , whichever is the greater.

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

5.3.6.3.6 Rules for subdivision of ships other than those covered by [5.3.6.3.7](#).

5.3.6.3.6.1 The subdivision abaft the forepeak of ships of $L_1 \geq 131$ m having a criterion numeral of 23 or less shall be governed by the factor A ; of those having a criterion numeral of 123 or more by the factor B ; and of those having a criterion numeral between 23 and 123 by the factor F obtained by linear interpolation between the factors A and B , using the formula:

$$F = A - \frac{(A-B)(C_s-23)}{100}, \quad (5.3.6.3.6.1)$$

5.3.6.3.6.2 Nevertheless, where the criterion numeral is equal to 45 or more and simultaneously the computed factor of subdivision F is 0,65 or less, but more than 0,5, the subdivision abaft the forepeak shall be governed by the factor 0,5.

5.3.6.3.6.3 Where the factor F is less than 0,4 and it is shown to be impracticable to comply with the factor F in a machinery compartment of the ship, the subdivision of such compartment may be governed by an increased factor, which, however, shall not exceed 0,4.

5.3.6.3.6.4 The subdivision abaft the forepeak of ships of $79 \text{ m} \leq L_1 < 131$ m in length having a criterion numeral equal to S determined by the formula:

$$S = \frac{3,574-25L_1}{13}, \quad (5.3.6.3.6.4-1)$$

shall be governed by the factor unity. The subdivision of the ships having a criterion numeral of 123 or more shall be governed by the factor B . The subdivision of the passenger yachts having a criterion numeral between S and 123 shall be governed by the factor F obtained by linear interpolation between unity and the factor B using the formula:

$$F = 1 - \frac{(1-B)(C_s-S)}{123-S}, \quad (5.3.6.3.6.4-2)$$

5.3.6.3.6.5 The subdivision abaft the forepeak of ships of $79 \text{ m} \leq L_1 < 131$ m in length having a criterion numeral less than S , and of ships of $L_1 < 79$ m in length shall be governed by the factor unity.

5.3.6.3.6.6 The provisions of [5.3.6.3.6.5](#) shall apply also to ships of whatever length, which are certified to carry a number of passengers exceeding 12 but not exceeding:

$$\frac{L_1^2}{650} \text{ or } 36, \text{ whichever is less.} \quad (5.3.6.3.6.6)$$

5.3.6.3.7 Special subdivision standards for ships complying with 3.1.1.2 of Part III "Equipment, Arrangements and Outfit".

5.3.6.3.7.1 The subdivision abaft the forepeak shall be governed by a factor of 0,5 or by the factor determined according to [5.3.6.3.5](#) and [5.3.6.3.6](#), if less than 0,5.

5.3.6.3.7.2 In the case of ships of $L_z < 91,5$ m in length, if compliance with such factor would be impracticable in a compartment, the length of that compartment shall be governed by a higher factor provided the factor used is the lowest possible.

5.3.6.3.7.3 The special provisions regarding permeability given in [5.3.6.2](#) shall be employed when calculating the floodable length curves.

5.3.6.4 Special requirements concerning subdivision.

5.3.6.4.1 Where in a portion or portions of a ship the watertight bulkheads are carried to a higher deck than in the remainder of the ship and it is desired to take advantage of this higher extension of the bulkheads in calculating the floodable length, separate margin lines may be used for each such portion of the ship provided that:

.1 the sides of the ship are extended throughout the ship's length to the deck corresponding to the upper margin line and all openings in the shell plating below this deck throughout the length of the ship are treated as being below a margin line; and

.2 the two compartments adjacent to the "step" in the bulkhead deck are each within the permissible length corresponding to their respective margin lines, and, in addition, their combined length does not exceed twice the permissible length based on the lower margin line.

5.3.6.4.2 A compartment may exceed the permissible length determined in accordance with [5.3.6.3](#) provided the combined length of each pair of adjacent compartments to which the compartment in question is common does not exceed either the floodable length or twice the permissible length, whichever is the less.

5.3.6.4.3 If one of the two adjacent compartments is situated inside the machinery room, and the second is situated outside the machinery room, and the average permeability of the portion of the ship in which the second is situated differs from that of the machinery room, the combined length of the two compartments shall be adjusted to the mean average permeability of the two portions of the ship in which the compartments are situated.

5.3.6.4.4 Where the two adjacent compartments have different factors of subdivision, the combined length of the two compartments shall be determined proportionately.

5.3.6.4.5 A main transverse bulkhead may be recessed provided that all parts of the recess lie inboard of vertical surfaces on both sides of the ship, situated at a distance from the shell plating equal to one fifth the breadth of the ship and measured at right angles to the centreline at the level of the deepest subdivision load line. Any part of a recess which lies outside these limits shall be dealt with as a step in accordance with [5.3.6.4.6](#).

5.3.6.4.6 A main transverse bulkhead may be stepped provided that it meets one of the following conditions:

.1 the combined length of the two compartments, separated by the bulkhead in question, does not exceed either 90 % of the floodable length or twice the permissible length, except that, in ships having a factor of subdivision greater than 0,9, the combined length of the two compartments in question shall not exceed the permissible length;

.2 additional subdivision is provided in way of the step to maintain the same measure of safety as that secured by a plane bulkhead; and

.3 the compartment over which the step extends does not exceed the permissible length corresponding to a margin line taken 76 millimetres below the step.

5.3.6.4.7 Where a main transverse bulkhead is recessed or stepped, an equivalent plane bulkhead shall be used in determining the subdivision.

5.3.6.4.8 If the distance between two adjacent main transverse bulkheads, or their equivalent plane bulkheads, or the distance between the transverse planes passing through the nearest stepped portions of the bulkheads, is less than 3 metres plus 3 % of the length of the ship L_1 or 11 metres, whichever is the less, only one of these bulkheads shall be regarded as forming part of the subdivision of the ship in accordance with the provisions of [5.3.6.3](#).

5.3.6.4.9 Where a main transverse watertight compartment contains local subdivision and it can be shown to the satisfaction of the Register that, after any assumed side damage extending over a length of 3 m plus 3 % of the length of the ship L_1 , or 11 m, whichever is the less, the whole volume of the main compartment shall not be flooded, a proportionate allowance may be made in the permissible length otherwise required for such compartment and in such a case the volume of effective buoyancy assumed on the undamaged side shall not be greater than that assumed on the damaged side.

5.3.6.4.10 Where the required factor of subdivision is 0,5 or less, the combined length of any two adjacent compartments shall not exceed the floodable length.

5.3.6.5 Stability in damaged condition.

5.3.6.5.1 Sufficient intact stability shall be provided in all service conditions so as to enable the ship to withstand the final stage of flooding of any one compartment which is required to be within the floodable length.

5.3.6.5.2 Where two adjacent compartments are separated by a bulkhead which is stepped under the conditions specified in [5.3.6.4.6.2](#), the intact stability shall be adequate to withstand the flooding of those two adjacent compartments.

5.3.6.5.3 Where the required factor of subdivision is 0,5 or less but more than 0,33 intact stability shall be adequate to withstand the flooding of any two adjacent compartments.

5.3.6.5.4 Where the required factor of subdivision is 0,33 or less the intact stability shall be adequate to withstand the flooding of any three adjacent compartments.

5.3.6.5.5 The requirements of [5.3.6.5.1 — 5.3.6.5.4](#) shall be determined by calculations which are in accordance with [5.3.6.5.10](#), [5.3.6.5.11](#) and [5.3.6.5.13](#) respectively and which take into consideration design characteristics of the ship and the arrangement and configuration of the damaged compartments and in making these calculations the ship shall be assumed in the worst anticipated service condition as regards stability.

5.3.6.5.6 The stability required in the final condition after damage, and after equalization where provided, shall be such that the positive righting lever curve (flooding angle considered) shall have a minimum range of 15° beyond the angle of equilibrium provided that this range may be reduced to a minimum of 10°, in the case where the area under the righting lever curve is that specified in [5.3.6.5.7](#), increased by the ratio:

$$15/\text{range} \quad (5.3.6.5.6)$$

where the range is defined in [5.3.6.5.6](#), in degrees.

5.3.6.5.7 The positive lever arm section shall be at least 0,015 m·rad, measured from the angle of equilibrium to the lesser of:

- .1 the angle at which progressive flooding occurs; or
- .2 22° (measured from 0 degrees) in the case of one-compartment flooding, or 27° (measured from 0 degrees) in the case of the simultaneous flooding of two or more adjacent compartments.

5.3.6.5.8 The maximum lever arm within the said extent shall be obtained taking into account the greatest of the following heeling moments:

- .1 the crowding of all passengers towards one side;
 - .2 the launching of all fully loaded davit-launched lifeboats and liferafts on one side;
- and
- .3 due to wind pressure,
- as calculated by the formula:

$$GZ = (M_{heel}/Displacement) + 0,04 \quad (5.3.6.5.8.3)$$

provided that in no case is the righting lever to be less than 0,1 m.

5.3.6.5.9 For the purpose of calculating the heeling moments in [5.3.6.5.8](#), the following assumptions shall be made:

- .1 moment due to crowding of passengers allowing:
four persons per square metre;

a mass of 75 kg for each passenger,
and passengers shall be distributed on available deck areas towards one side of the ship on the decks where muster stations are located and in such a way that they produce the most adverse heeling moment;

.2 moments due to launching of all fully loaded davit-launched lifeboats and liferafts on one side shall be calculated under the following conditions:

all lifeboats and rescue boats fitted on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out fully loaded and ready for lowering;

for lifeboats which are arranged to be launched fully loaded from the stowed position, the maximum heeling moment during launching shall be taken;

a fully loaded davit-launched liferaft attached to each davit on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out ready for lowering;

persons not in the life-saving appliances which are swung out shall not provide either additional heeling or righting moment;

life-saving appliances on the side of the ship opposite to the side to which the ship has heeled shall be assumed to be in a stowed position;

.3 moments due to wind pressure where:

a wind pressure of 120 N/m² is to be applied;

the area applicable shall be the projected lateral area of the ship above the waterline corresponding to the intact condition; and

the moment arm shall be the vertical distance from a point at one half of the mean draught corresponding to the intact condition to the centre of gravity of the projected lateral area of the ship above the waterline;

.4 in intermediate stages of flooding, the maximum righting lever shall be at least 0,05 m and the range of positive righting levers shall be at least 7° provided that in all cases, only one breach in the hull and only one free surface of sea water which penetrated after the accident need be assumed.

5.3.6.5.10 For the purpose of making damage stability calculations the volume and surface permeabilities shall be in general as follows:

Table 5.3.6.5.10

Spaces	Permeability
Appropriated for stores	0,60
Occupied by accommodation	0,95
Occupied by machinery	0,85
Intended for liquids	0 or 0,95 ¹

¹ Whichever results in the more severe consequences.

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

5.3.6.5.11 The assumed extent of damage shall be as follows:

.1 in the longitudinal extent, 3 m plus 3 % of the length L_1 of the ship, or 11 m, whichever is the less, provided that where the required factor of subdivision is 0,33 or less the assumed longitudinal extent of damage shall be increased as necessary so as to include any two consecutive main transverse watertight bulkheads;

.2 in the transverse extent, measured inboard from the ship's side, at right angles to the centreline at the level of the deepest subdivision load line, a distance of one fifth of the breadth of the ship B ; and

.3 in the vertical extent: from the base line upwards without limit;

provided that if any damage of lesser extent than that indicated in this paragraph would result in a more severe condition regarding heel or loss of metacentric height, such damage shall be assumed in the damage trim and stability calculations.

5.3.6.5.12 The following provisions apply with respect to unsymmetrical flooding:

- .1 such flooding shall be kept to a minimum consistent with efficient arrangements;
- .2 where it is necessary to correct large angles of heel, the means adopted shall, where practicable, be self-acting, but in any case where controls to cross-flooding fittings are provided they shall be operable from above the bulkhead deck;
- .3 cross-flooding fittings together with their controls shall be approved by the Register;
- .4 the maximum angle of heel after flooding but before equalization shall not exceed 15°;
- .5 where cross-flooding fittings are required the time for equalization shall not exceed 15 minutes; and
- .6 suitable information concerning the use of cross-flooding fittings shall be supplied to the master of the ship¹.

5.3.6.5.13 The final conditions of the ship after damage and, in the case of unsymmetrical flooding, after equalization measures have been taken shall be as follows:

- .1 in the case of symmetrical flooding there shall be a positive residual metacentric height of at least 0,05 m as calculated by the constant displacement method;
- .2 in the case of unsymmetrical flooding, the angle of heel for one-compartment flooding shall not exceed 7° and for the simultaneous flooding of two or more adjacent compartments, the angle of heel shall not exceed 12°; and
- .3 in no case shall the margin line be submerged in the final stage of flooding and if it is considered that the margin line may become submerged during an intermediate stage of flooding, the Register may require additional calculations and arrangements as it considers necessary for the safety of the ship.

5.3.7 Freeboard calculation for yachts shall be made in compliance with provisions in 6.4 of the Load Lines Rules for Sea-Going Ships.

5.3.8 The load lines shall be marked in accordance with [5.3.8.1 — 5.3.8.10](#).

5.3.8.1 The deck line is a horizontal line 300 mm in length and 25 mm in breadth. It shall be marked amidships on each side of the vessel, and its upper edge shall normally pass through the point where the continuation outwards of the upper surface of the freeboard deck intersects the outer surface of the side shell.

If the freeboard deck is wood-sheathed amidships, the upper edge of the deck line shall pass through the point where the continuation outwards of the upper surface of the actual deck sheathing intersects the outer surface of the side shell of the vessel ([refer to Fig. 5.3.8.1-1](#)).

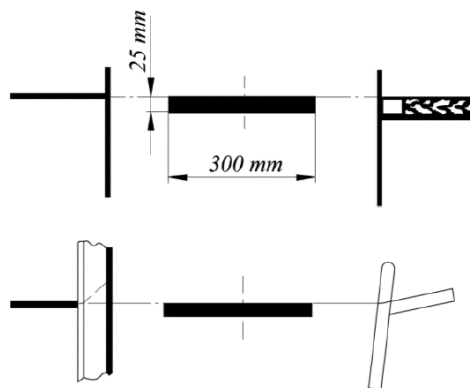


Fig. 5.3.8.1-1

Where it is impossible or inconvenient to mark the deck line by the above-mentioned method, the deck line may be placed with reference to another fixed point on the vessel side in condition that the freeboard is correspondingly corrected. The location of the reference point and the identification of the freeboard deck shall be indicated in the Load Line Certificate. For example, in a vessel having a rounded gunwale the upper edge of the deck

¹ Refer to IMO resolution A.266(VIII).

line may pass through the point *a* and the distance measured from it to the point *b* (where the continuation outwards of the upper surface of the freeboard deck intersects the outer surface of the shell) shall be indicated in the Load Line Certificate ([refer to Fig. 5.3.8.1-2](#)).

Where a vessel has complete superstructure extending along the whole length of the freeboard deck or the lower deck of the vessel is taken as a freeboard deck, the assumed minimum freeboard calculated with no correction for the position of the deck line may be such as the deck line will intersect the ring of the load line mark. In such case, if a vessel is assigned a minimum freeboard, the deck line shall be marked on the vessel's side in such a manner that it would be higher than the load line mark and the deepest load line. The appropriate correction for the position of the deck line relative to the freeboard deck shall be taken into account in the calculation and endorsed in the Load Line Certificate.

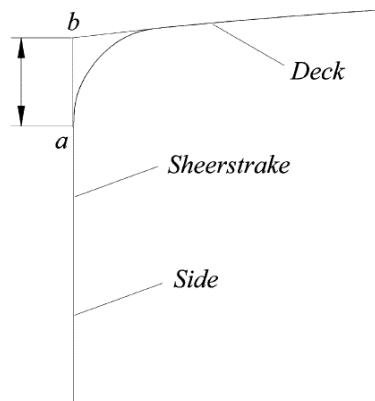


Fig. 5.3.8.1-2

5.3.8.2 The load line mark for each vessel shall consist of a ring 300 mm in outside diameter and 25 mm wide which is divided by the vertical line 25 mm in width, passing through its centre, which is intersected by a horizontal line 450 mm in length and 25 mm in breadth, the upper edge of which passes through the centre of the ring.

The centre of the ring is placed amidships and at a distance equal to the assigned summer freeboard measured vertically below the upper edge of the deck line ([refer to Fig. 5.3.8.2](#)).

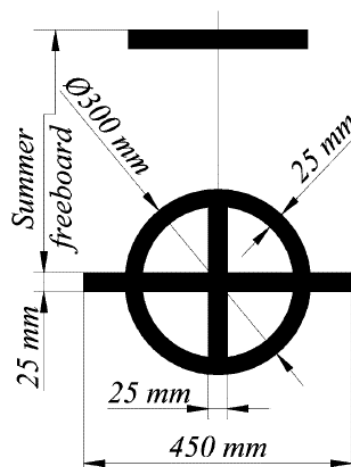


Fig. 5.3.8.2

5.3.8.3 The lines which indicate the load line in vessels of unrestricted service, operating in different zones, areas and during different seasonal periods, shall be applied in compliance with the requirements in 2.2.1 of the Load Line Rules for Sea-Going Ships.

The load lines for vessels of unrestricted service assigned minimum freeboards are shown in [Fig. 5.3.8.3](#).

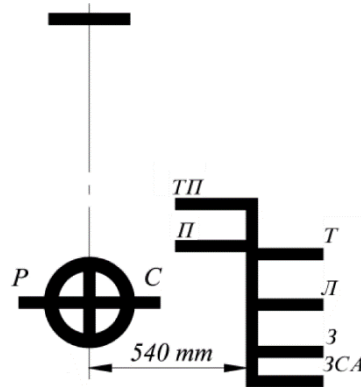


Fig. 5.3.8.3

5.3.8.4 On vessels of restricted areas of navigation **R1**, **R2**, **R2-RSN**, **R2-RSN(4,5)** and **R3-RSN** and **R3**, operating in different areas and during different seasonal periods the following load lines shall be applied:

- .1 the summer load line (Л)/(S);
- .2 the winter load line (З)/(W);
- .3 the fresh water load line in summer (П)/(F).

In sailing vessels, as well as in vessels assigned a greater than minimum freeboard, load lines shall be marked in conformity with the provisions in 2.2.3 — 2.2.6 of the Load Line Rules for Sea-Going Ships. In this case, load lines only out of those listed above shall be marked.

Load lines of vessels of restricted areas of navigation **R1**, **R2**, **R2-RSN**, **R2-RSN(4,5)** and **R3-RSN** and **R3** with minimum freeboard are shown in [Fig. 5.3.8.4](#).

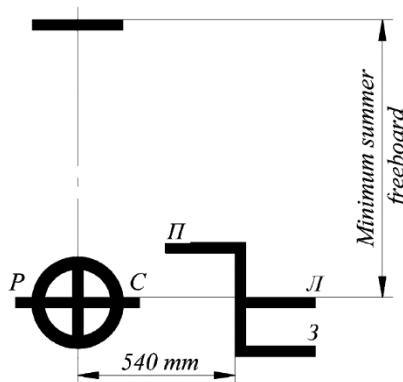


Fig. 5.3.8.4

5.3.8.5 Where the characteristics of a vessel or the nature of the vessel's service or navigational limits make any of the seasonal load lines inapplicable, these lines may be omitted and the freeboards therefore shall not be indicated in the International Load Line Certificate.

5.3.8.6 Where a winter North Atlantic load line coincides with winter load line at the same vertical line, this load line shall be marked with a letter *W*.

5.3.8.7 If assigned a greater than minimum freeboard, a vessel shall not be loaded in salt water deeper than the upper edge of the horizontal line of the load line mark when sailing within all the zones, areas and during the seasonal periods except those subject to marking by the appropriate load lines. This line shall not be marked with any letters relating to the navigational conditions.

In the Load Line Certificate the freeboard for load lines corresponding to the zones and seasonal periods (if applicable) not marked on vessel's sides shall be that as for the summer load line.

5.3.8.8 The letters which mark the load lines the outer free ends of which are directed away from the ring shall be placed against these ends of the respective load lines so that the lower edges of the letters are on the level with the upper edges of the lines. It is recommended that the letters which mark the load lines the free ends of which are directed to the ring, if the distance between load lines permits, shall be placed above the load lines at their free ends. The height of the letters indicating the load lines shall be at least 50 mm.

5.3.8.9 The mark of the Authority by whom the load lines are assigned shall be indicated above the horizontal line which passes through the centre of the load line ring. The mark of the Register consists of the letters P and C measuring 115 mm in height and 75 mm in width and placed on ring sides.

5.3.8.10 The ring, lines and letters shall be painted in white or yellow on a dark ground or in black on a light ground. They shall be marked using a method that ensures their durability.

The lines shall be plainly visible and shall be such as to enable freeboard measurements accurate to within ± 2 mm.

5.4 FIRE PROTECTION

5.4.1 The fire protection of yachts shall comply with the requirements of [5.4.1.1 — 5.4.1.5](#).

5.4.1.1 The hull, superstructures, structural bulkheads, decks and deckhouses of yachts of more than 2000 gross tonnage shall be constructed of steel or other equivalent material and comply with the requirements of Part VI "Fire Protection".

5.4.1.2 The hull, superstructures, structural bulkheads, decks and deckhouses of yachts of 300 gross tonnage and over, but less than 2000 shall be constructed of approved non-combustible materials or fire-restricting materials and their structural fire protection shall meet the applicable requirements of [5.4.3](#) and [5.4.4](#). The materials shall be tested in accordance with the requirements of Part 1 or Part 10 of the International Code for Application of Fire Test Procedures¹ respectively.

5.4.1.3 The hull, superstructures, structural bulkheads, decks and deckhouses of yachts of less than 300 gross tonnage may be constructed in whole or in part of combustible materials and their structural fire protection shall meet the applicable requirements of [5.4.2](#).

5.4.1.4 The fire-fighting systems, equipment and outfit of yachts of less than 500 gross tonnage shall meet the applicable requirements of Section 8 of Part VI "Fire Protection".

5.4.1.5 The fire-fighting systems, equipment and outfit of yachts of 500 gross tonnage and over shall meet the applicable requirements of Sections 3 — 5 of Part VI "Fire Protection".

5.4.2 Requirements for yachts of less than 300 gross tonnage.

5.4.2.1 Every vessel shall be so constructed and equipped that its structural fire protection shall reduce the risk of fire, restrict fire and smoke spreading throughout the vessel, in the event of fire, by dividing the hull, superstructures and deckhouses with steel or equivalent material bulkheads and application of insulation made of non-combustible materials, as well as create conditions for safe evacuation of people from the vessel's spaces and from the vessel.

5.4.2.2 Requirements for materials.

5.4.2.2.1 The below requirements for materials apply to all the vessels irrespective of hull construction materials.

5.4.2.2.2 The insulating materials used in accommodation spaces, service spaces, control stations and machinery spaces shall be non-combustible. The insulation surface in machinery spaces shall be impervious to oil products and their vapours.

5.4.2.2.3 In refrigerated cargo spaces and refrigerated storerooms of service spaces, combustible insulation may be used, provided it is protected by close fitting linings. As a lining material steel plates or moisture-resistant plywood with low flame-spread characteristics may be used as specified in the FTP Code. For plastic laminated moisture-resistant plywood, both composing materials (plywood and laminate) shall have low flame-spread characteristics.

5.4.2.2.4 Primary deck coverings within accommodation and service spaces and control stations shall have low flame-spread characteristics, shall not produce smoke or give rise to toxic or explosive hazards at elevated temperatures, this being determined in accordance with FTP Code.

5.4.2.2.5 Exposed surfaces within accommodation spaces, service spaces, control stations, corridors and enclosures of stairways serving these spaces, as well as the concealed surfaces behind linings, suspended ceilings and other panelling fitted within those spaces shall have low flame-spread characteristics.

5.4.2.2.6 Linings, ceilings, draught stops and their associated grounds shall be made of non-combustible materials.

5.4.2.2.7 Air spaces enclosed behind suspended ceilings, panelling or linings in accommodation spaces, service spaces and control stations shall be divided by close fitting draught stops spaced not more than 7 m apart.

5.4.2.2.8 Paints, varnishes and other finishes used on exposed surfaces inside accommodation and service spaces, control stations and stairway enclosures shall not

¹ Hereinafter referred to as "the FTP Code".

produce excessive quantities of smoke and toxic substances, this being determined in accordance with the FTP Code. This requirement applies to the finish materials of bulkheads, decks, floor coverings, linings and ceilings, but is not applicable to cables insulation, plastic piping and furniture.

5.4.2.2.9 Plastic pipes shall be applied in compliance with Section 3 of Part VIII "Systems and Piping".

5.4.2.3 Additional requirements for specific categories of spaces.

5.4.2.3.1 Galleys shall comply with the following requirements:

.1 wherever practicable, electrically powered cooking equipment shall be provided in preference to open flame types;

.2 galleys where deep-fat cooking equipment is installed shall comply with 3.1.2.14 of Part VI "Fire Protection";

.3 materials that are in the vicinity of any cooking appliance shall be non-combustible, except that combustible materials may be employed when these are faced with stainless steel or a similar non-combustible material;

.4 galley decks shall be covered with ceramic tiles or similar non-combustible covering;

.5 exhaust ventilation ducts from galley ranges shall meet the requirements of 12.2.4, 12.2.7 or 12.3.6 of Part VIII "Systems and Piping" and shall be protected by the fixed local fire extinguishing system according to Table 3.1.2.1 of Part VI "Fire Protection".

5.4.2.3.2 Storerooms for flammable materials and substances shall comply with the following requirements:

.1 cylinders containing flammable or other dangerous gases shall be clearly marked as to their contents and properly stowed and secured on open decks. All valves, pressure regulators and pipes leading from such cylinders shall be protected against damage. Flammable liquids shall always be carried in suitably sealed containers and stowed in a safe position on open decks. Such cylinders and containers may be stowed in the storerooms that meet the requirements set out in [5.4.2.3.2.2](#);

.2 containers and cylinders containing flammable liquids and combustible gases shall be stored in the storerooms having direct access from open deck. Such storerooms shall have boundary bulkheads constructed from steel or similar non-combustible materials; where boundary bulkheads of such compartments adjoin other enclosed spaces they shall be gas-tight. Pressure adjusting devices and relief valves, if any, shall be installed outside the storerooms. The storerooms shall be equipped with independent exhaust and input ventilation system arranged at high and low levels and the inlets and outlets of ventilators shall be positioned in safe areas and fitted with spark arresters;

.3 electrical equipment shall not be installed within the storerooms containing flammable liquids or combustible gases, except where necessary for service within the storeroom. Where such electrical equipment is installed, it shall be of safe type according to 2.9 of Part XI "Electrical Equipment";

.4 storerooms containing compressed and/or combustible gas cylinders shall not be used for stowage of other combustible products or for tools or objects not belonging to the gas distribution system.

5.4.2.3.3 Gas welding and cutting equipment, if carried, shall be stowed in a secure manner on the open deck at a safe distance from any potential source of fire and shall have the capability of being readily jettisoned overboard, if necessary.

5.4.2.3.4 Any enclosed gas-dangerous space that contains a gas consuming appliance or any space in which flammable gas may accumulate due to leaks shall be provided with effective gas detection and alarm systems in areas of its possible accumulation and leakage.

5.4.2.4 Structural fire protection for vessels with hulls constructed of steel of other equivalent materials.

5.4.2.4.1 In every vessel the superstructure, structural bulkheads, decks, deckhouses and pillars shall be constructed of steel or other equivalent material, having due regard to the risk of fire.

5.4.2.4.2 Bulkheads and decks bounding machinery spaces of category A shall be of "A-0" class, except those specified in [5.4.2.4.3 — 5.4.2.4.5](#).

5.4.2.4.3 Where cargo spaces are fitted with combustible insulation, bulkheads and decks separating such spaces from machinery spaces of category A shall be of "A-60" class.

5.4.2.4.4 Bulkheads and decks, which separate the machinery spaces of category A from the accommodation spaces, service spaces and control stations, shall be of "A-60" class.

5.4.2.4.5 Deck sections with the associated access routes located above a machinery space of category A or galley and intended for stowage of liferafts and EPIRB shall be of "A-60" class.

5.4.2.4.6 Bulkheads and decks, which separate galleys (or combined galley/mess rooms) from accommodation spaces, service spaces and control stations, shall be of "A-30" class.

5.4.2.4.7 Bulkheads and decks, which separate the accommodation and service spaces from control stations, shall be of "A-60" class.

5.4.2.4.8 Bulkheads of corridors serving accommodation spaces, service spaces and control stations, other than bulkheads required to meet the provisions of [5.4.2.4.2](#), [5.4.2.4.4](#), [5.4.2.4.6](#) and [5.4.2.4.7](#), shall be of "B-15" class and extend from deck to deck and to the shell plating or other boundaries.

5.4.2.4.9 Interior stairways serving accommodation spaces, service spaces or control stations shall be constructed of steel, the enclosures to such stairways shall be of "B-15" class divisions and be protected by "B-15" class self-closing doors at one end of each stairway (refer to Fig. 2.1.4.3.1-3 of Part VI "Fire Protection").

5.4.2.4.10 The number of openings in the bulkheads and decks referred to in [5.4.2.4.2](#) and [5.4.2.4.6](#), shall be the minimum practicable. Such openings shall be fitted with closing arrangements that provide fire protection equivalent to the surrounding structure. Any doors provided in the bulkheads bounding machinery spaces of category A and galleys shall be self-closing, except when such doors are required to be weathertight (semi watertight doors).

5.4.2.4.11 Where bulkheads or decks, that are required to be of "A" or "B" class divisions, are penetrated by pipes, cables, trunks, ducts, etc., arrangements shall be made to ensure that the fire integrity of the division is not impaired.

5.4.2.5 Structural fire protection for vessels with hulls partially or entirely constructed of combustible materials.

5.4.2.5.1 For vessels constructed of wood where the superstructure, structural bulkheads and decks over machinery spaces are constructed of steel or other equivalent material, fire protection arrangements shall be fitted as for steel vessels (refer to [5.4.2.4](#)).

5.4.2.5.2 On the vessel, which hull is constructed of combustible materials, the decks and bulkheads of machinery spaces of category A and galleys shall provide fire integrity equal to "B-30" due to non-combustible insulation, and such boundaries shall, as far as practicable, prevent the passage of smoke.

5.4.2.5.3 Decks and bulkheads separating control stations from accommodation spaces, service spaces and machinery spaces of category A shall provide fire integrity equal to "B-30".

5.4.2.5.4 Bulkheads of corridors serving accommodation spaces, service spaces and control stations shall be of "B-15" class and extend from deck to deck and to the shell plating or other boundaries.

5.4.2.5.5 Interior stairways serving accommodation spaces, service spaces or control stations shall be constructed of steel, the enclosures to such stairways shall be of "B-30" class divisions and be protected by "B-30" or "B-15" class self-closing doors at one end of each stairway (refer to Fig. 2.1.4.3.1-3 of Part VI "Fire Protection").

5.4.2.5.6 The number of openings in the bulkheads and decks referred to in [5.4.2.5.2](#) and [5.4.2.5.3](#) shall be the minimum practicable. Such openings shall be fitted with closing arrangements that provide fire integrity equivalent to the surrounding structure. Any doors provided in the bulkheads bounding machinery spaces of category A shall be of "B-30" or "B-15" class and be self-closing, except when such doors are required to be weathertight (semi watertight doors).

5.4.2.5.7 Where bulkheads or decks, that are required to be of "B-30" or "B-15" class divisions, are penetrated by pipes, cables, trunks, ducts, etc., arrangements shall be made to ensure that the fire integrity of the division is not impaired.

5.4.2.5.8 All exposed surfaces of glass reinforced plastic structures or composite structures within accommodation and service spaces, control stations, machinery spaces of category A and other machinery spaces of similar fire risk shall have the surface or final layer having low flame-spread characteristics and not producing excessive quantities of smoke and toxic substances, this being determined in accordance with the FTP Code, or be protected by non-combustible materials or paint coatings having the above characteristics, including media and paints with the above characteristics that intumesce when exposed to fire.

5.4.3 Structural fire protection for yachts of 300 gross tonnage and over but less than 2000 with hulls constructed of steel or other equivalent material, shall comply with the requirements of Part VI "Fire Protection".

5.4.4 Structural fire protection for yachts of 300 gross tonnage and over but less than 2000 with hulls constructed of fire-restricting materials.

5.4.4.1 Requirements for materials.

5.4.4.1.1 The hull, superstructure, structural bulkheads, decks, deckhouses and pillars shall be constructed of approved non-combustible materials having adequate structural characteristics. The use of fire-restricting materials may be permitted provided the materials comply with the requirements of the FTP Code Part 10.

Requirements in 5.4.4.1.1 do not apply to appendages such as propellers, air ducts to propellers, transmission shafts, rudders and other control surfaces, struts, spars, flexible skirts, etc., which do not comprise part of the main structure of the vessel.

5.4.4.1.2 All separating divisions, ceilings or linings if they are not fire-resisting, shall be of non-combustible or fire-restricting materials. Draught stops shall be of non-combustible or fire-restricting materials.

5.4.4.1.3 All furniture, such as chairs, sofas and tables, shall be constructed with frames of non-combustible or fire-restricting materials; all upholstered furniture shall be resistant to ignition and flame spreading, as defined by the FTP Code.

5.4.4.1.4 All draperies, curtains and other suspended textile materials, bedding components and deck finish materials shall be of a type approved by the Register based on the positive results of standard tests in accordance with the FTP Code.

5.4.4.1.5 All exposed surfaces of glass reinforced plastic structures or composite structures within accommodation and service spaces, control stations, machinery spaces of category A and other machinery spaces of similar fire risk shall have the surface or final layer having low flame-spread characteristics and not producing excessive quantities of smoke and toxic substances, this being determined in accordance with the FTP Code, or be protected by non-combustible materials or paint coatings having the above characteristics, including media and paints with the above characteristics that intumesce when exposed to fire.

5.4.4.1.6 Any thermal or acoustic insulation material shall be of non-combustible material, except when the use of fire-restricting materials is permitted in compliance with these Rules.

5.4.4.1.7 Void compartments, where low-density combustible materials are used to provide buoyancy shall be protected from adjacent fire hazardous areas by fire-resisting divisions in accordance with [Table 5.4.4.4.8](#). Besides, spaces and closures to them shall be gas-tight but ventilated to atmosphere.

5.4.4.1.8 In compartments where smoking is allowed, suitable non-combustible ash containers shall be provided. In compartments where smoking is not allowed, adequate notices shall be displayed.

5.4.4.2 Closure of doorways and other openings.

5.4.4.2.1 Except for hatches between store and baggage spaces, and between such spaces and weather decks, all openings shall be provided with permanently attached means of closing which shall be at least as effective for resisting fires as the divisions in which they are fitted.

5.4.4.2.2 It shall be possible for each door to be opened and closed from each side of the bulkhead by one person only.

5.4.4.2.3 Fire doors in bounding bulkheads of areas of major fire hazard and stairway enclosures shall satisfy the below requirements.

5.4.4.2.3.1 Doors shall be self-closing and be capable of closing with an angle of inclination up to 3,5° opposing closure, the time of closure for hinged doors shall be no more than 40 s but no less than 10 s from the beginning of their movement with the vessel in the upright position. Sliding doors shall move with the uniform rate of no more than 0,2 m/s but no less than 0,1 m/s with the vessel in the upright position.

5.4.4.2.3.2 Remote-controlled doors or power-operated doors shall be equipped with an alarm that sounds at least 5 s but no more than 10 s before the door begins to move and continues sounding until the door is completely closed. A door shall be designed so that to re-open when contacting an object in its path; it shall re-open sufficiently to allow a clear passage of no more than 1 m from the point of contact.

5.4.4.2.3.3 All doors shall be capable of remote and automatic release from a continuously manned control station, either simultaneously or in groups, and also individually from a position at both sides of the door. Indication shall be provided in the continuously manned central control station panel whether each of the remote-controlled doors is closed. The release mechanism shall be designed so that the door will automatically close in the event of disruption of control system or central power supply. Release switches shall have an on-off function to prevent automatic resetting of the system. Hold-back hooks not subject to central control station release are prohibited.

5.4.4.2.3.4 Local power accumulators for power-operated doors shall be provided in the immediate vicinity of the doors to enable the doors to be operated at least 10 times (fully opened and closed) under local control in the event of a control system disruption or failure of the main power source.

5.4.4.2.3.5 Double-leaf doors equipped with a latch necessary to their fire integrity shall have a latch that is automatically activated by the operation of doors when the operating system is released.

5.4.4.2.3.6 Doors giving direct access to special-category spaces which are power-operated and automatically closed need not be equipped with alarms and remote-release mechanisms required in [5.4.4.2.3.2](#) and [5.4.4.2.3.3](#).

5.4.4.2.3.7 Doors closed remotely from a continuously manned control station shall be capable of being re-opened at both sides of the door by local control. After such local opening, the door shall close again automatically.

5.4.4.2.3.8 Disruption of the control system or the main source of electrical power of one door shall not impair safe functioning of other doors.

5.4.4.2.3.9 Access shall be provided to local controls for adjustment and maintenance.

5.4.4.2.3.10 Power-operated doors shall be provided with a control system of the approved type which shall ensure functioning of doors in case of fire as defined by the FTP Code. This system shall comply with the following requirements:

.1 the control system shall be able to operate the door at the temperature of at least 200 °C for at least 60 min, served by power supply;

.2 power supply for doors not subject to fire shall not be impaired;

.3 at temperatures exceeding 200 °C the control system shall be automatically isolated from the power supply and shall be capable of keeping the door closed up to at least 945 °C.

5.4.4.2.3.11 Doors in smoke-tight divisions shall be self-closing. Doors which are normally in open position shall be closed automatically or remotely from a continuously manned control station.

5.4.4.2.4 The requirements for fire integrity of outer boundaries facing open decks do not apply to glass partitions, windows and side scuttles and to exterior doors of superstructures and deckhouses.

5.4.4.2.5 In public, crew accommodation and service spaces, control stations, corridors and stairways air spaces enclosed behind ceilings, panels and linings shall be suitably divided by close-fitting draught stops spaced not more than 14 m apart. Draught stops are not required in public spaces of vessels having only one public space and in spaces with

open ceilings (perforated ceilings) where the opening is 40 % or more and the ceiling is arranged in such a way that a fire behind the ceiling can be easily seen and extinguished.

5.4.4.3 Arrangement of stairways.

5.4.4.3.1 For internal stairways connecting two decks, enclosures with self-closing doors may be provided on one deck only. In such cases, the fire protection time for these enclosures shall comply with the requirements of [Table 5.4.4.4.8](#) for divisions separating spaces served by the stairway involved.

5.4.4.3.2 Lift trunks shall be fitted so as to prevent the passage of smoke and flame from one deck to another and shall be provided with means of closing so as to permit the control of draught and smoke.

5.4.4.3.3 Open stairways may be fitted in public spaces consisting of only two decks, provided the stairways are wholly within such public spaces and the following conditions are met:

- .1** all levels are used for the same purpose;
- .2** the area of the opening between the lower and upper parts of the space is at least 10 % of the deck area between the upper and lower parts of the space;
- .3** the design is such that persons within the space should be generally aware, or could easily be made aware of, a developing fire or other hazardous situation located within that space;
- .4** sufficient means of escape are provided from both levels of the space directly leading to an adjacent safe area or compartment;
- .5** the whole space is served by one section of the sprinkler system.

5.4.4.4 Fire-resisting divisions.

5.4.4.4.1 Areas of major and moderate fire hazard shall be enclosed by fire-resisting divisions, except where the omission of any such division would not affect the safety of the vessel. The requirements need not be applied to parts of the structure in contact with water at least 300 mm below the vessel's waterline in the lightweight condition in displacement mode, but due regard shall be given to the effect of temperature of hull in contact with water and heat transfer from any uninsulated structure above water.

5.4.4.4.2 Construction of all doors and door frames in fire-resisting divisions with means of securing them when closed, shall provide fire resistance as well as resistance to passage of smoke and flame equivalent to that of the bulkheads in which they are situated. Watertight doors of steel need not be insulated. Where a fire-resisting division has openings for pipes, ducts, controls, electrical cables or for other purposes, arrangements and necessary testing in compliance with the FTP Code shall be made to ensure that fire-resisting integrity of the division is not impaired. Where machinery shafts penetrate fire-resisting watertight divisions, arrangements shall be made to ensure that the required water-tightness and fire-resisting integrity of the division is not impaired.

5.4.4.4.3 In approving structural fire protection details, the risk of heat transmission at intersections and terminal points of required thermal barriers shall be regarded.

5.4.4.4.4 To prevent heat transmission at intersections and terminal points the insulation of the deck, bulkhead or pillars maintaining a control station shall be carried past the intersection or terminal point for a distance of at least 450 mm in the case of steel or aluminium structures (refer to Figs. [5.4.4.4.4a](#) and [5.4.4.4.4b](#)).

5.4.4.4.5 If the space is divided by a deck or bulkhead and the fire insulation required for each space is different, the insulation with the higher structural fire protection time shall continue on the deck or bulkhead with the insulation of the lesser structural fire protection time for a distance of at least 450 mm beyond the boundary between the spaces.

5.4.4.4.6 Where the lower part of the fire insulation has to be cut for drainage, the construction shall be in accordance with the structural details shown in [Fig. 5.4.4.4.4c](#).

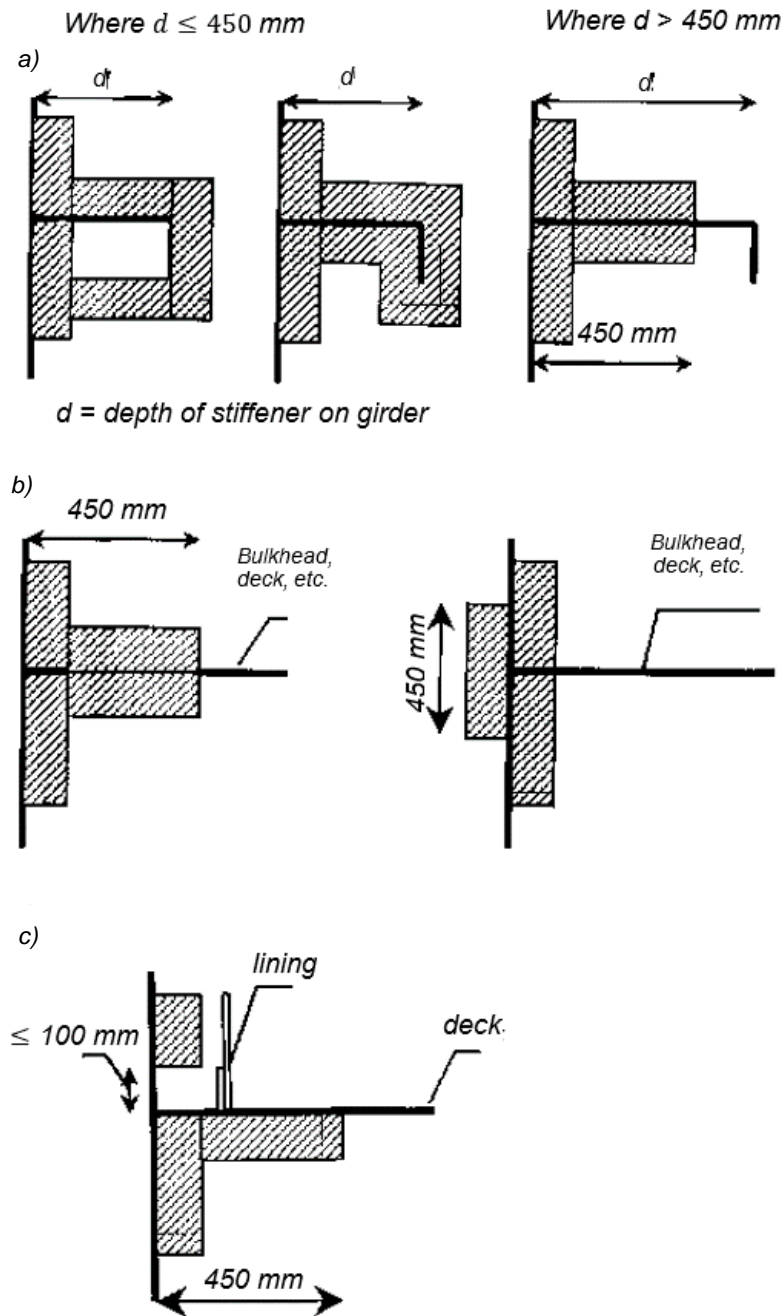


Fig. 5.4.4.4

5.4.4.4.7 Ventilation openings may be accepted in entrance doors to public toilets, provided they are positioned in the lower portion of the door and fitted with closable grilles made of non-combustible or fire-restricting material and operable from outside the space.

5.4.4.4.8 Fire integrity of separating bulkheads and decks shall be in accordance with [Table 5.4.4.4.8](#) to which provisions of [5.4.4.4.9](#) apply.

Areas of major fire hazard "A", areas of moderate fire hazard "B", areas of minor fire hazard "C", control stations "D", evacuation stations and escape routes "E" and open spaces "F" are defined in accordance with 1.3 of Part VI "Fire Protection" of the Rules for the Classification and Construction of High-Speed Craft.

Table 5.4.4.8

Structural fire protection time for separating bulkheads and decks

Categories	A	B	C	D	E	F
Areas of major fire hazard	60 1,2	30 60 1	3 60 1,8	3 60 1	3 60 1	60 1,7,9
Areas of moderate fire hazard		30 2	3 30 8	3 60 4	3 30 3	3
Areas of minor fire hazard			3 3	3 30 8,10	3 3	3
Control stations				3 4	3 4	3
Evacuation stations and escape routes					3 3	3
Open spaces						—

Notes: Figures on both sides of the diagonal line represent the required structural fire protection time for the protection system on the relevant side of the division.

When a steel division separates spaces of different zones, the structural fire protection time shall be set with regard to the area of the highest fire hazard.

1. The upper side of decks within spaces protected by fixed fire-extinguishing systems need not be insulated.

2. Where adjacent spaces are in the same alphabetical category and a note 2 appears, a bulkhead or deck between such spaces need not be fitted if deemed unnecessary by the Register. For example, a bulkhead need not be required between two store-rooms.

A bulkhead is, however, required between a machinery space and a special-category space even if both spaces are in the same category.

3. No fire resistance requirements; however, smoke-tight bulkhead made of non-combustible or fire-restricting material is required.

4. Control stations which are also auxiliary machinery spaces shall be provided with 30 min structural fire protection.

5. There are no special requirements for materials or integrity of boundaries where only a dash appears in the tables.

6. Fire protection time is 0 min and the time for prevention of passage of smoke and flame is 30 min, as determined by the first 30 min of the standard fire test.

7. Fire-restricting divisions may not comply with requirements for fire-resisting divisions as regards their insulation properties governed by the temperatures during standard fire test.

8. When steel construction is used, fire resisting divisions adjacent to void spaces need not comply with the requirement for a temperature rise according to the standard fire test.

9. The fire protection time may be reduced to 0 min for those parts of open ro-ro spaces which are not essential parts of the vessel's main load bearing structure, where passengers have no access to them and the crew need not have access to them during any emergency.

10. The fire protection time on vessels may be reduced to 0 min where the vessel is provided with only a single public space (excluding lavatories) protected by a sprinkler system and adjacent to the operating compartment.

5.4.4.4.9 In using [Table 5.4.4.8](#), it shall be noted that the title of each category is intended to be typical rather than restricted. If while determining the appropriate fire integrity standards to be applied to boundaries between adjacent spaces, there is doubt as to their classification for the purpose of this section, they shall be treated as spaces having the most stringent boundary requirement.

5.5 MACHINERY INSTALLATIONS

5.5.1 Machinery installations of yachts of less than 500 gross tonnage shall meet the applicable requirements specified in 6.5 of Part XIX "Additional Requirements for Cargo Ships of Less Than 500 Gross Tonnage".

5.5.2 Machinery installations of yachts of 500 gross tonnage and over shall meet the applicable requirements of Part VII "Machinery Installations".

5.6 SYSTEMS AND PIPING

5.6.1 Systems and piping of yachts of less than 500 gross tonnage shall meet the applicable requirements specified in Section 4 of Part V "Machinery Installations. Machinery. Systems and Piping" of the Rules for the Classification and Construction of Pleasure Craft as for pleasure craft of the appropriate design category.

5.6.2 Systems and piping of yachts of 500 gross tonnage and over shall meet the applicable requirements of Part VIII "Systems and Piping".

5.7 MACHINERY

5.7.1 Machinery of yachts of less than 500 gross tonnage shall meet the applicable requirements specified in 6.7 of Part XIX "Additional Requirements for Cargo Ships of Less Than 500 Gross Tonnage".

5.7.2 Machinery of yachts of 500 gross tonnage and over shall meet the applicable requirements of Part IX "Machinery".

5.8 BOILERS, HEAT EXCHANGERS AND PRESSURE VESSELS

5.8.1 The full provisions of Part X "Boilers, Heat Exchangers and Pressure Vessels" shall apply to the yachts.

5.8.2 Liquefied gas systems for household purposes shall meet the requirements specified in 19.1 of Part VII "Systems and Piping" of the Rules for the Classification and Construction of Inland Navigation Ships (for European Inland Waterways).

5.8.3 Where air heating installations are used, the requirements specified in 19.2 of Part VII "Systems and Piping" of the Rules for the Classification and Construction of Inland Navigation Ships (for European Inland Waterways) shall be met.

5.9 REFRIGERATING PLANTS

5.9.1 The full provisions of Part XII "Refrigerating Plants" shall apply to yachts.

5.10 ELECTRICAL EQUIPMENT

5.10.1 Application.

5.10.1.1 The requirements of this Chapter, which are amendments and additions to the relevant requirements in Part XI "Electrical Equipment", apply to the electrical installations as well as to individual types of electrical equipment (in accordance with [5.10.3](#)) of the yachts specified in [2.1](#), subject to the following.

Regardless of the nature of their use, for yachts carrying from 13 to 36 passengers, provisions in 19.1 of Part XI "Electrical Equipment" shall be additionally taken into account.

Yachts of 500 gross tonnage and over are subject to the full requirements of Part XI "Electrical Equipment".

5.10.1.2 The requirements of this Chapter apply to permanently installed electrical systems and equipment.

5.10.1.3 Electrical equipment not specified in [5.10.3](#) shall be designed and constructed in accordance with national standards so that its failure does not result in fire or electric shock to persons.

5.10.1.4 In case of using an electric network with a voltage in excess of the safety voltage for powering devices that may affect the safety of navigation and the manoeuvrability of vessels, the relevant requirements of Part XI "Electrical Equipment" shall be met.

5.10.1.5 The requirements of this Part do not apply to the electrical equipment intended for domestic and process use, except for the requirements set out in [5.10.3.2.2](#).

5.10.2 Definitions and explanations.

5.10.2.1 In addition to the definitions given in Part XI "Electrical Equipment" the following definitions shall be used.

Accessible means capable of being reached for inspection without the use of special tools.

Distribution system means a system of components intended for distribution of power in the vessel and/or for control, such as contactors, relays, fuses, instruments, pilot lamps.

External source of electrical power means a source of electrical power located outside the vessel and intended to supply all electrical devices and systems essential for maintaining the vessel in ready-for-use condition during lay-up, repair and in other navigational or operational cases, without resorting to the emergency source of electrical power.

Protection means permanent protection of one or several insulated conductors by means of insulating tape, rubber and plastic sheaths or thermo-sensible tubes.

Solar battery means a special assembly of crystals, which converts luminous energy to electrical power and supplies one or several accumulator batteries in flotage.

Wind-powered generator means a generator driven by the non-reversible machinery using wind power and supplying one or several accumulator batteries in flotage.

5.10.3 Survey scope.

5.10.3.1 General.

5.10.3.1.1 General provisions applicable to the classification procedure, survey procedure during ship's construction and manufacture of equipment are stated in the General Regulations for the Classification and Other Activities and in Part I "Classification".

5.10.3.2 Survey of vessel's electrical equipment.

5.10.3.2.1 The following types of equipment, systems and arrangements are subject to technical supervision on board the vessel:

- sources of electrical power;
- distribution systems;
- electric drives for shipboard mechanisms;
- electrical lighting;
- navigation lights;
- signalling and internal communication;
- radio and navigational equipment;
- cable network;

other, not listed above, as requested by the Register, specified in 1.3.2 of Part XI "Electrical Equipment".

5.10.3.2.2 Electrical equipment intended for domestic and process use shall be subject to supervision on board the vessel only in respect to the following:

.1 influence exerted by the operation of this equipment on the quality of electrical power produced by the shipboard electrical power plant;

.2 selection of the types and sections of cables and wires, as well as the methods of cable installation;

.3 insulation resistance, earthing and protective devices.

5.10.3.3 Survey during manufacture of electrical equipment.

5.10.3.3.1 The kinds of electrical equipment listed in 1.3.3 of Part XI "Electrical Equipment" are subject to survey during manufacture.

5.10.4 General requirements.

5.10.4.1 The general requirements for electrical equipment are specified in Section 2 of Part XI "Electrical Equipment".

5.10.4.2 Electrical equipment shall be installed in such a manner as to provide convenient access to controls and to all parts that require maintenance, inspection and replacement.

5.10.4.3 Electrical equipment shall not be fixed directly to the walls of fuel tanks. The distance from these appliances to the walls of tanks shall be not less than 75 mm.

5.10.4.4 Generators, starters and other electrical devices attached to the internal combustion engines shall be installed so that they are as far from the fuel system as practicable.

5.10.4.5 The vessel shall be provided with an electrical system diagram showing all electrical circuits and arrangement of electrical devices with identification of used wires, contactors, switches, relays and fuses, as well as description of the symbols used.

5.10.4.6 The electrical equipment installed in vessel's spaces wherein flammable gases are likely to accumulate, shall be of safe-type.

5.10.5 Structural requirements and protection of electrical equipment.

5.10.5.1 Internal wiring.

5.10.5.1.1 For internal wiring of switchgear, control panels, other distributing and switching devices, etc., wires of not less than 0,75 mm² in cross-sectional area shall be used.

For systems of control, protection, measurement of parameters, signalling and internal communication, the use of wires having a cross-sectional area not less than 0,5 mm² is permitted.

5.10.5.2 Protection of electrical equipment.

5.10.5.2.1 Depending on location, the use shall be made of electrical equipment in appropriate protective enclosure, or other suitable measures shall be taken to protect the equipment from harmful effects of environment and to protect personnel from current injury hazards.

5.10.5.2.2 The minimum degree of protection of the electrical equipment installed in vessel's spaces and zones shall be determined according to [Table 5.10.5.2.2](#).

Table 5.10.5.2.2

Nos.	Location of electrical equipment	Characteristics of spaces	Degree of protection
1	Dangerous spaces and zones (refer to 5.10.8)	In which explosive mixtures of vapours, gases and dust with air are likely to occur	Ex
2	Accommodation and general use spaces, as well as corridors having no direct exit to exposed deck	Dry	IP20
3	Spaces having direct exit to exposed deck, machinery spaces	With increased humidity	IP23

Nos.	Location of electrical equipment	Characteristics of spaces	Degree of protection
4	Galleys, showers, lavatories, toilets, accumulator rooms and lockers, ventilating trunks leading to exposed deck, etc.	Water splash	IP44
5	Exposed decks	Water flooding	IP56
Note. Where the enclosure of equipment does not guarantee the necessary protection, alternative methods of protection or alternative arrangement of equipment shall be applied to ensure the degree of protection stipulated by the Table.			

5.10.6 Protective earthing.

5.10.6.1 Metal enclosures of electrical equipment shall be fitted with an earth terminal marked with the symbol "≡", unless otherwise indicated in this Part.

Provisions shall be made for earthing inside and outside the electrical equipment enclosure depending on its purpose.

5.10.6.2 Parts to be earthed.

5.10.6.2.1 Metal parts of electrical equipment which are not live, but are likely to be touched under service conditions, except those listed in [5.10.7](#), shall have a reliable electric bond with a component fitted with an earth terminal (refer also to [5.10.7](#)).

5.10.6.2.2 In addition to 2.5.1.2 of Part XI "Electrical Equipment", protective earthing is not required for detachable or openable parts of metal lockers, guards, etc., if no electrical equipment is installed on the detachable (openable) parts or voltage of the electrical equipment installed does not exceed 42 V a.c or 55 V d.c.

5.10.6.2.3 Earthing of electrical equipment by connection of pipelines, cylinders for compressed gases and tanks for oil products is forbidden.

5.10.6.2.4 For vessels with non-conducting hull, earthing shall be effected with the use of a special copper plate of not less than 0,5 m² in area and not less than 2 mm thick or a plate made of carbon steel of not less than 1,5 m² in area and not less than 6 mm thick attached to the underwater part of the shell plating below the light-draught waterline and used for earthing of all items of equipment installed on board the vessel.

Instead of a special earthing plate, metal stem or other metal structures of the vessel (e.g. metal shaft strut) immersed in water under all sailing conditions are allowed to be used.

5.10.7 Earthing terminals and conductors.

5.10.7.1 Fixed electrical equipment, metal pipes and outer metal sheaths (braids) of cables used for protection against mechanical damage, metal sheaths of cables and screens of cores used for screening, shall be earthed at both ends. Earthing shall be effected by means of external earthing conductors, earthing core in the feeding cable or with the use of a direct electrical contact between the equipment enclosure and the metal vessel's hull.

For cables laid on wood or synthetic material, one earthing connection will be sufficient. In case of alternating current, single-core cables and feeders shall be earthed in one point.

Reliability of earthing of the electrical equipment and cable sheaths may be regarded as appropriate if parameters given in [Table 5.10.7.1-1](#) are met.

For earthing effected with external earthing conductor, copper conductors shall be used. Conductors made of any other corrosion-resistant material may be also used, provided the resistance of same will not exceed that of the copper conductor required. The cross-sectional area of the copper conductor shall not be less than that specified in [Table 5.10.7.1-2](#).

For earthing effected with a special core of feeding cable, the cross-sectional area of this core shall be equal to the nominal cross-sectional area of the feeding cable for cables having a cross-sectional area up to 16 mm² and at least half the cross-sectional area of the feeding cable, but not less than 16 mm², for cables having a cross-sectional area from 16 mm² to 35 mm².

Table 5.10.7.1-1

Type of earthing	Method of earthing		
	With a separate conductor	With a cable core	With a direct contact
	Value of resistance, in Ohm, not more than		
Protective	0,1	0,4	0,1
Shielding	0,02	—	0,02

Table 5.10.7.1-2

Cross-sectional area of a cable core connected to consumer, in mm ²	Cross-sectional area of external earthing conductor, in mm ²	
	solid	stranded
0,5 to 4	4	2,5
4 to 16	Half the cross-sectional area of cable core connected to consumer, in mm ²	
16 to 35	16	16
35 to 120	Half the cross-sectional area of cable core connected to consumer, in mm ²	
Over 120	70	

5.10.7.2 Earthing circuits of the fixed equipment shall be non-disconnectable.

5.10.8 Safe-type electrical equipment.

5.10.8.1 In addition to 2.9 of Part XI "Electrical Equipment" safe-type equipment and certificates issued by competent bodies shall be checked to ensure the correct selection of the type of equipment permitted for installation in different spaces, as well as integrity of the protective enclosure.

5.10.9 Sources of electrical power.

5.10.9.1 Composition and capacity of main electrical power source.

5.10.9.1.1 Generators and/or accumulator batteries with a capacity sufficient to supply all electrical equipment of the vessel under conditions specified in [5.10.9.1.6](#) may be used as sources of electrical power for yachts.

5.10.9.1.2 The main source of electrical power shall consist of at least two independently driven generators or two accumulator batteries with appropriate direct current generators capable of charging the main batteries to 80 % of their charge within 10 hours and simultaneously powering essential equipment. A combination of these power supplies is allowed.

5.10.9.1.3 As the main source of electrical power, it is allowed to use at least:

- .1 not less than two independently driven generators;
- .2 generator driven by a propulsion plant engine and generator driven by an individual internal combustion engine;
- .3 generator driven by an individual internal combustion engine and one or several accumulator battery(ies) which is(are) floating on the generator;
- .4 generator driven by a propulsion plant engine and one or several accumulator battery(ies) which is(are) floating on the generator;
- .5 generator driven by the propulsion plant and one or several accumulator battery(ies) which is(are) floating on the generator;
- .6 one or several accumulator battery(ies).

5.10.9.1.4 Where the main source of electrical power is needed to ensure propulsion and steering of the yacht, then such source shall exclusively consist of not less than two generator sets. The number and capacity of generators composing such a source of electrical power shall be such that in the event of failure of any of them, the remaining ones are capable of:

- .1 powering the electrical equipment essential for propulsion, steering and safety of the vessel;
- .2 guaranteeing normal habitable conditions on board;
- .3 starting the most powerful electric motor with the greatest starting current. The motor start shall not involve a voltage and frequency drop in the mains that could result in stop of generator engine or disconnection of machinery and apparatus being in operation.

5.10.9.1.5 The consumers necessary to ensure the propulsion and steering of the yacht under conditions specified in [5.10.9.1.6](#), minimal habitable conditions on board do not include:

- .1 motors that are not part of the propulsion;
- .2 refrigerating units for air conditioning.

5.10.9.1.6 The number and power of generators forming the main source of electrical power shall be determined with regard to the following operating conditions of the vessel:

- .1 running conditions;
- .2 manoeuvring;
- .3 in case of fire, hole in the vessel's hull or other conditions affecting the safety of navigation, with the main source of electrical power in operation;
- .4 other operating conditions according to vessel's purpose.

5.10.9.1.7 In vessels where accumulator batteries including such batteries which are floating on a generator are the main source of electrical power, their capacity shall be sufficient to supply, without additional recharging from the vessel's charging facilities and with regard to [5.10.10.1](#), the required electrical services during:

24 h — for yachts of unrestricted service and restricted area of navigation **R1**;

16 h — for yachts of restricted areas of navigation **R2, R2-RSN, R2-RSN(4,5)**;

8 h — for yachts of restricted areas of navigation **R3, R3-RSN**.

5.10.10 Emergency source of electrical power.

5.10.10.1 The emergency source of electrical power, taking into account the starting currents and the nature of certain loads, shall be capable of supplying power for 6 hours to the following simultaneously operating consumers:

- .1 emergency lighting for emergency escapes from enclosed spaces and muster and embarkation stations for boarding life-saving appliances;
- .2 internal communications and announcing systems required in an emergency;
- .3 navigation lights;
- .4 radio and navigational equipment;
- .5 fire detection alarm system;
- .6 other emergency consumers (bilge and fire pumps, etc.).

For yachts of restricted areas of navigation **R2, R2-RSN, R2-RSN(4,5), R3-RSN** and **R3**, the specified time period (6 hours) may be reduced, but in any case shall be at least 3 hours.

The emergency source of electrical power for yachts carrying from 13 to 36 passengers shall also supply, for a period of 30 minutes, the supplementary lighting in all passenger cabins to clearly indicate the exit. The supplementary lights may be powered by their own accumulator batteries fitted in lighting fixtures and continuously recharged from the emergency switchboard.

5.10.10.2 A means (visual or audible alarm) shall be made in the central control station or main switchboard to signal when any accumulator battery, which is part of emergency or transitional source of electrical power, is being discharged.

5.10.10.3 A generator or an accumulator battery may be used as the emergency source of electrical power.

5.10.10.4 Where a generator is used as the emergency source of electrical power, it shall be:

- .1 driven by an internal combustion engine with a flash point not less than 43 °C;
- .2 automatically started upon failure of the electrical supply from the main source of electrical power monitored at the emergency switchboard busbars and automatically connected to the emergency switchboard, and consumers stipulated under [5.10.10.1](#) shall be automatically supplied by the emergency generator. The total time of starting and load take-over by the generator shall not exceed 45 s;
- .3 in case the automatic start of emergency unit shall not take place within 45 s, an emergency transitional source of electrical power shall be provided, which shall start immediately on failure of the main source of electrical power.

For yachts carrying from 13 to 36 passengers, an emergency transitional source of electrical power, which shall start immediately on failure of the main source of electrical power, shall be provided irrespective of the time of starting of the emergency generator.

5.10.10.5 Where an accumulator battery is used as the emergency source of electrical power, it shall:

- .1 operate without recharging with voltage variations across the terminals within 12 % of the rated voltage throughout the whole discharge period. The voltage variations across the terminals of accumulator battery connected to an electronic voltage converter are determined by the permissible range of voltage variation across the terminals of the converter;

.2 be automatically connected to the emergency switchboard busbars in case of failure of the main source of electrical power and supply at least the consumers mentioned under [5.10.10.1](#);

.3 have only short-circuit current protection.

5.10.10.6 In vessels where an accumulator battery is used as the main source of electrical power, installation of an emergency source of electrical power is not required, provided that the capacity of the battery is sufficient to comply with the requirements under [5.10.10.1](#).

5.10.10.7 For the emergency transitional source of electrical power required by [5.10.10.4](#), an accumulator battery shall be used, which shall operate without recharging and with voltage across its terminals within 12 % of rated voltage during the whole discharge period. Voltage variations across the terminals of the accumulator battery connected to an electronic voltage converter are determined by the permissible range of voltage variation across the terminals of the converter, which shall not be above values specified in 2.1.3.1 of Part XI "Electrical Equipment".

The capacity of the battery serving as transitional source of electrical power shall be sufficient for supplying the services listed below during 30 min:

- .1 lighting and necessary navigation lights according to [5.10.10.1](#) and [5.10.10.3](#);
- .2 internal communication and announcing systems required in an emergency;
- .3 general alarm system, fire detection and fire alarm system;
- .4 daylight signalling lamps, sound signal means (whistles, gongs, etc.) and other types of signals required under emergency conditions;
- .5 ship's security alarm system and AIS installation required by Part IV "Radio Equipment" and Part V "Navigational Equipment" of the Rules for the Equipment of Sea-Going Ships.

Services listed under [5.10.10.7.2 — 5.10.10.7.5](#) may be supplied from their own accumulator batteries which shall ensure their supply during the time necessary.

5.10.11 Accumulator batteries.

5.10.11.1 Accumulator batteries shall be installed above the bilge level in dry locations, readily accessible, ventilated and not exposed to environmental effects, such as high or low temperature, water splashing and mechanical damage.

5.10.11.2 Accumulator batteries shall not be installed in close vicinity to fuel tank or fuel filter.

Any metal component of the fuel oil system within 300 mm above the battery top, as installed, shall be electrically insulated.

5.10.11.3 Accumulator batteries shall be so arranged that at yacht inclinations up to 45° deg. electrolyte does not leak.

5.10.11.4 In vessels with main engine having power output not more than 75 kW, one starting battery may be used, which can also power the electrical lighting system.

5.10.11.5 Capacity of the starting battery shall ensure six starts of the engine, considering that the duration of each start is at least 5 s, and shall meet the recommendations of the engine manufacturer.

5.10.11.6 The procedure of charging of an accumulator battery from the main source shall ensure charging of the battery during not more than 10 h.

5.10.11.7 When selecting capacity of acid batteries intended for a service other than starting service, their discharging of not more than 50 % of the rated capacity shall be specified. For alkaline batteries, a greater discharging value may be specified in accordance with the battery manufacturer's recommendations.

5.10.11.8 The starter of the main engine shall be supplied from the starting battery and in an emergency – from an other battery having adequate capacity.

5.10.11.9 The accumulator batteries shall not be used for supply of services with a voltage lower than the total voltage of all the battery cells.

5.10.11.10 It is recommended to use batteries which do not require attendance.

5.10.11.11 Only safe-type electrical equipment may be installed in the accumulator battery rooms, with the protection level as follows — sub-group IIC, temperature class T1.

5.10.12 Number and capacity of transformers.

5.10.12.1 For vessels of less than 500 gross tonnage of restricted areas of navigation **R2, R2-RSN, R2-RSN(4.5), R3-RSN and R3**, one transformer may be used.

5.10.13 Alternative sources of electrical power.

5.10.13.1 Where the alternative sources of electrical power are installed on board in addition to the requirements of [5.10.9](#) and/or [5.10.11](#) for their cooperative use, the systems of electrical power distribution including the wind-powered generator and/or solar battery shall be approved by the Register.

5.10.14 Distribution of electrical power.**5.10.14.1 General.**

5.10.14.1.1 Each outgoing electrical circuit in a switchboard shall be provided with a switching and protective device.

5.10.14.1.2 Final circuits of electrical lighting of spaces shall not be put under current load in excess of 10 A. These electrical circuits may supply cabin fans and other minor services.

5.10.14.2 Systems of electrical power distribution.

5.10.14.2.1 The following d.c. distribution systems shall be used on board:

- .1 two-wire insulated system, or
- .2 two-wire system with negative earthed pole;
- .3 three-wire system with a common negative pole.

5.10.14.2.2 A single-wire d.c. and a.c distribution system with the use of the vessel's hull as a return conductor is not permitted, except for limited and locally-earthed systems (e.g. starter systems).

5.10.14.2.3 The switchgear (main switchboard, emergency switchboard) may be fitted in a desk located in the wheelhouse.

5.10.14.2.4 The following services (if available on board) shall be supplied from the main switchboard by separate feeders:

- .1 steering gear electric drives (refer also to [5.10.15.2](#));
- .2 anchor gear electric drives;
- .3 fire pump electric drives;
- .4 bilge pump electric drives;
- .5 section switchboards of lighting;
- .6 radio station switchboard;
- .7 navigational equipment switchboard;
- .8 navigation lights switchboard;
- .9 switchboards of integrated control desk;
- .10 switchboard of automatic fire detection and alarm station;
- .11 electric drives of auxiliaries essential for the operation of main machinery;
- .12 switchboards of electric drives for cargo, mooring, lifeboat and other gear, ventilation and heating appliances;
- .13 charging facilities of starter accumulator batteries and batteries supplying essential services;
- .14 other services not listed above, as required by the Register.

It is permitted to supply services indicated in [5.10.14.2.4.4](#), [5.10.14.2.4.6](#), [5.10.14.2.4.7](#), [5.10.14.2.4.8](#), [5.10.14.2.4.10](#), [5.10.14.2.4.11](#), [5.10.14.2.4.13](#) from the switchboard specified in [5.10.14.2.4.9](#) by separate feeders provided with adequate switching and protective devices.

5.10.14.2.5 Final sub-circuits having a current rating in excess of 16 A shall supply not more than one service.

5.10.14.2.6 Supply circuits for smaller groups of services shall be specified for a rated current not in excess of 16 A. These circuits shall not supply simultaneously lighting and heating appliances.

5.10.14.3 Switchboards.

5.10.14.3.1 In addition to 4.6.1.7 of Part XI "Electrical Equipment", the generator panels may be illuminated with luminaries with built-in accumulators, at that the generator panels shall be provided with the power supply indicator light on the generator side.

5.10.14.3.2 Selection of electrical switching devices.

5.10.14.3.2.1 Electrical switching devices shall at least comply with the national standards and shall be so selected that:

.1 under normal service conditions their rated voltages, currents and temperature rise limits are not exceeded;

.2 they are capable of withstanding, without damage or exceeding temperature limits, such over-currents as specified for transient conditions;

.3 they characteristics under short-circuit conditions are consistent with the actual short-circuit power factors, as well as with the behaviour of the sub-transient and transient short-circuit current.

5.10.14.3.2.2 The rated breaking capacity of electrical switching devices designed to interrupt the short-circuit currents shall not be less than the prospective short-circuit current at the point of their installation at the moment of interrupting.

5.10.14.3.2.3 The rated making capacity of circuit breakers and switches, which may be incorporated in a shorted electric circuit, shall not be less than prospective peak making current at the point of their installation under short-circuit conditions.

5.10.14.3.2.4 The electrodynamic stability current of electrical devices not intended for interrupting short-circuit currents shall not be less than the prospective peak current at the point of their installation.

5.10.14.3.2.5 The thermal stability current of electrical devices under short-circuit conditions shall be consistent with the prospective short-circuit current at the point of their installation taking into account the duration of short-circuit attributed to the discriminative action of protection devices.

5.10.14.3.2.6 In electric circuits having a load current rating in excess of 320 A, circuit breakers shall be fitted for overcurrent protection. The use of circuit breakers is recommended at the current exceeding 200 A.

5.10.14.3.2.7 In d.c. compound generator circuits where the generators are intended for parallel operation, circuit breakers shall have a pole in the equalizing wire mated mechanically with the other poles of the circuit breaker so that it would close before the other poles are connected to the busbars and open after their disconnection.

5.10.14.3.3 Arrangement of electrical switching devices and measuring instruments.

5.10.14.3.3.1 In the main switchboard the feeder energized from the external power source, in addition to 4.6.4.6 of Part XI "Electrical Equipment", shall be provided with a voltage drop protection device.

5.10.14.3.3.2 Controls of generator apparatus shall be located not lower than 800 mm above the floor. Controls of other apparatus shall be located at least 300 mm above the floor.

5.10.14.3.4 Arrangement of switchgear.

5.10.14.3.4.1 Vessels equipped with both direct current (d.c.) and alternating current (a.c.) electrical systems shall have their distribution from either separate switchboards or a common one with a partition or the d.c. and a.c. sections clearly separated from each other. Wiring diagrams of the switchboard shall be included with the vessel.

5.10.14.3.5 Access to switchboards.

5.10.14.3.5.1 A passageway of at least 600 mm wide shall be provided in front of the switchboard.

5.10.14.3.5.2 A passageway of at least 600 mm wide shall be provided on the rear, lengthwise of free standing switchboards.

5.10.14.3.5.3 The space behind the free standing switchboards with live open parts shall be enclosed and fitted with doors.

5.10.14.3.5.4 Passageways specified in [5.10.14.3.5.1](#) and [5.10.14.3.5.2](#) are measured from the most protruding parts of the switchboard apparatus and structures to the protruding parts of equipment or hull structures.

5.10.15 Electric drives of the vessel's machinery and equipment.

5.10.15.1 General.

5.10.15.1.1 Control stations of drives shall meet the relevant requirements of Part VII "Machinery Installations".

5.10.15.1.2 Starting of the machinery, the electric motors or facilities of which require additional ventilation in normal operation shall be possible only with ventilation in action.

5.10.15.2 Electric drives and control of steering gear.

5.10.15.2.1 In addition to the requirements in 6.2 of Part IX "Machinery" and in 2.11 of Part III "Equipment, Arrangements and Outfit", steering gear shall meet the requirements of this Chapter.

5.10.15.2.2 Where several control stations for electric drives of steering gear are available, a change-over switch shall be provided to ensure functioning of only one control station, at the operator's choice.

5.10.15.3 Electric drives of anchor and mooring machinery.

5.10.15.3.1 In addition to the requirements set out in Section 6 of Part IX "Machinery", the electric drives of windlasses, anchor and mooring capstans and mooring winches shall meet the requirements of this Part.

5.10.15.3.2 When a.c. squirrel-cage electric motors are used, the electric drives of the anchor and mooring machinery shall ensure, after 30-minute operation at rated load, possible stalling of the electric motor at the rated voltage for at least 30 s for the anchor machinery and 15 s for the mooring machinery. For reconnecting stator winding motors this requirement is applicable to operation of the motors with the windings producing maximum starting torque. The d.c. motors and a.c. wound-rotor electric motors shall withstand the above-stated stalling conditions, but at the torque twice the rated one; in this case, the voltage may be below the rated value. Following stalling, the temperature rise shall not be over 130 % of the permissible value for the insulation used.

5.10.15.3.3 The supply of electric drives of anchor capstans or windlasses shall be effected from the main switchboard busbars.

5.10.15.4 Power supply of electrical (electronic) automation systems.

5.10.15.4.1 Power supply of electrical (electronic) automation systems shall satisfy the requirements of Part XV "Automation".

5.10.15.4.2 Power supply of automation devices necessary for starting and operating the emergency diesel generator shall be taken from a starter battery or another independent accumulator battery installed in the emergency diesel generator space.

5.10.16 Lighting.

5.10.16.1 Socket outlets.

5.10.16.1.1 In bath- and wash-rooms it is allowed to install socket outlets with a permissible operating voltage up to 50 V. An exception to this may be socket outlets with isolating transformers for electric shavers or socket outlets protected with the use of automatic switches with differential relay for < 30 mA.

5.10.16.1.2 The use of plugs with split pins is not permitted. The plug pins for a current in excess of 10 A shall be cylindrical and solid or hollow.

5.10.16.2 Illumination.

5.10.16.2.1 The illumination of particular spaces and zones shall comply with the standards specified by the current State Sanitary Rules for the ships of the Russian Federation and by the regulatory documents of the Administrations of other states.

The above requirement does not apply to vessels having the main lighting supplied at voltage below 30 V.

5.10.17 Signalling and internal communication.

5.10.17.1 Vessels where a general alarm signal given by voice cannot be heard in all locations manned during voyage shall be provided with an electric general alarm system that ensures good audibility of signals in all places on board the vessel.

For yachts, carrying from 13 to 36 passengers, general alarm and fixed fire detection and fire alarm system shall comply with the requirements in 19.1.1.5 and 19.1.1.6 of Part XI "Electrical Equipment".

The internal communication shall, as a minimum, ensure compliance with the requirements specified in 3.3.1 of Part VII "Machinery Installations", taking into account the requirements in 6.5.1.2 of Part XIX "Additional Requirements for Cargo Ships of Less Than 500 Gross Tonnage". Measures shall be taken to ensure clear audibility, with the machinery at work.

5.10.18 Protective devices.

5.10.18.1 General.

5.10.18.1.1 Overload protection, in addition to 8.1.4 of Part XI "Electrical Equipment", shall be provided in each positive pole in a three-wire system.

5.10.18.2 Protection of measuring instruments, pilot lamps and control circuits.

5.10.18.2.1 Measurement circuits and instruments (voltage transformers, voltmeters, voltage coils of measurement instruments, insulation monitoring devices, etc.) and pilot lamps shall be protected against a short circuit with multipole switches or fuses. Protective devices shall be located as close as possible to the tap from the power source. The secondary side of the current transformers shall not be protected.

5.10.18.2.2 Control circuits shall be protected against overload and short circuits with multipole switches or fuses on each pole. Overload protection can be omitted for transformers with a current rating of less than 2 A on the secondary side. Short circuit protection on the secondary side can be omitted if the transformer is designed to maintain a constant short circuit current.

5.10.18.2.3 Where failure of a pilot lamp can hamper the operation of essential services, such lamps shall be protected separately from other circuits such as control circuits.

5.10.18.2.4 Control circuits whose failure can compromise supply to the steering gear control circuits shall be protected against short circuits only.

5.10.19 Cable network.

5.10.19.1 In addition to Section 16 of Part XI "Electrical Equipment", when selecting the cable cross-section, the requirements of manufacturers for equipment connected in particular electric circuits shall also be met.

5.11 AUTOMATION

5.11.1 General.

5.11.1.1 Application and general requirements.

5.11.1.1.1 The requirements of this Chapter apply to automated and remotely controlled machinery installations of the vessels for which an automation mark **AUT** to be added to the classification notation is assigned (refer to 2.2.6 of Part I "Classification").

5.11.1.1.2 The requirements of this Chapter shall be complied with where the machinery installation of a vessel is adapted to operation without permanent attendance of personnel in machinery spaces.

The requirements of this Chapter do not cover vessels with locally controlled outboard engines.

5.11.1.1.3 The mechanical, electrical and electronic equipment, as well as components of the automation systems and machinery themselves shall meet the requirements of relevant parts of these Rules.

5.11.1.1.4 The requirements of this Chapter cover the automation equipment according to [5.11.1.3.2](#), as well as the cases when a vessel, as a whole, is not assigned the mark **AUT** in class notation.

5.11.1.2 Definitions and explanations.

5.11.1.2.1 In addition to the definitions given in Part XV "Automation", the following definitions and explanations shall be used.

Automated machinery plant means a plant fitted up with automated control of main and auxiliary machinery and their associated systems, remote monitoring, alarm and automatic protection facilities.

Remote control system means a control system which, when being used for executing intermediate operations, needs an Operator's action to manipulate controls located at the remote control station.

Local control station means a control station fitted with controls, indicators and means of communication, intended for control of a machinery and located in proximity to or directly on the machinery.

5.11.1.3 Scope of technical supervision.

5.11.1.3.1 General provisions concerning classification procedure, technical supervision of vessels being designed or constructed, manufacture of equipment and components thereof, surveys, as well as requirements for technical documentation on the vessel, as a whole, to be submitted to the Register for review and approval may be found in Part I "Classification" and in the General Regulations for the Classification and Other Activity.

5.11.1.3.2 Subject to technical supervision, as applied to a vessel, during manufacture and in service are automation components, devices and systems of the following:

- .1 main machinery and propellers;
- .2 electric power plants;
- .3 auxiliary services machinery;
- .4 auxiliary boilers;
- .5 alarm systems;
- .6 other systems as required by the Registers.

5.11.2 Design of automation equipment.

5.11.2.1 Automated main machinery.

5.11.2.1.1 Automated main machinery shall be provided with:

- .1 devices for remote automated control from the wheelhouse;
- .2 visual alarm to indicate the availability of the main machinery (systems) for service;
- .3 alarms to indicate malfunction in the control system and the limiting values of monitored parameters;
- .4 automatic safety devices activated when the monitored parameters fall beyond the limits of the allowed parameters being of potential menace of accident, as well as an alarm system to give warning signal at operation of safety devices;
- .5 a device to transfer control of the main machinery from remote to manual mode from a local control station regardless of the position of handle at the remote control station.

5.11.2.1.2 Hydraulic and pneumatic control systems shall be supplied from two sources. The second source shall be connected automatically upon pressure loss with application of an alarm signal.

5.11.2.1.3 Electric and electronic control systems shall be supplied from both the main and emergency power sources.

Power circuits for control systems shall be independent of the power circuits for safety and alarm systems.

Control systems of the main machinery having power of 220 kW and less may be supplied from the attached generators and starting accumulator batteries floating on the generators.

5.11.2.1.4 In installations with two or more engines driving one shaft, the safety system shall provide for automatic shut-down of the faulty engine so that the rest keep the vessel running and maneuvering.

Protection system of main engines, except for overspeed protection, shall be disconnectable, with the signal of disconnection being activated in the wheelhouse and at the control stations of machinery space.

5.11.2.1.5 A device, independent of the control and alarm systems, shall be provided for remote emergency shut-down of the main engines.

5.11.2.1.6 Failure of remote control system of the main machinery shall not cause an increase in the vessel speed, change in the propeller thrust direction, or inadvertent starting of the main machinery and also immediate stop of the main machinery from the remote control station shall be made possible.

5.11.2.1.7 If malfunctions occur in power system for the control systems, changeover from one power supply source to another may be effected manually from the control station, or automatically depending on the system functionality.

5.11.2.1.8 In vessels with main machinery having power of 220 kW and less, with attached auxiliaries, the composition of the monitoring, alarm and protection means may be reduced.

5.11.2.1.9 For engines with power of 220 kW and less, use of the remote control systems may be allowed.

5.11.2.1.10 For auxiliary machinery, which are required to operate under certain service conditions only, provision may be made for control from the wheelhouse with application of alarm signal and indication of starting thereof, if needed.

5.11.2.1.11 Pressure and temperature in essential systems of the machinery installation shall be controlled automatically.

5.11.2.2 Automated electric power plants.

5.11.2.2.1 The automated electric power plants shall be provided with the control devices ensuring remote starting of generator sets with automatic or remote synchronization, taking over and load sharing.

5.11.2.2.2 In vessels where electrical power is normally supplied by one generator, in case of its failure and de-energization of the main switchboard, provision shall be made for the following:

.1 automatic starting of stand-by diesel generator and its connection to busbars of the main switchboard within 45 s;

.2 automatic connection, in the necessary sequence, of essential devices ensuring propulsion, without any overloading of the electric power plant.

5.11.2.2.3 Indicators shall be provided at the electric power plant control stations to warn that the generator sets are ready to start immediately (automatically).

5.11.2.2.4 Where the generator driven by the propulsion plant (shaft generator) and diesel generator are not intended to operate in parallel, the system of connections shall be so interlocked as to prevent their possible switching-on for parallel operation.

5.11.2.2.5 Monitored parameters of the automatic electric power plants (except emergency), measuring points, limiting values of parameters and types of automatic protection and parameter indication are given in [Table 5.11.2.9.7](#).

5.11.2.3 Automated boiler plants.

5.11.2.3.1 The requirements under 5.11.2.3.1 — 5.11.2.3.6 cover boiler plants with oil-burning installations.

5.11.2.3.2 Steam boilers shall be provided with automatic feed water level and steam pressure governors.

5.11.2.3.3 Provision shall be made for a remote shut-down of the boiler plants from the control station where continuous watch is kept.

5.11.2.3.4 As far as the oil-burning installations are concerned, the oil supply to the burners shall be cut off automatically in the following cases:

- .1 absence of flame for not more than 5 s from the moment the oil supply begins;
- .2 degradation of parameters of air intended for fuel oil atomization;
- .3 insufficient pre-ventilation of the burner furnace.

5.11.2.3.5 Starting of boiler plants from cold condition and after being shut down by protection system shall be possible from the local control station only.

5.11.2.3.6 Automation system of exhaust gas water heating boilers operating under pressure shall provide for automatic changeover of the device which regulates direction of exhaust gas flow through the boiler or directly into the atmosphere, depending on temperature in the boiler.

5.11.2.4 Automated bilge plants of machinery spaces.

5.11.2.4.1 Depending on the water level in wells, the automated bilge plants shall put automatically the relevant bilge pumps in operation. Alarm to indicate pump operation shall be provided.

5.11.2.4.2 If, after the bilge pumps have been started, the water level in the bilge wells goes on rising or does not fall, an alarm shall be activated.

5.11.2.4.3 A separate sensor shall be provided to signal of the highest possible level, which should be independent of the sensors provided to control the bilge pumps.

5.11.2.5 Automated compressor plants.

5.11.2.5.1 Starting air receivers, tyfon, as well as the amount of air to feed automation systems shall be replenished automatically.

For automated compressors, provision shall be also made for starting and stopping thereof from the wheelhouse.

5.11.2.5.2 Compressed air system shall be fitted up with automatic drainage devices.

5.11.2.5.3 Air compressors shall be automatically started when the pressure in air receivers drops by not more than 30 % of the nominal pressure, and shut down when the pressure reaches 97 to 103 % of the nominal one.

5.11.2.6 Automated pumping units.

5.11.2.6.1 Automated pump control system shall ensure automatic starting of standby pumps and changeover, as necessary, in systems, in case of pump failure or upon reaching the highest permissible deviations of parameters in essential circulation systems. Along with that, the alarm system shall actuate signal to warn of faulty pump and of standby pump starting.

5.11.2.6.2 The starting circuit of pumps having equal output shall make it possible to use each of them as the main one.

5.11.2.7 Equipment arrangement in wheelhouse.

5.11.2.7.1 Facilities shall be provided to effect remote control of main and auxiliary machinery and propellers.

5.11.2.7.2 Provision shall be made for independent emergency stop of main engine from the wheelhouse.

5.11.2.7.3 Alarm system shall be provided to warn of troubles to machinery and plants in machinery space. Provision shall be made for indicating means to show speed and direction of propeller rotation, as well as the pitch of CPP.

5.11.2.7.4 Provision shall be made for indicating means to show engagement/disengagement position of the coupling of the main machinery.

5.11.2.7.5 In the wheelhouse, provision shall be made for the following separate alarms: "Water in machinery space", "Fire in machinery space", "Alarm system failure".

5.11.2.7.6 Control, indication and alarm devices in the wheelhouse shall be located on desks adapted for manipulation by one person.

The visual indicators shall be arranged in such a way as to prevent dazzling of the personnel and to be clearly seen in day-time.

Provision shall be made for dimming of the indicating system lamps.

5.11.2.7.7 In vessels with open machinery space, open navigating bridge, with main machinery of total power less than 220 kW, outboard engines and mechanical remote control system, engines with sterndrives, the scope and list of the automation system facilities may be reduced after review of the technical documentation by the Register, as well as with regard to the experience of application of such equipment on the vessels.

5.11.2.8 Equipment arrangement in machinery spaces.

5.11.2.8.1 Local control station of the main machinery shall be provided.

5.11.2.8.2 Provision shall be made for a panel for alarms and indicators of parameters, arranged in the vicinity of the control station of the main machinery.

5.11.2.8.3 The controls of auxiliaries shall be installed in close proximity to the control station of the main machinery.

5.11.2.8.4 For the main engines with power less than 220 kW, with mechanical remote control system, the local control stations and alarm panels may be dispensed with.

5.11.2.9 Alarm, protection and indication systems of machinery installation.

5.11.2.9.1 The alarm system of the machinery installation shall give visual and audible signals if operating parameters fall beyond the allowable limits. In this case, the alarm signal shall not be activated when allowable deviations of the operating parameters are caused by maneuvering. Alarm shall be activated in the engine room and in wheelhouse.

5.11.2.9.2 Irrespective of the extent of automation and the monitoring order used for the machinery, the alarm system shall give visual and audible warning signals at:

- .1** monitored parameters reaching predetermined limit values;
- .2** operation of protection devices;
- .3** power failure of particular automation systems;
- .4** starting of emergency power sources.

The visual signals shall be given as flashing lights. After being accepted (acknowledged) the flashing light shall change to steady light. Canceling of a visual signal shall be only possible after the fault has been cleared.

5.11.2.9.3 In the crew's accommodation and service spaces, the engineer's alarm shall be provided for the call of the engineers to machinery space, which is acknowledged manually, or automatically where an alarm has not been accepted.

5.11.2.9.4 For machinery installations with main engines having power less than 220 kW, outboard engines and mechanical remote control system, engines with sterndrives, the range of alarm signals may be reduced after review of the technical documentation for control systems, as well as with regard to the experience of application of such equipment on the vessels.

5.11.2.9.5 The protection systems of automated machinery shall be provided for those parameters only the deviations of which can lead to serious damage or complete failure of the machinery.

5.11.2.9.6 The indication system shall be so designed that the readings are displayed in units normally used for parameters, i.e. without recalculation.

5.11.2.9.7 Monitored parameters of machinery and systems, measuring points, limiting values of parameters and types of automatic protection and parameter indication shall be found in [Table 5.11.2.9.7](#).

5.11.2.9.8 The Owner's Manual shall contain information on limiting values of parameters and types of protection and parameter indication.

Table 5.11.2.9.7

Nos.	Monitored parameter	Measuring point	Alarm for limiting values of parameters	Automatic protection	Indication of parameters in wheelhouse	Comments
1	Main internal combustion engines					
1.1	Lubricating oil pressure	At engine inlet	Min.	Engine shut-down	Continuous or on call	–
1.2	Lubricating oil temperature	At engine inlet	Max.	–	Continuous or on call	–
1.3	Lubricating oil pressure drop	Filter	Max.	–	Continuous or on call	–
1.4	Coolant pressure or flow	At engine inlet	Min.	Slow-down	Continuous or on call	–
1.5	Coolant temperature	At engine outlet	Max.	Slow-down	Continuous or on call	–
1.6	Coolant level	Expansion tank	Min.	–	–	For independent tank
1.7	Cooling sea water pressure or flow	Sea water cooling system	Min.	–	Continuous or on call	–
1.8	Exhaust gas temperature	Main pipe	Max.	–	–	–
1.9	Starting air pressure	Before starting valve	Min.	–	–	–
1.10	Control air pressure	Engine control system	Min.	–	–	–
1.11	Fuel oil level	Daily service tank	Min.	–	–	–
1.12	Fuel oil leakage	From high-pressure piping	Presence of fuel oil	–	–	–
1.13	Engine speed	–	Max.	Engine shut-down	Continuous or on call	–
1.14	Power supply to remote automated control, alarm and safety systems	At inlet of systems	Failure of power supply	–	–	–
1.15	Oil pressure in CP-propeller hydraulic system	At filter outlet	Min.	–	Continuous or on call	–
1.16	CP-propeller hydraulic oil level	Header tank	Min.	–	–	–
2	Reduction gear					
2.1	Lubricating oil pressure	At reduction gear inlet	Min.	Engine shut-down	–	–
2.2	Lubricating oil temperature	In reduction gear	Max.	–	–	–
3	Internal combustion engines for driving generators					
3.1	Lubricating oil pressure	At engine inlet	Min.	Engine shut-down	–	–
3.2	Coolant pressure or flow	At engine inlet	Min.	–	–	–
3.3	Coolant temperature	At engine outlet	Max.	–	–	–
3.5	Engine speed	Limiting governor	Max.	Engine shut-down	–	–
4	Electric installation					
4.1	Voltage	Main switchboard	Min., max.	–	–	–
4.2	Insulation resistance	Main switchboard	Min.	–	–	–
5	Starting compressors					
5.1	Air temperature	At compressor outlet	Max.	Compressor shut-down	–	–
6	Tanks					
6.1	Leakage fuel oil level	Leakage fuel oil tank	Max.	–	–	–
6.2	Fuel oil level	Daily service tanks	Min.	–	–	–
6.3	Domestic waste and sewage level	Tanks	Max.	–	–	–
7	Bilge plants					
7.1	Emergency water level	Bilge wells	Max.	–	–	Alarm signal is activated in wheelhouse
8	Miscellaneous					
8.1	Safety system of boiler plant	Feeding unit	Failure	Boiler shut-down	–	–
8.2	Alarm system	Feeding unit	Failure	–	–	–
8.3	Protection system	Feeding unit	Failure	–	–	–

5.12 MATERIALS AND WELDING

5.12.1 Scope of supervision.

The scope of supervision of materials for yachts is specified in Parts I "General Regulations for Technical Supervision" and III "Technical Supervision during Manufacture of Materials" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships taking into account the relevant provisions in Part XIII "Materials".

5.12.2 General.

5.12.2.1 The procedures and conditions of testing of materials that are subject to the survey by the Register are set out in Section 2 of Part XIII "Materials".

The provisions of Part XIII "Materials" shall apply to yachts. For yachts of less than 500 gross tonnage, the provisions specified in 6.12 of Part XIX "Additional Requirement for Cargo Ships of Less Than 500 Gross Tonnage" shall apply.

Yachts made with the use of composite materials shall be subject to the requirements of Part XVI "Structure and Strength of Fiber-Reinforced Plastic Ships".

5.12.3 Welding.

The provisions of Part XIV "Welding" shall apply to yachts.

5.13 LIFE-SAVING APPLIANCES

5.13.1 Yachts shall be equipped with life-saving appliances in the amount prescribed in [Table 5.13.1](#).

Table 5.13.1

Items	Length ≥24 m	GT ≥500	Length ≥85 m
Lifeboats	—	—	x
Liferafts	x	x	x
Rescue boats	x	x	x
Lifejackets	x	x	x
Immersion suits	x	x	x
Lifebuoys	4	8	8
Line-throwing appliances	x	x	x
Distress flares	6	12	12
Two-way VHF radiotelephone apparatus	2	2	3
Locating devices	1	2	2
General alarm	x	x	x
Means of illumination	x	x	x

Notes: 1. GT means yacht gross tonnage.
 2. "x" means that yacht shall have an equipment in quantity prescribed by the requirements of Part XIX "Additional Requirements for Cargo Ships of Less Than 500 Gross Tonnage" of these Rules or Part II "Life-Saving Appliances" of the Rules for the Equipment of Sea-Going Ships, taking into consideration the provisions of 5.13.4 and 5.13.5.

5.13.2 All life-saving appliances and launching appliances shall comply with the requirements of the International Life-Saving Appliance Code, IMO resolution MSC.81(70) "Revised Recommendations on Testing of Life-Saving Appliances", as amended, or requirements of Sections 1 and 6 of Part II "Life-Saving Appliances" of the Rules for the Equipment of Sea-Going Ships.

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

5.13.4 Unless otherwise provided in this Part, yachts of less than 500 gross tonnage are subject to all applicable provisions of 6.13 of Part XIX "Additional Requirements for Cargo Ships of Less Than 500 Gross Tonnage".

5.13.5 Unless otherwise provided in this Part, yachts not engaged in international voyages as well as yachts without mechanical propulsion (sailing yachts) are subject to all applicable provisions of Part II "Life-Saving Appliances" of the Rules for the Equipment of Sea-Going Ships, with the exception of Sections 3 and 5.

5.13.6 Lifeboats.

5.13.6.1 Lifeboats shall be served by launching appliances and stowed in accordance with the provisions under 2.4.1 — 2.4.3 of Part II "Life-Saving Appliances" of the Rules for the Equipment of Sea-Going Ships.

5.13.6.2 On agreement with the Register, lifeboats may be substituted by liferafts provided that the following conditions are met:

1 the vessel complies with two compartment subdivision standard in accordance with the requirements of Part V "Subdivision";

2 a sufficient number of davit launched liferafts shall be installed such that in the event of any one liferaft being lost or rendered unserviceable, sufficient aggregate capacity remains on either side of the vessel for all persons onboard. Additionally, one rescue boat shall be provided on each side of the vessel for marshalling and towing the largest liferaft carried onboard;

.3 instead of davit launched liferafts installation as prescribed by [5.13.6.2.2](#), a sufficient number of marine evacuation systems (MES) may be installed such that in the event of any one MES being lost or rendered unserviceable:

.3.1 aggregate capacity of liferafts on either side of the yacht shall be sufficient to accommodate all persons onboard;

.3.2 on each side of a yacht an alternative means of embarkation of passengers and crew into survival craft shall be provided, such as an embarkation ladder;

.3.3 additionally, one rescue boat shall be provided on each side of the yacht capable of marshalling liferafts and towing the largest liferaft carried onboard.

5.13.7 Rescue boats and launching appliances for rescue boats.

5.13.7.1 Controls for means to launch the boat from within the boat are not required.

5.13.7.2 It shall be possible to launch the rescue boat down the side of the yacht whilst maintaining minimum speed to keep yacht course.

5.13.7.3 Yachts of 500 gross tonnage and over.

5.13.7.3.1 Yachts of 500 gross tonnage and over shall be provided with a rescue boat. It is acceptable to use rescue boats not of an international or vivid reddish orange, or a comparably highly visible colour. In this case covers, canopy or other elements of a highly visible colour equalling at least 1 m² in area, divided up into no more than 2 parts, shall be displayed on the visible part of the rescue boat.

5.13.7.3.2 When a power operated crane is fitted as launching appliance, it shall be capable of operation either by hand or by an emergency source of power in the event of a main power failure.

5.13.7.4 Yachts of less than 500 gross tonnage.

5.13.7.4.1 Yachts of less than 500 gross tonnage shall be provided with a rescue boat in compliance with 5.13.7.4.1 — 5.13.7.4.4:

.1 approved for compliance with the documents listed in [5.13.2](#) and meeting the requirements of [5.13.7.3](#); or

.2 instead of [5.13.7.4.1.1](#), boat not having approval for compliance with the documents listed in [5.13.2](#) but which is suitable for rescue purposes. The boat may be rigid, rigid inflated, or inflated, and shall have a capacity for not less than 4 persons, one of which shall be assumed to be lying down. Tubes of rigid inflatable or inflatable boats shall have a minimum of 3 buoyancy compartments. The boat shall be capable of displaying a highly visible colour. If the equipment as required is stowed in a grab bag, it may be stowed in the boat or in an easily accessible location close to the rescue boat; and

.3 with launching appliances approved for compliance with the documents listed in [5.13.2](#), approved to a recognised national or international standard acceptable to the Administration, or complying with the following requirements:

.3.1 when a power operated device is fitted, it shall be capable of operation either by hand or by an emergency source of power in the event of a main power failure;

.3.2 the launching appliance and its attachments, other than winches, shall be constructed to withstand a static proof load on test of not less than 2,2 times the maximum working load. A minimum factor of 4,5 shall be applied to all structural members including winch structural components and a minimum factor of safety of 6 shall be applied to falls, suspension chains, links and blocks.

5.13.7.4.2 Launching appliances shall be marked as "NOT SUITABLE FOR MAN-RIDING", unless they comply with the following:

.1 launching appliances have an automatically activated cross-band brakes not allowing launching when the controls are in neutral position;

.2 launching appliance is provided with original approved manufacturers or RS document stating that it is suitable for man-riding with a fully loaded rescue boat of persons and equipment.

5.13.7.4.3 The use of the running rigging on sailing vessels as a launching appliance is allowed only when the above requirements are met.

5.13.7.4.4 Yachts of less than 300 gross tonnage restricted to operating in forecast or actual wind of a maximum Beaufort Force 4, for a motor yacht, and Beaufort Force 6 for a

sailing yacht within 60 nautical miles of a safe haven shall either comply with requirements of [5.13.7.3](#) or [5.13.7.4](#) or the following:

.1 the yacht shall have sufficient mobility and manoeuvrability in a seaway to enable persons to be safely retrieved from the water. Recovery of persons over the stern of the vessel or adjacent to the propeller(s) is not allowed. The recovery location shall be visible from the control station at any time, this may be provided by the use of remote controls where necessary; and

.2 the yacht shall be provided with suitable equipment and/or arrangements to enable the person(s) to be recovered without further persons entering the water.

5.13.8 Lifejackets.

5.13.8.1 Additional spare adult lifejackets sufficient for at least 10 % of the total number of persons onboard or two, whichever is the greater, shall be provided.

5.13.8.2 Included in the above number of lifejackets, there shall be at least two inflatable lifejackets for use of the crew of any rescue boat or inflatable boat carried onboard.

5.13.8.3 One child lifejacket or infant lifejacket shall be provided for each child or infant onboard.

5.13.9 Immersion suits.

5.13.9.1 Yachts shall be provided with immersion/thermal protection suits for children and infants carried onboard.

5.13.9.2 Yachts operated in cold water areas shall be provided with immersion suits of the insulated type. Reference to IMO circular MSC/Circ.1046 shall be made for assessment of thermal protection.

5.13.10 General alarm system.

5.13.10.1 For yachts of less than 500 gross tonnage this alarm may consist of the vessel's whistle or siren providing it can be heard in all parts of the yacht.

5.13.10.2 For yachts of 500 gross tonnage and over the requirement of [5.13.10.1](#) shall be supplemented by an electrically operated bell or Klaxon system or other equivalent sound signal, which shall be powered from the vessel's main supply and also the emergency source of power.

5.13.11 Marine evacuation systems.

5.13.11.1 Where marine evacuation systems are intended to be utilised as either the sole or supplementary means of abandonment in accordance with [5.13.6.2.3](#), all such systems shall be of an approved type in accordance with the documents listed in [5.13.2](#) and comply with the following additional requirements:

.1 due consideration shall be given to the location and protection of MES stowage arrangements with respect to protection against fire according to [5.4](#) of this Part;

.2 the MES embarkation station shall not be higher than the bulkhead deck;

.3 powered hatches and doors that are required to be opened prior to MES deployment shall:

.3.1 be provided with both main and a local source of emergency power and capable of manual operation;

.3.2 have the time to operate included in the timed evacuation analysis as described under IMO Resolution MSC.81(70) Part 1 Section 12.6.1 as amended and in accordance with [5.13.3](#);

.4 at least one suitably sized inflatable slide or chute as applicable shall be provided on either side of the vessel. Where the installation results in the slide or chute coming into direct contact with the hull shell under any of the conditions the side shell shall be locally insulated to A-60 or shall have 60 minutes of fire structural protection time for plating made of fire-resisting materials. The extent of insulation to be provided shall be sufficient to cover at least +/- 10 degrees of longitudinal trim in way of the applicable areas;

.5 where glazed openings are located in the vessel's side between the embarkation station of the marine evacuation system and the waterline in the lightest sea-going condition, they shall be A-0.

5.14 RADIO EQUIPMENT

5.14.1 The radio equipment for yachts covered by chapter IV of SOLAS 74, as amended, shall comply with the applicable requirements of chapter IV of SOLAS 74, as amended, taking into account [2.6](#).

5.14.2 The radio equipment for yachts not covered by chapter IV of SOLAS 74, as amended, shall comply with the applicable requirements of Part IV "Radio Equipment" of the Rules for the Equipment of Sea-Going Ships.

5.15 NAVIGATIONAL EQUIPMENT

5.15.1 The navigational equipment for yachts covered by chapter V of SOLAS 74, as amended, shall comply with the applicable requirements of chapter V of SOLAS 74, as amended, taking into account [2.6](#).

5.15.2 The navigational equipment for yachts not covered by chapter V of SOLAS 74, as amended, shall comply with the applicable requirements of Part V "Navigational Equipment" of the Rules for the Equipment of Sea-Going Ships.

5.16 SIGNAL MEANS

5.16.1 The provisions of Part III "Signal Means" of the Rules for the Equipment of Sea-Going Ships" shall apply to commercial yachts depending on the vessel's purpose, gross tonnage, vessel's length, availability of propelling machinery, as for Group I ships.

The yachts shall be equipped with pyrotechnic signal means in accordance with 2.1.1 of Part III "Signal Means" of the Rules for the Equipment of Sea-Going Ships depending on the area of navigation.

5.17 SAILING RIG

5.17.1 Yachts equipped with sailing rig shall be subject to the provisions of Section 5 of Part III "Equipment, Arrangements and Outfit" of the Rules for the Classification and Construction of Pleasure Craft.

Russian Maritime Register of Shipping

Rules for the Classification and Construction of Sea-Going Ships
Part XX
Additional Requirements for Yachts

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